On the Long-Run Evolution of Inheritance: France 1820-2050

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Abstract: This paper attempts to document and account for the long run evolution of inheritance. We find that in a country like France the annual flow of inheritance was about 20%-25% of national income between 1820 and 1910, down to less than 5% in 1950, and back up to about 15% by 2010. A simple theoretical model of wealth accumulation, growth and inheritance can fully account for the observed U-shaped pattern and levels. Using this model, we find that under plausible assumptions the annual bequest flow might reach about 20%-25% of national income by 2050. This corresponds to a capitalized bequest share in total wealth accumulation well above 100%. Our findings illustrate the fact that when the growth rate g is small, and when the rate of return to private wealth r is permanently and substantially larger than the growth rate (say, r=4%-5% vs. g=1%-2%), which was the case in the 19th century and early 20th century and is likely to happen again in the 21st century, then past wealth and inheritance are bound to play a key role for aggregate wealth accumulation and the structure of lifetime inequality. Contrarily to a widely spread view, modern economic growth did not kill inheritance.

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A detailed data appendix supplementing the present working paper is available on-line at www.jourdan.ens.fr/piketty/inheritance/ .

1. Introduction

There are basically two ways to become rich: either through one's own work, or through inheritance. In Ancien Regime societies, as well as during the 19th century and early 20th century, it was self-evident to everybody that the inheritance channel was an important one. For instance, 19th century and early 20th century novels are full of stories where ambitious young men have to choose between becoming rich through their own work or by marrying a bride with large inherited wealth – and often opt for the second strategy. However, in the late 20th century and early 21st century, most observers seem to believe that this belongs to the past. That is, most observers – novelists, economists and laymen alike – tend to assume that labor income is now playing a much bigger role than inherited wealth in shaping people's lives, and that human capital and hard work have become the key to personal material well-being. Although this is rarely formulated explicitly, the implicit assumption seems to be that the structure of modern economic growth has led to the rise of human capital, the decline of inheritance, and the triumph of meritocracy.

This paper asks a simple question: is this optimistic view of economic development justified empirically and well-grounded theoretically? Our simple answer is "no". Our empirical and theoretical findings suggest that inherited wealth will most likely play as big a role in 21st century capitalism as it did in 19th century capitalism – at least from an aggregate viewpoint.

This paper makes two contributions. First, by combining various data sources in a systematic manner, we document and establish a simple – but striking – fact: the aggregate inheritance flow has been following a very pronounced U-shaped pattern in France since the 19th century. To our knowledge, this is the first time that such long-run, homogenous inheritance series are constructed for any country.

More precisely, we define the annual inheritance flow as the total market value of all assets (tangible and financial assets, net of financial liabilities) transmitted at death or through inter-vivos gifts during a given year.[1] We find that the annual inheritance flow was about 20%-25% of national income around 1900-1910. It then gradually fell to less than

[1] It is critical to include both bequests (wealth transmitted at death) and gifts (wealth transmitted inter vivos) in our definition of inheritance, first because gifts have always represented a large fraction of total wealth transmission, and next because this fraction has changed a lot over time. Throughout the paper, the words "inheritance" or "bequest" or "estate" will refer to the sum of bequests and gifts, unless otherwise noted.

10% in the 1920s-1930s, and to less than 5% in the 1950s. It has been rising regularly since then, with an acceleration of the trend during the past 30 years, and according to our latest data point (2008), it is now close to 15% (see Figure 1).

If we take a longer run perspective, then the 20th century U-shaped pattern looks even more spectacular. The inheritance flow was relatively stable around 20%-25% of national income throughout the 1820-1910 period (with a slight upward trend), before being divided by a factor of about 5-6 between 1910 and the 1950s, and then multiplied by a factor of about 3-4 between the 1950s and the 2000s (see Figure 2).

These are truly enormous historical variations – but they appear to be well founded empirically. In particular, we find similar patterns with our two fully independent estimates of the inheritance flow. The gap between our "economic flow" series (computed from national wealth estimates, mortality tables and observed age-wealth profiles) and our "fiscal flow" series (computed from observed bequest and gift tax data) can be interpreted as a measure of tax evasion and other measurement errors. This gap appears to approximately constant over time, and relatively small, so that our two series deliver fairly consistent long run patterns (see Figures 1 & 2).

If we use personal disposable income (national income minus taxes plus cash transfers) rather than national income as the denominator, then we find that the inheritance flow observed in the early 21st century is back to about 20%, i.e. approximately the same level as that observed one century ago (see Figure 3). This simply comes from the fact that disposable income was as high as 90%-95% of national income during the 19th century and early 20th century (when taxes and transfers were almost non existent), while it is now about 70% of national income. Though we prefer to use the national income denominator (both for conceptual and empirical reasons),[2] this is an important fact to keep in mind when studying these issues. An annual inheritance flow around 20% of disposable income

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[2] Whether one should use national or disposable income as denominator is a matter of perspective. If one assumes that government expenditures are useless, and that the rise of government during the 20th century has limited the ability of private individuals to save, accumulate and transmit private wealth, then one should use disposable income. But to the extent that government expenditures are mostly useful (e.g. assuming that in the absence of public spending in health and education, then individuals would have to had to pay at least as much to buy similar services on the market), it seems more justified to use national income. One additional advantage of using national income is that it tends to be better measured. Disposable income can display large time-series and cross-country variations for purely definitional reasons. E.g. in France, disposable income would jump from 70% to about 80% of national income if one includes in-kind health transfers (such as insurance reimbursements), and to about 90% of national income if one includes all in-kind transfers (education, housing, etc.). See Appendix A.

is a very large flow. It is typically larger than the annual flow of new savings, and almost as big as the annual flow of capital income. As we shall see, it corresponds to a cumulated, capitalized bequest share in aggregate wealth accumulation well above 100%.

The second – and most important – contribution of this paper is to account for these facts, and to draw lessons for other countries and for the future. We show that a simple theoretical model of wealth accumulation, growth and inheritance can easily explain why the French inheritance flow seems to return to a high steady-state value around 20% of national income. Consider first a dynastic model where all savings come from capital income. Wealth holders save a fraction g/r of their asset returns, so that aggregate private wealth W_t and national income Y_t grow at the same rate g, and the wealth-income ratio $\beta=W_t/Y_t$ is stationary. It is straightforward to prove that the steady-state inheritance flow-national income ratio is equal to $b_y=\beta/H$, where H is generation length (average age at parenthood). If β=600% and H=30, then b_y=20%. We show that this intuition can be generalized to more general saving models. Namely, as long as the (real) growth rate g is sufficiently small and the (real) rate of return on private wealth r is sufficiently large – say, g=1%-2% vs. r=4%-5% –, then steady-state b_y is close to the class saving level β/H.

The key intuition boils down to a simple r>g logic. In countries with large growth, such as France during the 1950s-1970s, then wealth coming from the past (i.e. accumulated or received by one's parents or grand-parents, who were relatively poor as compared to today's incomes) does not matter too much. What counts is new wealth accumulated out of current income. Inheritance flows are bound to be a small fraction of national income. But in countries with low growth, such as France in the 19th century and since the 1970s, the logic is reversed. With low growth, successors simply need to save a small fraction of their asset returns in order to ensure that their inherited wealth grows at least as fast as national income. In effect, g small and r>g imply that wealth coming from the past is being capitalized at a faster rate than national income. So past wealth tends to dominate new wealth, rentiers tend to dominate labor income earners, and inheritance flows are large relative to national income. As $g\to 0$, then $b_y \to \beta/H$ – irrespective of saving behavior.

The r>g logic is simple, but powerful. We simulate a full-fledged, out-of-steady-state version of this model, using observed macroeconomic and demographic shocks. We are able to reproduce remarkably well the observed evolution of inheritance flows in France over almost two centuries. The 1820-1913 period looks like a prototype low-growth, rentier-friendly quasi-steady-state. The growth rate was very small: g=1.0%. The wealth-income ratio β was 600%-700%, the capital share α was 30%-40%, so the average rate of return on private wealth was as large as r=α/β=5%-6%. Taxes at that time were very low, so after-tax returns were almost as high as pre-tax returns. It was sufficient for successors to save about 20% of their asset returns to ensure that their wealth grows as fast as national income (or actually slightly faster). The inheritance flow was close to its steady-state value b_y=β/H=20%-25%. The 1914-1945 capital shocks (involving war destructions, and most importantly a prolonged fall in asset prices) clearly dismantled this steady-state. It took a long time for inheritance flows to recover, especially given the exceptionally high growth rates observed during the 1950s-1970s (g=5.2% between 1949 and 1979). The recovery accelerated since the late 1970s, both because of low growth (g=1.7% between 1979 and 2009), and because of the long term recovery of asset prices and of the wealth-income ratio (β=500%-600% in 2008-9). As predicted by the theoretical model, the inheritance flow is now close to its steady-state value b_y=β/H=15%-20%.

We then use this model to predict the future. According to our benchmark scenario, based upon current growth rates and rates of returns, the inheritance flow will stabilize around 16% of national income by 2040, i.e. at a lower level than the 19th century steady-state. This is due both to higher projected growth rates (1.7% rather than 1.0%) and to lower projected after-tax rates of return (3.0% rather than 5.3%). In case growth slows down to 1.0% after 2010, and after-tax returns rise to 5.0% (which corresponds to the suppression of all capital taxes, and/or to a combination of capital tax cuts and a rising global capital share), then the model predicts that the inheritance flow will keep rising and converge towards 22%-23% after 2050. In all plausible scenarios, the inheritance-income ratio in the coming decades will be at least 15%-20%, i.e. closer to the 19th century levels than to the exceptionally low levels prevailing during the 1950s-1970s. A come-back to postwar levels would require pretty extreme assumptions, such as the combination of high growth rates (above 5%) and a prolonged fall in asset prices and aggregate wealth-income ratios.

Now, the fact that aggregate inheritance flows return to 19th century levels obviously does not imply that the concentration of inheritance and wealth will return to 19th century levels. On distributional issues, this macro paper has very little to say. We view the present research mostly as a positive exercise in aggregate accounting of wealth, income and inheritance, and as a building block for future work on inequality. One should however bear in mind that the historical decline of wealth concentration in developed societies has been quantitatively less important than some observers tend to imagine. E.g. according to the latest SCF (Survey of consumer finances), the top 10% owns 72% of U.S. aggregate wealth in 2007, while the middle 40% owns 26% and the bottom 50% owns 2%.[3] In a country like France, the top 10% currently owns about 60% of aggregate wealth, and the bottom 50% owns around 5%. These 60%-70% top decile wealth shares are certainly lower than the 90% top decile wealth shares observed in developed countries around 1900-1910, when there was basically no middle class at all.[4] But they are not that much lower. It has also been known for a long time that these high levels of wealth concentration have little to do with the life cycle: top wealth shares are almost as large within each age group.[5] The bottom line is that the historical decline in intra-cohort inequality of inherited wealth has been less important quantitatively than the long term changes in the aggregate inheritance-income ratio. So aggregate evolutions matter a lot for the study of inequality.

In order to illustrate this point, we provide applications of our aggregate findings to the measurement of two-dimensional inequality in lifetime resources (labor income vs inheritance) by cohort. By making approximate assumptions on intra cohort distributions, we compute simple two-dimensional inequality indicators, and we find that they have changed a lot over the past two centuries. In the 19th century, top successors vastly dominated top labor earners (not to mention bottom labor earners) in terms of total lifetime resources. Cohorts born in the 1900s-1950s faced very different life opportunities. For the first time maybe in history, high labor income was the key for high material well-being. According to our computations, cohorts born in the 1970s and after will fall somewhere in between the "rentier society" of the 19th century and the "meritocratic society" of the 20th century – and in many ways will be closer to the former than to the latter.

Do our findings also apply to other countries? We certainly do not pretend that the fairly specific U-shaped pattern of aggregate inheritance flows found for France applies everywhere as a universal law. It probably also applies to Continental European countries that were hit by similar growth and capital shocks. For countries like the U.S. and the U.K., which were little hit by war destructions, but suffered from the same mid-century fall in asset prices, the long-run U-shaped pattern of aggregate inheritance flows was possibly

[3] Here we simply report raw wealth shares from the 2007 SCF (see Kennickell (2009, Table 4)), with no correction whatsoever. Kennickell later compares the top wealth levels reported in the SCF with other sources (such as Forbes 500 rankings), and finds that the SCF understates top wealth shares.
[4] See Piketty, Postel-Vinay and Rosenthal (2006).
[5] See e.g. Atkinson (1983, p.176, table 7.4) for U.K. top wealth shares broken down by age groups.

somewhat less pronounced.[6] In fact, we do not really know. We tried to construct similar series for other countries. But unfortunately there does not seem to exist any other country with estate tax data that is as long run and as comprehensive as the French data.

In any case, even though we cannot make detailed cross country comparisons at this stage, the economic mechanisms revealed by the analysis of the French historical experience certainly apply to other countries as well. In particular, the r>g logic applies everywhere, and has important implications. For instance, it implies that in countries with very large economic and/or demographic growth rates, such as China or India, inheritance flows must be a relatively small fraction of national income. Conversely, in countries with low economic growth and projected negative population growth, such as Spain, Italy or Germany, then inheritance is bound to matter a lot during the 21st century. Aggregate inheritance flows will probably reach higher levels than in France. More generally, a major difference between the U.S. and Europe (taken as a whole) from the viewpoint of inheritance might well be that demographic (and to a lesser extent economic) growth rates have been historically larger in the U.S., thereby making inheritance flows relatively less important. This has little to do with cultural differences. This is just the mechanical impact of growth rates and of the r>g logic. And this may not last forever. If we take a very long run, global perspective, and make the assumption that economic and demographic growth rates will eventually be relatively small everywhere (say, g=1%-2%), then the conclusion follows mechanically: inheritance will matter a lot pretty much everywhere.

The rest of this paper is organized as follows. In section 2, we relate this work to the existing literature. In section 3, we describe our methodology and data sources. In section 4, we present a decomposition of the U-shaped pattern into three components: an aggregate wealth-income effect, a mortality effect, and a relative wealth effect. In section 5, we provide theoretical results on steady-state inheritance flows. In section 6, we report simulation results based upon a full fledged version of this model. In section 7, we present applications of our results to the structure of lifetime inequality and to the share of inheritance in aggregate wealth. Section 8 offers concluding comments.

[6] See section 3.2 below.

2. Related literature

2.1. Literature on top incomes

This paper is related to several literatures. First, this work represents in our view the logical continuation of the recent literature on the long run evolution of top income and top wealth shares initiated by Piketty (2001, 2003), Atkinson (2005) and Piketty and Saez (2003). In this collective research project, we constructed homogenous, long run series on the share of top decile and top percentile income groups in national income, using income tax return data. The resulting data base now includes annual series for over 20 countries, including most developed economies over most of the 20th century.[7] One the main findings is that the historical decline in top income shares that occurred in most countries during the first half of the 20th century was largely due to the fall of top capital incomes, which apparently never fully recovered from the 1914-1945 shocks, possibly because of the rise of progressive income and estate taxes (the “fall of rentiers”). Another important finding is that the large rise in top income shares that occurred in the U.S. (and, to a lesser extent, in other anglo-saxon countries) since the 1970s seem to be mostly due to the unprecedented rise of very top labor incomes (the “rise of working rich”).

One important limitation of this literature, however, is that although we did emphasize the distinction between top labor vs. top capital incomes, we did not go all the way towards a satisfactory decomposition of inequality between a labor income component and an inherited wealth component. First, due to various legal exemptions, a growing fraction of capital income has gradually escaped from the income tax base (which in several countries has almost become a labor income tax in recent decades), and we did not seriously attempt to impute full economic capital income (as measured by national accounts) back into our income-tax-returns-based series.[8] This might seriously affect some of our conclusions (e.g. about working rich vs rentiers),[9] and is likely to become

[7] See Atkinson and Piketty (2007, 2010) for the complete set of country studies, and Atkinson, Piketty and Saez (2010) for a recent survey. To a large extent, this project is a simple extension of Kuznets (1953) pioneering and innovative work. Kuznets was the first researcher to combine income tax return data with national income accounts data in order to compute top income shares series, using U.S. data over the 1913-1948 period. In a way, what we do in the present paper is also following Kuznets: we attempt to integrate national income and wealth accounts with income and estate tax data.

[8] Partial corrections were made for a number of countries, but there was no systematic attempt to develop an imputation method. One should be aware of the fact that for most countries (including France, the U.K. and the U.S.), our series measure the share of top reported incomes (rather than top economic incomes).

[9] Wolff and Zacharias (2009) attempt to combine income and wealth data from the Survey of consumer finances (SCF) in order to obtain more comprehensive measures of top capital income flows in the US during

increasingly problematic in the coming decades. So it is important to develop ways to correct for this. Next, even if we were able to observe (or impute) full economic capital income, this would not tell us anything about the share of capital income coming from one's own savings and the share originating from inherited wealth. In income tax returns, one does not observe where wealth comes from. For a small numbers of countries, long run series on top wealth shares (generally based upon estate tax returns) have recently been constructed.[10] These studies confirm that there was a significant decline in wealth concentration during the 1914-1945 period, apparently with no recovery so far.[11] But they do not attempt to break down wealth into an inherited component and a life-cycle or self-made component: these works use estate tax data to obtain information about the distribution of wealth among the living (using mortality multiplier techniques), but not to study the level of inheritance flows per se.[12]

This paper attempts to bridge this gap, by making use of the exceptionally high quality of French estate tax data. We felt that it was necessary to start by trying to reach a better empirical and theoretical understanding of the aggregate evolution of the inheritance-income ratio, which to us was very obscure when we started this research. However the next step is obviously to close this detour via macroeconomics and to integrate endogenous distributions back into the general picture.

2.2. Literature on intergenerational transfers and aggregate wealth accumulation

The present paper is also very much related to the literature on intergenerational transfers and aggregate wealth accumulation. However as far we know our paper is the first attempt to account for the observed historical evolution of inheritance, and to take a long run perspective on these issues. Although the perception of a long term decline of inheritance relatively to labor income seems to be relatively widespread, to our knowledge there are

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the 1980s-1990s. As they rightly point out, it is not so much that the "working rich" have replaced "coupon-clipping rentiers", but rather that "the two groups now appear to co-habitate at the top end of the distribution".

[10] See Kopczuk and Saez (2004) for the U.S., Piketty, Postel-Vinay and Rosenthal (2006) for France, and Roine and Waldenstrom (2009) for Sweden. These studies follow the pioneering work by Lampman (1962) and Atkinson and Harrison (1978), who respectively use U.S. 1922-1956 estate tax tabulations and U.K. 1923-1972 estate tax tabulations in order to compute top wealth share series.

[11] Given the relatively low quality of available wealth data for the recent period, especially regarding top global wealth holders, one should be modest and cautious about this conclusion.

[12] One exception is Edlund and Kopczuk (2009), who use the fraction of women in top estate brackets as a proxy for the relative importance of inherited vs self-made wealth. This is a relatively indirect way to study inheritance, however, and it ought to be supplemented by direct measures.

very few papers which formulate this perception explicitly.[13] For instance, in their famous controversy about the share of inheritance in U.S. aggregate wealth accumulation, both Kotlikoff and Summers (1981) and Modigliani (1986) were using a single – and relatively ancient and fragile – data point for the U.S. aggregate inheritance flow (namely, for year 1962). In addition to their definitional conflict, we believe that the lack of proper data contributes to explain the intensity of the dispute, which the subsequent literature did not fully resolve.[14] We return to this controversy when we use our aggregate inheritance flows series to compute inheritance shares in the total stock of wealth. The bottom line is that with steady-state inheritance flows around 20% of national income, the cumulated, capitalized bequest share in aggregate wealth accumulation is bound to be well above 100% - which in a way corroborates the Kotlikoff-Summers viewpoint. We hope that our findings contribute to clarify this long standing dispute.

2.3. Literature on calibrated models of wealth distributions

Our work is also related to the recent literature attempting to use calibrated general equilibrium models in order to replicate observed wealth inequality. Several authors have recently introduced new ingredients into calibrated models, such as large uninsured idiosyncratic shocks to labor earnings, tastes for savings and bequests, and/or asset returns.[15] In addition to the variance and functional form of these shocks, one key driving force in these models is naturally the macroeconomic importance of inheritance flows: other things equal, larger inheritance flows tend to lead to more persistent inequalities and higher steady-state levels of wealth concentration. However this key parameter tends to be imprecisely calibrated in this literature, and is generally underestimated: it is often based upon relatively ancient data (typically dating back to the KSM controversy and using data from the 1960s-1970s) and frequently ignores inter vivos gifts. We hope that our findings can contribute to offer a stronger empirical basis for these calibrations.

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[13] E.g. Galor and Moav (2006) take as granted the "demise of capitalist class structure", but are not fully explicit about what they mean by this. It is unclear whether this is supposed to be an aggregate phenomenon (involving a general rise of labor income relatively to capital income and/or inheritance, as suggested by their informal discussion of the "rise in human capital") or a purely distributional phenomenon (involving a compression of the wealth distribution, for given aggregate wealth-income and inheritance-income ratios, as suggested by their theoretical model). De Long (2003) takes an explicitly long term perspective on inheritance and informally discusses the main effects at play. However his intuition according to which the rise of life expectancy per se should lead to a decline in the importance of inheritance relatively to labor income turns out to be wrong, as we show in this paper.

[14] See e.g. Kessler and Masson (1989), Gale and Scholz (1994), Gokhale et al (2001).

[15] See e.g. Castaneda, Dias-Gimenes and Rios-Rull (2003), DeNardi (2004), Nirei and Souma (2007), Benhabib and Bisin (2009), Benhabib and Zhu (2009), Fiaschi and Marsili (2009) and Zhu (2010). See Cagetti and De Nardi (2008) for a recent survey of this literature.

2.4. Literature on estate multipliers

Finally, our paper is closely related to the late 19th century and early 20th century literature on national wealth and the so-called "estate multiplier". At that time, many economists were computing estimates of national wealth, especially in France and in the UK. In their view, it was obvious that most wealth derives from inheritance. They were satisfied to find that their national wealth estimates W_t (obtained from direct wealth census methods) were always approximately equal to 30-35 times the inheritance flow B_t (obtained from tax data). They interpreted 30-35 as generation length H, and they viewed the estate multiplier formula $e_t=W_t/B_t=H$ as self-evident.[16] In fact, it is not self-evident. This formula is not an accounting equation, and strictly speaking it is valid only under fairly specific models of saving behaviour and wealth accumulation, such as the class saving model. It is difficult to know exactly what model the economists of the time had in mind. From their informal discussions, one can infer that it was close to a stationary model with zero growth and zero saving (in which case $e_t=H$ is indeed self-evident), or maybe a model with small growth originating from slow capital accumulation and a gradual rise of the wealth-income ratio. Of course we now know that capital accumulation alone cannot generate positive self-sustained growth: one needs positive rates of productivity growth $g>0$. Economists writing in the 19th and early 20th centuries were not fully aware of this, and they faced major difficulties with the modelling of steady-state, positive self-sustained growth. This is probably the reason why they were unable to formulate an explicit dynamic, non-stationary model explaining where the estate multiplier formula comes from.

The estate multiplier literature disappeared during the interwar period, when economists realized that the formula was not working any more, or more precisely when they realized that it was necessary to raise the multiplier e_t to as much as 50 or 60 in order to make it work (in spite of the observed constancy of H around 30).[17] Shortly before World War 1, a number of British and French economists also started realizing on purely logical grounds that the formula was too simplistic. They started looking carefully at age-wealth profiles, and developed the so-called "mortality multiplier" literature, whereby wealth-at-death data is being re-weighted by the inverse morality rate of the given age group in order to

[16] For standard references on the "estate multiplier" formula, see Foville (1893), Colson (1903) and Levasseur (1907). The approach was also largely used by British economists (see e.g. Giffen (1878)), though less frequently than in France, probably because French estate tax data was more universal and easily accessible, while the British could use the income flow data from the schedular income tax system.
[17] See e.g. Colson (1927), Danysz (1934) and Fouquet (1982).

generate estimates for the distribution of wealth among the living (irrespective of whether this wealth comes from inheritance or not).[18] Unlike the estate multiplier formula, the mortality multiplier formula is indeed a pure accounting equation, and makes no assumption on saving behaviour. The price to pay for this is that the mortality multiplier approach does not say anything about where wealth comes from: this is simply a statistical technique to recover the cross-sectional distribution of wealth among the living.[19]

In the 1950s-1960s, economists then started developing the life cycle approach to wealth accumulation.[20] This was in many ways the complete opposite extreme to the estate multiplier approach. In the life cycle model, inheritance plays no role at all, individuals die with zero wealth (or little wealth), and the estate multiplier $e_t=W_t/B_t$ is infinite (or very large, say 100 or more). It is interesting to note that this theory was formulated precisely at the time when inheritance was at its historical nadir. According to our series, the inheritance flows were about 4% of national income in the 1950s-1960s, vs. as much as 20%-25% at the time of estate multiplier economists (see Figure 2). Presumably, economists were in both cases very much influenced by the wealth accumulation and inheritance patterns prevailing at the time they wrote.

Our advantage over both estate-multiplier and life-cycle economists is that we have more years of data. Our two-century-long perspective allows us to clarify these issues and to reconcile the various approaches in a unified framework (or so we hope). The lifecycle motive for saving is logically plausible. But it clearly cohabits with many other motives for wealth accumulation (bequest, security, prestige and social status, etc.). Most importantly, we show that with low growth rates and high rates of return, past wealth naturally tends to dominate new wealth, and inheritance flows naturally tend to converge towards levels that are not too far from those posited by the estate multiplier formula, whatever the exact combination of these saving motives might be.

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[18] See Mallet (1908), Séailles (1910), Strutt (1910), Mallet and Strutt (1915) and Stamp (1919). This other way to use estate tax data was followed by Lampan (1962), Atkinson and Harrison (1978), and more recent authors (see above). See also Shorrocks (1975).

[19] The accounting equation given in section 3 below ($e_t=W_t/B_t=1/\mu_t m_t$) is of course identical to the mortality multiplier formula, except that we use it the other way around: we use it to compute inheritance flows from the wealth stock, while it has generally been used to compute the wealth of living from decedents' wealth.

[20] See e.g. Brumberg and Modigliani (1954), Ando and Modigliani (1963) and Modigliani (1986).

3. Data sources and methodology

The two main data sources used in this paper are national income and wealth accounts on the one hand, and estate tax data on the other hand. Before we present these two data sources in a more detailed way, it is useful to describe the basic accounting equation that we will be using throughout the paper in order to relate national accounts and inheritance flows. In particular, this is the accounting equation that we used to compute our "economic inheritance flow" series.

3.1. Basic accounting equation: $B_t/Y_t = \mu_t m_t W_t/Y_t$

If there was no inter vivos gift, i.e. if all wealth transmission occurred at death, then in principle one would not need in any estate tax data in order to compute the inheritance flow. One would simply need to apply the following equation:

$$B_t/Y_t = \mu_t \; m_t \; W_t/Y_t$$

$$\text{I.e.} \qquad b_{yt} = \mu_t \; m_t \; \beta_t \qquad (3.1)$$

With: B_t = annual inheritance flow
Y_t = national income
W_t = aggregate private wealth
m_t = annual mortality rate = (total number of decedents)/(total living population)
μ_t = ratio between average wealth of the deceased and average wealth of the living
$b_{yt} = B_t/Y_t$ = aggregate inheritance flow-national income ratio
$\beta_t = W_t/Y_t$ = aggregate private wealth-national income ratio

Alternatively, equation (3.1) can be written in per capita terms:

$$b_t/y_t = \mu_t \; w_t/y_t = \mu_t \; \beta_t \qquad (3.2)$$

With: b_t = average inheritance per decedent
y_t = average national income per living individual
w_t = average private wealth per living individual

Equation (3.1) is a pure accounting equation: it does not make any assumption about behaviour or about anything. For instance, if the aggregate wealth-income ratio β_t is equal to 600%, if the annual mortality rate m_t is equal to 2%, and if people who die have the same average wealth as the living (μ_t=100%), then the annual inheritance flow b_{yt} has to be equal to 12% of national income. In case old-age individuals massively dissave in order to finance retirement consumption, or annuitize their assets so as to die with zero wealth, as predicted by the pure life-cycle model, then μ_t=0% and b_{yt}=0%. I.e. there is no inheritance at all, no matter how large β_t and m_t might be. Conversely, in case people who die are on average twice as rich as the living (μ_t=200%), then for β_t=600% and m_t=2%, the annual inheritance flow has to be equal to 24% of national income.

If we express the inheritance flow B_t as a fraction of aggregate private wealth W_t, rather than as a fraction of national income Y_t, then the formula is even simpler:

$$b_{wt} = B_t/W_t = \mu_t\, m_t \qquad (3.3)$$

I.e. the inheritance-wealth ratio b_{wt} is equal to the mortality rate multiplied by the μ_t ratio. In case μ_t=100%, e.g. if the age-wealth profile is flat, then b_{wt} is equal to the mortality rate. The estate multiplier $e_t=W_t/B_t$ is simply the inverse of b_{wt}. We will return to the evolution of the inheritance-wealth ratio b_{wt} later in this paper. But for the most part we choose to focus the attention upon the inheritance-income ratio b_{yt} and accounting equation (3.1), first because the evolution of the wealth-income ratio $\beta_t=W_t/Y_t$ involves economic processes that are interesting per se (and interact with the inheritance process); and next because national wealth data is missing in a number of countries, so that for future comparison purposes we find it useful to emphasize b_{yt} ratios, which are easier to compute (if one has fiscal data). Also, b_{yt} has arguably greater intuitive economic appeal than b_{wt}. E.g. it can easily be compared to other flow ratios such as the capital share α_t or the saving rate s_t.

An example with real numbers might be useful here. In 2008, per adult national income was about 35,000€ in France. Per adult private wealth was about 200,000€. That is, $\beta_t=W_t/Y_t=w_t/y_t$=560%. The mortality rate m_t was equal to 1.2%, and we estimate that μ_t was approximately 220%.[21] It follows from equations (3.1) and (3.3) that the inheritance-

[21] In 2008, French national income Y_t was about 1,700 billions €, aggregate private wealth W_t was about 9,500 billions €, and adult population was about 47 millions, so y_t≈35,000€ and w_t≈200,000€. The number of adult decedents was about 540,000, so the mortality rate m_t≈1.2%. Here we give round up numbers to simplify exposition. For μ_t we actually report the gift-corrected ratio μ_t* (see below), so "average inheritance

income ratio b_{yt} was 14.7% and that the inheritance-wealth ratio b_{yt} was 2.6%. It also follows from equation (3.2) that average inheritance per decedent b_t was about 440,000€, i.e. about 12.5 years of average income y_t (μ_t x β_t = 12.5). One can then introduce distributional issues: about half of decedents have virtually no wealth, the other half owns about twice the average (i.e. about 25 years of average income); and so on.[22]

For the time being, however, we concentrate on b_{yt} and equation (3.1), which is more suitable for the macro level analysis of inheritance. But it is important to keep in mind that the three accounting equations (3.1), (3.2) and (3.3) are by construction fully equivalent.

What kind of data do we need in order to compute equation (3.1)? First, we need data on the wealth-income ratio β_t=W_t/Y_t. To a large extent, this is given by existing national accounts data, as described below. It is conceptually important to use private wealth as the numerator (i.e. the sum of all tangible and financial assets owned by private individuals, minus their financial liabilities) rather than national wealth (i.e. the sum of private wealth and government wealth). Private wealth can be transmitted at death, while government wealth cannot. Practically, however, this does not make a big difference, since private wealth usually represents over 90% of national wealth (i.e. government net wealth is typically positive but small). The choice of the income denominator is unimportant, as long as one uses the same denominator on both sides of the equation. For reasons explained in the introduction, we choose to use national income (rather for instance than personal disposable income) as the denominator.

Next, we need data on the mortality rate m_t. This is the easiest part: demographic data is plentiful and easily accessible.[23] In practice, children usually own very little wealth and receive very little income. In order to abstract from the large historical variations in infant mortality, and in order to make the quantitative values of the m_t and μ_t parameters easier to interpret, we define them over the adult population. That is, we define the mortality rate m_t as the adult mortality rate, i.e. the ratio between the number of decedents aged 20-year-old and over and the number of living individuals aged 20-year-old and over.

per decedent" corresponds to "total bequests and gifts divided by number of decedents". For complete computations and exact values, see Appendix A, Table A2, line 2008.

[22] See section 7 below.

[23] All detailed demographic series and references are given in Appendix C.

Similarly, we define μ_t as the ratio between the average wealth of decedents aged 20-year-old and over and the average wealth of living individuals aged 20-year-old and over.[24]

Finally, we need data to compute the μ_t ratio. This is the most challenging part, and also the most interesting part from an economic viewpoint. In order to compute μ_t we need two different kinds of data. First, we need data on the cross-sectional age-wealth profile. The more steeply rising the age-wealth profile, the higher the μ_t ratio. Conversely, if the age-wealth profile is strongly hump-shaped, then μ_t will be smaller. Next, we need data on differential mortality. For a given age-wealth profile, the fact that the poor tend to have higher mortality rates than the rich implies a lower μ_t ratio. In the extreme case where only the poor (say, zero-wealth individuals) die, and the rich never die, then the μ_t ratio will be permanently equal to 0% (even with a steeply rising cross-sectional age-wealth profile), and there will be no inheritance. There exists a large research literature on differential mortality. We simply borrow the best available estimates from this literature. We checked that these differential mortality factors are consistent with the age-at-death differential between wealthy decedents and poor decedents, as measured by estate tax data and demographic data; they are consistent.[25]

Regarding the age-wealth profile, one would ideally like to use exhaustive, administrative data on the wealth of the living, such as wealth tax data. However such data generally does not exist for long time periods, and/or only covers relatively small segments of the population. Wealth surveys do cover the entire population, but they are not fully reliable (especially for top wealth holders, which might bias estimated age-wealth profiles), and in any case they are not available for long time periods. The only data source offering long-run, reliable raw data on age-wealth profiles appears to be the estate tax itself.[26] This is wealth-at-death data, so one needs to use the differential mortality factors to convert them back into wealth-of-the-living age-wealth profiles.[27] This data source combines many advantages: it covers the entire population (nearly everybody has to file an estate tax

[24] Throughout the paper, "adult" means "20-year-old and over". In practice, children wealth is small but positive (parents sometime die early). In our estimates, we do take into account children wealth, i.e. we add a (small) correcting factor to the μ_t ratio in order to correct for the fact that the share of adult wealth in total wealth (both among the deceased and among the living) is slightly smaller than 100%. See Appendix B2.

[25] See Appendix B2. We use the mortality rates differentials broken down by wealth quartiles and age groups estimated by Attanasio and Hoynes (2000). If anything, we probably over-estimate differential mortality a little bit. Consequently, our resulting μ_t series and inheritance series are probably (slightly) under-estimated.

[26] The fact that we use estate tax data to compute our economic inheritance flow series does not affect the independence between the economic and fiscal series, because for the economic flow computation we only use the relative age-wealth profile observed in estate tax returns (not the absolute levels).

[27] Whether one starts from wealth-of-the-living or wealth-at-death raw age-wealth profiles, one needs to use differential mortality factors in one way or another in order to compute the μ_t ratio.

return in France), and it is available on a continuous and homogenous basis since the beginning of the 19th century. We checked that the resulting age-wealth profiles are consistent with those obtained with wealth tax data and (corrected) wealth survey data for the recent period (1990s-2000s); they are consistent.[28]

We have now described how we proceed in order to compute our "economic inheritance flow" series using equation (3.1). There is however one important term that needs to be added to the computation in order to obtain meaningful results. In the real world, inter vivos gifts do exist and play an important role in the process of intergenerational wealth transmission and in shaping the age-wealth profile. In France, gifts have always represented a large fraction of total wealth transmission (around 20%-30%), and moreover this fraction has changed a lot over time (currently it is almost 50%). Not taking them into account would bias the results in important ways. The simplest way to take gifts into account is to correct equation (3.1) in the following way:

$$\mathbf{B_t/Y_t = \mu_t^* \, m_t \; W_t/Y_t} \qquad \mathbf{(3.1')}$$

With: $\mu_t^* = (1+v_t)\,\mu_t$ = gift-corrected ratio between decedents wealth and wealth of the living
$v_t = V_t^{f0}/B_t^{f0}$ = observed fiscal gift-bequest ratio
B_t^{f0} = raw fiscal bequest flow (total value of bequests left by decedents during year t)
V_t^{f0} = raw fiscal gift flow (total value of inter vivos gifts made during year t)

Equation (3.1') simply uses the observed, fiscal gift-bequest ratio during year t and upgrades the economic inheritance flow accordingly. Intuitively, the gift-corrected ratio μ_t^* attempts to correct for the fact that the raw μ_t under-estimates the true relative importance of decedents' wealth (decedents have already given away part of their wealth before they die, so that their wealth-at-death looks artificially low), and attempts to compute what the μ_t ratio would have been in the absence of inter-vivos gifts. Of course, this simple way to proceed is not fully satisfactory, since the individuals who make gifts during year t are usually not the same as the individuals who die during year t (on average gifts are made about 7-8 years before the time of death). In the simulated model, we re-attribute gifts to the proper generation of decedents, and re-simulate the entire age-wealth profile dynamics in the absence of gifts. We show that this creates time lags, but does not significantly affect long-run levels and patterns of the inheritance-income ratio.

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[28] See Appendix B2 and section 4.3 below.

Before we present and analyse the results of these computations, we give more details about our two main data sources: national accounts data and estate tax data. Readers who feel uninterested by these details might want to go directly to section 4.

3.2. National income and wealth accounts: Y_t and W_t

National income and wealth accounts have a long tradition in France, and available historical series are of reasonably high quality.[29] In particular, the national statistical institute (Insee) has been compiling official national accounts series since 1949. Homogenous, updated national income accounts series covering the entire 1949-2008 period and following the latest international guidelines were recently released by Insee. These are the series we use in this paper for the post-1949 period, with no adjustment whatsoever. National income Y_t and its components are defined according to the standard international definitions: national income equals gross domestic product minus capital depreciation plus net foreign factor income, etc.

Prior to 1949, there exists no official national accounts series in France. However a very complete set of retrospective, annual income accounts series covering the 1896-1949 period was compiled and published by Villa (1994). These series use the concepts of modern national accounts and are based upon a systematic comparison of raw output, expenditure and income series constructed by many authors. Villa also made new computations based upon raw statistical material. Although some of year-to-year variations in this data base are probably fragile, there are good reasons to view these annual series as globally reliable.[30] These are the series we use for the 1896-1949 period, with minor adjustments, so as to ensure continuity in 1949. Regarding the 1820-1900 period, though a number of authors have produced annual national income series, we are not sure that the limited raw statistical material available for the 19th century makes such an exercise really meaningful. Moreover we do not really need annual series for our purposes. So for the 19th century, we use decennial-averages estimates of national income (these

[29] All national accounts series, references and computations are described in a detailed manner in Appendix A. Here we simply present the main data sources and conceptual issues.

[30] In particular, the factor income decompositions (wages, profits, rents, business income, etc.) series released by Villa (1994) rely primarily on the original series constructed by Dugé de Bernonville (1933-1939), who described very precisely all his raw data sources and computations. For more detailed technical descriptions of the Dugé and Villa series, see Piketty (2001, pp.693-720).

decennial averages are almost identical across the different authors and data sources), and we assume fixed growth rates, saving rates and factor shares within each decade.[31]

The national wealth part of our macro data base requires more care than the national income part. It is only in 1970 that Insee started producing official, annual national wealth estimates in addition to the standard national income estimates. For the post-1970 period, the wealth and income sides of French national accounts are fully integrated and consistent. That is, the balance sheets of the personal sector, the government sector, the corporate sector, and the rest of the world, estimated at asset market prices on January 1st of each year, are fully consistent with the corresponding balance sheets estimated on the previous January 1st and the income and savings accounts of each sector during the previous year, and the recorded changes in asset prices.[32] We use these official Insee balance sheets for the 1970-2009 period, with no adjustment whatsoever. We define private wealth W_t as the net wealth (tangible assets, in particular real estate, plus financial assets, minus financial liabilities) of the personal sector. W_t is estimated at current asset market prices (real estate assets are estimated at current real estate prices, equity assets are estimated at current stock market prices, etc.). This is exactly what we want, since our objective is to relate aggregate private wealth to the inheritance flow, and since – according to estate tax law – the value of bequests is always estimated at the market prices of the day of death (or on the day the gift is made). Although this is of no use for our purposes, one can also define government wealth W_{gt} as the net wealth of the government sector, and national wealth $W_{nt} = W_t+W_{gt}$. According to the Insee estimates, private wealth during the 1990s-2000s has always represented around 90%-95% of national wealth. I.e. government wealth is positive but small: government tangible and financial assets only slightly exceed the value of government debt. During the 1970s-1980s, private wealth was equal to about 85%-90% of national wealth. Government net wealth was somewhat bigger than it is today, both because public debt was smaller and because the government owned more tangible and financial assets (the public sector was bigger at that time).[33]

Prior to 1970, we have to use various non-official, national wealth estimates. For the 1820-1913 period, national wealth estimates are plentiful and relatively reliable. This was a time of almost zero inflation (0.5% per year on average during the 1820-1913 period), so there

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[31] We used the 19th century series due to Bourguignon and Lévy-Leboyer (1985) and Toutain (1987).
[32] The concepts and methods used in Insee-Banque de France balance sheets are broadly similar to the flows-of-funds and tangible-assets series released by the U.S. Federal Reserve and Bureau of Commerce.
[33] More details on these issues are provided in Appendix A4.

was no big problem with asset prices. Most importantly, the economists of the time were literally obsessed with national wealth (which they found to be much more interesting than national income), and many of them produced relatively sophisticated national wealth estimates. They used the decennial censuses of tangible assets organized by the tax administration (the tax system of the time relied extensively on the property values of real estate, land and business assets, so such censuses played a critical role). They took into account the growing stock and bond market capitalisation and the booming foreign assets, and they explained in a precise and careful manner how they made all the necessary corrections in order to avoid all forms of double counting. We certainly do not pretend that these national wealth estimates are perfectly comparable to the modern, official balance sheets. In particular, these estimates are never available on an annual basis, and they certainly cannot be used to do short run business cycle analysis. But as far as decennial averages are concerned, we consider that the margin of error on these estimates does not exceed 5%-10%. As compared to the enormous historical variations in aggregate wealth-income ratios and in the inheritance-income ratio, in which we are primarily interested in, such margins of errors are negligible. According to these national wealth estimates, private wealth at that time accounted for as much as 97%-98% of national wealth, i.e. net government wealth was slightly positive but negligible.

The period 1914-1969 is the time period for which French national wealth estimates are the most problematic. This was a chaotic time for wealth, both because of war destructions and because of large inflation and wide variations in the relative price of the various assets. Very few economists compiled detailed, reliable national balance sheets for this time period. We proceed as follows. We use only two data points, namely the national wealth estimate for year 1925 due to Colson (1927), and the national wealth estimate for year 1954 due to Divisia, Dupin and Roy (1956). These are the two most sophisticated estimates available for this time period. They both rely on a direct wealth census method, and they both attempt to estimate assets and liabilities at asset market prices prevailing in 1925 and 1954, which is what we want. Moreover, Colson is the author of some of the most sophisticated pre-World War 1 national wealth estimates (we used his estimates for 1896 and 1913), and his 1925 computations are based on the same methods and sources as those used for 1896 and 1913. Divisia and his co-authors view the Colson 1896-1913-1925 estimates as their model, and they also attempt to follow the same methodology. To the extent that national wealth can be estimated during such a chaotic time period, this is probably the best one can find.

For the missing years, we estimate private wealth W_t by using a simple wealth accumulation equation, based upon the private saving flows S_t coming from national income accounts. Generally speaking, year-to-year variations in private wealth W_t can be due either to volume effects (savings) or to price effects (asset prices might rise or fall relatively to consumer prices). That is, the accumulation equation for private wealth can be written as follows:

$$\mathbf{W_{t+1} = (1+q_{t+1})\ (1+p_{t+1})\ (W_t + S_t)} \qquad \mathbf{(3.4)}$$

In equation (3.4), p_{t+1} is consumer price inflation between year t and year t+1, and q_{t+1} is the real rate of capital gain (or capital loss) between year t and year t+1, which we define as the excess of asset price inflation over consumer price inflation. For the 1970-2009 period, since French national income and wealth accounts are fully integrated, q_t can indeed be interpreted as the real rate of capital gains. For the pre-1970 period, q_t is better interpreted as a residual error term: it includes real asset price inflation, but it also includes all the variations in private wealth that cannot be accounted for by saving flows. For simplicity, we assume a fixed q_t factor during the 1954-1970 period (i.e. we compute the implicit average q_t factor needed to account for 1970 private wealth, given 1954 private wealth and 1954-1969 private savings flows). We do the same for the 1925-1954 period, the 1913-1925 period, and for each decade of the 1820-1913 period. The resulting decennial averages for the private wealth-national income ratio $\beta_t = W_t/Y_t$ are plotted on Figure 4. Summary statistics on the accumulation of private wealth in France over the entire 1820-2009 period are given on Table 1.

Again, we do not pretend that the resulting annual series are fully satisfactory, and we certainly do not recommend that one uses them for short run business cycle analysis, especially for the 1913-1925 and 1925-1954 sub-periods, for which the simplifying assumption of a fixed capital gain effect makes little sense. However we believe that the resulting decennial averages are relatively precise. In particular, it is re-insuring to see that most of wealth accumulation in the medium and long run seems to be well accounted for by savings. This suggests that saving rates are reasonably well measured by our national accounts series, and that in the long run there exists no major divergence between asset prices and consumer prices. The fact that our private wealth series delivers economic inheritance flow estimates that are reasonably well in line with the observed fiscal flow also gives us confidence about our wealth estimates.

A few additional points about the long-run evolution of the wealth-income ratio β_t might be worth noting here.[34] Consider first the 1820-1913 period. We find that β_t gradually rose from about 550%-600% around 1820 to about 650%-700% around 1900-1910 (see Figure 4). The real growth rate g of national income was 1.0%.[35] The savings rate s was about 8%-9%, so that the average savings-induced wealth growth rate $g_{ws}=s/\beta$ was 1.4%. I.e. it was larger than g. This explains why the wealth-income ratio was rising during the 19th century: savings were slightly higher than the level required for a steady-state growth path (i.e. the savings rate was slightly higher than $s^*=\beta g=6\%-7\%$). The observed real growth rate of private wealth g_w was actually 1.3%, i.e. slightly below g_{ws}. In our accounting framework, we attribute the differential to changes in the relative price of assets, and we find a modest negative q effect (-0.1%) (see Table 1). Of course, it could just be that we slightly overestimate 19th century saving rates, or that we slightly underestimate the 19th century rise in the wealth-income ratio, or both. But the important point is that our stock and flow series are broadly consistent. Although the data is imperfect, it is also well established that a very substantial fraction of the 19th century rise in the wealth-income ratio (and possibly all of it) went though the accumulation of large foreign assets.[36]

Consider now the 1913-2009 period. The real growth rate g of national income was 2.6%, thanks to the high growth postwar decades. The real growth rate of private wealth g_w was 2.4%. Given observed saving flows (and taking into account wartime capital destructions, which we include in volume effects), private wealth should have grown slightly faster, i.e. we find that the saving-induced wealth growth rate g_{ws} was 2.9%. We again attribute the differential to real capital gains, and we find a modest negative q effect (-0.4%) (see Table 1). Taken literally, this would mean that the 1949-2009 gradual rise in the relative price of assets has not yet fully compensated the 1913-1949 fall, and that asset prices are currently about 30% lower than what they were at the eve of World War 1. Again, it could also be that we slightly overestimate 20th century saving flows, or underestimate end-of-

[34] For a more detailed technical analysis of the series, see Appendix A3 and A4.
[35] All "real" growth rates (either for national income or for private wealth) and "real" rates or return referred to in this paper are defined relatively to consumer price inflation. Any CPI mismeasurement would translate into similar changes for the various rates without affecting the differentials and the ratios.
[36] Net foreign assets gradually rose from about 2% of private wealth in 1820 to about 15% around 1900-1910, i.e. from about 10% of national income to about 100% of national income. See Appendix A, Table A16.

period wealth stocks.[37] The important point is that our stock and flow data sources are mutually consistent. In the long run, the bulk of wealth accumulation is well accounted for by savings, both during the 19th and the 20th century. As a first approximation, the 1913-1949 fall in the relative price of assets seems to have been almost exactly compensated by the 1949-2009 rise, so that the total 1913-2009 net effect is close to zero.

The other important finding is that the 1913-1949 fall in the aggregate wealth-income ratio was not due – for the most part – to the physical destructions of the capital stock that took place during the wars. We find that β_t dropped from about 600%-650% in 1913 to about 200%-250% in 1949. Physical capital destructions per se seem to account for little more than 10% of the total fall. On the basis of physical destructions and the observed saving response (saving flows were fairly large in the 1920s and late 1940s), we find that private wealth should have grown at g_{ws}=0.9% per year between 1913 and 1949, i.e. almost as fast as national income (g=1.3%). However the market value of private wealth fell dramatically (g_w=-1.7%), which we attribute to a large negative q effect (q=-2.6%). This large real rate of capital loss can be broken down into a variety of factors: holders of nominal assets (public and private bonds, domestic and foreign) were literally expropriated by inflation; real estate prices fell sharply relatively to consumer prices (probably largely due to sharp rent control policies enacted in the 1920s and late 1940s); and stock prices also fell to historical lows in 1945 (probably reflecting the dramatic loss of faith in capital markets, as well as the large nationalization policies and capital taxes enacted in the aftermath of World War 2). In effect, the 1914-1945 political and military shocks generated an unprecedented wave of anti-capital policies, which had a much larger impact on private wealth than the wars themselves.

This asset price effect explains why the wealth-income ratio also seems to have fallen substantially in countries whose territories were not directly hit by the wars. In the U.K., the private wealth-national income ratio was apparently as large as 650%-750% in the late 19th and early 20th century, down to 350%-400% in the 1950s-1970s, up to about 450%-

[37] In the benchmark estimates reported on Table 1, private saving flows are defined as the sum of personal savings and net corporate retained earnings (our preferred definition). If we instead use personal saving flows, we find a lower g_{ws} (2.0%) and a modest positive q effect (+0.4%). Taken literally, this would mean that asset prices are currently about 40% higher than what they were in 1913, but that if we deduct the cumulated value of corporate retained earnings, then they are actually 30% smaller. Within our accounting framework, retained earnings account for about a third of total real capital gains during the 1949-2009 period, which seems reasonable. For detailed results, see Appendix A5, Table A19, from which Table 1 is extracted.

550% in the 1990s-2000s.[38] In the U.S., it seems to have declined from about 550%-600% in the early 20th century and in the interwar period to about 350%-400% in the 1950s-1970s, up to 450%-500% in the 1990s-2000s.[39] This suggests that the U.K. and the U.S. have gone through the same U-shaped pattern as France – albeit in a somewhat less pronounced manner, which seems consistent with the above observations. We stress however that these U.K.-U.S. series are not fully homogenous over time; nor are they fully comparable to our French series. We report them for illustrative purposes only. The U-shaped pattern is probably robust, but the exact levels should be interpreted with caution.

Finally, it is worth noting that if we use disposable income rather than national income as the denominator, then the wealth-income ratios reached in France in the 2000s (750%-800%) appear to be slightly higher than the levels observed in the 19th and early 20th century, rather than slightly smaller (see Figure 5). We feel that it is more justified to look at the wealth-national income ratios, but this is a matter of perspective.

3.3. Estate tax data: B_t^f, μ_t and v_t

Estate tax data is the other key data source used in this paper.[40] It plays an essential role for several reasons. First, because of various data imperfections (e.g. regarding national wealth estimates), we thought that it was important to compute two independent measures of inheritance flows: one "economic flow" indirect measure (based upon national wealth estimates and mortality tables, as described above) and one "fiscal flow" direct measure. The fiscal flow is a direct measure in the sense that it was obtained simply by dividing the observed aggregate bequest and gift flow reported to the tax administration (with a few corrections, see below) by national income, and therefore makes no use at all of national wealth estimates. Next, we need estate tax data in order to compute the gift-bequest ratio $v_t = V_t^{f0}/B_t^{f0}$, and in order to obtain reliable, long-run data on the age-wealth profile and to

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[38] Here we piece together the following data sources: for the late 19th century and early 20th century, we use the private wealth and national income estimates of the authors of the time (see e.g. Giffen (1878) and Bowley (1920)); for the period going from the 1920s to the 1970s, we use the series reported by Atkinson and Harrison (1978); for the 1990s-2000s we use the official personal wealth series released on hmrc.gov.uk. See also Solomou and Weale (1997, p.316), whose 1920-1995 UK wealth-income ratio series display a similar U-shaped pattern (from 600% in the interwar down to less than 400% in the 1950s-1970s, up to 500%-600% in the 1980s-1990s).

[39] Here we use for the post-1952 period the net worth series (household and non-profit sectors) released by the Federal Reserve (see e.g. *Statistical Abstract of the U.S. 2010*, Table 706), and for the pre-1952 period the personal wealth series computed by Kopczuk and Saez (2004, Table A) and Wolff (1989). .

[40] All estate tax series, references and computations are described in a detailed manner in Appendix B. Here we simply present the main data sources and conceptual issues.

compute the μ_t ratio. Finally, we also use estate tax data in order to know the age structure of decedents, heirs, donors and donees, which we need for our simulations.

French estate tax data is exceptionally good, for one simple reason. As early as 1791, shortly after the abolition of the tax privileges of the aristocracy, the French National Assembly introduced a universal estate tax, which has remained in force since then. This estate tax was universal because it applied both to bequests and to inter-vivos gifts, at any level of wealth, and for nearly all types of property (both tangible and financial assets). The key characteristic of the tax is that the successors of all decedents with positive wealth, as well as all donees receiving a positive gift, have always been required to file a return, no matter how small the estate was, and no matter whether the heirs and donees actually ended up paying a tax or not. This followed from the fact that the tax was thought more as a registration duty than as a tax: filling a return has always been the way to register the fact that a given property has changed hands and to secure one's property rights.[41]

Between 1791 and 1901, the estate tax was strictly proportional. The tax rate did vary with the identity of the heir or donee (children and surviving spouses have always faced much lower tax rates than other successors in the French system), but not with the wealth level. The proportional tax rates were fairly small (generally 1%-2% for children and spouses), so there was really very little incentive to cheat. The estate tax was made progressive in 1901. In the 1920s, tax rates were sharply increased for large estates. In 1901, the top marginal rate applying to children heirs was as small as 5%; by the mid 1930s it was 35%; it is currently 40%. Throughout the 20th century these high top rates were only applied to small segments of the population and assets. So the aggregate effective tax rate on estates has actually been relatively stable around 5% over the past century in France.[42] Most importantly, the introduction of tax progressivity did not significantly affect the universal legal requirement to fill a return, no matters how small the bequest or gift.

There is ample evidence that this legal requirement has been applied relatively strictly, both before and after the 1901 reform. In particular, the number of estate tax returns filled

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[41] This is reflected in the official name of the tax, which since 1791 has always been "droits d'enregistrement" (more specifically, "droits d'enregistrement sur les mutations à titre gratuity" (DMTG)), rather than "impôt sur les successions et les donations". In the U.S., the estate tax is simply called the "estate tax".

[42] See Appendix A, Table A9, col. (15). This low aggregate effective tax rate reflects the fact that top rates only apply to relatively high wealth levels (e.g. the top 40% marginal rate currently applies to per children, per parent bequests above 1.8 millions euros), and the fact that tax exempt assets and tax rebates for inter vivos gifts have become increasingly important over time. See Appendix B for more details.

each year has generally been around 65% of the total number of adult decedents (about 350,000 yearly returns for 500,000 adult decedents, both in the 1900s and in the 2000s). This is a very large number, given that the bottom 50% of the population hardly owns any wealth at all. We do upgrade the raw fiscal flow in order to take non-filers into account, but the point is that the corresponding correction is small (generally around 5%-10%).

The other good news for scholars is that the raw tax material has been well archived. Since the beginning of the 19th century, the tax authorities transcribed individual returns in registers that have been preserved. In a previous paper we used these registers to collect large micro samples of Paris decedents every five year between 1807 and 1902, which allowed us to study the changing concentration of wealth and the evolution of age-wealth profiles.[43] Ideally one would like to collect micro samples for the whole of France over the two-century period, but this has proved to be too costly so far.

So in this paper we rely mostly on aggregate national data collected by the tax administration. For the 1826-1964 period, we use the estate tax tabulations published on a quasi-annual basis by the French Ministry of Finance. For the whole period, these tables indicate the aggregate value of bequests and gifts reported in estate tax returns, which is the basic information that we need. Starting in 1902, these annual publications also include detailed tabulations on the number and value of bequests and gifts broken down by size of estate and age of decedent or donor. These tabulations were abandoned in the 1960s-1970s, when the tax administration started compiling electronic files with nationally representative samples of bequest and gift tax returns. We use these so-called “DMTG” micro files for years 1977, 1984, 1987, 1994, 2000 and 2006. The data is not annual, but it is very detailed. Each micro-file includes all variables reported in tax returns, including the value of the various types of assets, total estate value, the share going each heir or donee, and the demographic characteristics of decedents, heirs, donors and donees.

We proceed as follows. We start from the raw fiscal bequest flow B_t^{f0}, i.e. the aggregate net wealth transmitted at death, as reported to tax authorities by heirs, whoever they are. In particular, we do not exclude the estate share going to surviving spouses, first because it has always been relatively small (about 10%),[44] and next because we choose in the

[43] See Piketty, Postel-Vinay and Rosenthal (2006).
[44] The spouse share has always been about 10% of the aggregate estate flow, vs. 70% for children and 20% for non-spouse, non-children heirs, typically siblings and nephews/nieces (see Appendix C2). It is unclear why one should exclude the spouse share and not the latter. In any case, this would make little difference.

present paper to adopt a gender-free, individual-centred approach to inheritance. So we ignore marriage and gender issues altogether, which given our aggregate perspective seems to be the most appropriate option.[45]

We first make an upward correction to B_t^{f0} for non filers (see above), and we then make another upward correction for tax exempt assets. When the estate tax was first created, the major exception to the universal tax base was government bonds, which benefited from a general estate tax exemption until 1850. Between 1850 and World War 1, very few assets were exempted (except fairly specific assets like forests). Shortly after World War 1, and again after World War 2, temporary exemptions were introduced for particular types of government bonds. In order to foster reconstruction, new real estate property built between 1947 and 1973 also benefited from a temporary exemption. Most importantly, a general exemption for life insurance assets was introduced in 1930. It became very popular in recent decades. Life insurances assets were about 2% of aggregate wealth in the 1970s and grew to about 15% in the 2000s. Using various sources, we estimate that the total fraction of tax exempt assets in aggregate private wealth gradually rose from less than 10% around 1900 to 20% in the interwar period, 20%-25% in the 1950s-1970s and 30%-35% in the 1990s-2000s. We upgrade the raw fiscal bequest flow accordingly.

We apply the same upward corrections to inter vivos gifts, leaving the gift-bequest ratio v_t unaffected. To the extent that gifts are less well reported to tax authorities than bequests, this implies that we probably under-estimate their true economic importance. Also, in this paper we entirely ignore informal monetary and in-kind transfers between households, as well as parental transfers to children taking the form of educational investments, tuition fees and other non-taxable gifts (which ideally should all be included in the analysis, in one way or another).[46] That is, we only consider formal, potentially taxable gifts.

[45] Gender-based wealth inequality is an important issue. On average, however, women have been almost as rich as men in France ever since the early 19th century (with aggregate women-men wealth ratios usually in the 80%-90% range; this is largely due to the gender neutrality of the 1804 Civil Code; see Piketty et al (2006)). So the aggregate consequences of ignoring gender issues cannot be very large.

[46] Parental transfers to non-adult children and educational investments raise complicated empirical and conceptual issues, however. One would need to look at the financing of education as a whole.

4. The U-shaped pattern of inheritance: a simple decomposition

The accounting equation $B_t/Y_t = \mu_t^* \ m_t \ W_t/Y_t$ allows for a simple and transparent decomposition of changes in the aggregate inheritance flow. Here the important finding is that the long-run U-shaped pattern of B_t/Y_t is the product of three U-shaped curves, which explains why it was so pronounced. We take these three effects in turn: the aggregate wealth-income effect W_t/Y_t, the mortality rate effect m_t, and the μ_t^* ratio effect.

4.1. The aggregate wealth-income ratio effect W_t/Y_t

We already described the U-shaped pattern the aggregate wealth-income ratio β_t (see Figure 4). By comparing this pattern with that of the inheritance flow b_{yt} (see Figure 2), one can see that the 1913-1949 decline in the aggregate wealth-income ratio explains about half of the decline in the inheritance-income ratio. Between 1913 and 1949, β_t dropped from 650%-700% to 200%-250%. I.e. it was divided by a factor of about 2.5-3. In the meantime, b_{yt} dropped from 20%-25% to 4%. I.e. it was divided by a factor of about 5-6.

4.2. The mortality rate effect m_t

Where does the other half of the decline in the inheritance-income ratio come from? By construction, it comes from a combination of μ_t^* and m_t effects. The simplest term to analyze is the mortality rate m_t. The demographic history of France since 1820 is simple. Population was growing at a small rate during the 19th century (less than 0.5% per year), and was quasi-stationary around 1900 (0.1%). The only time of sustained population growth during the past two centuries was due to the well-known postwar baby-boom, with population growth rates around 1% in the 1950s-1960s. Population growth has been declining since then, and in the 1990s-2000s it was approximately 0.5% per year (about a third of which comes from net migration flows). According to official projections, population growth will be less than 0.1% by 2040-2050, with a quasi-stationary population after 2050. Adult population was about 20 millions in the 1820s, 30 millions in the 1950s, 50 millions in the 2010s, and is projected to stabilize below 60 millions.

The evolution of mortality rates follows directly from this and from the evolution of life expectancy. Between 1820 and 1910, the mortality rate was relatively stable around 2.2%-2.3% per year (see Figure 6). This corresponds to the fact that the population was growing at a very small rate, and that life expectancy was stable around 60, with a slight upward trend (see Figure 7). In a world with a fully stationary population and a fixed adult life expectancy equal to 60, then the adult mortality rate (i.e. the mortality rate for individuals aged 20-year-old and above) should indeed be exactly equal to 1/40 = 2.5%. Since population was rising a little bit, the mortality rate was a bit below that.

There was a purely temporary rise in mortality rates in the 1910s and 1940s due to the wars. Ignoring this, we have a regular downward trend in the mortality rate during the 20th century, with a decline from about 2.2%-2.3% in 1910 to about 1.6% in the 1950s-1960s and 1.1%-1.2% in the 2000s. According to official projections, this downward trend is now over, and the mortality rate is bound to rise in the coming decades, and to stabilize around 1.4%-1.5% after 2050 (see Figure 6). This corresponds to the fact that the French population is expected to stabilize by 2050, with an age expectancy of about 85, which implies a stationary mortality rate equal to 1/65 = 1.5%. The reason why the mortality rate is currently much below this steady-state level is because the large baby-boom cohorts are not dead yet. When they die, i.e. around 2020-2030, then the mortality rate will mechanically increase, and so will the inheritance flow. This simple demographic arithmetic is obvious, but important. In the coming decades, this is likely to be a very big effect in countries with negative projected population growth (Spain, Italy, Germany). In the extreme case where each couple has only one kid, the new cohorts are twice as small as the dying cohorts, and inheritance flows can mechanically become very large.

However the large inheritance flows observed in the 2000s are not due to a mortally rate effect. The U-shaped mortality effect will start operating only in future decades. The 2000-2010 period actually corresponds to the lowest historical mortality ever observed, with mortality rates as low as 1.1%-1.2%. On the basis of mortality rates alone, the inheritance flow in the 1990s-2000s should have been much smaller than what we actually observe.

4.3. The μ_t* ratio effect

So why has there been such a strong recovery in the inheritance flow since the 1950s-1960s, and why is the inheritance flow so large in the 1990s-2000s? We now come to the most interesting part, namely the μ_t* ratio effect. Here it is important to distinguish between the raw ratio μ_t and the gift-corrected ratio $\mu_t^* = (1+v_t)\ \mu_t$. We plot on Figure 8 the historical evolution of the μ_t and μ_t* ratios, as estimated using observed age-wealth-at-death profiles and differential mortality parameters. We plot on Figure 9 the inheritance flow-private wealth ratio $b_{wt} = m_t \mu_t^*$. We also show on Table 2 some of the raw wealth-at-death profiles that we used for the computation of our μ_t series.

Between 1820 and 1910, the μ_t ratio was around 130%. I.e. on average decedents' wealth was about 30% bigger than the average wealth of the living. There was actually a slight upward trend, from about 120% in the 1820s to about 130%-140% in 1900-1910. But this upward trend disappears once one takes inter vivos gifts into account: the gift-bequest ratio v_t was as high as 30%-40% during the 1820s-1850s, and then gradually declined, before stabilizing at about 20% between the 1870s and 1900-1910.[47] When we add this gift effect, i.e. when we take into account the fact that decedents have already given away about 30%-40% of their wealth when they die in the 1820s-1840s, and about 20% of their wealth when they die in the 1870s-1910s, then we find that the gift-corrected μ_t^* ratio was stable at about 160% during the 1820-1913 period (see Figure 8).

During this entire period, cross-sectional age-wealth profiles were steeply increasing up until the very old, and were becoming more and more steeply increasing over time (see Table 2).[48] Here we report and use profiles for the all of France. In Paris, where many of the top wealth holders lived, age-wealth profiles were even more steeply increasing.[49]

The 1913-1949 capital shocks clearly had a strong disturbing impact on age-wealth profiles. Observed profiles gradually become less and less steeply-increasing at old age after World War 1, and shortly become hump-shaped in the aftermath of World War 2 (see Table 2).[50] Consequently, our μ_t ratio estimates declined from about 140% at the eve of World War 1 to about 90% in the 1940s (see Figure 8). The gift-bequest ratio was stable around 20% throughout this period, so the μ_t^* went through a similar evolution.

One possible explanation for this change in pattern is that it was too late for the elderly to recover from the capital shocks (war destruction, capital losses), while active and younger

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[47] We know little as to why inter vivos gifts were so high in the early 19th century. This seems to correspond to the fact that dowries (i.e. large inter-vivos gifts at the time of wedding) were more common at that time.

[48] The raw profiles reported on Table 2 do not take into account differential mortality. If one were to use them to compute μ_t ratios without making any correction, then one would find substantially bigger for values for μ_t than those reported on Figure 8, e.g. 171% instead of 135% for 1912. Estimated age-wealth profiles for the living (i.e. after taking into account the differential mortality correction) are also steeply increasing up until the very old. See Appendix B2, Tables B3-B5 for detailed computations and results.

[49] See Piketty, Postel-Vinay and Rosenthal (2006).

[50] The differential-mortality-corrected profiles look even more hump-shaped (see Appendix B2).

cohorts could earn labour income and accumulate new wealth. It could also be that elderly wealth holders were hit by proportionally larger shocks, e.g. because they held a larger fraction of their assets in nominal assets such as public bonds.

The most interesting fact is the strong recovery of the μ_t and μ_t* ratios which took place since the 1950s. The raw age-wealth-at-death profiles gradually became upward sloping again. In the 1900s-2000s, decedents aged 70 and over are about 20%-30% richer than the 50-to-59-year-old decedents (see Table 2).[51] As a consequence, the μ_t ratio gradually rose from about 90% in the 1940s-1950s to over 120% in the 2000s (see Figure 8).

Next, and most importantly, the gift-bequest ratio v_t rose enormously since the 1950s. The gift-bequest ratio was about 20%-30% in the 1950s-1960s, and then gradually increased to about 40% in the 1980s, 60% in the 1990s and over 80% in the 2000s. This is by far the highest historical level ever observed. Gifts currently represent almost 50% of total wealth transmission (bequests plus gifts) in France. That is, when we observe wealth at death, or wealth among the elderly, we are actually observing the wealth of individuals who have already given away almost half of their wealth. So it would make little sense to study age-wealth profiles without taking gifts into account. Gifts are probably less well reported than bequests to the tax administration, so it is hard to see how our tax-data-measured v_t ratio can be over-estimated. If anything, we probably underestimate the gift effect. We do not know whether such as large rise in gifts also occurred in other countries.[52]

The age differential between decedents and donors has remained relatively stable around 7-8 years throughout the 20th century, and in particular during the past few decades. On average, people have always made gifts about 7-8 years before they die. So the impact of gifts on the average age at which individuals receive wealth transfers has been relatively limited. We compute the evolution of the average age of “receivers” (by weighting average age of heirs and average age of donees by the relevant amounts), and we find that the rise

[51] Differential-mortality-corrected profiles are basically flat above age 50 (see Appendix B2). Using the 1998 and 2004 Insee wealth surveys, we find age-wealth profiles which are slightly declining after age 50 (the 70-to-79 and 80-to-89-year-old own about 90% of the 50-to-59-year-old level). However this seems to be largely due to top-wealth under-reporting in surveys. Using wealth tax data (see Zucman (2008, p.68)), we find that the fraction of the 70-to-79 and 80-to-89-year-old subject to the wealth tax (i.e. with wealth above 1 million €) is around 200%-250% of the corresponding fraction for the 50-to-59-year-old (average taxpayers wealth is similar for all age groups). This steeply rising profile does not show up at all in wealth surveys, and might also be under-estimated in estate tax data (e.g. because the elderly hold more estate-tax-exempt assets).

[52] However the upward trend in gifts clearly started before new tax incentives were put in place in the late 1990s and 2000s, so it is hard to identify the the tax effect per se. For additional details, see Appendix B.

of gifts since the 1980s merely led to a pause in the historical rise in the average age of receivers (currently about 45-year-old), but not to an absolute decline.[53]

The most plausible interpretation for this large increase in gifts is the rise in life expectancy: wealthy parents realize that they are not going to die very soon, and decide that they should help their children to buy an apartment or start a business before they die. Tax incentives might also have played a role.[54] There is an issue as to whether such a high gift-bequest ratio is sustainable in the long run, which we address in the simulations.

For the time being, it is legitimate to add the gift flow to the bequest flow, especially given the relatively small and stable age differential between decedents and donors. Consequently, we find that the gift-corrected μ_t* ratio has increased enormously since World War 2, from about 120% in the 1940s-1950s to over 180% in the 1990s and over 220% in the 2000s (see Figure 8).

To summarize: the long run decline in the mortality m_t seems to have been (partially) compensated by a long run increase in the μ_t* ratio. Consequently, the product of two, i.e. the inheritance-wealth ratio $b_{wt}= m_t \mu_t^*$, declined much less than the mortality rate: b_{wt} was about 3.3%-3.5% in the 19th century (the estate multiplier $e_t=1/b_{wt}$ was about 30), and it is above 2.5% in the 2000s (the estate multiplier is about 40). One obvious explanation as to why wealth tends to get older when age expectancy increases is because individuals wait longer before they inherit. However there are many other effects going on, so it is useful to clarify this simple effect with a stylized model, before moving on to full-fledged simulations.

[53] See Appendix C, Table C8. The slight decline in average age of heirs plotted on Figure 7 for the post-2040 period corresponds to another effect, namely a slight projected rise in average age at parenthood.

[54] According to on-line IRS data, the U.S. gift-bequest ratio is about 20% in 2008 (45 billions $ in gifts and 230 billions $ in bequests were reported to the IRS). Unfortunately, the bequest data relates to less than 2% of U.S. decedents (less than 40,000 decedents, out of a total of 2.5 millions), and we do not really know what fraction of gifts were actually reported to the IRS. On-line IRS tables also indicate steeply rising age-wealth-at-death profiles. This is consistent with the findings of Kopczuk (2007) and Kopczuk and Luton (2007).

5. Wealth accumulation, inheritance & growth: a simple steady-state model

Why is it that the long-run decline in mortality rate m_t seems to be compensated by a corresponding increase in the μ_t ratio? I.e. why does the relative wealth of the old seem to rise with life expectancy? More generally, what are the economic forces that seem to be pushing for a constant inheritance-income steady-state ratio b_{yt} (around 20% of national income), independently from life expectancy and other parameters?

In order to highlight the key effects at play, we develop in this section a stylized theoretical model of wealth accumulation, inheritance and growth. We use various savings models (exogenous savings model, dynastic model, and wealth-in-the-utility model) and derive simple steady-state formulas for the μ_t ratio and the inheritance-income and inheritance-wealth ratios $b_{yt}=\mu_t m_t \beta_t$ and $b_{wt}=\mu_t m_t$. We prove two main results.

First, we show that with pure class savings, then the m_t and μ_t effects exactly compensate one another, so that the steady-state ratios b_{wt} and b_{yt} are simply equal to 1/H and β/H, where H is generation length (age at parenthood) and β is the aggregate wealth income ratio. That is, inheritance ratios do not depend at all on life expectancy or the growth rate.

Next, we show that this result extends to other saving models, assuming that growth rates are relatively low. Typically, for g=1% or g=2%, inheritance ratios are almost exclusively determined by the age at parenthood H – and not so much on life expectancy and other parameters (thereby providing an explanation for the 20% magic number). More generally, we find that the steady-state ratios μ, b_y and b_w always tend to be decreasing functions of the growth rate g and increasing functions of the rate of return r. That is, higher growth and/or lower rates of return reduce the relative importance of inheritance.

The steady-state inheritance formulas developed in this section are simple and can be used with real numbers so as to better understand the quantitative importance of each effect. However they naturally rely on strong demographic and macroeconomic steady-state assumptions, which are at odds with the real world. In section 6, we present simulation results based upon a full-fledged, out-of-steady-state version of this model, using observed demographic and macro shocks, and show that the basic intuitions and results obtained in the stylized steady-state model are robust.

5.1. Notations and definitions

5.1.1. Demography.

We use a relatively standard, Solow-type model of capital accumulation and growth, but with a specific demographic structure. In order to obtain meaningful theoretical formulas for inheritance flows (i.e. formulas that can be used with real numbers), we need a dynamic model with a realistic demographic structure. Models with infinitely lived agents or perpetual youth models will not do, and standard two-period or three-period overlapping generations models will not do either.

To keep notations simple, we consider a continuous-time OLG model with the following deterministic, stationary demographic structure (see Figure 9).[55] Everybody becomes adult at age a=A, has exactly one kid at age a=H>A, and dies at age D>H. As a consequence everybody inherits at age a=I=D-H. This is a gender free population. There is no inter vivos gift: all wealth is transmitted at death. Cohort x is defined as the set of individuals born at time x. Each cohort size N^x is normalized to 1 and includes a continuum [0;1] of agents. So at any time t, the living population includes a mass $N_t(a)=1$ of adult individuals of age a (A≤a≤D). Total adult population N_t is permanently equal to D-A. The adult mortality rate m_t is also stationary and is given by:

$$m_t = m^* = \frac{1}{D-A} \qquad \textbf{(5.1)}$$

Example. Around 1900, we have A=20, H=30 and D=60, so that people inherit at age I=D-H=30, and m*=1/(D-A)=1/40=2.5%. Around 2020, we have A=20, H=30 and D=80, so that people inherit at age I=D-H=50, and m*=1/(D-A)=1/60=1.7%.

5.1.2. Production.

We assume a standard two-factor production function, with exogenous productivity growth:

$$Y_t = F(K_t,H_t) = F(K_t,e^{gt}L_t) \qquad \textbf{(5.2)}$$

55 All results can be extended to the case with a non-stationary population N_t growing at a fixed rate n (generally by replacing g by g+n in the formulas and results). Below we also relax the deterministic mortality assumption and introduce demographic noise, i.e. the fact that different individuals die at different ages (or have children at different ages), and therefore that different individuals inherit at different ages.

With: Y_t = national income

K_t = physical (non-human) capital

H_t = human capital = efficient labor supply = $e^{gt} L_t$

L_t = labor supply

g = exogenous labor productivity growth rate

Since population N_t=D-A is stationary, so is labor supply L_t. We assume that all adults inelastically supply one unit of labor each year from age a=A until some exogenous retirement age a=R≤D (say, A=20 and R=60), so that aggregate labor supply L_t=R-A.

So in the steady state of our model, everything will grow at some exogenous growth rate g≥0. One might want to plug in endogenous growth models into this setting. By doing so, one could generate interesting two-way interactions between growth and inheritance.[56] However in order to simplify the analysis, and also because growth depends on so many factors on which we know relatively little, we choose in this paper to take the growth rate g as given and to study its one-way impact on aggregate inheritance flows.

For notational simplicity, we also assume away government debt (and government assets). In the closed economy case (no foreign assets),[57] private wealth W_t is exactly equal to the domestic capital stock K_t, and the aggregate private wealth-national income ratio is exactly equal to the domestic capital-output ratio:

$$\beta_t = W_t/Y_t = K_t/Y_t \qquad (5.3)$$

We note $Y_t=Y_{Kt}+Y_{Lt}$ the functional distribution of income, with Y_{Kt}= capital income and Y_{Lt}= labor income. We note $\alpha_t=Y_{Kt}/Y_t$ the capital share, $1-\alpha_t=Y_{Lt}/Y_t$ the labor share, and r_t the average rate of return to private wealth: $r_t = Y_{Kt}/W_t = \alpha_t/\beta_t$.

Example. Typically the wealth-income income ratio β_t = 600%, the capital share α_t = 30%, and the average rate of return to private wealth r_t = 5%.

[56] E.g. with credit constraints high inheritance flows can have a negative impact on growth-inducing investments (high-inheritance low-talent agents cannot easily lend money to low-inheritance high-talent agents). So high inheritance could lead to lower growth, which itself tends to reinforce high inheritance, as we see below. This two-way process can naturally generate multiple growth paths (with a high inheritance, low mobility, low growth path, and conversely). See Piketty (1997) for a similar steady-state multiplicity.

[57] Below we also consider the open economy case. See Appendix E for the corresponding equations.

For simplicity, we assume a Cobb-Douglas production function $F(K,H)=K^{\alpha} H^{1-\alpha}$, which as a first approximation seems to be a reasonably good description of the real world in the long-run.[58] Together with the competitive factor markets assumption and the closed economy assumption, the Cobb-Douglas specification implies that the capital share α_t is permanently equal to α, so that the rate of return is simply an inverse function of the wealth-income ratio: $r_t = \alpha/\beta_t$.

We note y_t, w_t, y_{Kt}, y_{Lt} the per adult averages of all aggregate variables: $y_t=Y_t/N_t=y_{Lt}+r_tw_t$, $w_t=W_t/N_t$, $y_{Kt}=Y_{Kt}/N_t=r_tw_t$, and $y_{Lt}=Y_{Lt}/N_t$. We use subscripts for time t, parentheses for age a and superscripts for cohort x. E.g. $y_t(a)$ is the average income at time t of individuals aged a-year-old at that time (they belong to cohort x=t-a), y_t^x is the average income at time t of individuals who were born at time x (they have age a=t-x), and $y^x(a)$ is the average income at age a of individuals who were born at time x (this happens at time t=x+a).

The aggregate cross-sectional age-wealth and age-labor income profiles at time t are noted $w_t(a)$ and $y_{Lt}(a)$, and the aggregate longitudinal age-wealth and age-labor income profiles followed by cohort x are noted $w^x(a)$ and $y_L{}^x(a)$.

When we refer to particular individuals we use subscripts i. E.g. y_{Lti} (resp. w_{ti}) is the labor income (resp. the wealth) at time t of a given individual i. In this paper, we are primarily interested in the evolution of aggregate ratios. We use linear saving models, which allow us to solve for aggregate evolutions without keeping track of the intra-cohort distributions of labor income and wealth. So we will mostly concentrate upon per adult averages y_t, w_t, y_{Lt} and age-level averages $y_t(a)$, $w_t(a)$, $y_{Lt}(a)$. But it is worth noting that our results hold not only for the representative-agent interpretation of the model (zero intra cohort inequality), but also for any given level of permanent, intra-cohort labor income inequality stemming

[58] All results below can easily be extended to CES production functions of the form $F(K,H) = [a K^{(\gamma-1)/\gamma} + (1-a) H^{(\gamma-1)/\gamma}]^{\gamma/(\gamma-1)}$, where γ is the constant elasticity of substitution between K and H (γ=1 corresponds to Cobb-Douglas, γ=0 to putty-clay, and γ=∞ to a linear production function). In competitive equilibrium the capital share α is then given by $\alpha=Y_K/Y=r\beta= a\beta^{1-1/\gamma}$. I.e. the capital share α is an increasing function of the wealth-income ratio β if and only if γ>1. The fact that capital shares were slightly below normal levels in historical periods when the wealth-income ratio was below normal levels (e.g. in the 1950s) tends to suggest that γ is somewhat bigger than 1. However the assumption of competitive factor markets is quite heroic, especially during those periods (e.g. rent control and other policies influencing factor prices certainly played a big role at mid-20th century), and so is this inference process. See Appendix A for detailed factor shares series.

from some exogenous heterogeneity in skills or luck or taste or effort, as well as for various structures of idiosyncratic shocks on saving behavior.[59]

5.1.3. Age-labor income profile and pension system

For simplicity, we assume that the cross-sectional age-labor income profile $y_{Lt}(a)$ is flat among adult workers, i.e. all age groups between age a=A and age a=R have the same average labor income at any time t.[60] This assumption of a flat cross-sectional age-labor income profile obviously does not apply to longitudinal profiles: with positive productivity growth g>0, average labor income y_{Lt} grows at rate g in steady-state, i.e. longitudinal age-labor income profiles are upward sloping.

We take as given the existence of an unfunded, pay-as-you-go pension system financed by a flat payroll tax rate τ_ρ on all adult workers and offering a flat replacement rate $\rho \leq 1$ to adults older than retirement age R.[61] To simplify notations, we integrate pension income into labor income $y_{Lt}(a)$. That is, $y_{Lt}(a)$ is equal to "augmented labor income", which we define as net-of-pension-tax labor income for working adults (A<a<R) and pension income for retired adults (R<a<D).[62] In effect we assume a simple two-tier cross-sectional age-labor income profile $y_{Lt}(a)$ among adults (see Figure 10):

If $a \in [A,R[$, $y_{Lt}(a) = (1-\tau_\rho)\,\hat{y}_{Lt}$

If $a \in [R,D]$, $y_{Lt}(a) = \rho\,(1-\tau_\rho)\,\hat{y}_{Lt}$

With: $\hat{y}_{Lt} = \dfrac{D-A}{R-A}\, y_{Lt}$ = average pre-tax labor income of adult workers at time t

τ_ρ = budget-balanced pension tax rate = $\dfrac{\rho(D-R)}{R-A+\rho(D-R)}$

[59] We will make this clear in the context of each specific saving model as we go along.
[60] In simulations we use observed, non-flat age-labor income profiles. In France, the current profile $y_{Lt}(a)$ is moderately upward sloping: the average labor income of adults aged 20-to-29 and 30-to-39 is about 70%-80% of the average labor income of those aged 40-to-49 and 50-to-59. See Appendix D, Table D4.
[61] In a world with r>g, it is unclear why people would want to have pay-as-you-go pension systems (whose internal rate of return is by definition equal to g). In order to do a proper welfare analysis, one would need to introduce into the model the reasons why pay-as-you-go systems were introduced in the first place (and why they remain popular in most developed countries), i.e. uninsurable uncertainty about the rate of return on private wealth r. This is in turn would have an impact on the welfare analysis of inheritance and on the structure of optimal taxes. We leave these difficult normative issues to future research.
[62] In what follows we often omit to specify that labor income y_{Lt} actually refers to "augmented" labor income.

In order to offer 100% replacement rates, the pension tax τ_ρ must by definition be equal to the share of pensioners in total adult population, which in the absence of population growth is simply equal to retirement length D-R divided by total adult life length D-A.

In practice, pay-as-you-go pension systems offer significant replacement rates ρ in most developed countries (usually over 50%). In France, ρ is currently about 70%-80%.[63] In the theoretical results below, we use ρ as a free parameter of the model. When we set ρ to 100%, we effectively shut down the life-cycle saving motive. When we reduce ρ, we gradually make lifecycle wealth accumulation more important. This allows us to investigate the quantitative interaction between private wealth accumulation, inheritance flows and the generosity of pay-as-you-go pension systems.

5.1.4. Aggregate inheritance flow

Since each cohort size N^x is normalized to 1, the aggregate inheritance flow B_t is equal to per decedent inheritance b_t. Since everybody dies at age a=D, per decedent inheritance b_t is equal to the average wealth $w_t(D)$ of D-year-old individuals.[64] So the ratio $\mu_t = b_t/w_t$ between average wealth of decedents and average wealth of the living is given by:

$$\mu_t = \frac{b_t}{w_t} = \frac{w_t(D)}{w_t} \qquad (5.4)$$

In order to compute the value of μ_t, we simply need to study the dynamics of the age-wealth profile $w_t(a)$. The inheritance-income ratio $b_{yt} = B_t/Y_t = m_t\ \mu_t\ \beta_t$ and the inheritance-wealth ratio $b_{wt} = B_t/W_t = m_t\ \mu_t$ are then given by applying accounting equations (3.1)-(3.3).

5.2. Steady-state inheritance flow in the exogenous savings model

We start by solving the model with exogenous saving rates. That is, we assume that the average saving rates out of labor income s_L and out of capital income s_K are the same for

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[63] That is, the average (augmented) labor income of adults aged 60-to-69, 70-to-79 and 80-and-over is about 70%-80% of the average labor income of those aged 50-to-59. See Appendix D, Table D4. In principle, with A=20, R=60, D=80, the pension tax rate should be τ_ρ=33% for ρ=100% and τ_ρ =26% for ρ=70%. In practice, the French pension tax rate is a bit smaller (it is closer to 20%), thanks to the fact that retired cohorts are somewhat smaller than working cohorts (i.e. population growth n is small but >0).

[64] For simplicity, here we ignore differential mortality (i.e. we implicitly assume uniform mortality rates for the poor and the rich). Of course we do take into account differential mortality in the simulations. In effect, this simply introduces a uniform downward correction factor on b_t. See Appendix B, section B2.

all age groups (in particular there is no dissaving at old age). We take s_L and s_K as given and constant over time.[65]

A special case of this formulation is uniform savings: s_L=s_K=s. Another special case is so called "class savings" (s_L=0 and s_K>0), whereby savings come solely from capital income. In the general case (s_L≥0, s_K≥0), the aggregate savings rate s is given by $s=\alpha s_K+(1-\alpha)s_L$, where α is the Cobb-Douglas capital share.

The exogenous savings model is obviously not very satisfactory from an intellectual viewpoint. We later move to more micro founded models.[66] However it provides a useful benchmark and helps to clarify some of the key intuitions. Also note that real world aggregate saving rates happen to be relatively flat with respect to age (consumption tends to track down income pretty closely), or at least much less age-dependant that what most micro models would tend to predict.[67] Whatever the exact explanation for this fact might be (imperfect capital markets, imperfect foresight, etc.), it is useful to know what the implications are for the long dynamics of age-wealth profiles and inheritance flows.[68]

5.2.1. Steady-state wealth-income ratio and rate of return

A well know property of our Solow-type wealth accumulation model is that the long-run wealth-income ratio $\beta_t=W_t/Y_t$ and rate of return r_t are uniquely determined:[69]

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[65] I.e. we assume $s_t(a) = s_L y_{Lt}(a) + s_K\, r_t w_t(a)$ (with $s_t(a)$ = average savings of a-year-old individuals).

[66] One possible micro rationale for class saving behaviour is the dynastic model (see below). The more traditional, Kaldor-Pasinetti-type justification involves income effects: zero-wealth workers have wages below or around subsistence consumption and save little or not at all; while high-wealth capitalists are far above subsistence and save a large fraction of their capital income. One needs however to assume that the subsistence consumption level grows at rate g (maybe because of reference group effects). Our formulation for the general case is closer to Kaldor (1966) than to Pasinetti (1962), as the different savings propensities attach to types of income rather than to classes of people (i.e. once workers have started accumulated wealth from their labor income, their saving rate out of capital income is the same as the capitalists' saving rate; Kaldor's justification for this is corporate savings; but this is not really a micro founded explanation).

[67] See section 6 below and Antonin (2009) for recent estimates using French expenditure surveys.

[68] The flat saving rates that we assume here could come from any micro model, and do not need to be the same for all individuals. Because of linearity, all results below hold for any distribution of savings rates s_{Lti} and s_{Kti} (with both permanent intra-cohort heterogeneity and idiosyncratic within-lifetime shocks), as long as average savings rates s_L and s_K are the same for all age groups. More generally, all results obtained under the exogenous savings model also hold for any distribution of labor income y_{Lti} and rate of return r_{ti}, as long as age-level averages are the same. The exact structure of shocks matters for the steady-state wealth distribution, but has no impact on steady-state aggregate ratios.

[69] This simply comes from the wealth accumulation equation $dW_t/dt = sY_t$, i.e. $d\beta_t/dt = s - g\beta_t = 0$ iff $\beta^* = s/g$. If population N_t grows at rate n>0 (or n<0), then one simply needs to replace g by g+n.

Proposition 1 (exogenous savings, closed economy)

Assume exogenous saving rates $s_L \geq 0$, $s_K \geq 0$. Note $s=\alpha s_K+(1-\alpha)s_L$ (aggregate savings rate). As $t \to +\infty$, the wealth-income ratio $\beta_t=W_t/Y_t \to \beta^*$ and the rate of return $r_t \to r^*$.

Steady-state β^* and r^* are uniquely determined by: $\boldsymbol{\beta^*= s/g}$ and $\boldsymbol{r^*= \alpha/\beta^*= \alpha g/s}$

Example: If the savings rate s=10% and the growth rate g=2%, then the long-run wealth-income ratio β*=500%. If the Cobb-Douglas capital share α=30%, then this corresponds to a long-run rate of return r*=6%.

The Harrod-Domar-Solow formula β*=s/g is a pure accounting equation. It necessarily holds in steady-state, whatever the production function or the savings model might be. If the long run savings rate is equal to s, then in the long run β* converges toward s/g.[70]

In the Cobb-Douglas specification, the long run rate of return r*=αg/s can in principle be larger or smaller than the growth rate g, depending on whether on the capital share α is larger or smaller than the savings rate s. In practice however, α is usually much larger s in real world economies, so steady-state r* is larger than g.[71] In any case, the rate of return r* is always an increasing function of g. For a given saving rate, higher growth makes capital relatively scarcer, and therefore marginally more productive.

The rate of wealth reproduction $s_K r^*$ is by construction always less than g in steady-state. Otherwise this would not be a steady-state: with $s_K r^*>g$, wealth holders accumulate new wealth at a faster rate than national income growth (even in the absence of any labor income), and the wealth-income ratio rises indefinitely. So $s_K r^* \leq g$. As long as $s_L>0$, one can see that $g-s_K r^*=g(1-\alpha)s_L/s$ is strictly positive: it is equal to the growth rate times the share of labor income savings in total savings. With uniform savings, it is simply equal to $(1-\alpha)g$. The equality $s_K r^*=g$ corresponds to the class savings case $s_L=0$ and $s_K>0$.

[70] The formula β*=s/g was first derived by Harrod (1939) and Domar (1947) using fixed-coefficient production functions, in which case β* is entirely given by technology, hence the knife-edge growth conclusion (Harrod emphasized the inherent instability of the growth process; Domar stressed the possibility that β* and s can adjust in case the natural growth rate g+n differs from s/β*). The classic derivation of the formula with a production function Y=F(K,L) involving capital-labor substitution, thereby making balanced growth path possible, is due to Solow (1956). Authors of the time had limited national accounts at their disposal to estimate the parameters of the formula. In numerical illustrations they typically took β*=400%, g=2%, s=8%.

[71] Note also that in micro founded models α<s and r*<g lead to dynamic inconsistencies: the present value of future resources is infinite, so agents should be willing to borrow, not to save. See the dynastic model below.

Example: With s_L=0%, s_K=20%, g=1% and α=30%, then the aggregate savings rate $s=\alpha s_k$=6%. So the long-run wealth-income ratio $\beta^*=s/g$=600%, and the long-run rate of return $r^*=\alpha/\beta^*$=5%. Wealth holders get a 5% return, consume 80% of it and save 20%, so that their wealth grows at 1%, just like national income. This is a steady-state.

5.2.2. Steady-state inheritance flows: class savings case

How do the steady-state age-wealth profile $w_t(a)$, the μ_t ratio and the inheritance flow ratios b_{yt} and b_{wt} look like in this well-known model? Consider first the class savings case: s_L=0, s_K>0. Then the steady-state age-wealth profile $w_t(a)$ takes a simple form (see Figure 11):

If $a\in[A,I[$, then $w_t(a) = 0$
If $a\in[I,D]$, then $w_t(a) = \overline{w}_t$

Since s_L=0, young individuals have zero wealth until the time they inherit. Then, at age a=I, everybody inherits (some inherit very little or nothing at all, some inherit a lot, depending on the cross-sectional distribution, and on average they inherit $b_t=w_t(I)=w_t(D)$), so that average wealth $w_t(a)$ jumps to some positive level $\overline{w}_t=b_t$. Now, the interesting point is that in the cross-section all age groups with age a between I and D has the same average wealth $w_t(a)=\overline{w}_t$. This is because in steady-state the growth effect and the saving effect exactly compensate each other. Take the group of individuals with age a>I at time t. They inherited a-I years ago, at time s=t-a+I. They received average bequests $b_s=w_s(I)$ that are smaller than the average bequests $b_t=w_t(I)$ inherited at time t by the I-year-old. Since everything grows at rate g in steady-state, we simply have: $b_s= e^{-g(a-I)}\, b_t$. But although they received smaller bequests, they saved a fraction $s_K=g/r^*$ of the corresponding return, so at time t their inherited wealth is now equal to: $w_t(a) = e^{s_K r^*(a-I)}\ e^{-g(a-I)}\, b_t = b_t = w_t(I) = \overline{w}_t$.

Given this age-wealth profile, the average wealth w_t over all age groups $a\in[A,D]$ is given by: $w_t=(D-I)\overline{w}_t/(D-A)=H\overline{w}_t/(D-A)$. It follows that the steady-state ratio $\mu^*=w_t(D)/w_t=\overline{w}_t/w_t$ is entirely determined by demographic parameters:

$$\mu^* = \frac{w_t(D)}{w_t} = \frac{D-A}{H} \qquad \textbf{(5.5)}$$

Once we know μ^*, we can easily compute steady-state inheritance flow ratios $b_w^*=m^*\mu^*$ and $b_y^*=m^*\mu^*\beta^*$. Here the important point is that since the mortality rate $m^*=1/(D-A)$, the product $m^*\mu^*$ is simply equal to one divided by generation length H, and does not depend on adult life length D-A. We summarize these observations in the following proposition:

<u>Proposition 2</u> (class savings, closed economy)

Assume pure class savings: $s_L=0$ & $s_K>0$. As $t\to+\infty$, $\mu_t\to\mu^*$, $b_{wt}\to b_w^*$ and $b_{yt}\to b_y^*$.

Steady-state ratios μ^*, b_w^* and b_y^* are uniquely determined as follows:

(1) The ratio μ^* between average wealth of decedents and average adult wealth depends solely on demographic parameters: $\boldsymbol{\mu^* = \overline{\mu} = (D-A)/H}$ (>1).

(2) The inheritance flow-private wealth ratio $b_w^*=\mu^* m^*$ and the estate multiplier $e^*=1/b_w^*$ depend solely on generation length H: $\boldsymbol{b_w^* = \overline{b}_w = 1/H}$ and $\boldsymbol{e^* = \overline{e} = H}$

(3) The inheritance flow-national income ratio $b_y^*=\mu^* m^*\beta^*$ depends solely on the aggregate wealth-income ratio β^* and on generation length H: $\boldsymbol{b_y^*= \overline{b}_y = \beta^*/H}$

Proposition 2 is simple, but powerful. It holds for any growth rate g, saving rate s_K, and life expectancy D. It says that societies with a higher life expectancy D will have both lower mortality rates m_t and higher μ_t ratios, and that in steady state both effects will exactly compensate each other, so that the product of the two does not depend on life expectancy. The product $b_{wt}=m_t\mu_t$ will only depend on generation length H, i.e. the average age at which people have children – a parameter which has been relatively constant over the development process (around H=30). If we assume that the wealth-income ratio β^* also tends to be constant in the long run (around $\beta^*=600\%$), then we have a simple explanation as to why the aggregate inheritance flow $b_y^*=\beta^*/H$ always seems to return to approximately 20% of national income.

The intuition is the following: in aging societies with higher life expectancy, people die less often, but they die with higher relative wealth, so that the aggregate inheritance flow is unchanged. In effect, the entire wealth profile is simply shifted towards older age groups: one has to wait longer before inheritance, but one inherits larger amounts, so that from a lifetime perspective inheritance is just as important as before.[72]

Example. Assume $\beta^* = 600\%$ and H=30. Then $b_w^* = 1/H = 3.3\%$ and $b_y^*= \beta^*/H = 20\%$.

[72] In section 7 below, we translate these results expressed in cross-sectional macroeconomic flows into results expressed in longitudinal lifetime resources.

I.e. the aggregate inheritance flow equals 20% of national income, irrespective of other parameter values, and in particular irrespective of life expectancy D.

- Around 1900, we have A=20, H=30 and D=60, so that people inherit at age I=D-H=30. In steady-state, m*=1/(D-A)=2.5% and μ*=(D-A)/H=133%. Then b_w*=m*μ* equals 3.3% of private wealth and b_y*=m*μ*β* equals 20% of national income.
- Around 2020, we have A=20, H=30 and D=80, so that people inherit at age I=D-H=50. In steady-state, m*=1/(D-A)=1.7%, μ*=(D-A)/H=200%. Then b_w*=m*μ* again equals 3.3% of private wealth and b_y*=m*μ*β* again equals 20% of national income.

Although this is a very crude model, we believe that this simple result provides the right intuition as to why the historical decline in mortality rates was to a large extent compensated by an historical rise in the relative wealth of decedents. Moreover, as we see below, this intuition obtained in the class savings model generalizes to more general savings behaviour, assuming that the growth rate g is relatively small.

The discontinuous age-wealth profile obtained in this model (see Figure 11) is obviously an artefact due to the deterministic demographic structure, and would immediately disappear once one introduces demographic noise (as there is in the real world), without affecting the results. E.g. assume that individuals, instead of dying with certainty at age a=D, die at any age on the interval [D-d;D+d], with uniform distribution. Then individuals will inherit at any age on the interval [I-d;I+d]. To fix ideas, say that A=20, H=30, D=70 and d=10, i.e. individuals die at any age between 60 and 80, with uniform probability, and therefore inherit at any age between 30 and 50, with uniform probability. Then one can show that the steady-state age-wealth profile has a simple linear shape (see Figure 12), and that the theoretical results of proposition 2 are wholly unaffected.[73]

In the real world, there are several other types of demographic noise (age at parenthood is not the same everybody, fathers and mothers usually do not die at the same time, there is differential mortality, there are inter vivos gifts, etc.), and we take all of these into account in the full fledged simulated model. The important point, however, is that the basic intuition provided by proposition 2 is essentially unaffected by demographic noise.

[73] If A≤a≤I-d, then nobody has inherited, so $w_t(a)=0$. If I-d≤a≤I+d, then a fraction (a-I+d)/2d has already inherited, and for those individuals the growth and capitalization effects again cancel each other, so that $w_t(a)$ is a linear fraction of age: $w_t(a)=(a-I+d)\overline{w}_t/2d$. If a≥I+d, then everybody has inherited, so the age-wealth profile is flat: $w_t(a)=\overline{w}_t$. Average wealth $w_t=[2d\overline{w}_t/2+(D-I-d)\overline{w}_t]/(D-A)=(D-I)\overline{w}_t/(D-A)$ remains the same as before, and so do all other results of proposition 2.

5.2.4. Steady-state inheritance flow: general case

In the general case ($s_L \geq 0$ & $s_K \geq 0$), one can show that steady-state inheritance ratios depend negatively on the growth rate, and converge towards class saving levels as $g \to 0$:

Proposition 3 (exogenous savings model, closed economy)
Assume exogenous saving rates $s_L>0$, $s_K \geq 0$. As $t \to +\infty$, $\mu_t \to \mu^* = \mu(g) < \bar{\mu}$
Higher growth reduces the relative importance of inheritance: **$\mu'(g)<0$**
With low growth, inheritance ratios converge to class saving levels: **$\lim_{g \to 0} \mu(g) = \bar{\mu}$**

Proposition 3 is a generalization of Proposition 2 and includes it as a special case. The general formula for steady-state $\mu^* = \mu(g)$ turns out to be reasonably simple:

$$\mu(g) = \frac{1 - e^{-(g - s_K r^*)(D-A)}}{1 - e^{-(g - s_K r^*)H}} \qquad \textbf{(5.6)}$$

With $s_L>0$, the steady-state rate of wealth reproduction $s_K r^*$ is strictly less than the growth rate g, and $g - s_K r^* = g(1-\alpha)s_L/s > 0$. If $s_L \to 0$, then $g - s_K r^* \to 0$. Simple first order approximation using the formula $\mu(g)$ shows that steady-state μ^* then tends toward $\bar{\mu} = (D-A)/H$.[74] This is just a continuity result: as we get closer to class savings, we converge toward the same age-wealth profile and inheritance ratios, whatever the growth rate might be.

The more interesting part of Proposition 3 is that for any saving behaviour ($s_L>0$, $s_K \geq 0$), steady-state μ^* also tends toward the same class-saving level $\bar{\mu}$ when the growth rate g tends toward 0. In the uniform savings case ($s_L = s_K = s$), $g - s_K r^* = (1-\alpha)g$, so we simply have:

$$\mu(g) = \frac{1 - e^{-(1-\alpha)g(D-A)}}{1 - e^{-(1-\alpha)gH}} \qquad \textbf{(5.7)}$$

First-order approximations again show that $\mu(g) \to \bar{\mu}$ as $g \to 0$. Steady-state inheritance ratios b_w^* and b_y^* also tend toward their class saving levels $\bar{b}_w = 1/H$ and $\bar{b}_y = \beta^*/H$ when growth rates go to zero. Conversely, the higher the growth rate g, the lower the steady-state inheritance ratios $\mu^* = \mu(g)$, b_w^* and b_y^*.

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[74] For $g - s_K r^*$ small, $\mu(g) \approx \bar{\mu}\,[1 - (g - s_K r^*)(D-A-H)/2]$.

The intuition is the following. With $s_L>0$, the age-wealth profile is less extreme than the class saving profile depicted on Figure 11. Young workers now accumulate positive wealth before they inherit (and accumulate positive wealth even if they never inherit). So the relative wealth of the elderly μ_t will always be lower than under class savings. Since labor income grows at rate g, this effect will be stronger for higher growth rates. With large growth, young workers earn a lot more than their parents. This reduces the importance of inheritance. But with low growth, the inheritance effect increasingly dominates, and the steady-state age-wealth profile looks closer and closer to the class saving profile. So inheritance flows converge towards class saving levels, irrespective of saving behavior.[75]

Next, and most importantly, formulas (5.6)-(5.7) can be used to quantify the magnitude of the effects at play. The point is that convergence towards class saving levels happens very fast. That is, for low but realistic growth rates (typically, g=1% or g=2%), we find that μ(g) is already very close to $\bar{\mu}$. That is, inheritance-wise, a growth rate of g=1% or g=2% is not very different from a growth rate g=0%.

Example. Assume g=1% and uniform savings ($s=s_K=s_L$). Then for A=20, H=30, D=60, i.e. I=D-H=30, we have μ(g)=129%. This is lower than $\bar{\mu}$=(D-A)/H=133% obtained under class savings, but not very much lower. With β*=600%, this corresponds to b_y*=19% instead of b_y*=20% under class savings. With A=20, H=30, D=80, i.e. I=D-H=50, we get μ(g)=181% under uniform savings instead of $\bar{\mu}$=200% with class savings, and again b_y*=19% instead of b_y*=20%. Assuming g=2%, we still get b_y*=19% with D=60, and b_y*=17% with D=80, instead of b_y*=20% in both cases under class savings.[76]

Assume for instance that there was a major structural shift from class saving behaviour in the 19th century to uniform savings in the 20th century (or even to reverse class saving, where all savings come from labor income), for instance because of a structural decline in wealth concentration. This will tend to make wealth less persistent over time, and therefore to reduce the steady-state magnitude of inheritance flows. However with growth rates

[75] See Appendix E, Figures E1-E2. For a given saving rate s, steady-state β* (and not only μ*) rises as g decreases, which also pushes towards higher b_y*. If s→0 as g→0, so as to keep β*=s/g and r*=α/β* constant, then in effect g/r*→0 as g→0, i.e. with low growth the capitalization effect is infinitely large as compared to the growth effect. The extreme case g=0 is indeterminate in the exogenous savings model: if g=0 and s>0, then as t→+∞, β_t→+∞ and r_t→0; if g=0 and s=0, then β* and r* are entirely determined by initial conditions; in both cases our key result still holds: $\mu_t \to \bar{\mu}$ as t→+∞.
[76] See Appendix E, Table E1 for detailed computations using formulas (5.6)-(5.7).

around g=1%-2% the effect will be quantitatively extremely modest: the annual inheritance flow will be 17%-19% of national income instead of 20%.

In order to obtain more substantial declines in μ^* and b_y^*, one needs to assume much larger growth rates. E.g. with g=5%, then one gets b_y^*=17% with D=60, and b_y^*=13% with D=80 (again for β^*=600%). This can contribute to explain why inheritance flows remained low during the 1950s-1970s period, when growth rates were indeed exceptionally high.[77]

As $g \to +\infty$, then $\mu^*=\mu(g) \to 1$, $b_w^* \to 1/(D-A)$ and $b_y^* \to \beta^*/(D-A)$. Assume D=80, so that adult life length D-A=60 is twice as long as generation length H=30. Then infinite growth leads to a doubling of the estate multiplier e* (from e*=30 to e*=60), and a division by two of the inheritance flow b_y^* (from b_y^*=20% to b_y^*=10%, for given β^*=600%). In case life expectancy rises to D=110, then the inheritance flow is divided by three. With infinite growth, $b_w^* \to 0$ and $b_y^* \to 0$ as $D \to +\infty$. That is, societies where people die later and later resemble societies where one never dies, and inheritance effectively vanishes. The key point, however, is that this naive intuition only applies to the case with infinite growth. With plausible growth rates, then the inheritance flow b_y^* depends almost exclusively on generation length H, and is little affected by the rise of life expectancy D.

The generosity of the pay-as-you-go pension system also has a limited impact on inheritance flows in this model. Under class savings, the replacement rate ρ has no impact at all, since there is no saving from labor income. With s_L>0, the replacement rate has an effect going in the expected direction: lower pensions make the elderly relatively poorer, thereby reducing μ^* and b_y^*. But for small growth rates, the quantitative impact is again limited. E.g. with g=1% and D=80, then going from ρ=100% to ρ=0% (no pension at all) makes b_y^* go from 18% to 17%.[78] However this is partly an artefact due to the exogenous saving modelling. Here the impact of the pension system is by construction solely due to the mechanical effect going through age-income profiles (for fixed saving rates). In the real world, if there was no pension system at all, at least some individuals would presumably react by saving more while active and by dissaving while retired, i.e. they would adopt non-

[77] Of course the other part of the explanation is that β_t was much smaller than 600% at that time. Here we report the findings obtained for b_y^* under the assumption of a fixed β^*=600%, so as to isolate the effect going through age-wealth profiles and the resulting μ^* ratio.
[78] See Appendix E, Table E1. In Appendix E we provide a closed-form formula for $\mu(g,\rho)$ extending the above formula and show that our key result still holds: for all $\rho \leq 1$, $\mu(g,\rho) \to \bar{\mu}$ as $g \to 0$.

flat age-saving rates profiles and accumulate lifecycle wealth. In order to address this issue, one needs to use endogenous saving models, which we do below.

5.2.4. Open economy

So far we could not study separately the effect of g and r on steady-state inheritance flows, since r=r* was entirely determined by g in the long run. This followed from the closed economy assumption. So consider now the opposite extreme case of a small open economy taking as given the world rate of return r>0. We have the following result:

Proposition 4 (exogenous savings model, open economy).

Assume exogenous saving rates $s_L \geq 0$, $s_K \geq 0$, and a world rate of return $r \geq 0$.

As $t \to +\infty$, $\mu_t \to \mu^* = \mu(g,r)$. If $r > \bar{r} = g/s_K$, then $\mu(g,r) = \bar{\mu}$. If $r < \bar{r}$, then $\mu(g,r) < \bar{\mu}$.

Lower growth and/or higher rates of return raise the relative importance of inheritance: **$\mu'(g)<0$, $\mu'(r)>0$**.

With low growth and/or high rates of return, inheritance ratios converge to class saving levels: $\lim_{g \to 0}$ **$\mu(g,r)$ =** $\lim_{r \to \bar{r}}$ **$\mu(g,r) = \bar{\mu}$**

Strictly speaking, the case $r > \bar{r}$ cannot be a long run outcome. With $s_K r > g$, wealth holders in our small open economy accumulate an infinite quantity of foreign assets (relatively to domestic output and domestic assets) and eventually become the owners of the entire world. This in principle should push downwards the world rate of return r. But it takes a long time to own the entire world. So such a process can apply during many decades. This model is useful to understand the wealth accumulation patterns prevailing in France (and other European countries such as the U.K.) in the 19th century and early 20th century. The French β_t rose from 550%-600% in 1820 to 650%-700% in 1900-1910, and most of the rise came from the accumulation of foreign assets. The case $r > \bar{r}$ is indeed particularly likely to prevail in environments with low growth and high wealth concentration (so that wealth holders can afford re-investing a large fraction s_K of their asset returns). E.g. with g=1% and s_K=25%, the world rate of return r simply needs to be larger than $\bar{r} = g/s_K$ =4%. So if r=5%, then $s_K r$=1.25%, i.e. private wealth grows 25% faster than domestic output, which over a few decades makes a big difference.

What we add to these well-know open economy insights is the inheritance dimension. The interesting result here is that in case $r > \bar{r}$ then μ_t always converges towards its maximum class-saving level $\bar{\mu}$, whatever the growth rate g and the labor saving rate s_L. That is, g or

s_L do not need to be infinitely small: they just need to be such that $r>\bar{r}$. Intuitively, labor income as a whole matters less and less along such explosive paths, and the age-wealth profile becomes almost exclusively determined by inheritance receipts.

The case $r<\bar{r}$ corresponds to balanced open-economy development paths. In steady-state the stock of net foreign assets (positive or negative) is a constant fraction of domestic output and assets. Here the steady-state μ*=μ(g,r) is determined by the same formula as in the closed economy case, except that now both g and r are free parameters:

$$\mu(g,r) = \frac{1-e^{-(g-s_K r)(D-A)}}{1-e^{-(g-s_K r)H}} \qquad \textbf{(5.8)}$$

The intuition for μ'(g)<0 is the same as before: higher growth raises the relative wealth of the young and reduces the relative wealth of elderly (and therefore the relative importance of inheritance). The intuition for μ'(r)>0 is the opposite: a higher rate of return gives more weight to past inheritance and raises the relative wealth of the elderly.

In the same way as in the closed economy case, the important point about this formula is that it converges very fast to class saving levels as g→0 and/or as $r\to\bar{r}$.

The formula μ(g,r) also shows that the g effect is quantitatively larger than the r effect, because the r effect is multiplied by $s_K<1$. That is, the absolute growth rate g matters, and not only the differential r-g. For given r-g, the steady-state μ*=μ(g,r) and the corresponding b_y* will be lower for higher g.

Example. Assume r-g=3%, D=80, s_K=20%. If g=1% and r=4%, then we obtain μ*=μ(g,r)=194% and b_y*=19% (i.e. almost as much as the class saving levels $\bar{\mu}$=200% and b_y*=20%). But if g=5% and r=8%, then we get μ*=μ(g,r)=136% and b_y*=14%.[79]

5.3. Steady-state inheritance flow in the dynastic model

We now move to the infinite-horizon, dynastic model. Each dynasty i is assumed to maximize a utility function of the following form:

[79] See Appendix E, Table E2 for detailed computations using the μ(g,r) formula.

$$U_i = \int_{t \geq s} e^{-\theta t} u(c_{ti}) dt \qquad (5.9)$$

Where θ is the rate of time preference, c_{ti} is the consumption flow of dynasty i at time t, and $u(c) = c^{1-\sigma}/(1-\sigma)$ is a standard utility function with constant intertemporal elasticity of substitution (IES). The constant IES is equal to 1/σ. Realistic values for the IES are usually considered to be relatively small (typically between 0.2 and 0.5), and in any case smaller than one, i.e. σ is a parameter that is typically bigger than one.

As is well known, the closed-economy steady-state rate of return r* in dynastic models is uniquely determined by the modified Ramsey-Cass golden rule of capital accumulation:[80]

$$r^* = \theta + \sigma g \qquad (5.13)$$

The special case g=0 implies r*=θ. More generally, for g≥0, the steady-state rate of return r* is always larger than the growth rate g in the dynastic model.[81] In the same way as in the exogenous saving model, r* is also an increasing function of g.[82]

Once r* is uniquely determined, other aggregates follow. With Cobb-Douglas production, the steady-state wealth-income ratio $\beta_t = W_t/Y_t$ is uniquely determined by: β*= α/r*.

Example: If θ=1%, σ=2, g=2%, then r*=5%. If α=30%, then β*=600%.

It is also well known that any wealth distribution such that the aggregate wealth-income ratio is equal to β* is a steady-state of the dynastic model.[83] Because of the OLG

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[80] This follows directly from the first-order condition describing the optimal consumption path: $dc_t/dt = (r-\theta)c_t/\sigma$ i.e. utility-maximizing agents want their consumption path to grow at rate $g_c = (r-\theta)/\sigma$. This is a steady-state iff $g_c = g$, i.e. r=r*=θ+σg. If r>r* they accumulate indefinitely, and if r<r* they borrow indefinitely.

[81] Since σ is typically >1, one can be sure that r*=θ+σg>g. In the (unplausible) case where σ<1, then in theory one could have r*<g. However this would then violate the transversality condition, so this would not be a steady-state (the net present value of future income flows would be infinite, and everybody would like to borrow infinite amounts against future resources, thereby pushing r upwards).

[82] The fact that the equilibrium, aggregate rate of return on assets r*(g) is always higher than g and an increasing function of g in standard models (r*=αg/s with exogenous savings, r*=θ+σg with dynastic savings) is well known to macroeconomists (see e.g. Baker et al (2005) for an application to pension projections).

[83] See e.g. Bertola et al (2006, chapter 3). Note however that the steady-state equation r*=θ+σg only applies to the case of perfect capital markets, and in particular in the absence of uninsurable idiosyncratic shocks. So in order to keep the model simple we need to assume that all generations of a given dynasty i have the same labor productivity parameter $\bar{y}_{Lti} = y_{Lti}/y_{Lt}$, i.e. the same relative position in the distribution of labor income of their time. In the absence of any other shock, all generations of a given dynasty i also have the same relative position $\bar{b}_{ti} = b_{ti}/b_t$ in the wealth-at-death distribution of their time. Relative positions for labor income and inherited wealth do not need to be perfectly correlated across dynasties: any stationary joint

demographic structure, we need to specify how various generations of the same dynasty act with one another when they are alive at the same time. Consider a dynasty i with successive generations born at time x_i, x_i+H, x_i+2H, etc. At time $t\in[x_i+H,x_i+D]$, generation x_i has age $a\in[H,D]$, and his child born at time x_i+H is also alive and has age $a\varepsilon[0,I]$. We do not want to enter into the modelling of inter vivos gifts, so for simplicity we assume that parents start to care about their children's consumption level only after they die. That is, we assume that generation x_i is maximizing $U_i = \int_{t\geq s} e^{-\theta t}u(c_{ti})dt$ with $s=x_i+A$, and where c_{ti} denotes the consumption path followed by generation x_i for $t\varepsilon[x_i+A,x_i+D]$, by generation x_i+H for $t\in[x_i+D,x_i+D+H]$, and so on. We start with the simplest case:

<u>Proposition 5</u>: (dynastic model, closed economy)
Assume ρ=1, and no borrowing against future inheritance.
Then inheritance ratios in the dynastic model are the same as in the class saving model.
As $t\to+\infty$, $\mu_t\to\overline{\mu} = (D-A)/H$, $b_{wt}\to\overline{b}_w = 1/H$ and $b_{yt}\to\overline{b}_y = \beta^*/H$

The intuition for this result is the following. Since the pay-as-you-go pension system offers 100% replacement rates (ρ=1), there is no need at all for lifecycle saving. We also assume that young age agents cannot borrow against their future inheritance, which in the real world is indeed difficult, if not impossible.[84] With these two assumptions, the consumption and wealth profiles look exactly the same as in the class saving model (see Figure 11):

If $a\in[A,I[$, $c_t(a)= y_{Lt}(a)$ and $w_t(a)=0$
If $a\in[I,D]$, $c_t(a)= y_{Lt}(a) + (r^*-g)\overline{w}_t$ and $w_t(a)=\overline{w}_t$

That is, until the time they inherit, young workers simply consume their labor income (s_L=0) and accumulate no wealth. Then they inherit. They still consume their full labor income, and in addition they can now consume a fraction 1-s_K of the return to their inherited wealth, and save the rest, with $s_K=g/r^*$. The growth and saving effects again cancel out, so that everybody above inheritance age has the same wealth $\overline{w}_t$. The reason why dynastic

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distribution $G(\overline{y}_{Lti}, \overline{b}_{ti})$ is a steady-state of the dynastic model, as long as the aggregate $\beta_t=w_t/y_t$ is equal to β^*. Shocks on dynastic productivity parameters would generate precautionary savings (i.e. high productivity parents would accumulate extra wealth in order to protect their children against the risk of having a low productivity). This would lead to higher aggregate wealth accumulation and push steady-state $r<r^*$. This would complicate the resolution of the model, without offering substantial additional insights.

[84] In particular, there is uncertainty about time of parental death, future parental wealth, etc. so banks may not like lending against future inheritance. Also parents may not like to see their children borrow against their own death, and can threaten to disinherit them.

agents behave in the same way as in the exogenous class saving model (with a marginal propensity to save out of labor income $s_L=0$, and a marginal propensity to save out of capital income $s_K=g/r^*$) can be phrased as follows. In this deterministic model, the consumption path of every dynasty (poor or rich) grows at rate g in steady-state. Since labor income naturally grows at rate g, zero-wealth dynasties do not need to save out of labor income. However wealth does not naturally grows at rate g. So if wealthy dynasties do not save, and instead consume the full return to their inherited wealth, then their future consumption will not grow. In order to make sure that their wealth and future capital income grows at rate g, they need to save a fraction $s_K=g/r^*$. Now, because $r^*>g$, $s_K=g/r^*<100\%$: wealthy dynasties consume a positive fraction $1-g/r^*$ of the return to their inherited wealth and save the rest.

Therefore the relative wealth of decedents μ_t converges towards class saving level $\overline{\mu}$, and the inheritance ratios b_{wt} and b_{yt} converge toward 1/H and β*/H. So if H=30 and β*=600%, then the dynastic model predicts that the inheritance flow should be equal to 20% of national income, whatever the growth rate g and life expectancy D might be.

If we allow for borrowing against future inheritance, and we solve for the time-consistent steady-state (whereby parents anticipate that their children borrow against future inheritance and adjust their saving behaviour accordingly), we find that inheritance ratios will be even larger than the class saving levels. Intuitively, parents leave larger bequests so as to compensate for the fact that children consume part of it before they die:

<u>Proposition 6</u>: (dynastic model, closed economy)

Assume ρ=1, and borrowing against future inheritance.

Then inheritance ratios in the dynastic model are larger than in the class saving model.

As $t\to+\infty$, $\mu_t \to \mu^* = \dfrac{e^{(r-g)(D-A)}-1}{e^{(r-g)H}-1} > \overline{\mu}$, $b_{wt}\to b_w^* > 1/H$ and $b_{yt}\to b_y^* > \beta^*/H$

The borrowing effect can be very large (b_y^* can be well above 20%).[85] But we are not sure that the full borrowing case is empirically relevant. The results obtained with ρ<1 and no-borrowing are probably more relevant:

<u>Proposition 7</u>: (dynastic model, closed economy)

[85] See Appendix E for numerical illustrations and Figure E4 for the steady-state age-wealth profile.

Assume $\rho<1$, and no borrowing against future inheritance.

Then inheritance ratios in the dynastic model are smaller than in the class saving model.

As $t\rightarrow+\infty$, $\mu_t\rightarrow\mu^*=\overline{\mu}\ [1-\frac{(1-\alpha)\beta_L}{\beta^*}]$ (with β_L= lifecycle wealth in years of labor income)

If the pay-as-you-go pension system offers replacement rates below 100%, then utility maximizing agents will start accumulating lifecycle wealth $w_{Lt}(a)$, i.e. hump-shaped wealth with maximal value at retirement age a=R and going to zero as $a\rightarrow D$. Typically this takes the form of private pension funds. In the context of the dynastic model, this extra form of wealth accumulation will entirely crowd out other forms of wealth (since the aggregate wealth-income ratio $\beta^*=\alpha/r^*$ is fixed). So for instance if lifecycle wealth represents half of aggregate wealth, then steady-state inheritance ratios will be divided by two.

One can show that steady-state lifecycle wealth $\beta_L=w_{Lt}/y_{Lt}$ in this model is given by a relatively simple closed form formula, which we calibrate in order to estimate the size of this effect. If there is no capitalization effect (r-g=0), and no pension system at all ($\rho=0$), then β_L is given by the standard Modigliani triangle formula. β_L is negligible when retirement length D-R is low, e.g. in the 19th century and early 20th century (indeed it is null if R=D=60). But for late 20th century and early 21st century parameters (say, R=60 and D=70 or D=80), then β_L can be as large as 400%-600%. In theory it can therefore absorb a very large fraction of β^*. With r-g>0, β_L is reduced significantly: lifecycle savers benefit from a capitalization effect, so they do not need to save and accumulate as much. Most importantly, pay-as-you go pension systems are an important feature of the real world, and they reduce drastically the need for lifecycle wealth accumulation.

Example. Assume $r^*=\theta+\sigma g=5\%$ and $\alpha=30\%$, so that $\beta^*=600\%$. Assume that the pension system offers a replacement rate $\rho=80\%$, which is roughly the case in France. Then we find that utility maximizing agents will accumulate lifecycle wealth $(1-\alpha)\beta_L$ around 40% of national income for D=70 and 80% of national income for D=80. That is, lifecycle wealth is predicted to represent around 10% of aggregate wealth accumulation.[86] Consequently, the theoretical formulas indicate that the inheritance flow b_y^* should be about 18% of national income (rather than 20% in the case $\rho=1$). The crowding out impact of lifecycle wealth is only slightly larger with higher growth rates. In case $\rho=50\%$, then the crowding out effect is

[86] This is larger than the estimated share of annuitized wealth in French aggregate private wealth, which appears to be less than 5% (mostly through the annuitized fraction of life insurance assets). See Appendix A.

much larger: with g=2%, b_y* falls to 16% if D=70 and to 13% if D=80. With ρ=0% (i.e. no pension system at all), b_y* falls to 12% if D=70 and to 7% if D=80.[87]

These results suggest that the generosity of public pension system can be an important determinant of inheritance flows in advanced economies – together with the growth rate. The dynastic model predicts that steady-state inheritance flows would be approximately divided by two if the pay-as-you-go pension system was abolished. With more realistic pension reforms, the effects are less spectacular, but still significant. E.g. the dynastic model predicts that for a given growth rate (say, g=2%), countries with replacement rates around 70%-80% (such as France or Germany) should have inheritance flows b_y* around 18% of national income, while countries with replacement rates around 50% (such as the U.K. or the U.S) should have inheritance flows around 14%-15% of national income.

These illustrative computations should however be viewed as upper bound estimates of the likely negative impact of lifecycle wealth on inheritance flows. We assume that young workers have perfect foresight and save whatever it takes in order to suffer zero consumption loss at retirement, which might not hold empirically.[88] Most importantly, the 100% crowding out property of the dynastic model is rather extreme, and seems at odd with available evidence.[89] Other models, such as the wealth-in-the-utility model, have less extreme implications. When the lifecycle saving motive becomes more important, then steady-state aggregate wealth accumulation β* also rises (and the rate of return r* declines), so that crowding out is only partial. The fact that r* and β* are entirely pinned down by preference and technology parameters in the dynastic model (r*=θ+σg, β*=α/r*) has extreme implications regarding other policy issues, which also seem to be at odd with empirical evidence. E.g. the dynastic model implies that when the capital income tax rate τ_K rises from 0% to 30%-40% (which is roughly what happened during the 20th century), then β* should also decline by 30%-40%, so that the after-tax rate of return $(1-\tau_K)r^*$ remains the same as before. Prima facie, the long run β* appears to have been relatively stable around 600%, and after-tax returns seem to have declined accordingly.[90]

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[87] See Appendix E, Tables E3-E4 and Figures E5-E8 for detailed computations and age-wealth profiles.
[88] We also assume that young workers cannot borrow from future inheritance, and that expected inheritance does not reduce lifecycle saving. This is more realistic than full borrowing, but probably too extreme.
[89] According to Blau (2009), empirical estimates of the crowding-out effect of pension wealth on total household wealth are much closer to zero than to -1. From a different angle, Poterba (2001) finds that there seems to be little effect of demographic changes and retirement patterns on observed asset returns.
[90] For national accounts based series on capital and labor tax rates τ_K and τ_L in France, see Appendix A. With taxes, the dynastic steady-state conditions are $(1-\tau_K)r^*=\theta+\sigma g$, and $\beta^*=\alpha/r^*=(1-\tau_K)\alpha/(\theta+\sigma g)$.

Another reason why lifecycle wealth might not fully crowd out other forms of wealth is the fact that pension funds can be invested in foreign assets – thereby raising the economy's β^* without affecting the rate of return. But again this cannot be addressed in the context of the dynastic model, since opening up the economy leads to degenerate outcomes. If the world rate of return r is above $r^*=\theta+\sigma g$, then the economy accumulates an infinite quantity of foreign assets and eventually owns the rest of the world. And if r is below r*, then the economy borrows indefinitely and is eventually owned by the rest of the world. In order to study open economy issues, one needs to use less extreme models.

5.4. Steady-state inheritance flow in the wealth-in-the-utility model

We now move to the finite-horizon, wealth-in-the-utility model. Each agent i is assumed to maximize a utility function of the following form:

$$\mathbf{V_i = V(U_{Ci} , w_i(D))} \qquad \textbf{(5.14)}$$

With: $U_{Ci} = [\int_{A\leq a\leq D} e^{-\theta(a-A)} c_i(a)^{1-\sigma} da]^{\frac{1}{1-\sigma}}$

$V(U,w) = (1-s_B)\log(U)+s_B\log(w)$

s_B = share of lifetime resources devoted to end-of-life wealth $w_i(D)$

$1-s_B$ = share of lifetime resources devoted to lifetime consumption flow $c_i(a)$ ($a\bullet[A,D]$)

θ = rate of time preference, $1/\sigma$ = intertemporal elasticity of substitution

One standard interpretation for this formulation is that agents care directly about the bequest $b_i=w_i(D)$ which they leave to the next generation. It could also be that they care about what wealth brings to them. In the presence of uninsurable lifetime shocks (income, health, time of death), people might like the security that goes with wealth. So this utility function can be interpreted as a reduced form for precautionary savings.[91] People might also derive direct utility from the prestige, power and social status conferred by wealth.[92] Presumably the exact combination of these saving motives varies a lot across individuals, just like other tastes.[93] Whatever the interpretation, we have the following results:

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[91] See e.g. Dynan, Skinner and Zeldes (2002) for a calibrated model illustrating how plausible uncertainty about end of life health spendings can generate substantial savings and wealth accumulation

[92] See e.g. Carroll (2000), who argues that this wealth-loving model is the best explanation as to why saving rates increase so much with the level of lifetime income. See also Dynan et al (2004) and Kpoczuk (2007).

[93] See Kopczuk and Lupton (2007).

<u>Proposition 8</u> (wealth-in-the-utility model, closed economy)

As $t \to +\infty$, $\mu_t \to \mu^* = \mu(g)$, $b_{wt} \to b_w^* = \mu^* m^*$, and $b_{yt} \to b_y^* = \mu^* m^* \beta^* = \frac{s_B \lambda (1-\alpha) e^{(r-g)H}}{1 - s_B e^{(r-g)H}}$

Higher growth reduces inheritance: **$\mu'(g) < 0$**

For reasonable parameter values, and low growth, inheritance ratios are very close to class saving levels: **μ^* close to $\overline{\mu}$ and b_y^* close to β^*/H**

The generosity of the pension system ($\rho \leq 1$) has a small impact on b_y

<u>Proposition 9</u> (wealth-in-the-utility model, open economy).

As $t \to +\infty$, $\mu_t \to \mu^* = \mu(g,r)$, $b_{wt} \to b_w^* = \mu^* m^*$, and $b_{yt} \to b_y^* = \mu^* m^* \beta^* = \frac{s_B \lambda (1-\alpha) e^{(r-g)H}}{1 - s_B e^{(r-g)H}}$

Lower growth and/or higher rates of return raise inheritance: **$\mu'(g) < 0$, $\mu'(r) > 0$**.

With reasonable parameter values, and low growth and/or high rates of return, inheritance ratios are very close to class saving levels: **μ^* close to $\overline{\mu}$ and b_y^* close to β/H**

The generosity of the pension system ($\rho \leq 1$) has no impact on b_y.

So we obtain the same general results as with the exogenous saving model and the dynastic model. That is, steady-state inheritance ratios are a decreasing function of the growth rate and an increasing function of the rate or return; for low growth, they are almost exclusively determined by generation length H. Technically, one important difference is that the formulas for steady-state β^*, r^* and μ^* are more complicated in the wealth-in-the-utility model than in other models. In the closed economy case can be solved only by numerical methods. On the other hand the wealth-in-the-utility-function model implies a very simple closed-form formula for the steady-state inheritance flow b_y^*:

$$b_y^* = b_y(g,r) = \frac{s_B \lambda (1-\alpha) e^{(r-g)H}}{1 - s_B e^{(r-g)H}} \qquad (5.15)$$

This formula follows directly from the fact that agents devote a fraction s_B of their lifetime resources (labor income and inherited wealth) to their end-of-life wealth.[94] It holds both in the closed and open economy cases, and for any structure of intra-cohort labor income or

[94] This formula applies to the inheritance-domestic income ratio; the formula for the inheritance-national income ratio is more complicated. See Appendix E1. The factor λ corrects for the differences between the lifetime profile of labor income and inheritance flows, and is typically close to 1. See section 7 below.

preference shocks.[95] The intuition as to why the inheritance-income ratio b_y^* is a rising function of r-g is straightforward. The excess of the rate of return over the growth rate exactly measures the extent to which wealth coming from the past is being capitalized at a faster pace than the growth rate of current income.

Numerical solutions to the theoretical formulas yield the following results.[96] Assume A=20, H=30, D=80, s_B=10%, and g=1%. Then in the closed-economy case we get r*=4% and b_y^*=22%. If life expectancy was instead D=60, we would get instead b_y^*=21%. I.e. inheritance ratios are almost exclusively determined by generation length H, and depend very little on life expectancy. With g=2%, we get r*=5% and b_y^*=18% (both for D=60 and D=80). One needs to assume much larger growth rates to obtain more significant declines. In the open-economy case, inheritance can reach higher levels. E.g. with D=80, s_B=10%, g=1% and r=5%, then b_y^*=30%.

Also, note that in the closed-economy case, the generosity of pay-as-you-go pension system has a smaller impact than in the dynastic model (because crowding out is only partial, which seems more realistic). In the open-economy case, the generosity of the pay-as-you-go pension system has no impact at all: in effect, additional pension wealth is entirely invested abroad, so b_y^* is wholly unaffected. Though full international capital mobility is a somewhat extreme assumption, this result seems to capture a plausible intuition explaining why inherited wealth and pension wealth are to a large extent disconnected issues in today's global economy. That is, with high capital mobility, the fact that the generosity of pay-as-you-pension systems varies across countries should have little impact the magnitude of inheritance flows in the various countries.

[95] Agents in this model do not care directly about the welfare of the next generation (but simply about their end-of-life wealth), so we do not need to assume any longer that all generations of a given dynasty i have the same labor parameter. Any shock structure will do, both for the distribution of labor income y_{Li} and of preference parameters s_{Bi}. By linearity, the aggregate steady-state only depends on the average s_B.

[96] See Appendix E, Tables E5-E11 for detailed results. Here we report partial results from Table E11 (closed economy case) and Table E7 (open economy case).

6. Simulations

We now come to the full fledged simulations. Our simulated model is conceptually simple. We start from observed demographic data. We also take as given observed national-accounts aggregate values for all macroeconomic variables (growth rates, factor shares, tax rates, rates of return, saving rates). We then make different assumptions about saving behaviour in order to see whether we can replicate observed age-wealth profiles, μ_t ratios and the resulting inheritance flows.

More precisely, we constructed an exhaustive, annual demographic data base on the age structure of the living population and of decedents, heirs, donors and donees in France over the 1820-2008 period. In practice, bequest and gift flows accrue to individuals in several different payments during their lifetime: usually both parents do not die in the same year, sometime individuals receive gifts from their parents, and sometime they receive bequests and gifts from individuals other than their parents. We use the estate tax returns micro-files available since the 1970s (and the historical tabulations broken by decedent and donor age group available for the earlier period), as well as historical demographic data on age at parenthood, in order to compute the exact fraction of bequest and gift flow accruing to each cohort and transmitted by each cohort during each year of the 1820-2008 period. In the simulated model, the value of bequests is endogenous: it depends on the wealth at death of the relevant cohorts, as determined by the endogenous dynamics of the age-wealth profile. But the fraction of the aggregate bequest flow going to each cohort is taken from observed data. Regarding gifts, in some variants we take the observed gift-bequet ratio v_t as given, and in some other variants we assume other gift-bequest ratios (so as to check whether long run patterns are affected by v_t). In all variants, the age structure of donors and donees is exogenously given by our demographic data base.

Regarding the economic side of the model, we proceed as follows. We start from observed factor shares in national income, as measured by national accounts: $Y_t = Y_{Kt} + Y_{Lt}$. We use national accounts tax and transfer series to compute aggregate, net-of-tax labor and pension income $(1-\tau_{Lt})Y_{Lt}$ (where τ_{Lt} is the aggregate labor tax rate, excluding pension payroll taxes). We use income tax data to estimate the age-labor income profile (including pension income) $Y_{Lt}(a)$ throughout the period, which we take as given. On this basis we attribute an average net-of-tax labor and pension income $y_{Lt}(a)$ to each cohort for each year of the 1820-2008 period. Because we use liner saving models, we do not attempt to model intra-cohort inequality labor income or wealth.

We also take as given the average pre-tax rate of return r_t, which we compute by dividing capital income Y_{Kt} by aggregate private wealth W_t, and the average after-tax rate of return $r_{dt}=(1-\tau_{Kt})r_t$ (where τ_{Kt} is the aggregate capital tax rate). We assume that wealth holders from all age groups get the same average after-tax rate of return r_{dt} on their wealth $W_t(a)$. This is very much a simplifying assumption. In the real world, rates of return vary widely across assets: typically, returns on stock and real estate are much larger than returns on bonds.[97] This might possibly entail systematic differences across age groups.[98] However we know very little on such systematic variations, so as a first approximation attributing the same average return to all age groups seems like the most reasonable assumption.

Our national-accounts approach to average rates of return r_t and r_{dt} also appears to be the most appropriate option. To the extent that national accounts correctly measure annual flows of capital income Y_{Kt} (rental income, interest, dividend, etc.), then r_t and r_{dt} indeed measure the true average rate of return received by holders of private wealth W_t in France over the past two centuries. National accounts are not perfect. But this is arguably the most comprehensive data source we have, and one ought to start from there.

We present two main series of simulations: one for the 1820-1913 quasi-steady-state period, and one for the 1900-2008 U-shaped period (which was then extended to the future). In the first one, we start from the observed age-wealth profile in 1820, and attempt to simulate the evolution of the profile during the 1820-1913 period. In the second one, we start from the observed age-wealth profile in 1900, and attempt to simulate the evolution of the age-wealth profile during the 1900-2008 period. In both cases, the cohort level transition equation for wealth is the following:[99]

$$\mathbf{W_{t+1}(a+1) = (1+q_{t+1})\,[W_t(a) + s_{Lt}Y_{Lt}(a) + s_{Kt}r_{dt}W_t(a)]} \qquad \mathbf{(6.1)}$$

(+ bequests and gifts received – bequests and gifts transmitted)

[97] E.g. according to Barro (2009, Table 1), the average real rate of return on stocks has been as large as 7.5% over the 1880-2005 period, vs. 1.0% for bonds (averages over 11 Oecd countries).
[98] Thanks to linear savings, and because we focus on age-level averages, we do not need to assume that all individuals get the same return: we are just assuming that average returns are the same for all age groups.
[99] The full transition equations, and detailed simulation results, are given in Appendix D.

The real rates of capital gains q_t come from our aggregate wealth accumulation equation.[100] The only parameters on which we need to make assumptions are the labor-income and capital-income savings rates s_{Lt} and s_{Kt}. We make various assumptions on these and analyze the extent to which we replicate observed age-wealth profiles, μ_t ratios and resulting inheritance flows. In all simulations we make sure that the aggregate savings $s_t=(1-\alpha_t)s_{Lt}+\alpha_t s_{Kt}$ (where α_t is the observed, after-tax capital share) is equal to the observed private savings rate s_t, which according to national accounts data has been relatively stable around 8%-10% in France in the long run (see Figure 14).

By construction, the simulated model always perfectly reproduces the aggregate wealth-income ratio $\beta_t=W_t/Y_t$. The name of the game is the following: what assumptions on saving behaviour also allow us to reproduce the observed dynamics of age-wealth profiles, the μ_t ratio and the inheritance flow-national income ratio b_{yt}?

Our main conclusion is summarized on Figures 15a-15b. By making simple assumptions on savings behaviour (namely, class saving for the 1820-1913 period, and uniform saving for the 1913-2008 period), we are able to reproduce remarkably well the observed evolution of the aggregate inheritance flow over almost two centuries. If we then use the model to predict the future, we find that the inheritance flow should stabilize or keep rising, depending on the future evolutions of growth rates and after-tax rates of return.

6.1. Simulating the 1820-1913 quasi-steady-state

The most interesting period to simulate and investigate is maybe the 1820-1913 period. As was already stressed, this is because this time period looks very close to the theoretical steady-state associated to the class saving model, with s_K close to g/r, and s_L close to 0.

The first thing to notice is that the 1820-1913 period was a time when the rate of return to private wealth r was much bigger than the growth rate g. Generally speaking, factor shares appear to have been relatively stable in France over the past two centuries, with a capital share generally around 30% (see Figure 16). Note however that according to the best available data, the capital share during the 19th century was somewhat higher than during the 20th century (30%-40%, vs 20%-30%). Dividing capital shares by aggregate wealth-

[100] See section 3.2 above and Appendix A5.

income ratios, we get average rates of returns to private wealth r_t of about 5%-6% in 1820-1913, much larger than the growth rate, which on average was only 1.0% (see Figure 17).

We run several simulations. If we assume uniform saving rates, then we under-predict somewhat the aggregate evolution of inheritance. Most importantly, we predict an age-wealth profile in 1900-1910 that is flat after age 60 (or even slightly declining after age 70), while the observed profile is steeply increasing, including for the very old. This has a limited impact on the aggregate μ_t and b_{yt} ratios, because at that time few people died after age 70. But this is an important part of the observed data. This shows that uniform saving is an inadequate description of actual savings behaviour at that time. If we assume that all savings came from capital income, which implies $s_K \approx 25\%$-30% and $s_L \approx 0\%$ (instead of $s_K = s_L \approx 8\%$-10%), then we can predict adequately both the evolution of the inheritance-income ratio b_{yt} and the evolution of the age-wealth profiles $w_t(a)$.

Given the very large wealth concentration prevailing at that time, class saving behavior seems highly plausible. The income levels and living standards attained by wealth holders were so much higher than those of the rest of the population that is was not too difficult for them to save 25%-30% of their capital income annually. In order to fully account for the steepness of the age-wealth profile around 1900-1910, one would actually need to assume not only that (most) savings come from capital income, but also that the average saving rate $s_K(a)$ actually rises with age. This could be explained by a simple consumption satiation effect among elderly wealth holders. To properly study this issue, one would need however to explicitly introduce distributional issues and to use micro data.

We also did various sensitivity checks by varying the gift-bequest ratio v_t. In particular, in one variant, we set v_t=0% for the entire 1820-1913 period, i.e. 19th century wealth holders were assumed to make no inter vivos gifts and to hold on their wealth until the die. Of course, this leads us to under-predict the observed inheritance (bequests plus gifts) flow at the beginning of the period. The interesting finding, however, is that we get approximately the same inheritance-income ratio at the end of the period (about 20%) than the observed ratio with gifts (but with an even more steeply increasing age-wealth profile). This validates our methodological choice of adding gifts to bequests. The existence of inter-vivos gifts has an impact on the timing of inheritance receipts, but very little impact on the long run aggregate flow of aggregate wealth transmission.

6.2. Simulating the 20th century chaotic U-shaped pattern

We proceed in the same way for the 20th century. Whether we assume uniform savings or class savings, the model predicts a decline in the μ_t ratio during the 1913-1949 period. The channel through which this effect operates is the one that we already described, i.e. it was too late for the elderly to start re-accumulating wealth again after the shocks. However we get a significantly better fit by assuming that aggregate savings behaviour has shifted from class savings to uniform savings during the 1913-1949 period. For instance, if we look at the inheritance-income ratio at its lowest point, i.e. during the 1950s (4.3%), we predict 5.3% with uniform saving and 6.0% with class saving.

Intuitively, this structural change in saving behaviour could come from the large decline in wealth concentration that occurred during that time: top wealth holders were much less prosperous than they used to be, and they were not able to save as much. It could even be that they saved even less than labor earners, for instance if they tried to maintain their living standards for too long. The other possible interpretation as to why we slightly over predict the observed 1950s inheritance flow (even with uniform saving) is because the capital shocks of the 1913-1949 disproportionally hit elderly wealth holders, e.g. because they held a larger fraction of their wealth in bonds and other nominal assets. In the simulated model, we assume that the shocks (both the destruction shocks and the capital losses) hit all wealth holders in a proportional manner. Finally, it is possible that the gradual rise in age expectancy that occurred during this period led to a rise in lifecycle savings out of labor income. The data we use in this paper is insufficient to settle this issue. Our aggregate approach allows us to adequately reproduce the general pattern over a two century period. But in order to better understand the micro processes at work, one would clearly need to model explicitly distributional issues and to use micro data.

The post 1949 simulations confirm the view that a structural shift from class saving to uniform saving occurred during the 20th century. All saving models predict a strong recovery of μ_t and b_{yt} between the 1950s and the 2000s (especially since the 1970s, due to lower growth rates, see below). But class saving would lead us to over predict the recovery, with an inheritance flow of 16.8% in 2010, vs 14.4% with uniform savings, vs 13.8% with reverse class savings (i.e. zero saving from capital income), vs 14.5% in the observed data. We interpret this as evidence in favour of the uniform saving assumption as an adequate way to describe postwar aggregate savings behaviour (as a first approximation). This interpretation seems to be consistent with micro evidence from French household budget surveys: aggregate age-saving rates profiles have been quasi-flat during the 1978-2006 period, and do not appear to vary systematically with factor income composition.[101] This is imperfect data, however, and this issue would need to be better addressed in future research, by introducing explicitly distributional effects.

The simulations as a whole also confirm the critical importance of the r>g logic. Also, as predicted by the theoretical formulas, the absolute level of g appears to have a stronger quantitative impact than the differential r-g. This is exemplified by the 1949-1979 period. Growth rates were above 5%, which slowed down considerably the rise of the μ_t ratio. During the 1979-2009 period, growth slowed down to 1%-2%, the rise of the μ_t ratio was more rapid, and so was the recovery of the inheritance-income ratio b_{yt}. This simple growth effect plays a much bigger role than saving behaviour, as predicted by the theory.

Finally, capital taxes play an important role in our simulations. The average rate of return on private wealth $r_t=\alpha_t/\beta_t$ has always been much larger than the growth rate g_t in France, both during the 19th and the 20th centuries (see Table 3). The major change is that the effective capital tax rate τ_{Kt} was less than 10% prior to World War 1, then rose to about 20% in the interwar period, and finally grew to 30%-40% in the postwar period.[102] This had a large impact on the differential between $r_{dt}=(1-\tau_{Kt})r_t$ and g_t. In particular, capital taxes largely explain why the differential was relatively small (but still positive) during the 1949-1979 period, in spite of positive capital gains. In our simulations, this differential has a smaller impact on μ_t and b_{yt} than the absolute growth rate level, but the effect is still significant. We further investigate this issue with 21st century simulations.

6.3. Simulating the 21st century: towards a new steady-state?

In our baseline scenario, we assume that growth rates in 2010-2100 will be the same as the 1979-2009 average (1.7%), that the aggregate saving rate will be the same as the

[101] Using Insee household budget surveys for 1978, 1984, 1989, 1994, 2000 and 2006, one finds aggregate age-saving rates profiles that are rising somewhat until age 40-49, and almost flat above age 40-49: sligltly declining in 1978-1984-1989, flat in 1994-2000, slightly rising in 2006. In any case, these variations across age groups are always very small as compared to variations over permanent income quartiles. To the extent that wealth and capital income are adequately measured in such surveys, average savings rates also seem to vary little with respect to factor income shares. See Antonin (2009).

[102] Inheritance taxes are included, but have always been a small fraction of the total capital taxes, which mostly consist of flow taxes such as the corporate tax, personal capital income taxes, and housing taxes. See Appendix A, Tables A9-A11 for detailed series. There are approximate estimates, based on simplifying assumptions (especially regarding product taxes incidence). But the orders of magnitude seem to be right.

1979-2009 average (9.4%), and that the capital share will be the same as the 2008 value (26%).[103] On the basis of the historical evolutions described in section 3.2 above, we assume that asset prices remain the same (relatively to consumer prices) after 2010.

In this scenario, we predict that the inheritance-income ratio b_{yt} will keep increasing somewhat after 2010, but will soon stabilize at about 16% (see Figure 15a). There are several reasons why this new steady-state level is substantially below the 20%-25% quasi-steady-state level prevailing in 1820-1913. First, our projected growth rate (1.7%) is small, but bigger than the 19th century growth rate (1.0%). Next, our projected after-tax rate of return (3.0%) is substantially smaller than the 19th century level (5.3%).

We then consider an alternative scenario with a growth slowdown after 2010 (1.0%), and a rise of the after-tax rate of return to 5.0%. This could be due either to a large rise in the capital share (say, because of increased international competition to attract capital), or to a complete elimination of capital taxes (which could also be triggered by international competition), or to a combination of the two. Under these assumptions, the inheritance-income ratio converges towards a new steady-state around 22%-23% by 2050-2060, i.e. approximately the same level as that prevailing in the early 20th century (see Figure 15b).

This finding confirms that the rise in life expectancy has little effect on the long run level of inheritance. With low growth and high returns, the inheritance-income ratio depends almost exclusively on generation length H. Detailed results also show that the largest part of the effect (about two thirds) comes from the growth slowdown, versus about one third for the rise in the net-of-tax rate of return. This decomposition is relatively sensitive to assumptions about savings behaviour, however.

We also explored various alternative scenarios. With a 5% growth rate after 2010, and a rise in saving rate to 25%, so as to preserve a plausible aggregate wealth income ratio, inheritance flows converge towards about 12% of national income by 2050-2060. With no rise in savings, inheritance flows converge to about 5%-6% of national income (i.e. approximately the same level as in the 1950s-1960s). But this is largely due to the fall in the aggregate wealth-income ratio. Another equivalent scenario would involve large scale capital shocks similar to the 1913-1949 period, with capital destructions, and/or a

[103] The capital share that has been approximately constant since the late 1980s, but is significantly larger than the level observed in the late 1970s-early 1980s.

prolonged fall in asset prices, due to rent control, nationalization, high capital taxes or other anti-capital policies. Given the chaotic 20th century record, one certainly cannot exclude such a radical scenario. The bottom line, however, is that a return to the exceptionally low inheritance flows of the 1950s-1960s can occur only under fairly extreme assumptions. One needs a combination of exceptionally high growth rates during several decades and a large fall in aggregate wealth-income ratio.

Finally, we made simulations assuming that the gift-bequest ratio v_t did not rise after 1980. This is an important sensitivity check, because the large rise in gifts in recent decades played an important role in the overall analysis. We find a predicted inheritance-income ratio of 15% by 2050, instead of 16% in the baseline scenario. This suggests that the current gift levels are almost fully sustainable. We also simulated the entire 1900-2100 period assuming there was no gift at all. In the same way as for the 1820-1913 period, this has little effect on long run patterns, which again validates the way we treated gifts.

7. Applications & directions for future research

7.1. The share of inheritance in total lifetime resources by cohort

In this paper, we mostly focused on the cross-sectional inheritance flow-national income ratio $b_{yt}=B_t/Y_t$. However this ratio is closely related to another ratio: namely the share of inheritance in the lifetime resources of the currently inheriting cohort, which we note $\hat{\alpha}_t$.

To see why, consider again the deterministic, stationary demographic structure introduced in section 5. Everybody becomes adult at age A, has one kid at age H, inherits at age I=D-H, and dies at age D. Each cohort size is normalized to 1, so that total (adult) population N_t is equal to (adult) life length D-A. Per decedent inheritance $b_t=B_t=b_{yt}Y_t$ and per adult income $y_t=Y_t/(D-A)$. At time t, the cohort receiving average inheritance b_t is the cohort born at time x=t-I. We note $\tilde{y}_t=\tilde{b}_t+\tilde{y}_{Lt}$ the total lifetime resources received by cohort x, where $\tilde{b}_t=b_te^{rH}$ is the end-of-life capitalized value of their inheritance resources, and $\tilde{y}_{Lt}$ is the end-of-life capitalized value of their labor income resources. We define $\hat{\alpha}_t=\tilde{b}_t/\tilde{y}_t$ the share of inheritance in total lifetime resources of this cohort. Assuming flat age-labor income profile $y_{Lt}(a)=y_{Lt}$ (i.e. full replacement rate ρ=1), we have:

$$\tilde{y}_{Lt} = \int_{A\leq a\leq D} e^{r(D-a)}\, y_L^{\,x}(a)\, da \ = \int_{A\leq a\leq D} e^{r(D-a)}\, y_{Lt}\, e^{g(a-I)}\, da$$

$$\text{I.e.}\quad \tilde{y}_{Lt} = \lambda(D-A)y_{Lt}\, e^{rH} = \lambda Y_{Lt}\, e^{rH} = \lambda(1-\alpha)Y_t\, e^{rH}$$

$$\text{With:}\quad \lambda = \frac{e^{(r-g)(I-A)} - e^{-(r-g)(D-I)}}{(r-g)(D-A)} \qquad (7.1)$$

We therefore have a simple formula for $\hat{\alpha}_t$ as a function of b_{yt}:

Proposition 10. Define $\hat{\alpha}_t$ the share of inheritance in the total lifetime resources of the cohort inheriting at time t. Then we have: $\hat{\alpha}_t = \dfrac{b_{yt}}{b_{yt} + \lambda(1-\alpha)}$ (7.2)

With: b_{yt} = inheritance flow-national income ratio

1-α = labor share in national income

λ = correcting factor given by equation (7.1)

The inheritance share $\hat{\alpha}_t$ can be viewed as an indicator of the functional distribution of resources accruing to individuals. During their lifetime, individuals from cohort x receive on average a fraction $\hat{\alpha}_t$ of their resources through inheritance, and a fraction 1-$\hat{\alpha}_t$ through their labor income. $\hat{\alpha}_t$ is simply related to the standard cross-sectional capital share α. If λ≈1, which as we see below is typically the case, then $\hat{\alpha}_t > \alpha$ iff $b_{yt} > \alpha$. That is, the share of inheritance in lifetime resources is larger than the capital share in national income if and only if the inheritance flow is larger than the capital share. In general, both cases can happen: there are societies where the capital share is large but the inheritance share is low (say, because most wealth comes from lifecycle accumulation), and conversely there are societies where the inheritance is large but where the capital share is low (say, because capital serves mostly as storage of value and produces little flow returns).

It is interesting to see that in practice the inheritance share $\hat{\alpha}$ and the capital share α happen to have the same order of magnitude (typically around 20%-30%) – mostly by coincidence, as far as we can see. Proposition 10 is pure accounting, and it holds for any saving model, both in and out of steady-state (one simply needs to use time-varying g_t and r_t to compute λ). If we now apply Proposition 10 to the steady-state models analyzed in section 5, then we just need to replace b_{yt} by the relevant steady-state value b_y. So for instance in the class saving model or in the dynastic model, we have $b_y = \beta/H$, so that:

$$\hat{\alpha} = \frac{b_y}{b_y + \lambda(1-\alpha)} = \frac{\beta}{\beta + \lambda(1-\alpha)H} \qquad (7.3)$$

Example. With benchmark values β=600%, H=30, α=30%, λ=1, we have b_y=20%, and $\hat{\alpha} = b_y/(b_y+1-\alpha)$=22%. That is, in steady-state each cohort derives $\hat{\alpha}$=22% of its lifetime resources through inheritance, and 1-$\hat{\alpha}$=78% through labor. To put it differently, inheritance resources represents $\psi = b_y/(1-\alpha)$=29% of their labor resources.

We now come to the correcting factor λ. Intuitively, λ corrects for differences between the lifetime profile of labor income flows and the lifetime profile of inheritance flows. That is, λ measures the relative capitalized value of 1€ in labor resources vs 1€ in inheritance resources, given the differences in lifetime profile between both flows of resources.

In the stylized model with deterministic demographic structure, all inheritance flows come at age a=I, while labor income flows come from age a=A until age a=D. The flows received before age a=I are smaller in size but needs to be capitalized; the flows received after age a=I are larger in size but needs to be discounted. In case r-g=0%, then the growth and capitalization effects cancel each other, so λ is exactly equal to 100%. Simple first order approximations using the λ formula (equation (7.1) above) also show that if inheritance happens around mid-life (say, A=20, H=30, D=80, I=D-H=50), then λ will tend to be close to 100% even if r-g>0.[104] When inheritance happens early in adult life (say, A=20, H=30, D=80, I=D-H=30), then λ is below 100%. Flows of resources accruing earlier in life are worth more from a lifetime, capitalized value perspective. Since inheritance flows were received relatively earlier in life one century ago, this effect implies that – other things equal – the relative importance of labour income should have increased over time.

Example. Assume r-g=3% (say, g=2%, r=5%). With A=20, H=30, D=80, then λ=114%. With A=20, H=30, D=60, then λ=79%.[105]

In practice, however, there are several other counteracting effects. In the real world, individuals receive bequests and inter vivos gifts at different point in their life (and not only at age a=I), and the gift-bequest ratio has risen over time. Also the cross-sectional age-labor income profile is not flat: young and old individuals receive smaller average labor income and middle age individuals.

So we use our simulated model, based upon observed and simulated data on the complete age profiles of bequest, gift and labor income receipts, in order to compute the correcting factor λ^x for all cohorts born in France between x=1800 and x=2030. We find that λ^x has been remarkably constant around 90%-110% over two centuries, with no long run trend. Since we observe bequest and gift flows until 2008, the latest cohorts for which we have complete (or near complete) observed data are those born in 1950s-1960s, for whom the λ^x factor is about 100%-110%. For cohorts born in the 1970s and later, our computations increasingly rely on our simulations on future inheritance flows, i.e. on our assumptions about 2010-2100 growth rates and rates of return. Under the benchmark scenario (g=1.7%, $(1-\tau_K)r$=3.0%), we find that λ^x will be stable around 100%-110% for

[104] $\lambda = [e^{(r-g)(I-A)} - e^{(r-g)(I-D)}]/(r-g)(D-A) = 1 + (r-g)(2I-A-D)$. With I=(A+D)/2, the first-order term disappears.
[105] See Appendix E, Table E5 for illustrative computations using the λ formula.

cohorts 1970-2030. Under the growth slowdown-rising wealth returns scenario (g=1.0%, $(1-\tau_K)r$=5.0%), we find that λ^x will be rising to about 110%-120% for cohorts 1970-2030.[106]

We also use our simulated model in order to compute the capitalized value of lifetime resources $\tilde{y}^x = \tilde{b}^x + \tilde{y}_L{}^x$ for all French cohorts born between x=1800 and x=2030. Unsurprisingly, we find that the inheritance share in lifetime resources $\hat{\alpha}^x = \tilde{b}^x / \tilde{y}^x$ has been following a marked U-shaped pattern: $\hat{\alpha}^x$ was about 20%-25% for 19th century cohorts, fell to less than 10% for cohorts born in the 1900s-1930s, then gradually rose to 15%-20% for cohorts born in the 1950s-1960s, and is expected to stabilitize around 20%-25% for cohorts 1970-2030 (benchmark scenario). If we instead plot the ratio $\psi^x = \tilde{b}^x / \tilde{y}_L{}^x$ between average inheritance resources and average labor resources ($\psi^x = \hat{\alpha}^x/(1-\hat{\alpha}^x)$), then all levels are simply shifted upwards. I.e. 19th century cohorts received in inheritance the equivalent of about 30% of their lifetime labor income; this figure declined to about 12% for cohorts 1900-1930, and is projected to be about 30% for cohorts 1970-2030 (see Figure 19a).

Here it might be useful to give some orders of magnitude. Consider the cohorts born in the 1960s, who have already received a large fraction of their gifts and bequests in the 1990s-2000s. We find that their average lifetime resources, capitalized at age 50 (in the 2010s), are about 1.78 millions €, out of which about 320,000€ come from inheritance, and about 1.46 millions € come from labor income.[107] So we have: $\hat{\alpha}^x$=18% and ψ^x=22%. Given that λ is close to 1, these average labor income resources roughly correspond to the product of average per adult labor income (currently about 25,000€ in France) by average adult life length (about 60 years). With the cohorts born in the 1970s, we find 2.02 millions €, 440,000€ and 1.58 millions €. So $\hat{\alpha}^x$=22% and ψ^x=28%. On Figure 19a we therefore plot ψ^x=22% for the 1960s and ψ^x=28% for the 1970s.

As predicted by the simplified theoretical model (Proposition 10), the historical evolution of the cohort-level inheritance-labor income ratio ψ^x (Figure 19a) is the mirror image of the pattern found for the cross-sectional inheritance flow-national income ratio b_{yt} (Figure 15a). There are two interesting differences, however.

[106] See Appendix D, Tables D7-D8 for detailed simulation results.
[107] See Appendix D, Table D7. Values are expressed in 2009 euros. As far as the shares are concerned, it is of course irrelevant at what age we capitalize lifetime resources (as long as we use the same age for inheritance and labor resources, and a common rate of return).

First, the U-shaped pattern is less marked for ψ^x than for b_{yt}. At its lowest point, i.e. in the 1950s, the inheritance flow b_{yt} was less than 5% of national income. In comparison, the lowest point of ψ^x, which was attained for cohorts born in the 1900s-1930s, is somewhat above 10%. This is because all members of a given cohort do not inherit exactly at the same time. E.g. cohorts born in the 1900s-1930s inherited everywhere between the 1940s and 1970s. So when we compute cohort level averages of inheritance resources, we tend to smooth cross-sectional evolutions of the inheritance flow-national income ratio. The cohort level pattern is nevertheless quite spectacular. Cohorts born in the 19th century were used to receive by inheritance the equivalent of about 30% of their lifetime labor income. This figure suddenly fell to little more than 10% for cohorts born in the 1900s-1930s, and it took several decades before returning to 19th century levels. The point is that cohorts born in the 1900s-1930s (and to a lesser extent those born in the 1940s-1950s) had to rely mostly on themselves in order to accumulate wealth. Maybe it is not too surprising if they happen to be strong believers in lifecycle theory.

Next, it is striking to see that in our benchmark simulations $\hat{\alpha}^x$ and ψ^x attain approximately the same levels for cohorts born in the 1970s and after as for 19th century cohorts ($\hat{\alpha}^x \approx 20\%$-$25\%$, $\psi^x \approx 30\%$), in spite of the fact that we project b_{yt} to stabilize below 19th century levels (15%-16% instead of 20%-25%). This is due to a differential tax effect. $\hat{\alpha}^x$ and ψ^x were computed from the simulated model, which uses observed after-tax resources, so these are effectively after-tax ratios. The aggregate labor income tax rate τ_L rose from less than 10% in the 19th century-early 20th century to about 30% in the late 20th century-early 21st century.[108] The aggregate inheritance tax rate has remained relatively small throughout the 19th-20th centuries (about 5%, with no trend).[109] This mechanically raises the after-tax value of inheritance resources relatively to labor resources. Since modern fiscal systems tax labor much more heavily than inherited wealth, the inheritance flow-national income ratio does not need to be as large as during the 19th century in order to generate the same share of inheritance in disposable lifetime resources.[110]

[108] See Appendix A, Table A11, col.(11). Here we exclude pension-related payroll taxes from labor income taxes (otherwise the aggregate labor tax rate would exceed 50%, see col.(9)). This follows from the fact that we treat pensions as replacement income, i.e. as part of (augmented) labor income.

[109] See Appendix A, Table A9, col.(15). Inheritance taxes were included in capital income flow taxes τ_K, which can be questioned. Given their low level, however, a direct imputation method would not make a big difference to our α^{x*} and ψ^x estimates. For a discussion of tax incidence issues, see Appendix A2.

[110] One might argue that the rise of taxes allowed for the rise of government services (e.g. education, health), and that this should be added to income. However these services are generally open to everybody, irrespective of whether one lives off labor income or inheritance. So as a first approximation α^{x*} and ψ^x appear to be consistent measures of the aggregate share of inheritance in disposable lifetime resources.

For illustrative purposes, we did the same computations with the growth slowdown-rising wealth returns scenario (g=1.0%, $(1-\tau_K)r$=5.0%), under which b_{yt} is projected to return to the 19th century levels (see Figure 15b). Because of the differential tax effect, we project that $\hat{\alpha}^x$ will be about 25%-30% for cohorts born in the 1970s-1980s, and as large as 35%-40% for cohorts born in the 2010s-2020s, which corresponds to an inheritance-labor ratio ψ^x over 60%.[111] That is, we project that cohorts born in the coming years will receive in inheritance the equivalent of over 60% of what they will receive in labor income during their entire lifetime, far above 19th century levels (see Figure 19b). This shows that taxes can have a strong impact on the balance between inheritance and labor resources.

7.2. Labor-based vs inheritance-based inequality

Now that we have computed the inheritance share in average lifetime resources, we are in a position to put inequality back into the picture. Our objective is to illustrate that changes in aggregate ratios $\hat{\alpha}^x$ and ψ^x matter a great deal for the study of inequality. We do this by making simple assumptions about the intra-cohort distributions of labor income and inheritance, taken from the recent literature on top income and top wealth shares.

Our distributional assumptions are summarized on Table 4. The inequality of labor income has been relatively stable in France throughout the 20th century. So we assume constant shares for the bottom 50%, the middle 40%, and the top 10% of the intra-cohort distribution of labor income for all cohorts born in 1820-2020. Wealth concentration has always been much larger than that of labor income. It was particularly high during the 1820-1913 period, when the top 10% (the "upper class") owned over 90% of aggregate wealth, with little left for the middle 40% (the "middle class") and the bottom 50% (the "poor"). Basically, there was no middle class. Today, the poor still own less than 5% of aggregate wealth. But the middle class share rose from 5% to 35%, while the upper class share dropped from 90% to 60%. Wealth concentration declined mostly during the 1914-1945 period, and seems to have stabilized since the 1950s-1960s (as a first approximation).[112] For simplicity, we apply 1910 inherited wealth shares by fractiles to all cohorts born in 1820-1870, we apply 2010 shares to all cohorts born in 1920-2020, and we assume linear changes in shares for cohorts born between 1870 and 1920.

[111] See Appendix D, Table D8 for detailed simulation results.
[112] For a detailed analysis of historical changes in wealth concentration in France, see Piketty et al (2006).

By applying these assumptions to the lifetime inheritance-labor income resources ratio ψ^x plotted on Figure 19a, we obtain the inequality indicators plotted on Figures 20a-23a (benchmark scenario). Consider first the ratio between the lifetime resources available for the top 50% successors and those available for the bottom 50% labor earners. Since the top 50% wealth share has been stable at 95%, and the bottom 50% labor income share has been stable 30%, this ratio follows exactly the same U-shaped pattern as the aggregate ψ^x, with levels multiplied by about three. In the 19th century, the top 50% successors received in inheritance about 100% of what the bottom 50% labor earners received in labor income throughout their lifetime. Then this ratio dropped to 30%-40% for cohorts born in the 1900s-1930s. According to our computations, this ratio has now well recovered, and is be about 90% for cohorts born in the 1970s-1980s (see Figure 20a).

Take again the example of the cohorts born in the 1970s. On average they will receive 440,000€ in inheritance. But the bottom half will receive almost no inheritance (40,000€), while the upper half will receive almost twice this amount (840,000€). This is roughly what the bottom 50% labor earners will receive in labor income (950,000€). So we get the ratio of 88% plotted for the 1970s on Figure 20a. On average, the bottom 50% labor earners earn little more than the minimum wage: their lifetime labor income roughly corresponds to the product of about 15,000€ by adult life length (about 60 years). For the sake of concreteness they can be thought of as minimum wage workers.

Consider now the ratios between what top 10% and top 1% successors receive in inheritance and what minimum wage workers receive in labor income. Due to the decline in wealth concentration, these inequality indicators are still lower for current generations than what they used to be in the 19th century. But they are much higher than what they used for cohorts born in 1900-1940, in spite of the fact that intra cohort distributions have remained the same. This illustrates the importance of changes in the aggregate ratio ψ^x.

For cohorts born between the 1900s and the 1950s, it was almost impossible to become rich through inheritance. Even if you belong to the top 10% or top 1% successors, or if you marry with such a person, the corresponding lifetime resources would be a lot smaller than those you can attain by making your way to the top 10% or top 1% of the labor income hierarchy of your time (see Figures 21a-22a). This is what most people would describe as a "meritocratic society". Material well-being required high labor income. For the first time maybe in history, it was difficult to live as well by simply receiving inheritance.

In the 19th century, the world looked very different. Top 10% inheritance resources were roughly equivalent to top 10% labor resources. Top 1% inheritance resources were almost three times as large as top 1% labor resources. I.e. top rentiers vastly dominated top labor earners. If you want to attain high living standards in the 19th century, then inheriting from your parents or your spouse's family is a much better strategy than work. This looks very much like a "rentier society".

Life opportunities open to today's generations are intermediate between the meritocratic society of the 1900-1950 cohorts and the rentier society of the 19th century. For cohorts born in the 1970s, we find that the lifetime resources attained by the 1% successors and top 1% labor earners will be roughly equivalent. I.e. finding a top 1% job or a top 1% spouse will get you to the same living standards: you obtain about 10 millions € in both cases (see Table 5). In the 19th century, the spouse strategy was three times more profitable. For early 20th century cohorts, the job strategy was twice more profitable.

The decline in wealth concentration makes it less likely to inherit sufficiently large amounts to sustain high living standards with zero labor income. But it makes it more likely – for a given aggregate inheritance-labor ratio ψ^x – to receive amounts which are not enough to be a rentier, but which still make a big difference in life, at least as compared to what most people earn. Using standard Pareto assumptions on the shape of the intra cohort distribution of inherited wealth, we find that the cohort fraction inheriting more than minimum wage lifetime income (about 950,000€ for 1970s cohorts) was less than 10% in the 19th century, and will be as large as 12%-14% for cohorts born in the 1970s-2000s. Among cohorts born in the 1900s-1930s, this almost never happened: only 2%-3% of each cohort inherited that much (see Figure 23a).

We did the same computations under the low-growth, high-return scenario (see Figures 20b-23b). Unsurprisingly, given that we project the aggregate inheritance-labor ratio ψ^x to rise well above 19th century values, we also find that our lifetime inequality indicators reach unheard of levels. At the top 1% level, the spouse strategy again becomes almost three times more profitable: the aggregate effect entirely compensates the distribution effect.

These computations should be viewed as illustrative and exploratory. They ought to be improved in many ways. First, progressive taxation of inheritance and labor income can obviously have a strong impact on such inequality indicators, both in the short run (mechanical effect) and in the long run (endogenous intra-cohort distribution effect). Here we ignored progressive taxes altogether. I.e. in our aggregate computations we simply assumed that inheritance and labor income taxes were purely proportional.

Next, we made no assumption about the individual-level rank correlation between the intra-cohort distributions of inheritance and labor income. Our inequality indicators hold for any joint distribution $G(\tilde{b}_i^x, \tilde{y}_{Li}^x)$. In practice, $corr(\tilde{b}_i^x, \tilde{y}_{Li}^x)$ might be endogenous. With publicly financed education and the lessening of credit constraints, one might expect the correlation to decline over time. But this could be counterbalanced by the fact that top heirs now need to work in order to reach the same relative living standards as in the past. So the correlation might have increased. It could also be that the moral value attached to work has risen somewhat, so that top successors work more than they used to. Or maybe they have always worked. We do not know of any evidence on this interesting issue.

Finally, we looked at a country with a relatively stable distribution of labor income. So for simplicity we assumed full stability, including at the top. In practice, the top 1% share actually rose a little bit in France in the late 1990s-early 2000s (from about 6% to 7%-8% of aggregate labor income). This is too small a trend to make a significant difference so far. But if we were to make the same computations for the U.S., where the top 1% share rose from 6%-7% in the 1970s to 15%-20% in the 2000s, this would have strong and contradictory impacts on our inheritance-labor inequality indicators. The rise of the working rich reduces the inequality between top successors and top labor earners. But it increases the inequality between the working poor and successors as a whole. It also has dynamic effects on the future intra-cohort distributions of inherited wealth.

7.3. The share of inheritance in aggregate wealth accumulation

The inheritance flow-national income ratio $b_{yt}=B_t/Y_t$ analyzed in this paper is also closely related to the share of inheritance in aggregate wealth accumulation, which we note φ_t.

There are two competing definitions of φ_t in the economics literature. Modigliani (1986, 1988) define φ_t^M as the share of non-capitalized past bequests in total wealth, while Kotlikoff and Summers (1981, 1988) use the share of capitalized past bequests φ_t^{KS} :

$$\varphi_t^M = \hat{B}_t/W_t \text{ , with: } \hat{B}_t = \int_{s\leq t} B_{st}\, ds \qquad (7.4)$$

$$\varphi_t^{KS} = \tilde{B}_t/W_t \text{ , with: } \tilde{B}_t = \int_{s\leq t} B_{st}\, e^{r_{st}}\, ds \qquad (7.5)$$

With: B_{st} = aggregate bequests received at time s by individuals who are still alive at time t
r_{st} = cumulated return to wealth between time s and time t

Consider again the deterministic, stationary demographic structure introduced in section 5. Everybody becomes adult at age A, has one kid at age H, inherits at age I=D-H, and dies at age D. Each cohort size is normalized to 1, so that total (adult) population N_t is equal to life length D-A. Along a steady-state path with constant growth rate g, rate of return r, wealth-income ratio $\beta=W_t/Y_t$ and inheritance flow-income ratio $b_y=B_t/Y_t$, we have:[113]

$$\varphi_t^M = \int_{t-H\leq s\leq t} \frac{b_y}{\beta}\, e^{-g(t-s)}\, ds = \frac{b_y}{\beta}\, \frac{1-e^{-gH}}{g} \qquad (7.6)$$

$$\varphi_t^{KS} = \int_{t-H\leq s\leq t} \frac{b_y}{\beta}\, e^{(r-g)(t-s)}\, ds = \frac{b_y}{\beta}\, \frac{e^{(r-g)H}-1}{r-g} \qquad (7.7)$$

Proposition 11. Define φ_t^M the non-capitalized bequest share in aggregate wealth and φ_t^{KS} the capitalized bequest share. In steady-state: $\varphi^M=\frac{b_y}{\beta}\frac{1-e^{-gH}}{g}$ and $\varphi^{KS}=\frac{b_y}{\beta}\frac{e^{(r-g)H}-1}{r-g}$

Equations (7.6)-(7.7) are again pure accounting equations. They hold for any saving model. If we now apply them to the saving models analyzed in section 5, then we just need to replace b_y by the relevant steady-state value. So for instance in the class saving model or in the dynastic model, we have $b_y=\beta/H$. Therefore:

$$\varphi^M = \frac{1-e^{-gH}}{gH} \quad \text{and} \quad \varphi^{KS} = \frac{e^{(r-g)H}-1}{(r-g)H}$$

[113] Alternatively one can replace b_y/β by b_w (=B_t/W_t) in equations (7.6)-(7.7).

It immediately follows that ∙g>0, φ^M<1, and ∙r-g>0, φ^{KS}>1.

Example: With H=30, then φ^M=75% if g=2% and φ^M=52% if g=5%.
If r-g=3%, then φ^{KS}=162%. If r-g=5%, then φ^{KS}=232%.[114]

More generally, if steady-state b_y is close to β/H, or not too much below, which as we saw in section 5 is generally the case with low growth and/or high returns, the same properties hold. That is, φ^M is structurally below 100%, while φ^{KS} is structurally above 100%.

The Modigliani definition φ^M is particularly problematic, since it fails to recognize that inherited wealth produces flow returns. This mechanically leads to artificially low values for the inheritance share φ^M in aggregate wealth accumulation. It is particularly puzzling to see that φ^M can be equal to 75% or 52% in the class saving model – a model where by construction 100% of wealth comes from inheritance, and where successors are just consuming part of the return to their inheritance and saving the rest. As was pointed out by Blinder (1988), a Rockefeller with zero lifetime labor income would appear to be a life-cycle saver in Modigliani's definition, as long he does not consume the full return to his inherited wealth. In effect, Modigliani defines saving as labor income plus capital income minus consumption (and then defines lifecycle wealth as the capitalized value of past savings, and inherited wealth as aggregate wealth minus lifecycle wealth), while Kotlikoff-Summers define saving as labor income minus consumption. Given that the capital share is generally larger than the saving rate, this of course makes a big difference.

The Kotlikoff-Summers definition is conceptually more consistent. But in a way it suffers from the opposite drawback. For reasonable parameter values, φ^M is bound to be larger than 100% (or close to 100%). It is also extremely sensitive to the exact value of r-g.

By applying both definitions φ_t^M and φ_t^{KS} (out-of-steady-state equations (7.4)-(7.5)) to our simulated model based upon two-century-long observed French data, we find the following results (see Figures 24a-b and 25a-b). The uncapitalized inheritance share was about 80% of aggregate wealth during the 19th century and until World War 1. It then dropped to 50%-60% in the 1930s-1950s, and to 40% in the 1960s-1980s. It is interesting to note that the historical nadir happens rather late for φ_t^M (in the 1970s), much later than the historical

[114] See Appendix E, Table E12 for illustrative computations using these formulas.

nadir for b_{yt} (which occurred in the 1950s). This time lag simply stems from the fact that φ_t^M is based upon the cumulated value of b_{yt} of the previous decades. In the benchmark scenario, we find that φ_t^M will be above 60% in the 2010s and should stabilize above 70% after 2040 (see Figure 24a). In the low-growth, high-return scenario, we find that φ_t^M stabilizes above 80% during the 21st century – as in the 19th century (see Figure 24b).

When we capitalize past bequests, we find that φ_t^{KS} is always above 100%, including during the low-inheritance postwar period, and that it is vey sensitive to r-g. In the 19th century, r was so large (5%-6%) and g so low (1%) that we mechanically find extremly high φ_t^{KS} (as large as 450% in the 1870s-1880s).[115] The capitalized bequest share φ_t^{KS} was about 250%-300% around 1900-1910, then gradually dropped to about 150% in the 1960s-1980s. Again the nadir happens very late, due to the same time lags as above, and to the decennial variations in growth and asset returns (e.g. returns were low in the 1970s). In the benchmark scenario, we find that φ_t^{KS} stabilizes around 150% in the 21st century, due to the relatively low projected r-g (see Figure 25a). In the low-growth, high-return scenario, we find that φ_t^M stabilizes above 250%-300% (the same level as in 1900-1910), due to the much larger r-g (see Figure 25b).

We conclude from these computations that φ_t^M and φ_t^{KS} are fragile concepts. First, it is apparent from our French findings that the study of wealth accumulation and inheritance requires long term perspectives and adequate data sources. One should be careful when computing φ_t^M and φ_t^{KS} from one data point and steady-state assumptions. In the KSM controversy, both sides used single-data-point estimates of the U.S. inheritance flow b_{yt}, and applied steady-state formulas similar to equations (7.6)-(7.7) in order to compute φ_t^M and φ_t^{KS}. Due to the limitations of U.S. estate tax data (which only covers the very top), they did not have direct measures of the fiscal inheritance flow. So they computed b_{yt} by using national wealth estimates and age-wealth profiles for year 1962 (using the 1962 Survey of consumer finances). Kotlikoff and Summers (1981) applied the capitalized definition, and found that φ_t^{KS} was about 80% (and possibly larger than 100%) in the U.S. in the 1960s-1970s. By using essentially the same data, Modigliani (1986) concluded that

[115] See Appendix D5, Table D9 for detailed results.

φ_t^M was as low as 20%-30% in the U.S. in the 1960s-1970s.[116] Using SCF data from the 1980s, Gale and Scholz (1994) found that φ_t^M was closer to 40%.[117]

These U.S. estimates (say, $\varphi_t^M \approx 20\%-40\%$, $\varphi_t^{KS} \approx 80\%-100\%$) are somewhat lower than our French estimates for the 1960s-1980s. It could well be that inheritance flows are indeed somewhat lower in the U.S., due to higher economic and (especially) demographic growth, and/or to the crowding out effect of funded pension wealth. However, U.S. estimates are based upon relatively fragile data, so it could also be that they understate true economic inheritance flows. In particular, they tend to rely on relatively low gift-bequest ratios v_t (and sometime ignore gifts altogether) – a parameter which is hard to estimate in the absence of good fiscal data. This probably contributes to explain why the U.S. literature tends to adopt relatively low inheritance flow-aggregate wealth ratios b_{wt}, typically as low as 1%-1.5%, while we always find ratios above 2% in France.[118]

In any case, inheritance flows have probably changed a lot in the U.S. since the 1970s-1980s. In order to settle the issue, it would be necessary to construct homogenous, yearly (or decennial) U.S. series on β_t, μ_t, b_{wt} and b_{yt} up until the present day, as we have done for France. Given U.S. data limitations, one way to proceed would be to use the retrospective information on bequests and gifts available in SCF questionnaires. One needs however to find ways to adequately upgrade these self-reported bequest and gift flows, which in French wealth surveys appear to be far below fiscal flows.[119]

Next, and most importantly, even in a steady-state world with perfect data, none of the definitions φ_t^M and φ_t^{KS} would be really satisfactory. On the one hand, the Modigliani definition ignores the fact that inheritance produces flow returns, which amounts to

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[116] In addition to the estimate of the 1962 inheritance flow, both Kotlikoff-Summers and Modigliani used data on age-income and consumption profiles in the U.S. during the 1950s-1970s. Both sides were essentially applying different definitions to the same raw data (with a few differences, generally reinforcing each side).

[117] Using a 1975 French wealth survey, Kessler and Masson (1989) also find φ_t^M around 40%.

[118] E.g. Gokhale et al (2001) simulate the transmission of inequality via bequests by assuming inheritance flows around 6% of aggregate labor income and 1% of aggregate wealth, which seems very small to us. These flow ratios are taken from Auerbarch et al (1995, p.25). They are based upon relatively ancient age-wealth profiles (taken from 1962 and 1983 SCF) and seem to wholly ignore inter vivos gifts.

[119] See Wolff (2002) for an attempt to use retrospective information on bequests and gifts reported in the 1989-1998 SCF (with no upward correction). We tried to use the retrospective questionnaires of the French wealth surveys conducted in 1992, 1998 and 2004, but found that self-reported bequest and gift flows were less than 50% of the fiscal flows (a lower bound of the true economic flows, given tax exempt assets). This is not due to imperfect recall: we also found this low ratio by comparing self-reported and fiscal flows for the past few years before each survey. We see no reason why reporting rates should be higher in similar wealth surveys in other countries, such as the SCF in the US. Reporting rates might also be biased, e.g. people who have consumed most of their inherited wealth might be particularly reluctant to report wealth transfers.

assuming away the existence of rentiers (this should be part of the empirical demonstration, not of the assumptions). On the other hand, the Kotlikoff-Summers definition φ_t^{KS} is mostly a measure of the magnitude of the capitalized resources available for consumption by successors. It does not really say anything about the relative importance of inherited vs self-made wealth. For instance, in case successors entirely consume their bequest the day they receive it, then φ_t^{KS} would still be far above 100%, even though 0% of aggregate wealth belongs to successors, and 100% belongs to self-made individuals who received zero bequest.

The problem with both definitions is that they are based upon a representative-agent approach. In practice, the wealth accumulation process always involves two different kinds of people and wealth trajectories. In every economy, there are inheritors or “rentiers” (people who typically consume part the return to their inherited wealth, and during the course of their lifetime consume more than their labor income), and there are savers or “self-made men” (people who do not inherit much but do accumulate wealth through labor income savings, so that their capitalized consumption is less than their capitalized labor income). A natural way to proceed would be to distinguish explicitly between these two groups, and to define φ_t as the wealth share of the second group. The downside is that this definition is more data demanding. While φ_t^M and φ_t^{KS} can be computed using aggregate data, φ_t requires micro level data on the joint distribution $H_t(w_{ti}, \tilde{b}_{ti})$ of current wealth and capitalized inherited wealth.

8. Concluding comments

What have we learned from this paper? In our view, the main contribution of this paper is to demonstrate empirically and theoretically that there is nothing inherent in the structure of modern economic growth that should lead a long run decline of inherited (non-human) wealth relatively to labor income.

The fact that the "rise of human capital" is to a large extent an illusion should not come as a surprise to macroeconomists. With stable capital shares and wealth-income ratios, the simple arithmetic of growth and wealth accumulation is likely to operate pretty much in the same way in the future as it did in the past. In particular, the r>g logic implies that past wealth and inheritance are bound to play a key role in the future.

As we have shown, there is no reason to expect demographic changes per se to lead to a decline in the relative importance of inheritance. Rising life expectancy implies that heirs inherit later in life. But this is compensated by the rise of inter vivos gifts, and by the fact that wealth also tends to get older in aging societies – so that heirs inherit bigger amounts.

Now, does this mean that the rise of human capital did not happen at all? No. It did happen, in the sense that human capital is what made long run productivity growth and self sustained economic growth possible. We know from the works of Solow and the modern endogenous growth literature that (non-human) capital accumulation alone cannot deliver self-sustained growth, and that human capital is what made g>0. The point, however, is that a world with g positive but small (say, g=1%-2%) is not very different from a world with g=0%.

If the world rates of productivity and demographic growth are small in the very long run (say, by 2050-2100), then the r>g logic implies that inheritance will eventually matter a lot pretty much everywhere – as it did in ancient societies. Past wealth will tend to dominate new wealth, and successors will tend to dominate labor income earners. This is less apocalyptic than Karl Marx: with g=0%, the wealth-income ratio rises indefinitely, leading either to a rising capital share, or to a fall in the rate of return, and in any case to non sustainable economic and political outcomes. With g>0, at least we have a steady-state. But this is a rather gloom steady-state.

The main limitation of this paper is that we did not attempt to analyze socially optimal tax policy. We have seen in our simulations that 20th century capital taxes, by reducing the differential between $(1-\tau_K)r$ and g, can and did have a significant impact on the steady-state magnitude of inheritance flows, i.e. on the extent to which wealth perpetuates itself over time and across generations. In order to properly address these issues, one would need however to explicitly introduce inequality and normative concerns into the model, which we did not do in this paper, and which we plan to do in future research. We hope that our results will be useful for scholars interested in capital and inheritance taxation.

The other important – and closely related – limitation of this paper is that we constantly assumed a common rate of return r on private wealth for all individuals. In the real world, the average r is larger than g, but the effective r varies enormously across individuals, over time and over assets. Available data and anecdotal evidence suggest that higher wealth individuals tend to get higher average returns (e.g. because of fixed costs in portfolio management, or risk aversion effects, or both).[120] By assuming a common rate of return, we almost certainly underestimate the inheritance share and overestimate the labor share in capitalized lifetime resources – possibly by large amounts.

In some cases, inherited wealth might also require human skills and effort in order to deliver high returns. That is, it sometime takes labor input to get high capital income. If anything, the empirical relevance of the theoretical distinction between labor and capital income has probably increased over the development process, following the rise of financial intermediation and the separation of ownership and control. I.e. with perfect capital markets, any dull successor should be able to get a high return. But the hererogeneity and potential endogeneity of asset returns are important issues which should be taken into account in a unified positive and normative analysis of inheritance. This raises major conceptual and empirical challenges for future research.

[120] See e.g. Calvet, Campbell and Sodini (2009).

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Note: this list of references includes all publications quoted in the working paper and in the data appendices, with the exception of unsigned administrative publications (typically, statistical publications), the references of which are given when they are quoted (generally in the data appendices).

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Figure 1: Annual inheritance flow as a fraction of national income, France 1900-2008

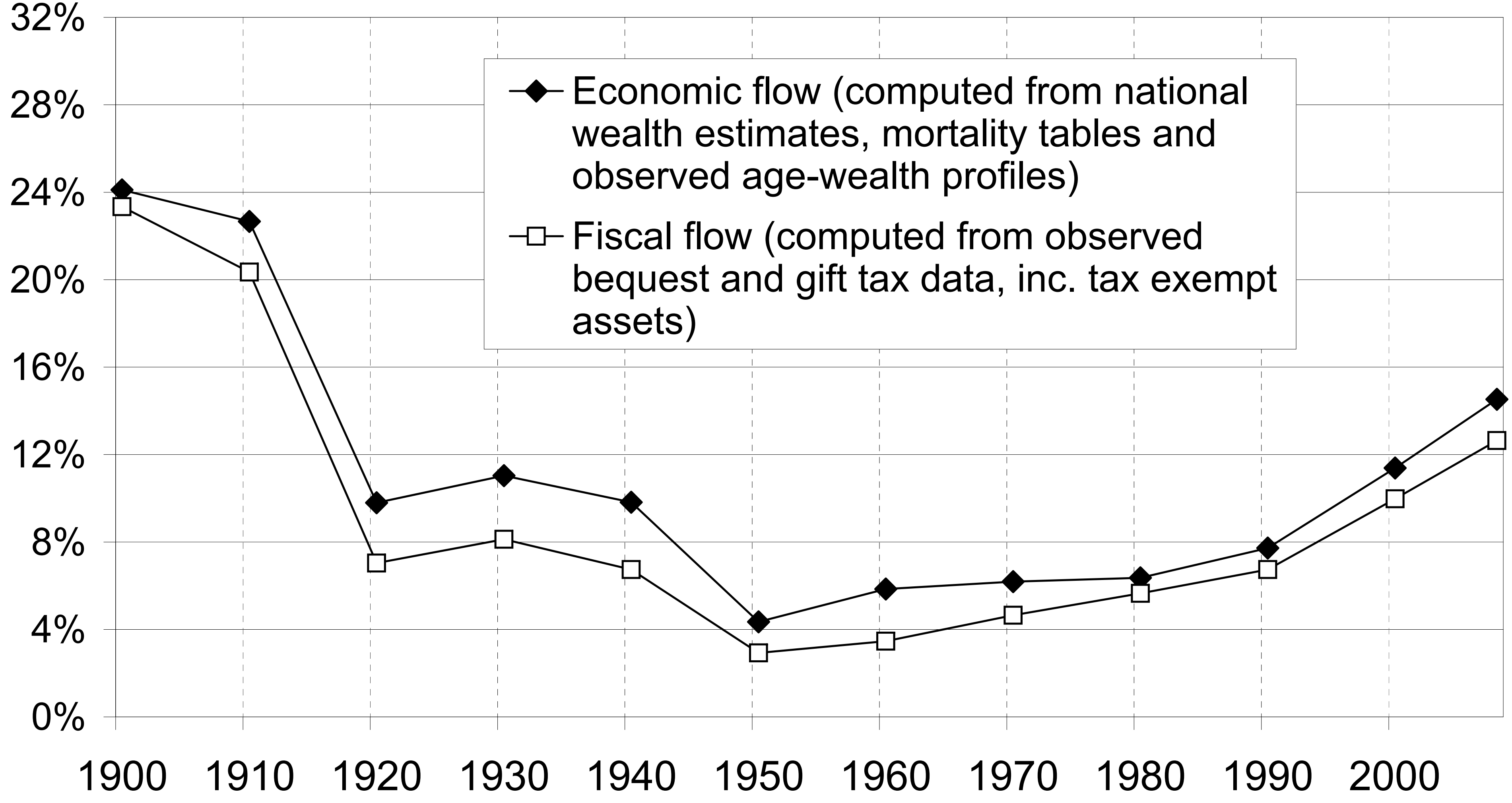


Figure 2: Annual inheritance flow as a fraction of national income, France 1820-2008

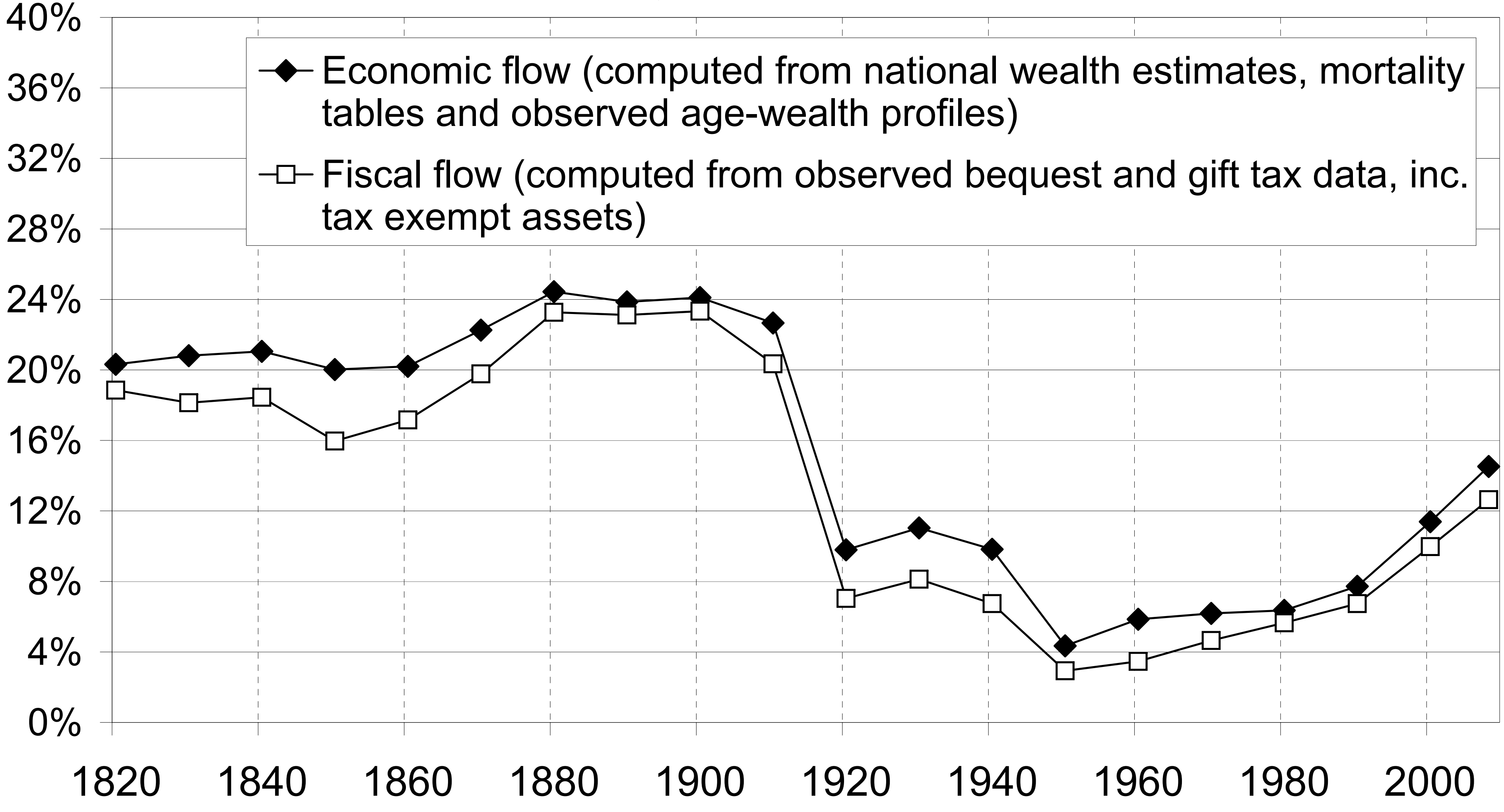


Figure 3: Annual inheritance flow as a fraction of disposable income, France 1820-2008

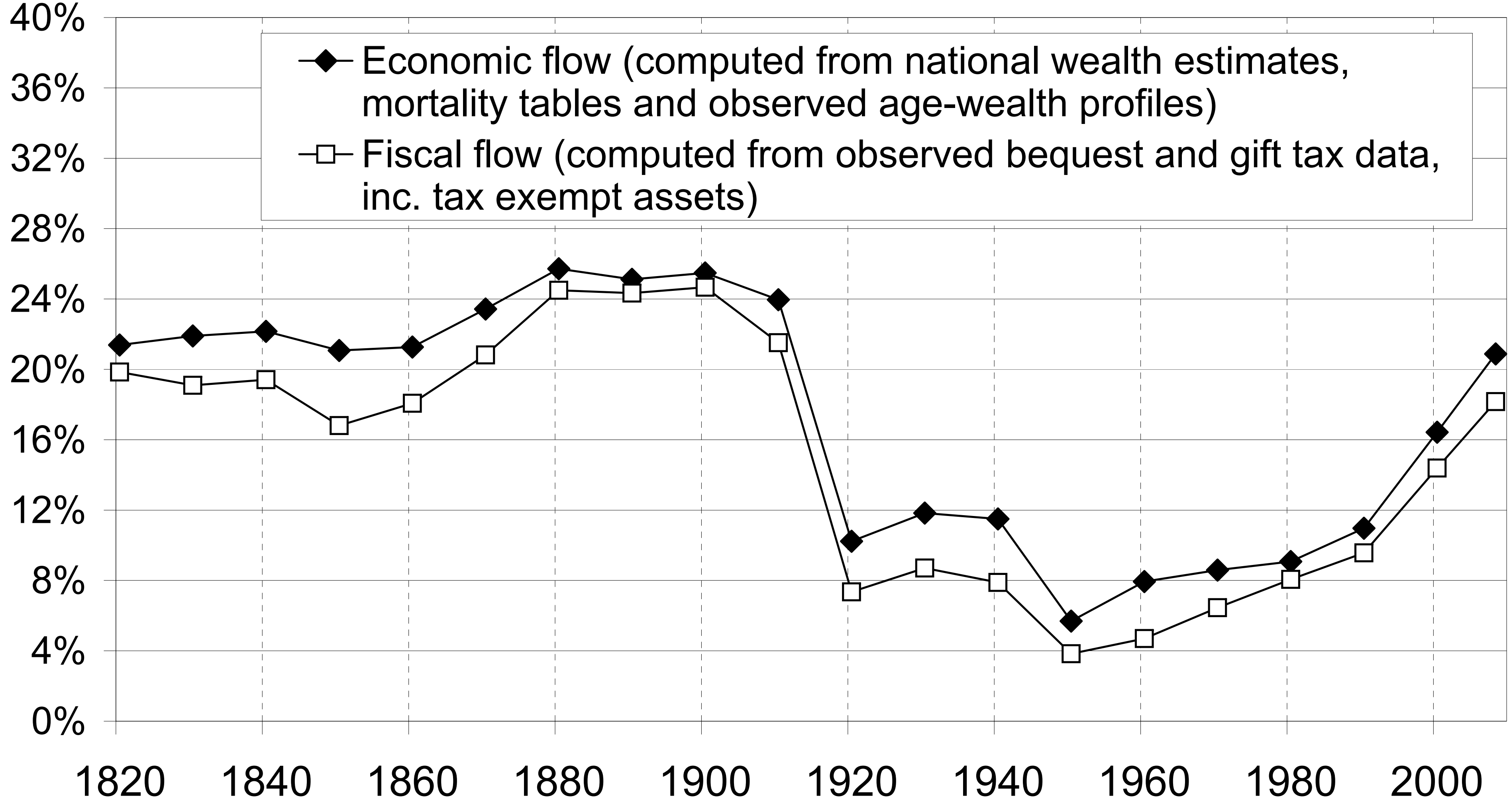


Figure 4: Wealth-income ratio in France 1820-2008

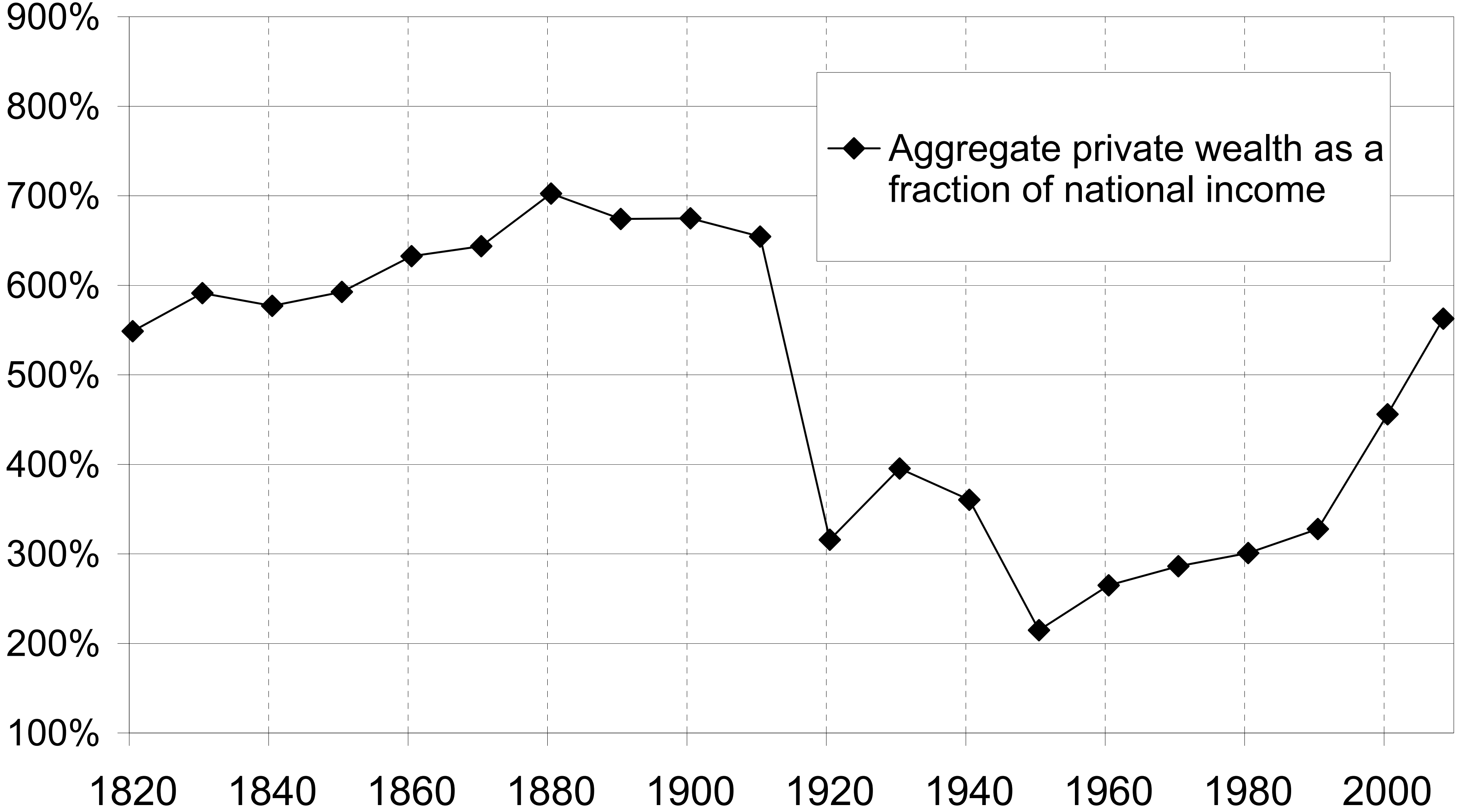


Figure 5: Wealth-disposable income ratio in France 1820-2008

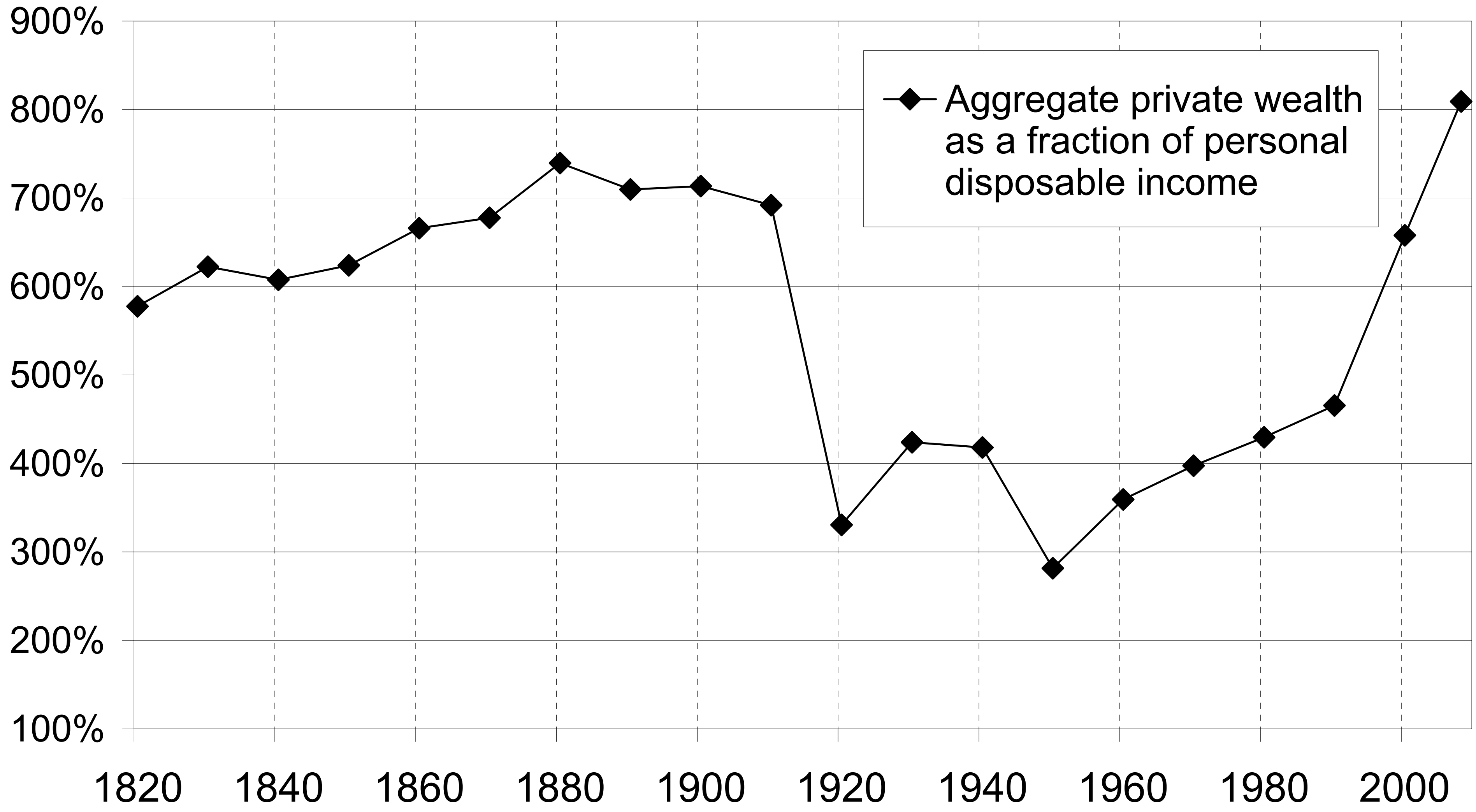


Figure 6: Mortality rate in France, 1820-2100

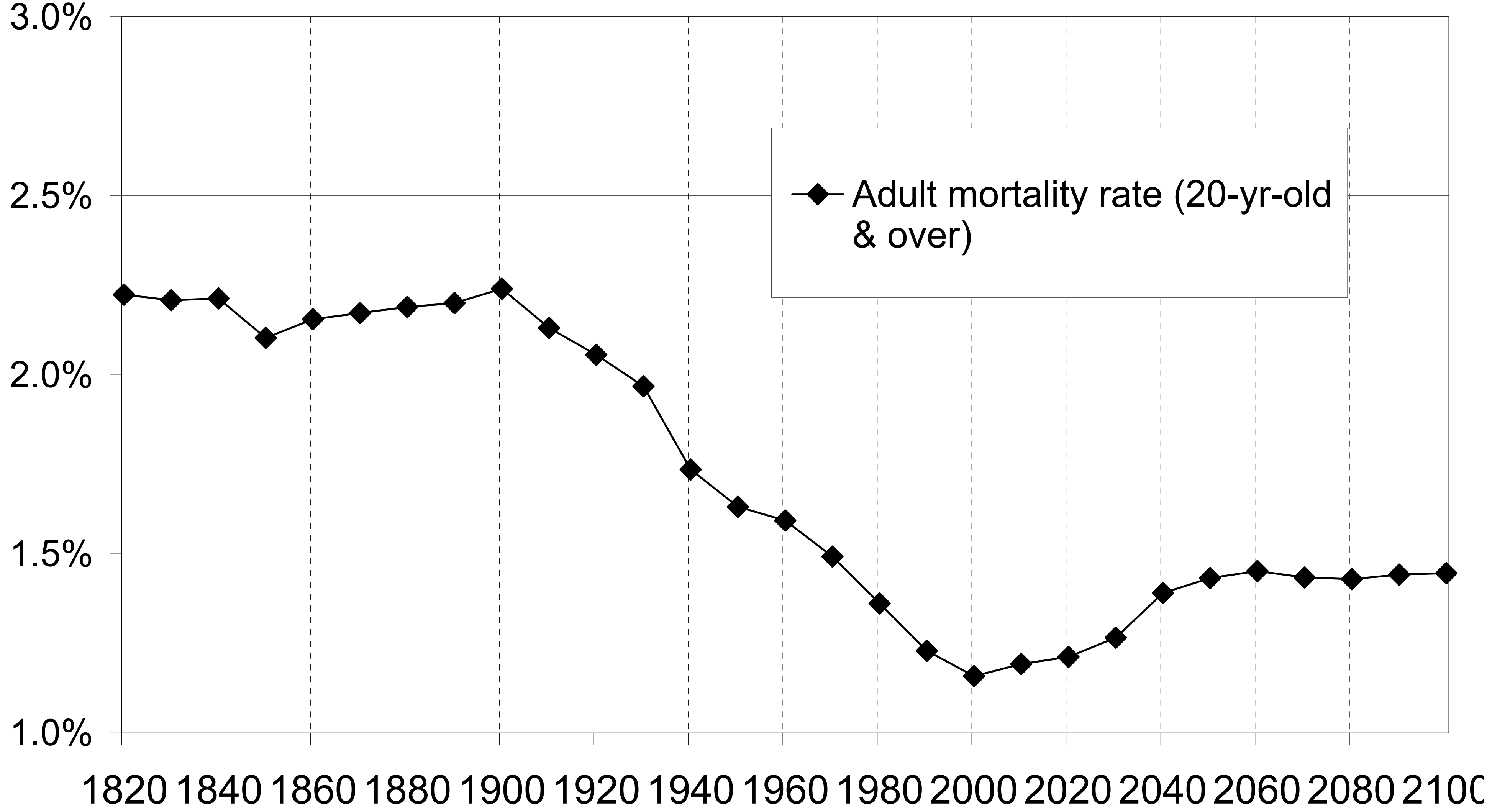


Figure 7: Age of decedents & heirs in France, 1820-2100

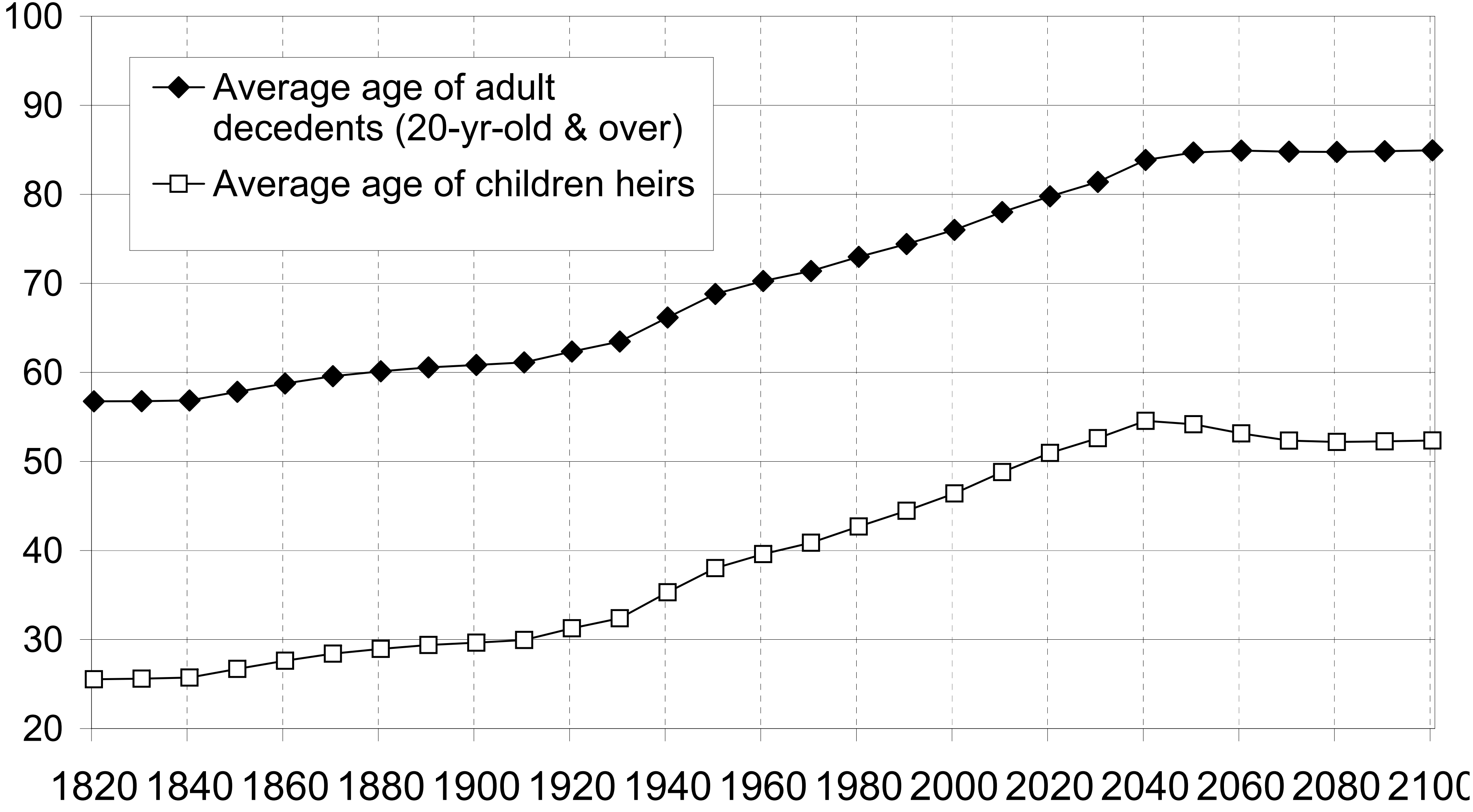


Figure 8: The ratio between average wealth of decedents and average wealth of the living France 1820-2008

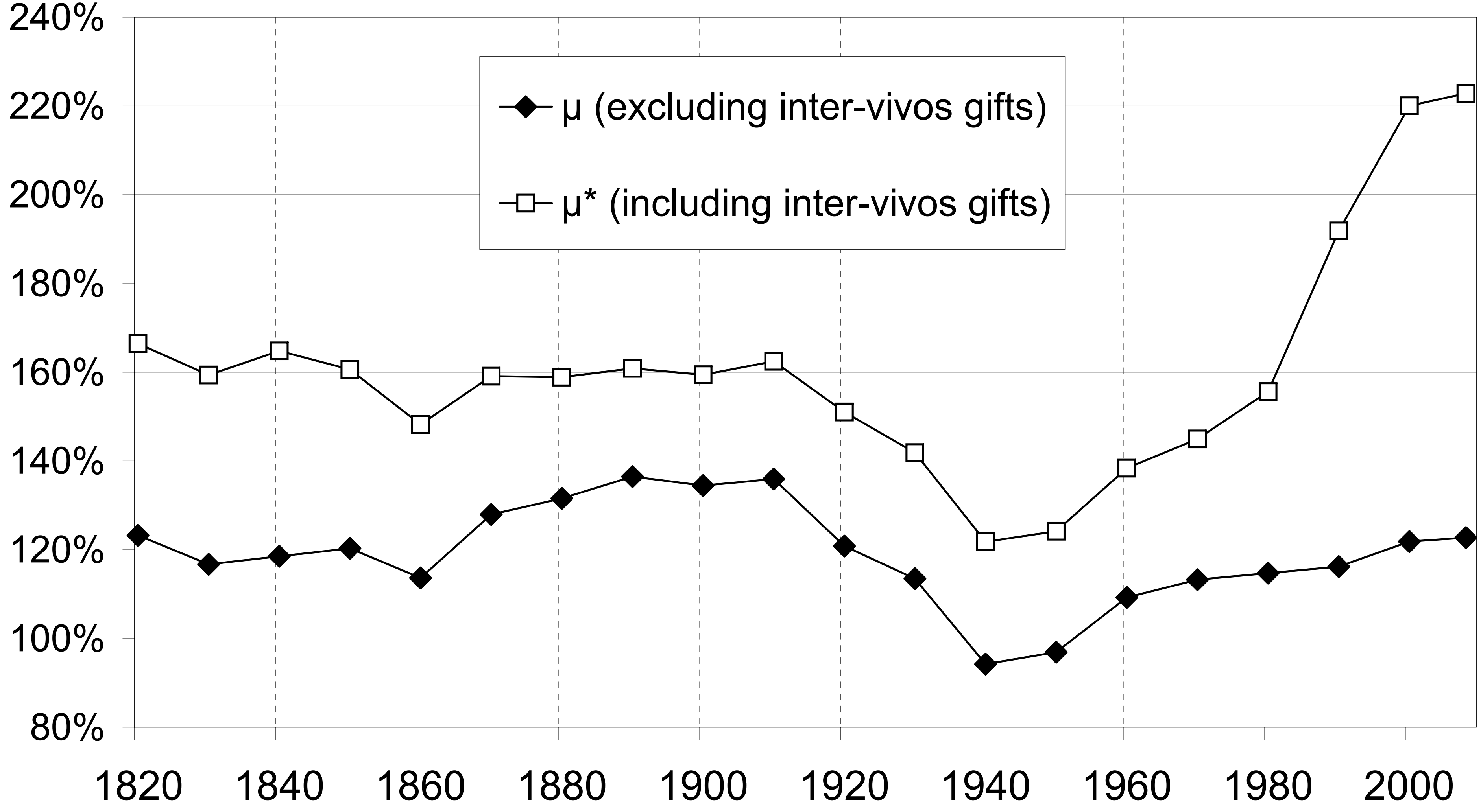


Figure 9: Inheritance flow vs mortality rate in France, 1820-2008

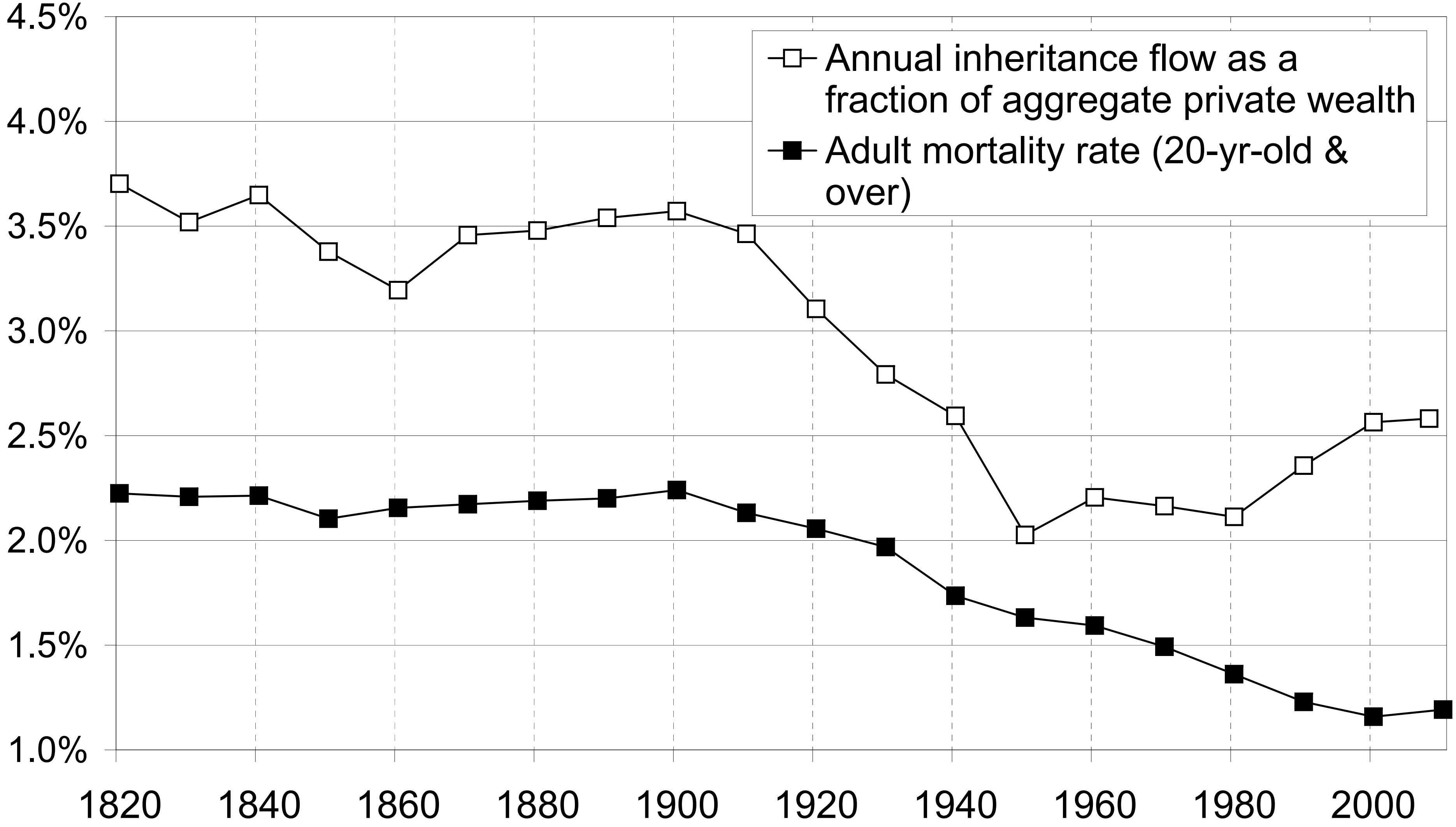


Figure 10: Demographic structure of the model (continuous time)

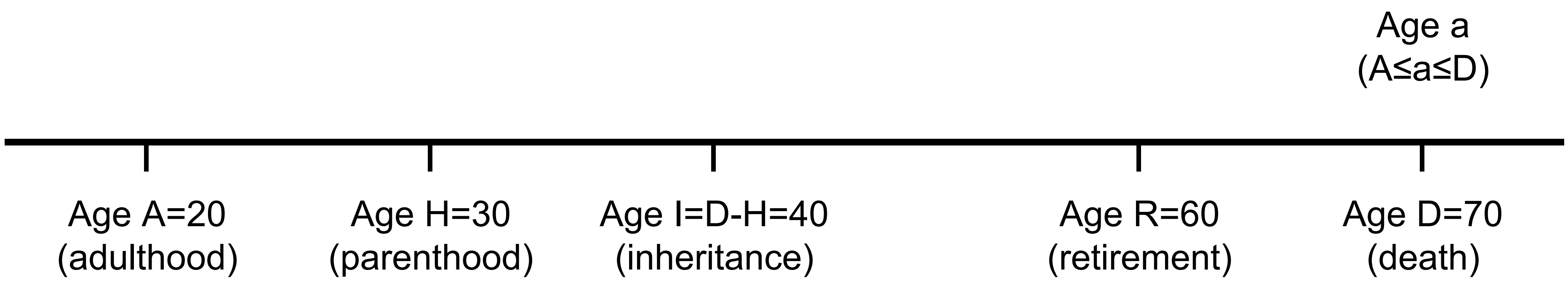


Figure 11: Cross-sectional age-labor income profile $y_{Lt}(a)$

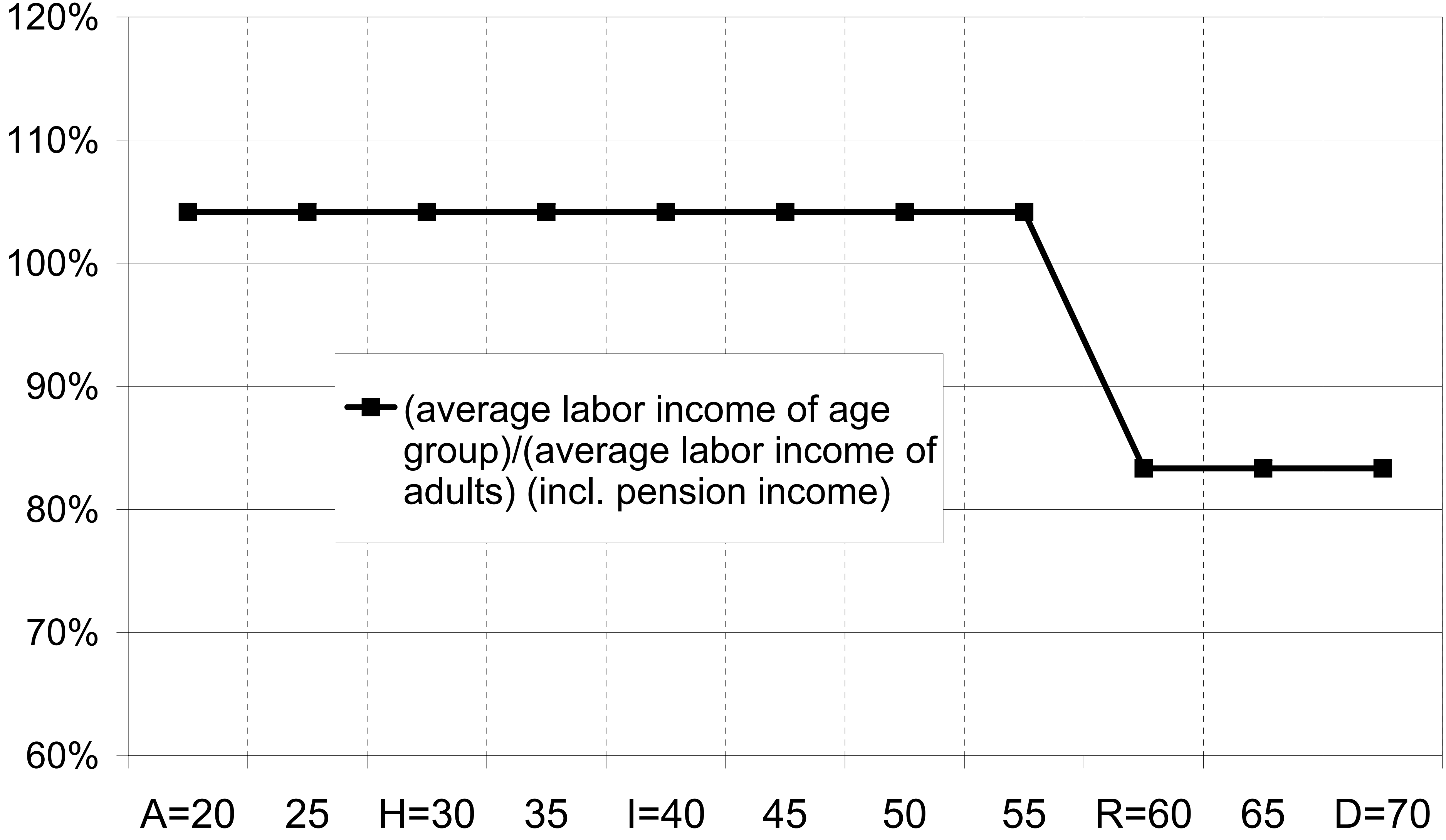


Figure 12: Steady-state cross-sectional age-wealth profile in the class savings model (s_L=0, s_K>0)

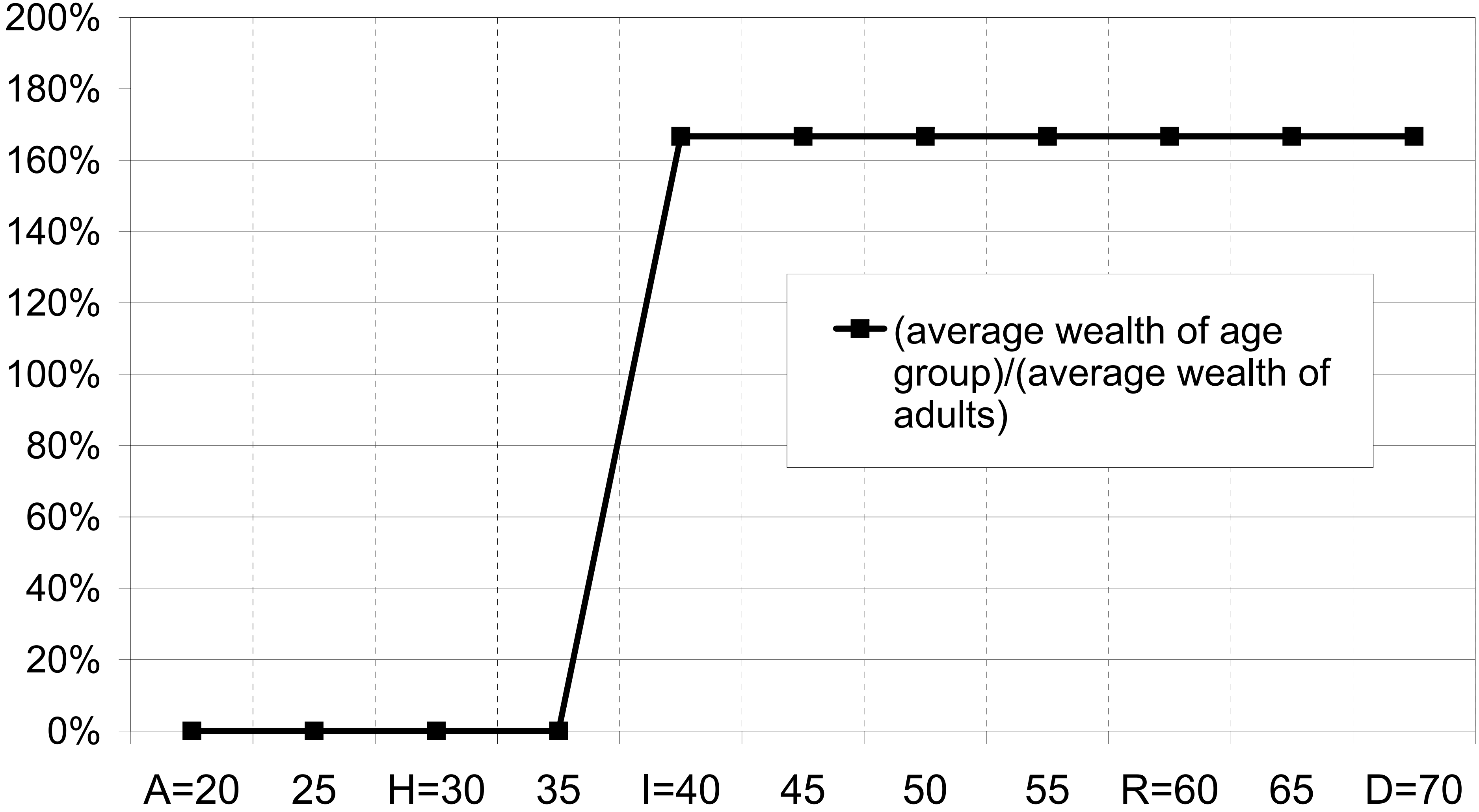


Figure 13: Steady-state cross-sectional age-wealth profile in the class savings model with demographic noise

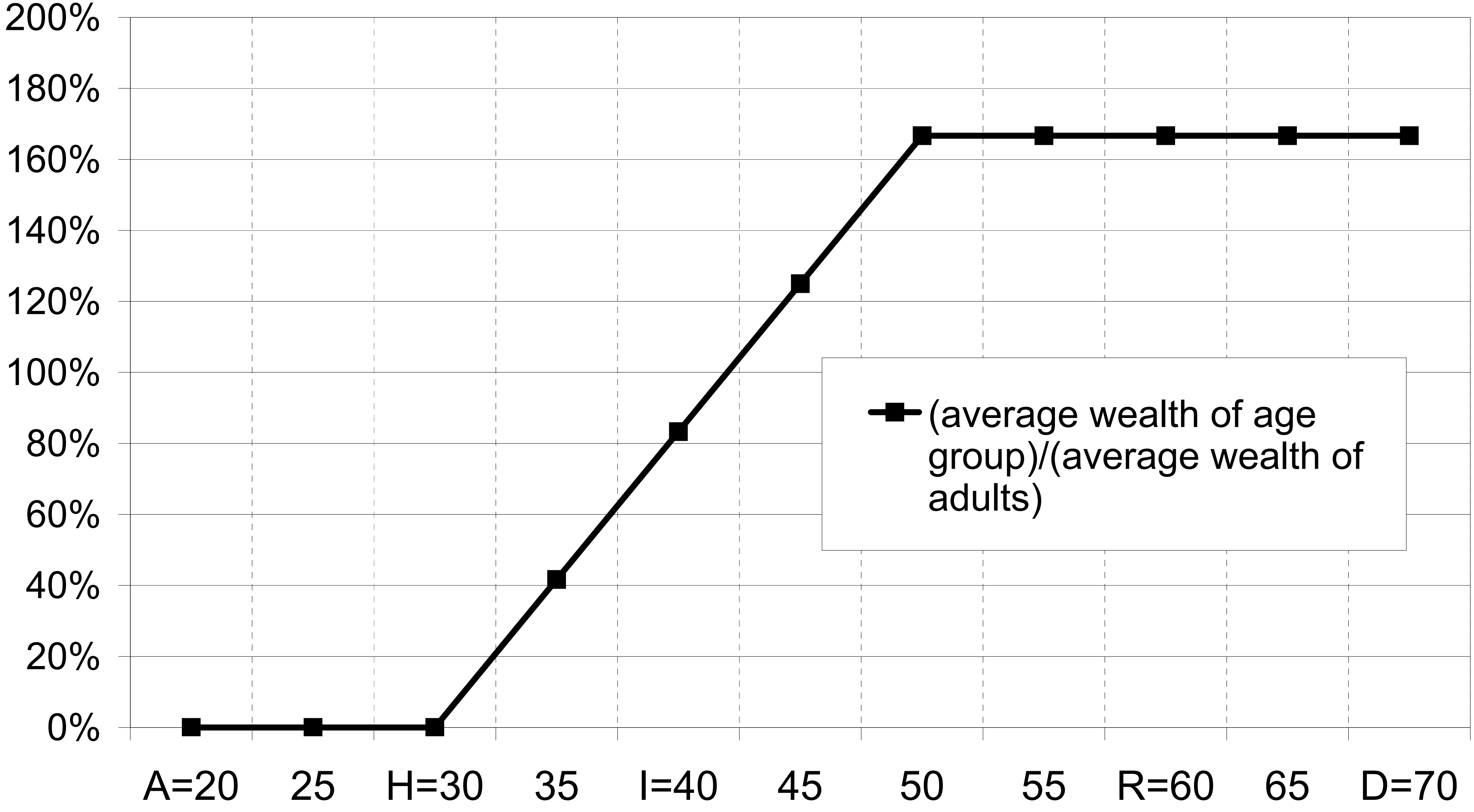


Figure 14: Private savings rate in France 1820-2008

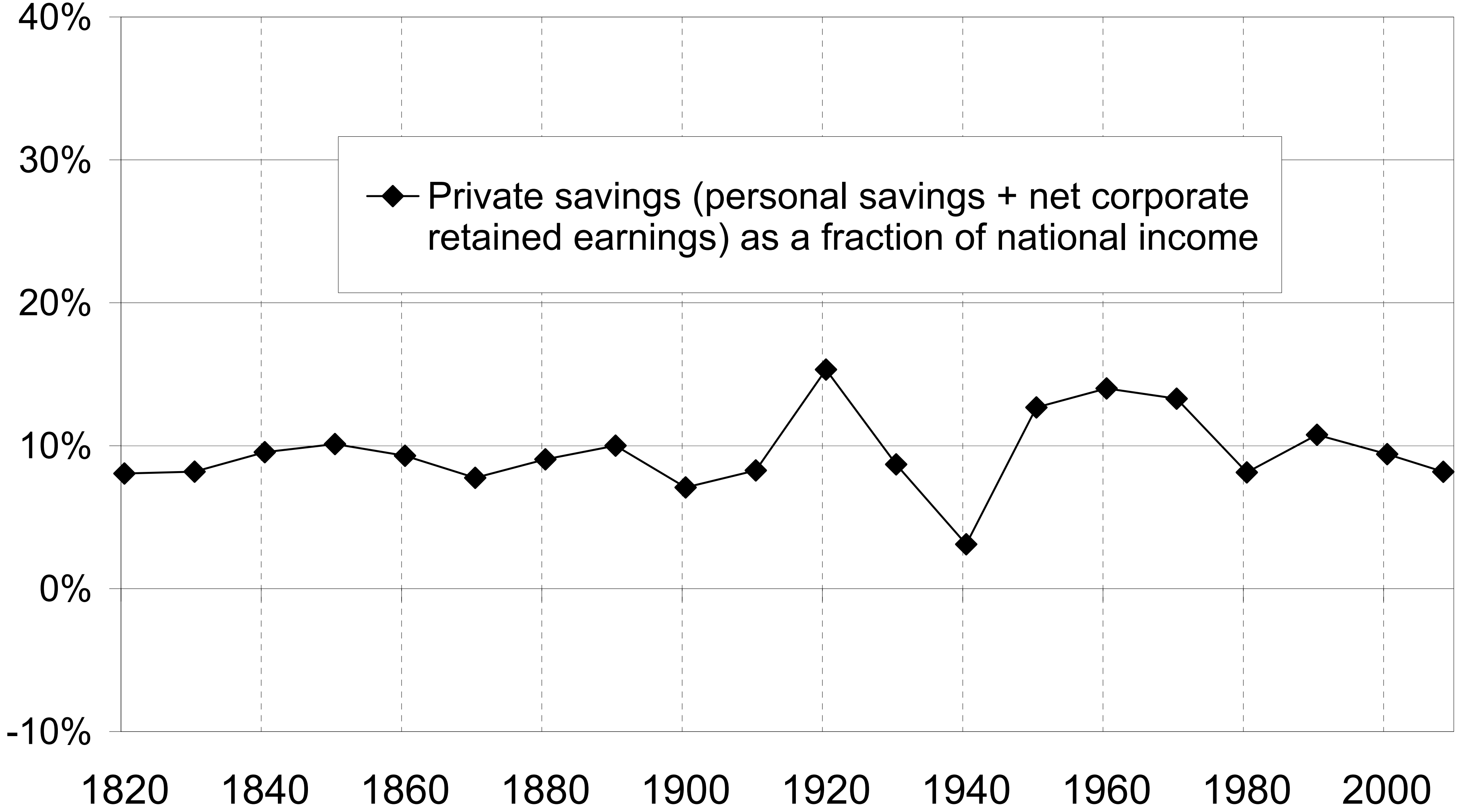


Figure 15a: Observed vs simulated inheritance flow B/Y, France 1820-2100

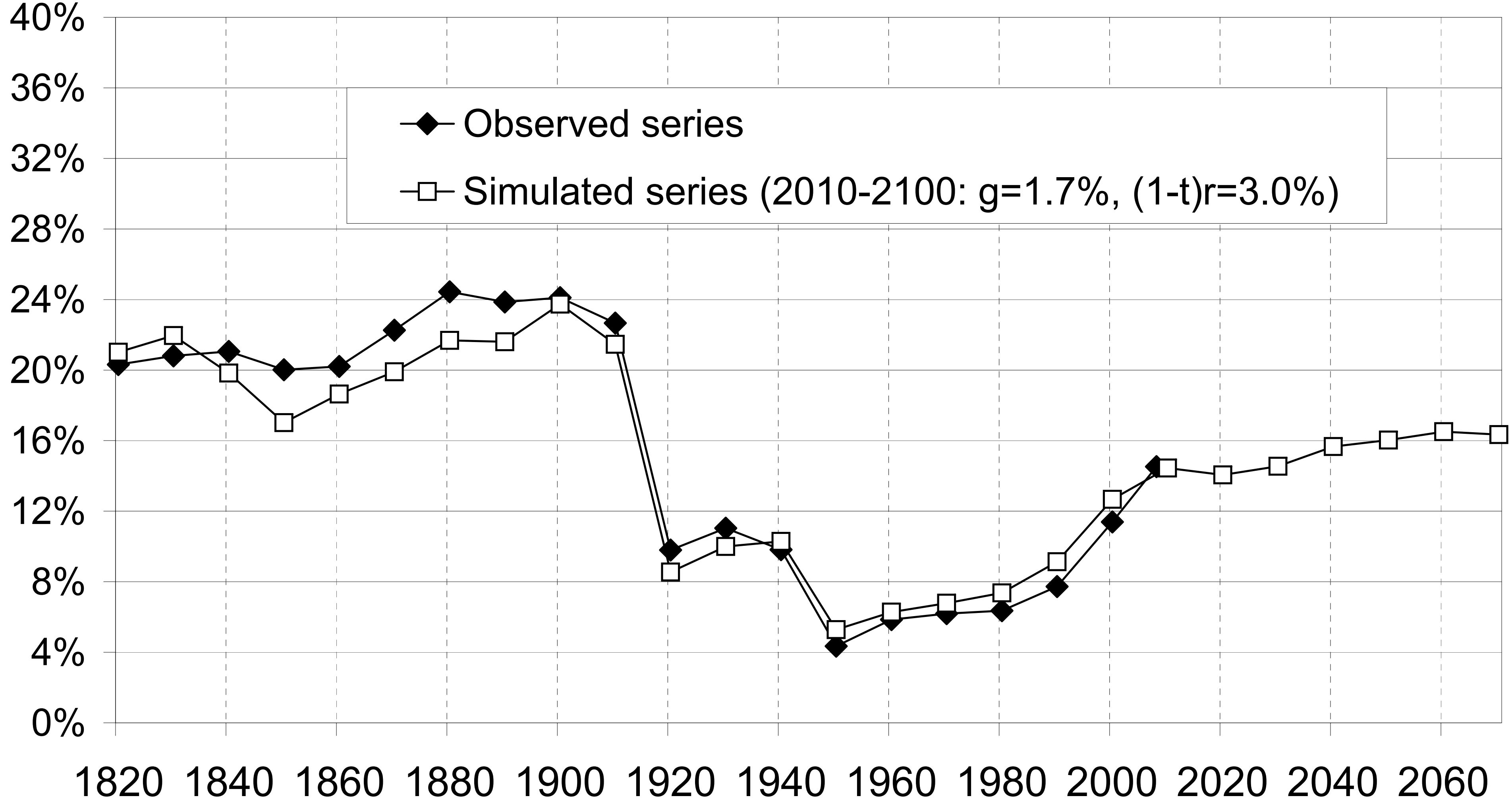
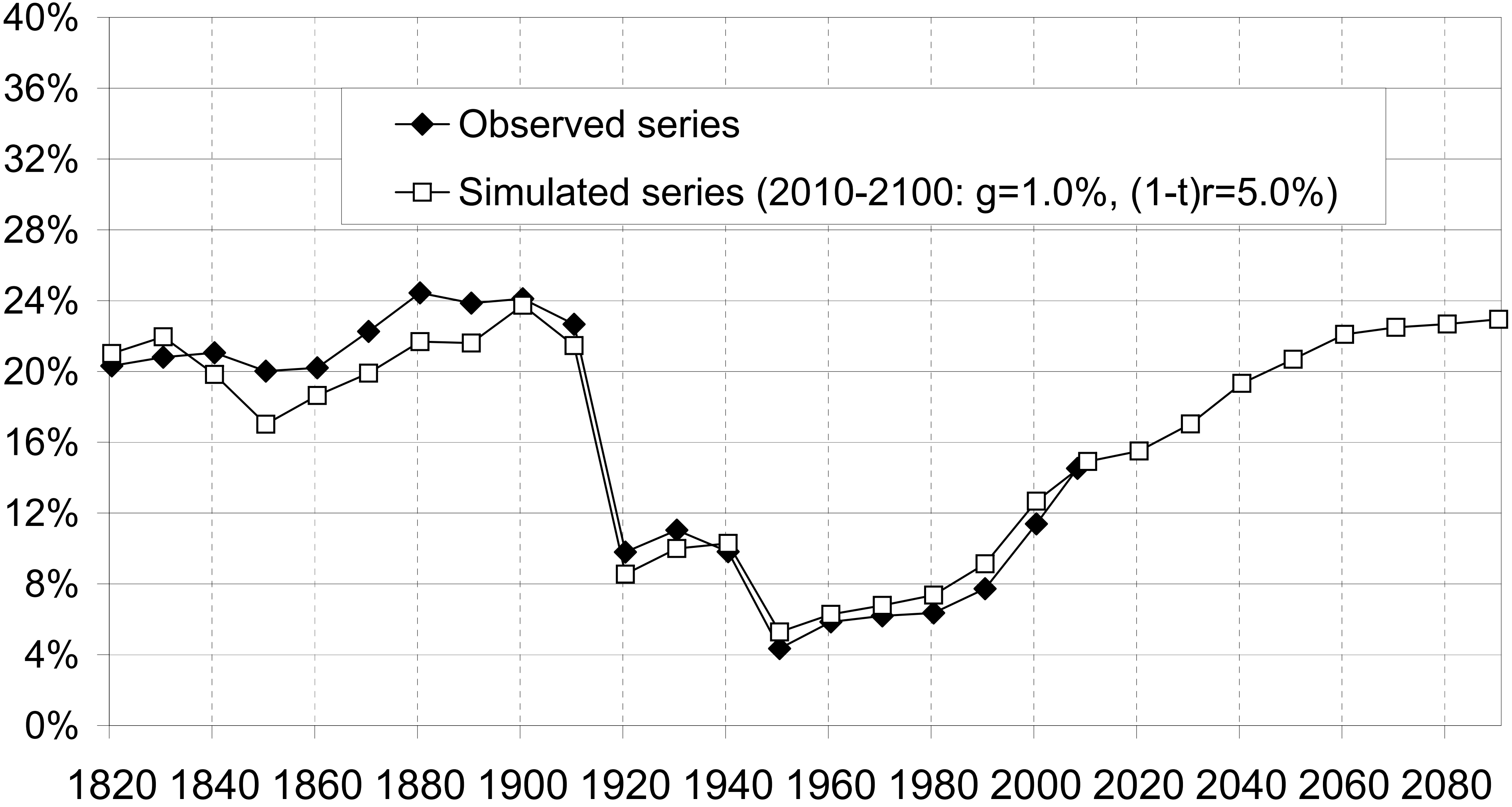


Figure 15b: Observed vs simulated inheritance flow B/Y, France 1820-2100



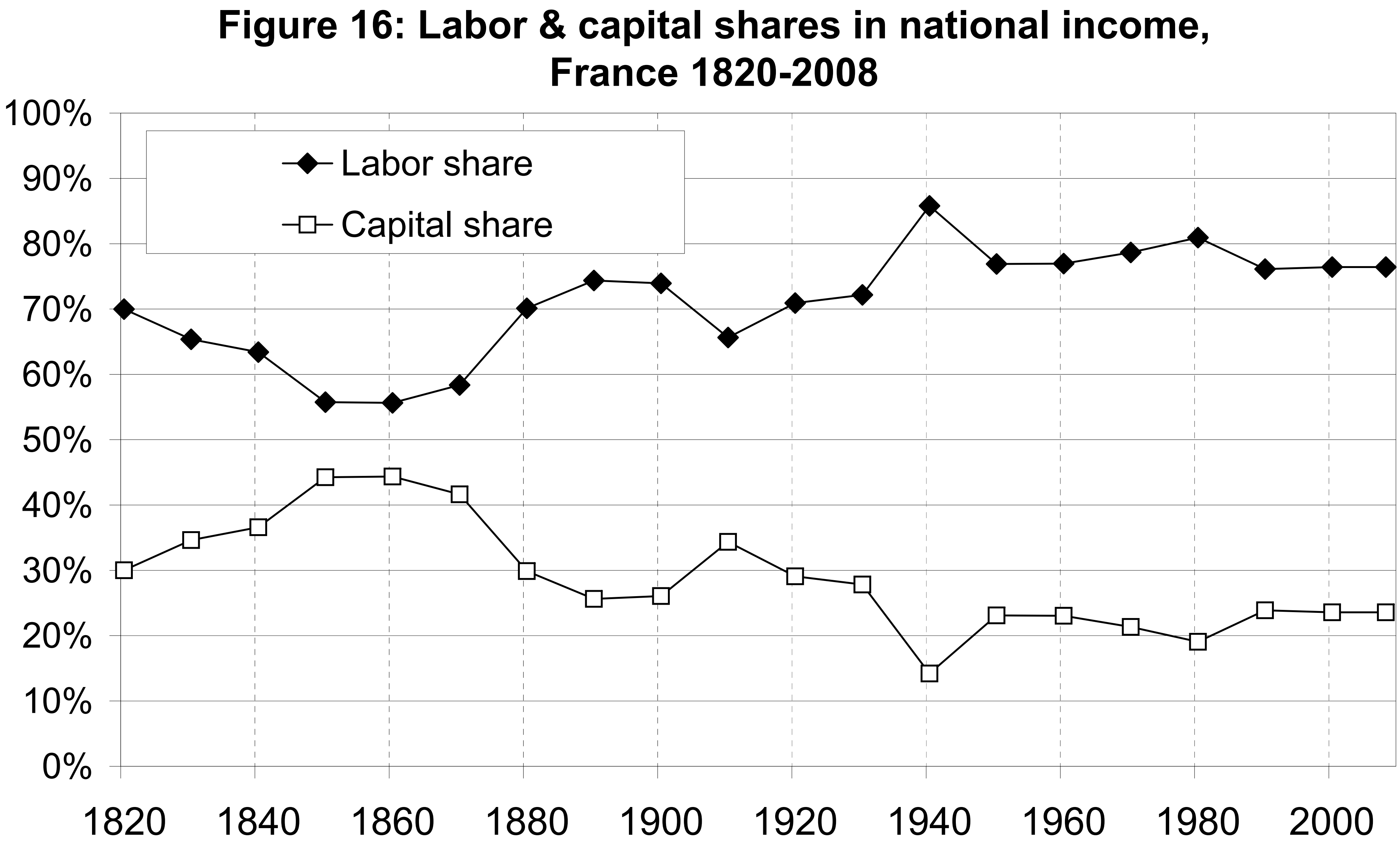


Figure 16: Labor & capital shares in national income,
France 1820-2008
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Labor share
Capital share
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000

Figure 17: Rate of return vs growth rate France 1820-1913

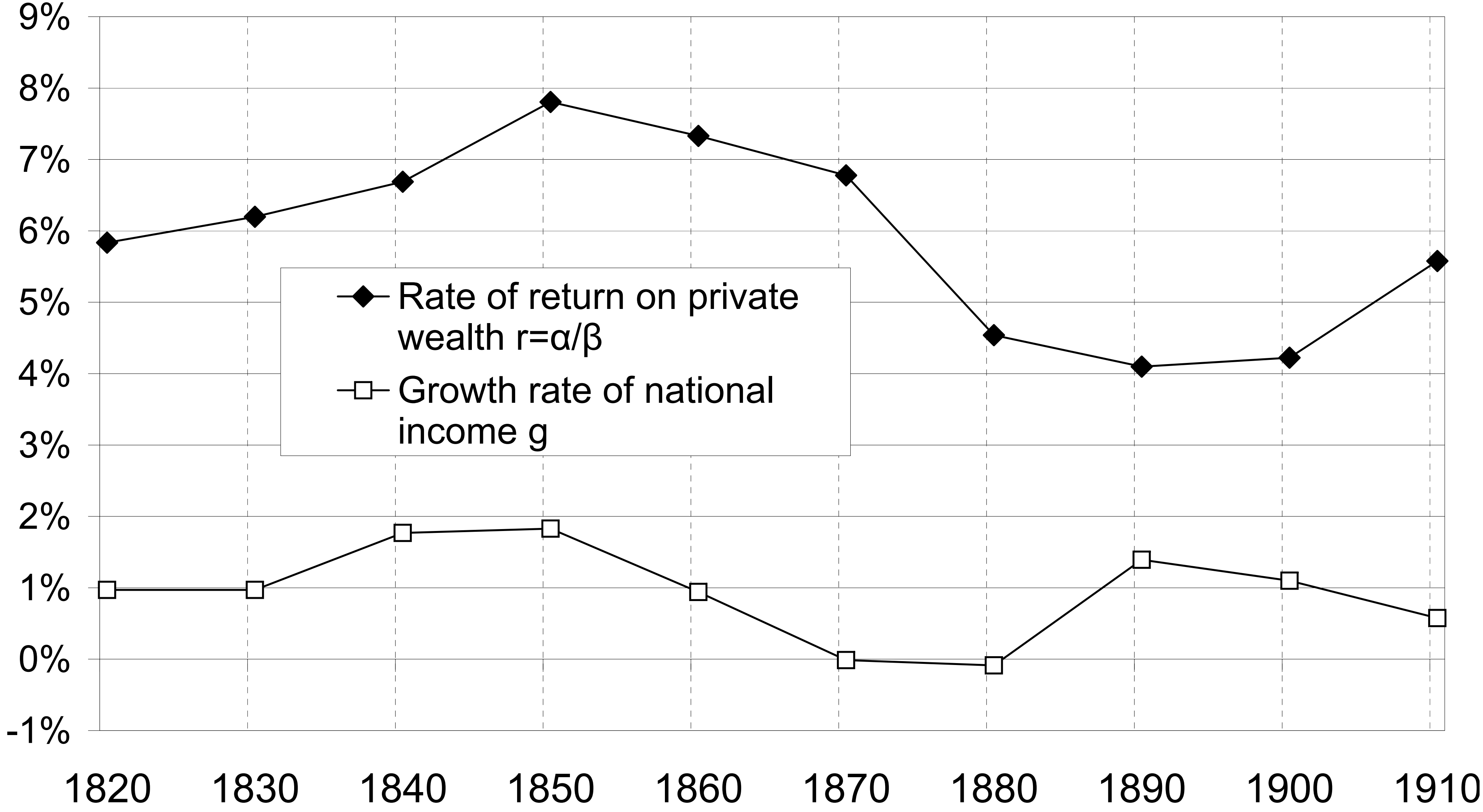


Figure 18: Capital share vs savings rate France 1820-1913

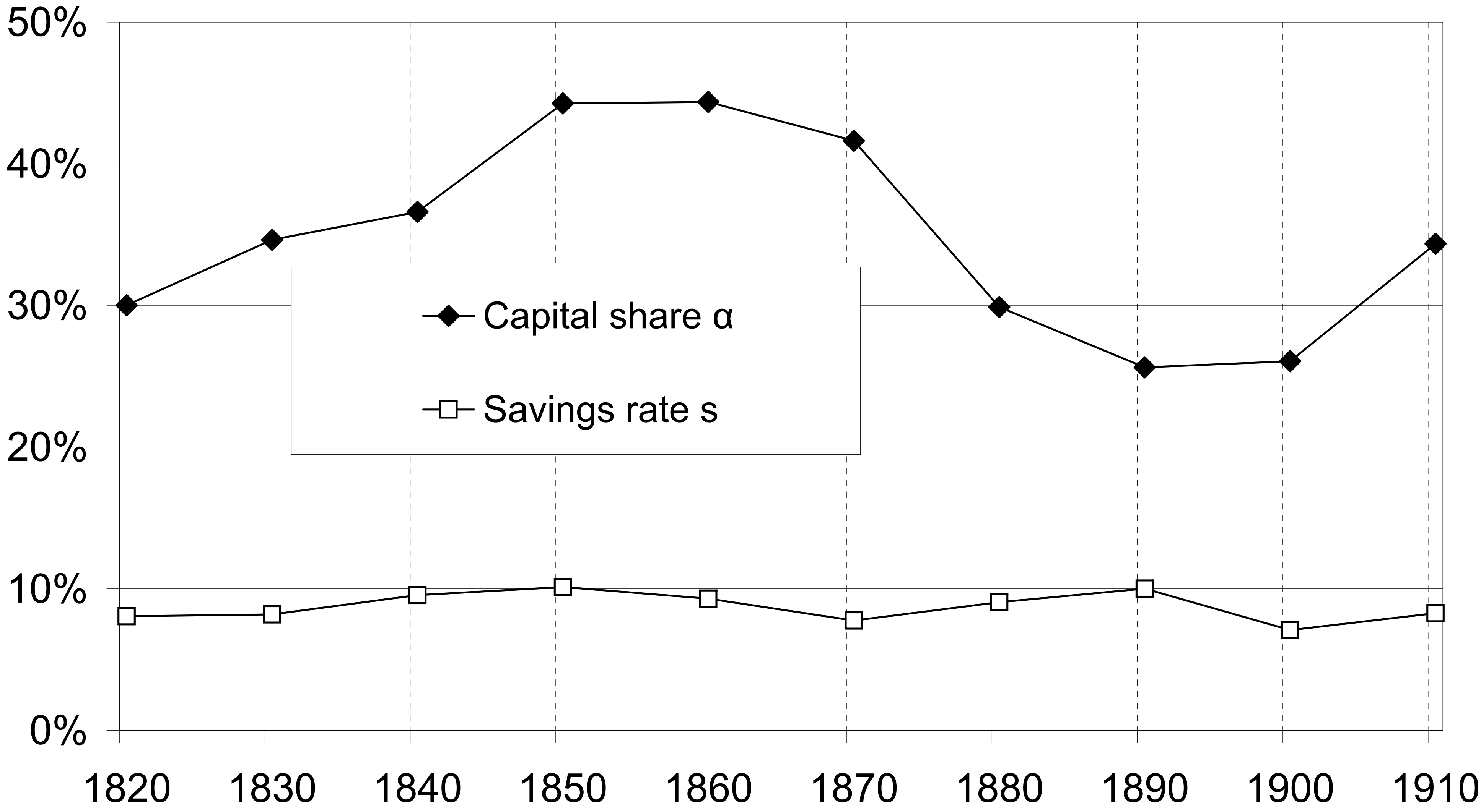
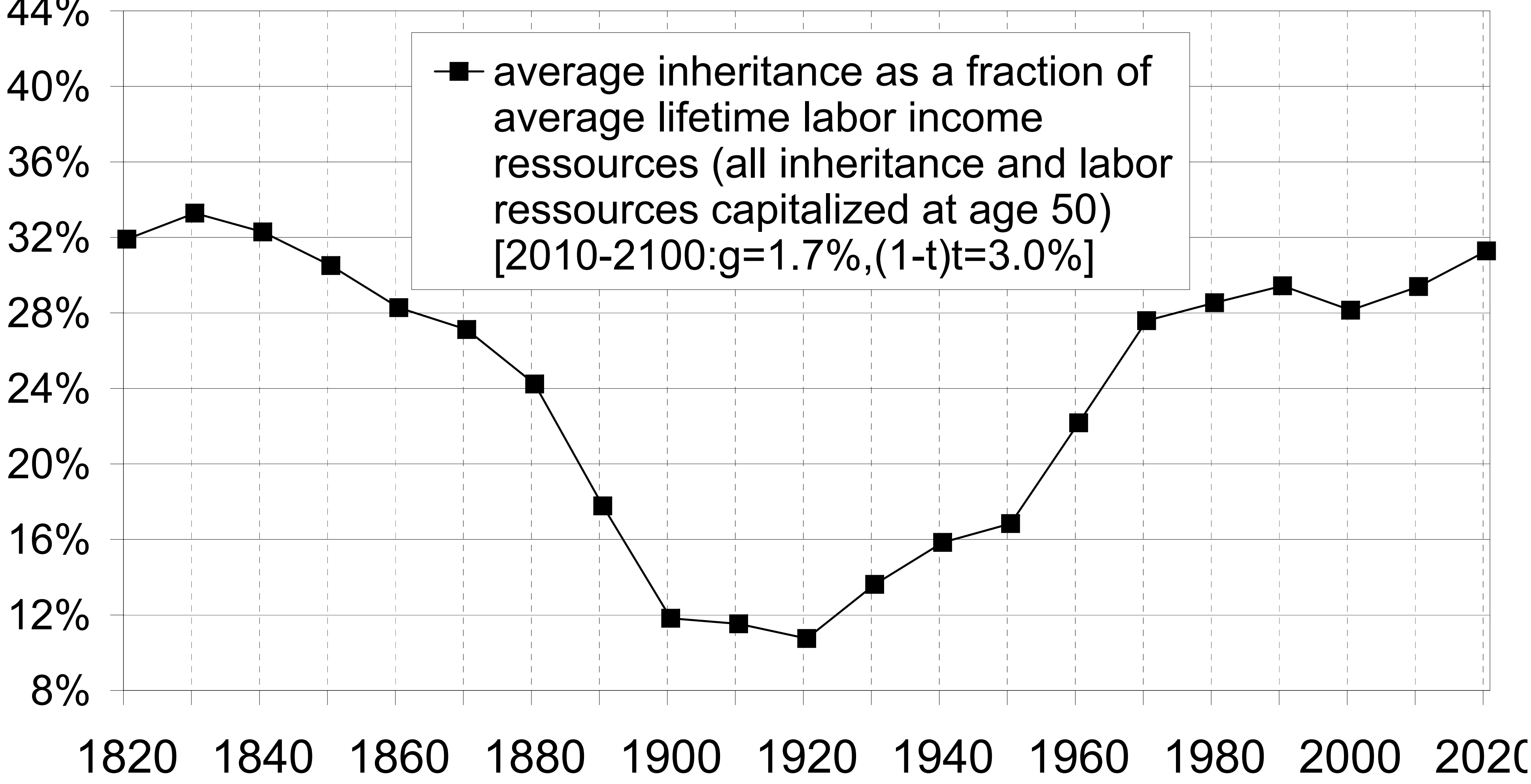


Figure 19a: The share of inheritance in lifetime ressources received by cohorts born in 1820-2020



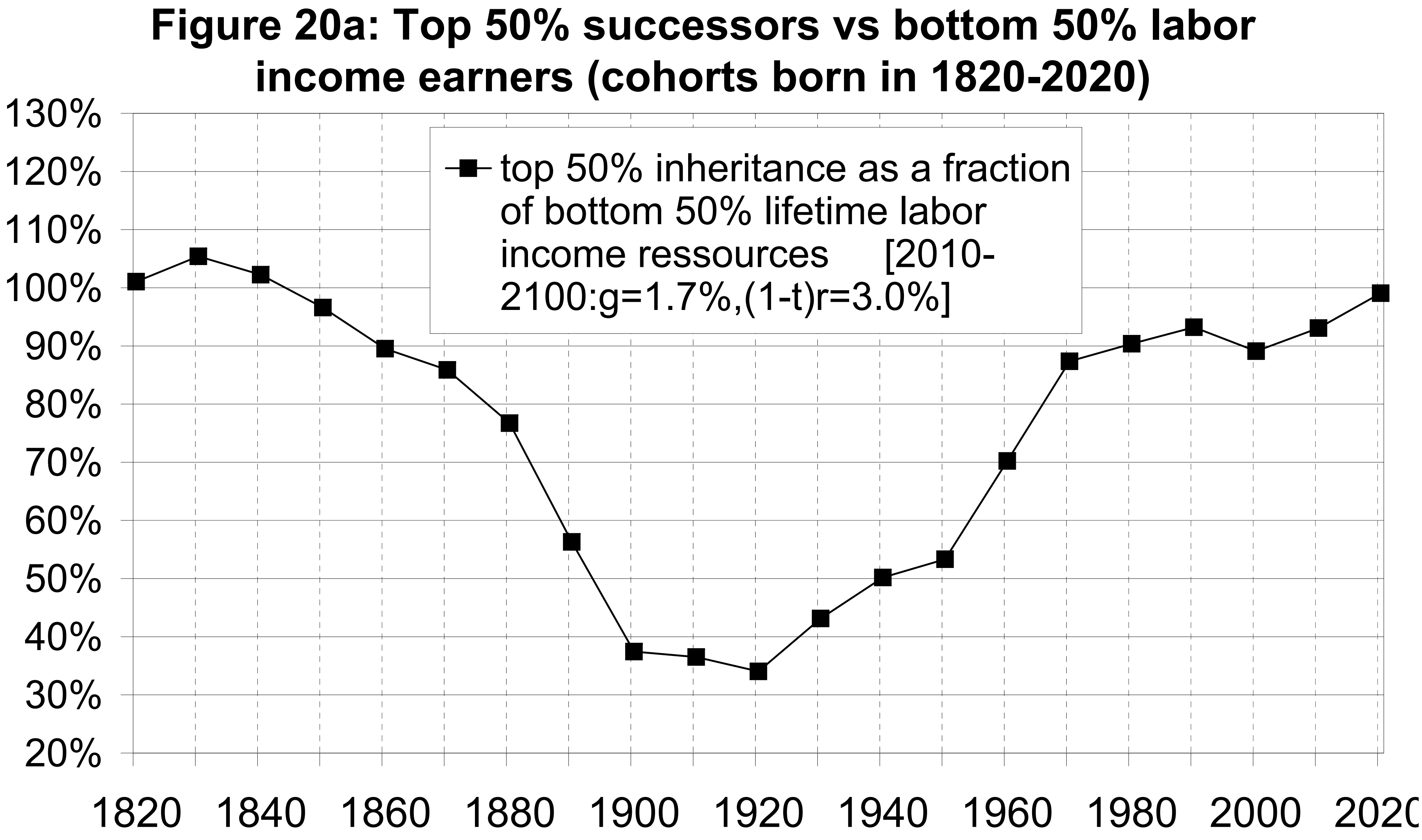
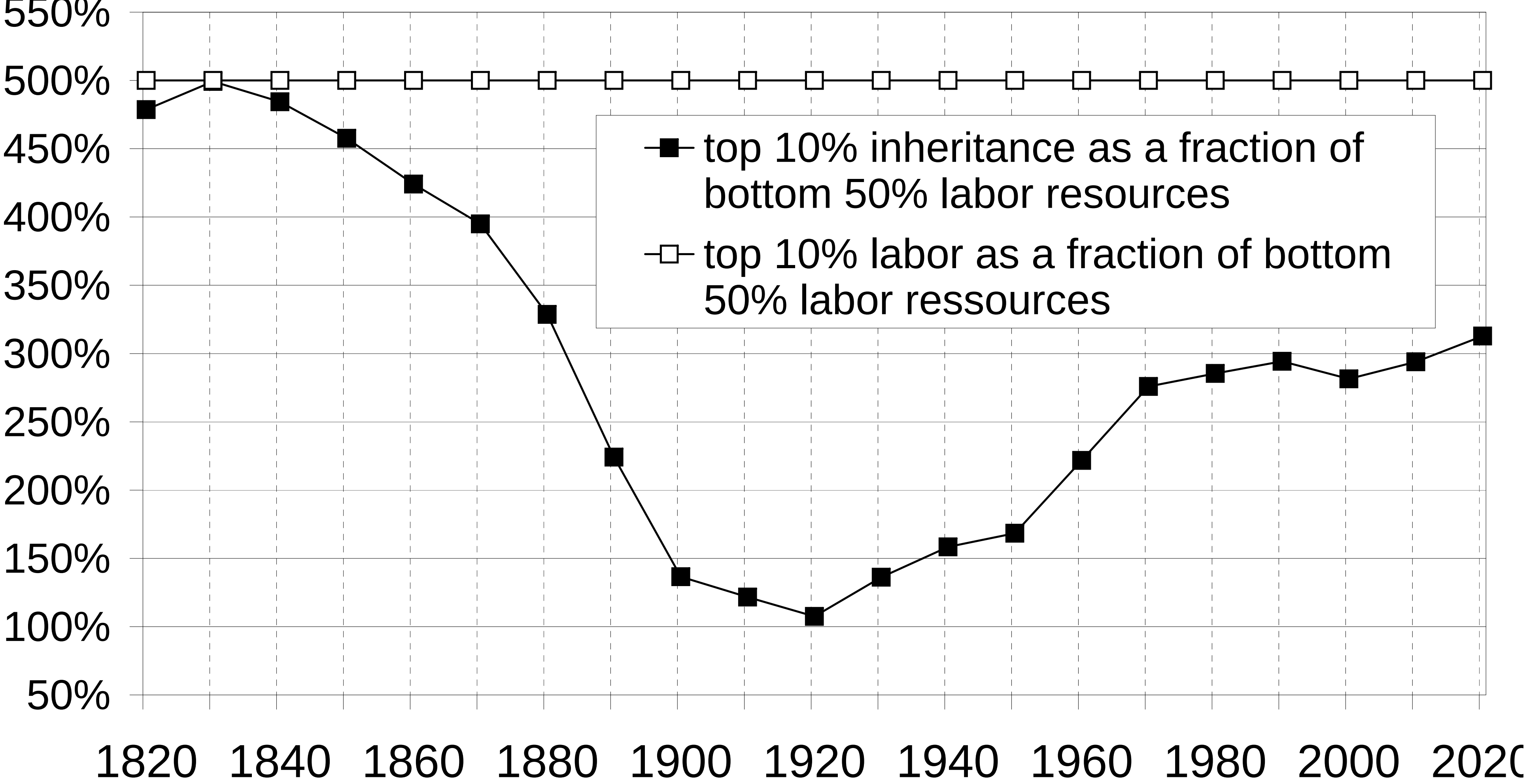


Figure 20a: Top 50% successors vs bottom 50% labor income earners (cohorts born in 1820-2020)
top 50% inheritance as a fraction of bottom 50% lifetime labor income ressources [2010-2100:g=1.7%,(1-t)r=3.0%]
130%
120%
110%
100%
90%
80%
70%
60%
50%
40%
30%
20%
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
2020

Figure 21a: Top 10% successors vs bottom 50% labor income earners (cohorts born in 1820-2020)



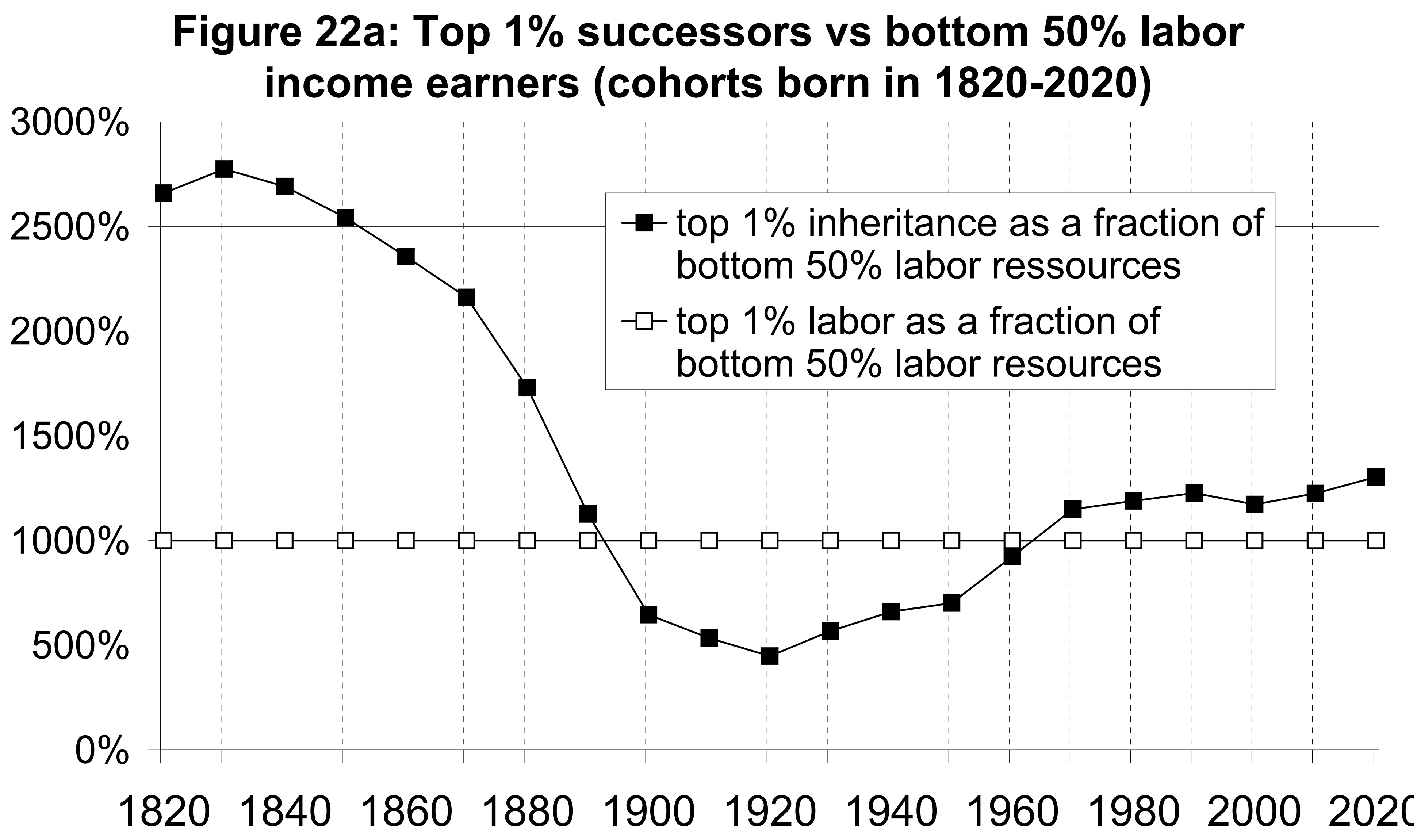


Figure 22a: Top 1% successors vs bottom 50% labor income earners (cohorts born in 1820-2020)
3000%
2500%
2000%
1500%
1000%
500%
0%
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
2020
top 1% inheritance as a fraction of bottom 50% labor ressources
top 1% labor as a fraction of bottom 50% labor resources

Figure 23a: Cohort fraction inheriting more than bottom 50% labor income (cohorts born in 1820-2020)

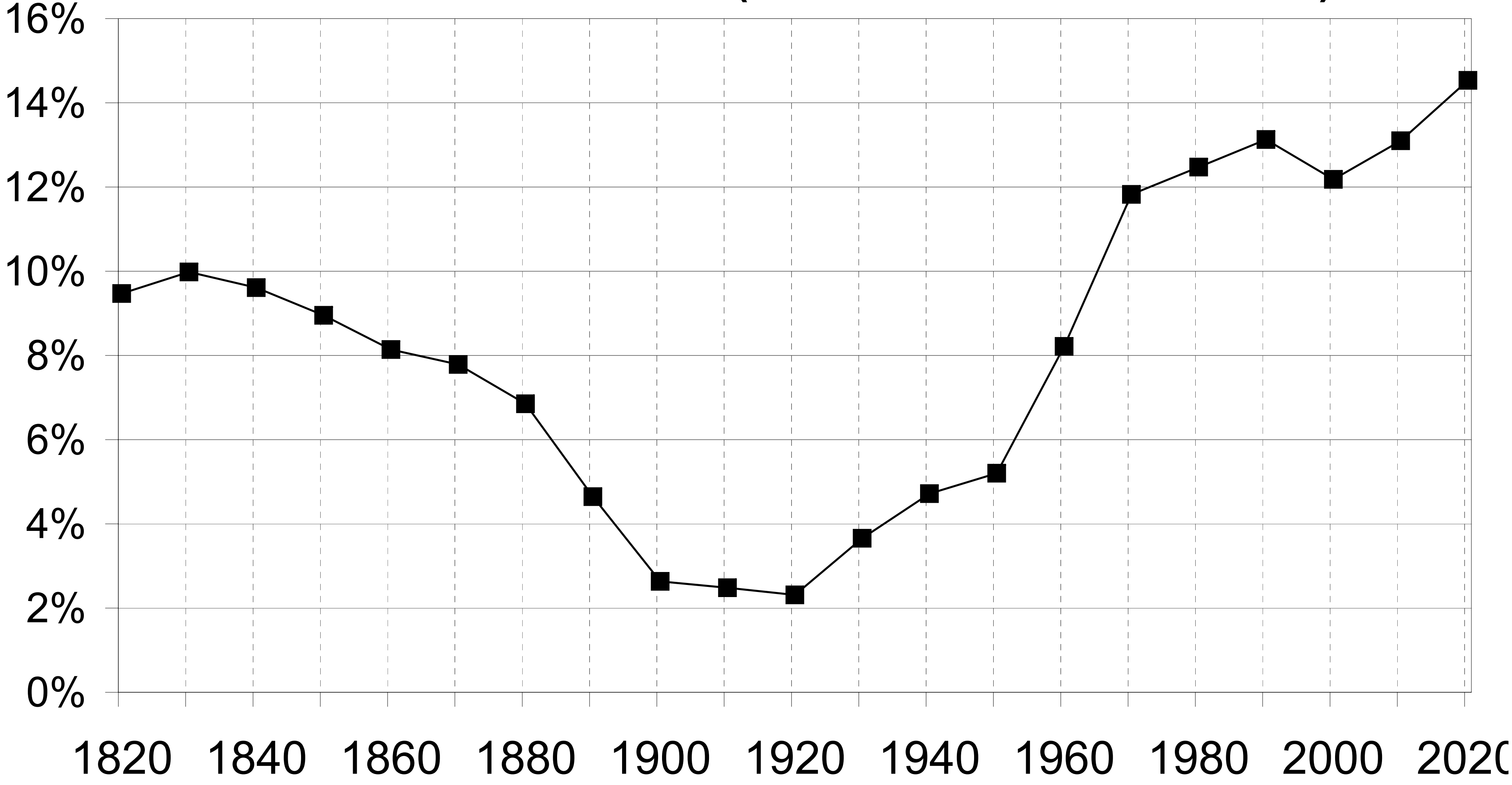
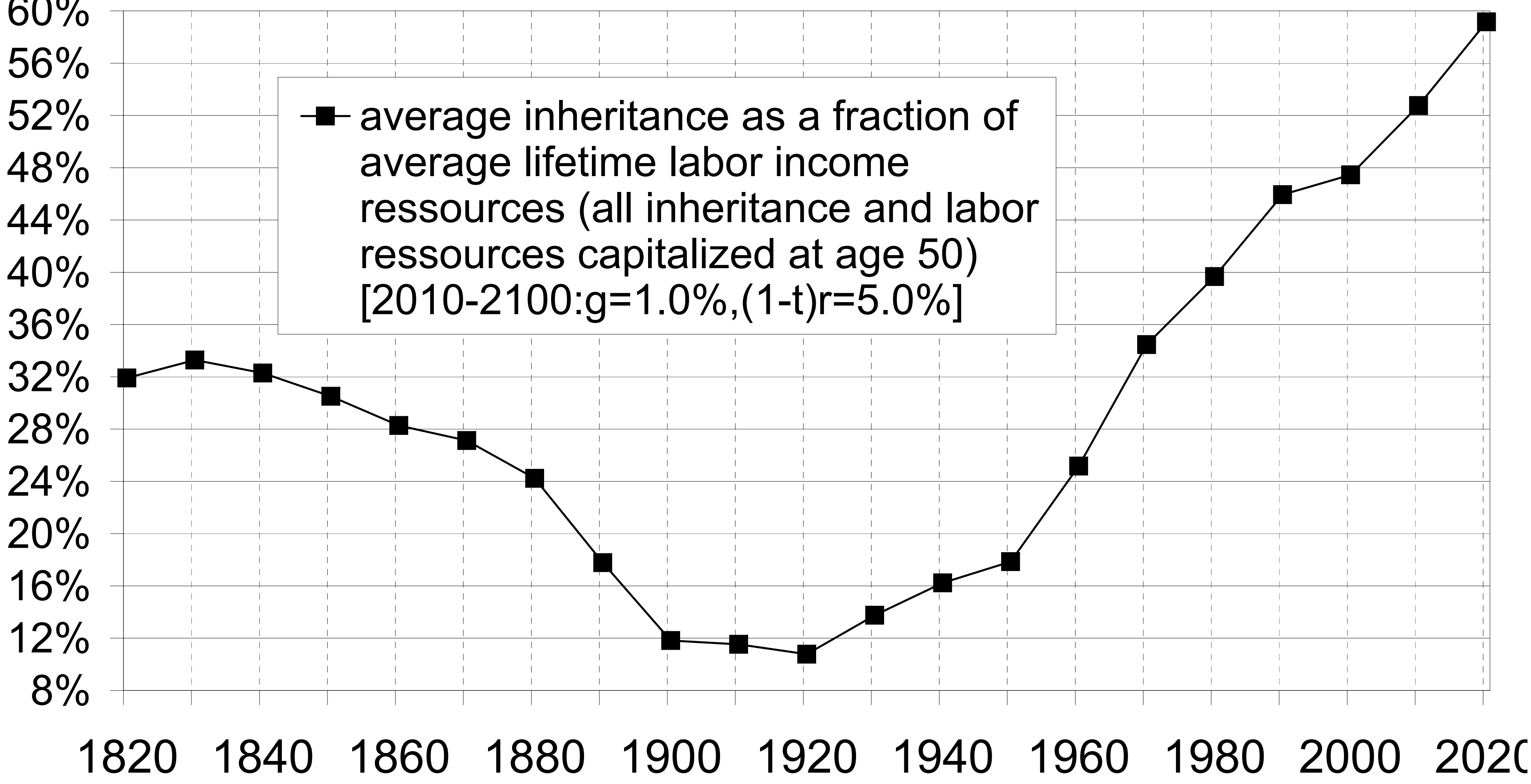


Figure 19b: The share of inheritance in lifetime ressources received by cohorts born in 1820-2020



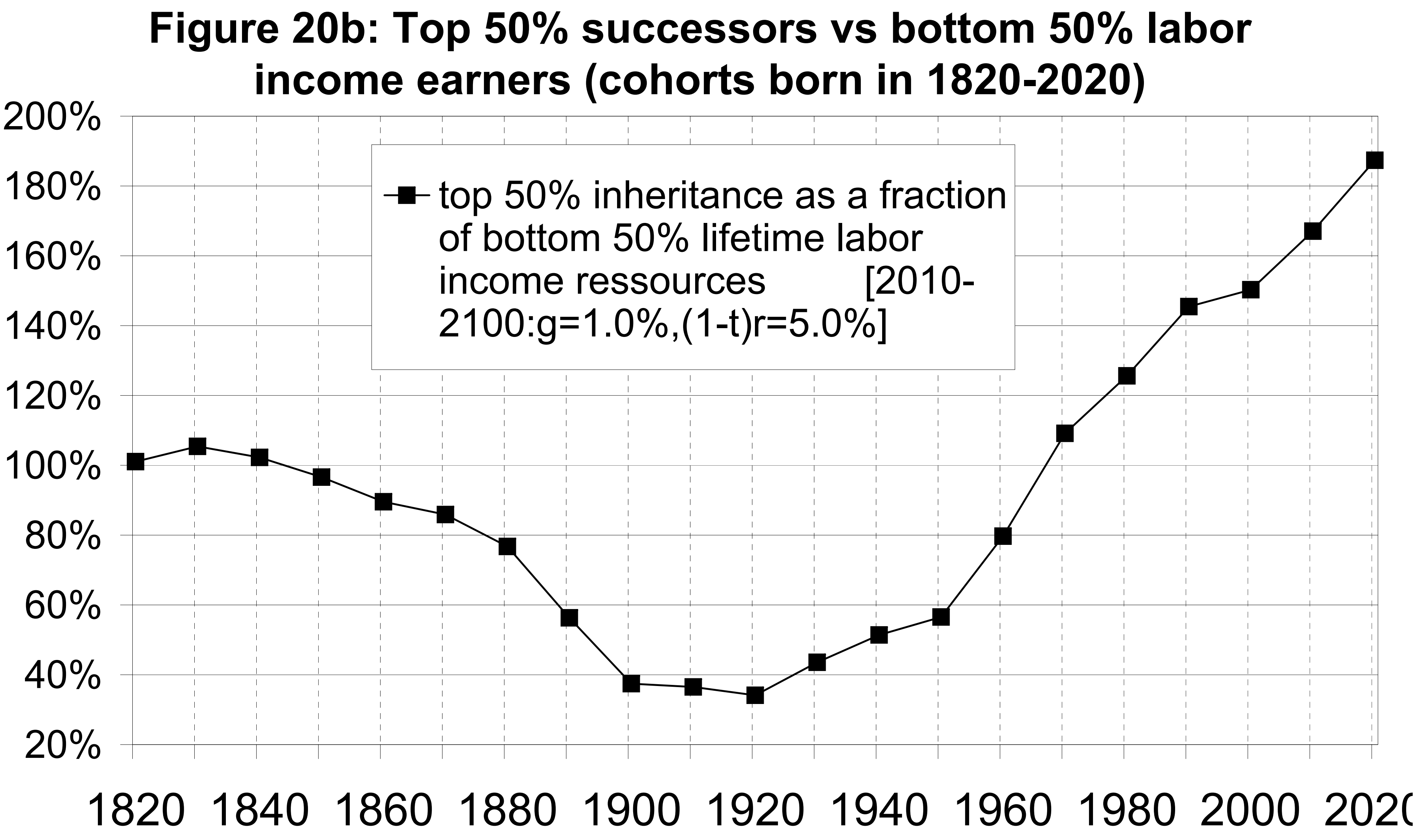
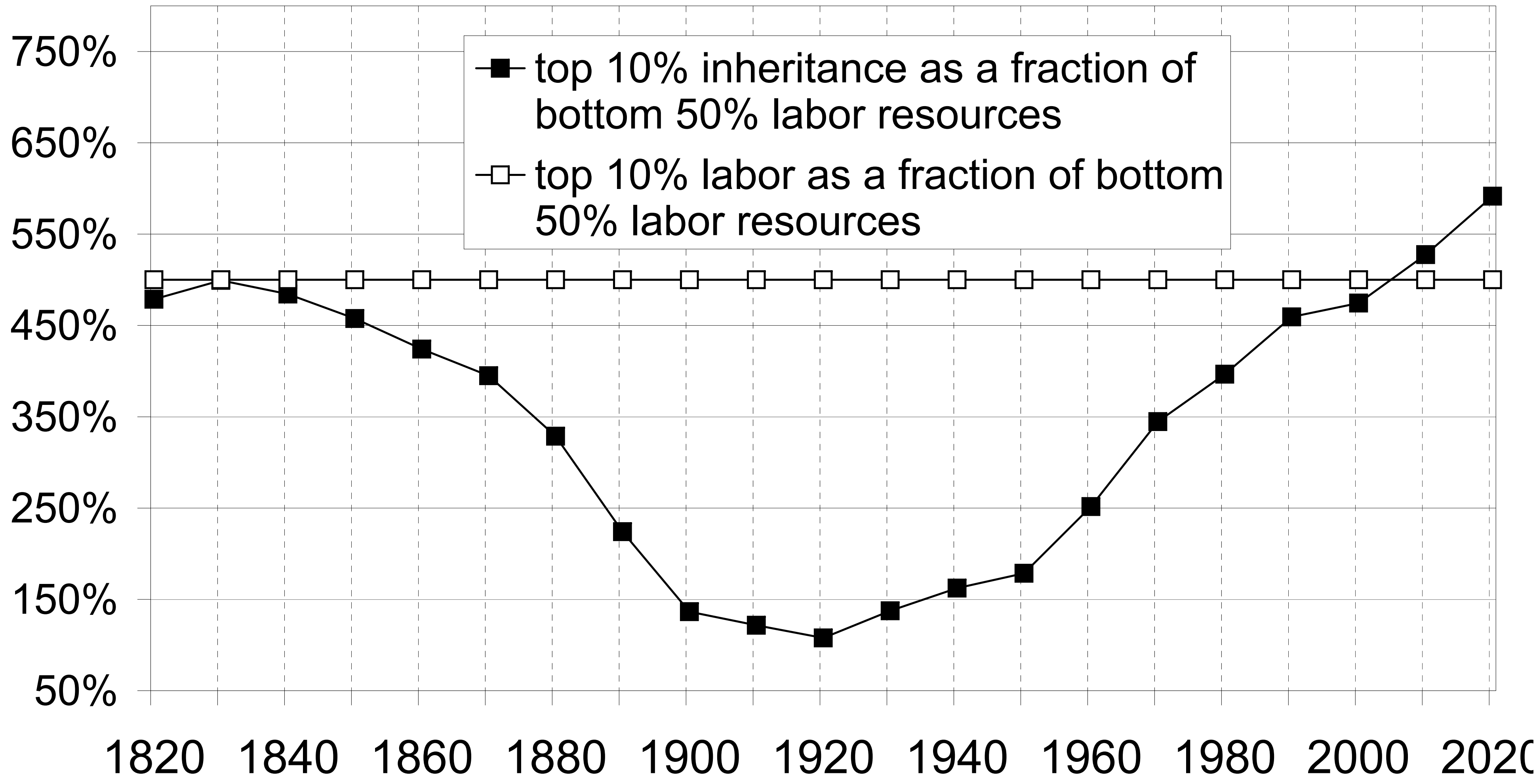


Figure 20b: Top 50% successors vs bottom 50% labor income earners (cohorts born in 1820-2020)
top 50% inheritance as a fraction of bottom 50% lifetime labor income ressources [2010-2100:g=1.0%,(1-t)r=5.0%]
200%
180%
160%
140%
120%
100%
80%
60%
40%
20%
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
2020

Figure 21b: Top 10% successors vs bottom 50% labor income earners (cohorts born in 1820-2020)



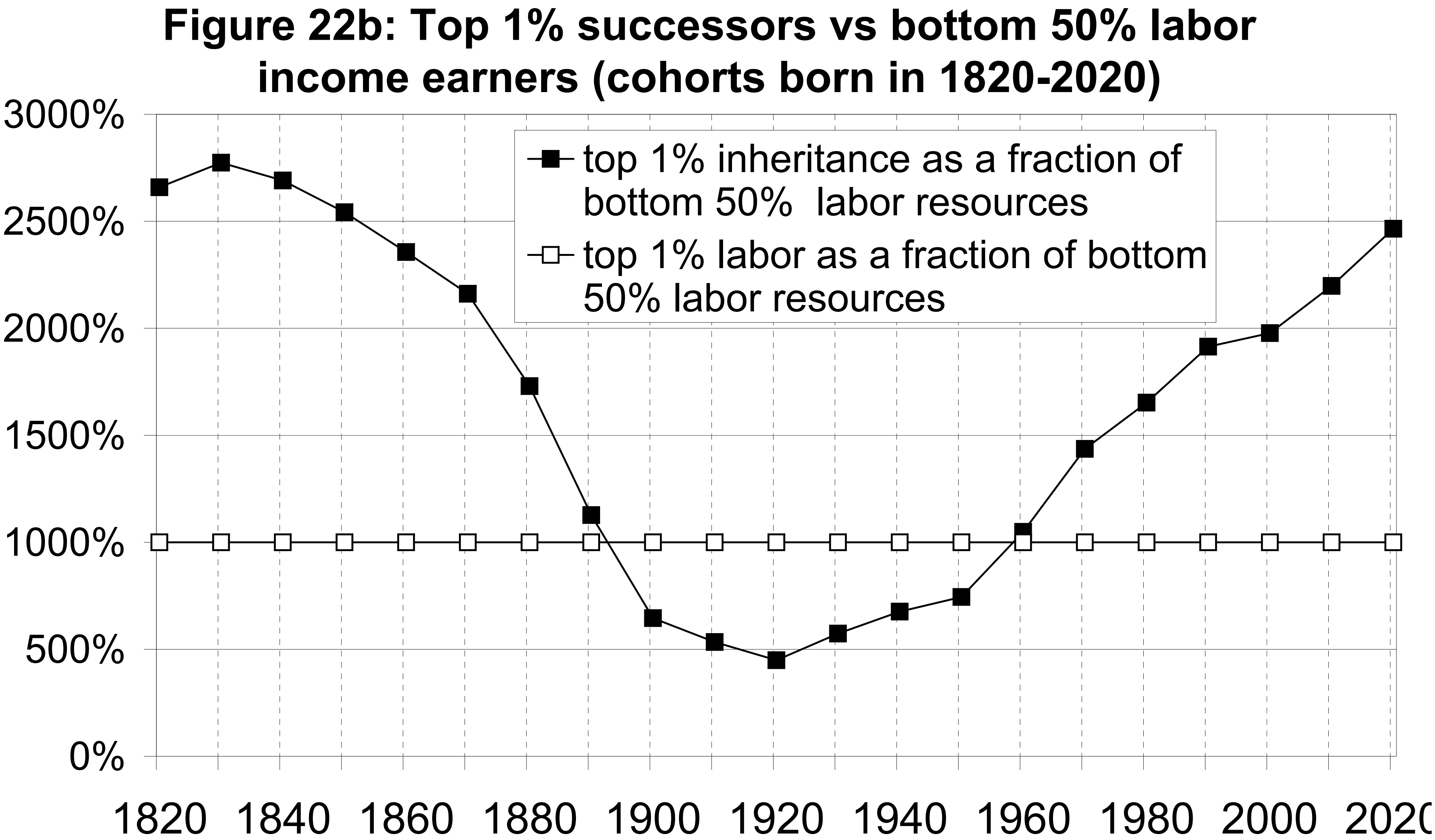


Figure 22b: Top 1% successors vs bottom 50% labor income earners (cohorts born in 1820-2020)
top 1% inheritance as a fraction of bottom 50% labor resources
top 1% labor as a fraction of bottom 50% labor resources
3000%
2500%
2000%
1500%
1000%
500%
0%
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
2020

Figure 23b: Cohort fraction inheriting more than bottom 50% labor income (cohorts born in 1820-2020)

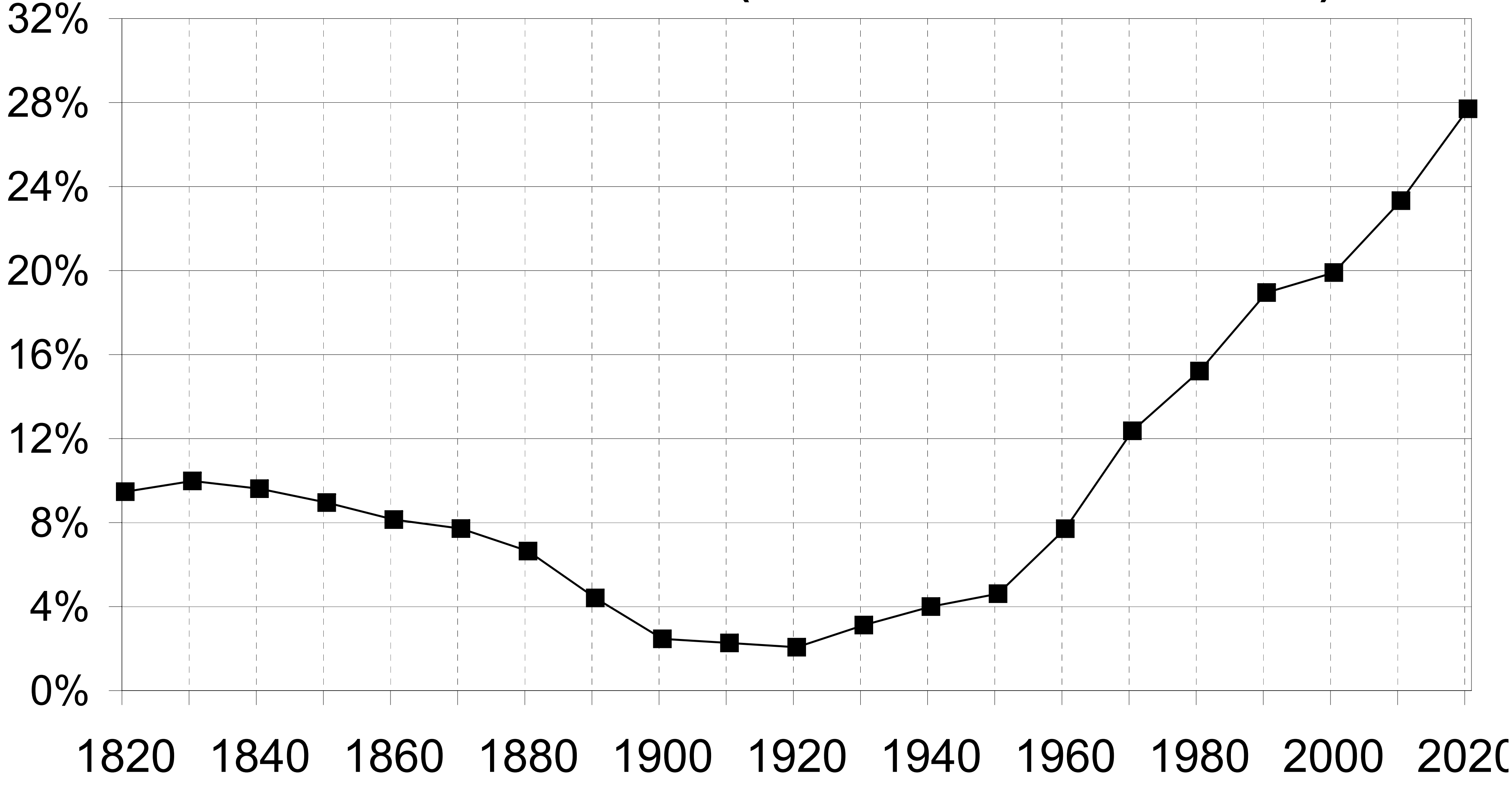


Figure 24a: The share of non-capitalized inheritance in aggregate wealth accumulation , France 1850-2100

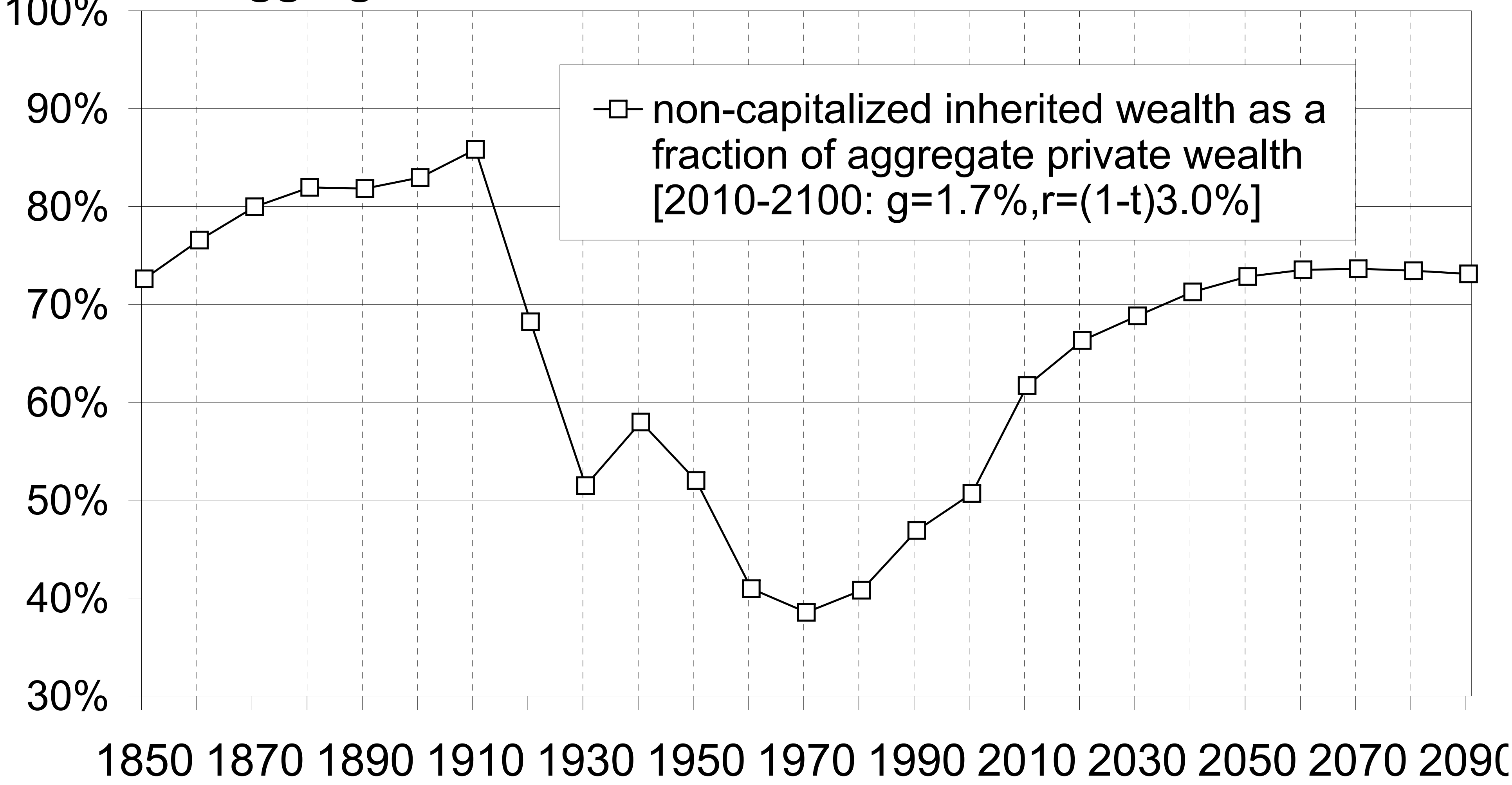


Figure 25a: The share of capitalized inheritance in aggregate wealth accumulation , France 1900-2100

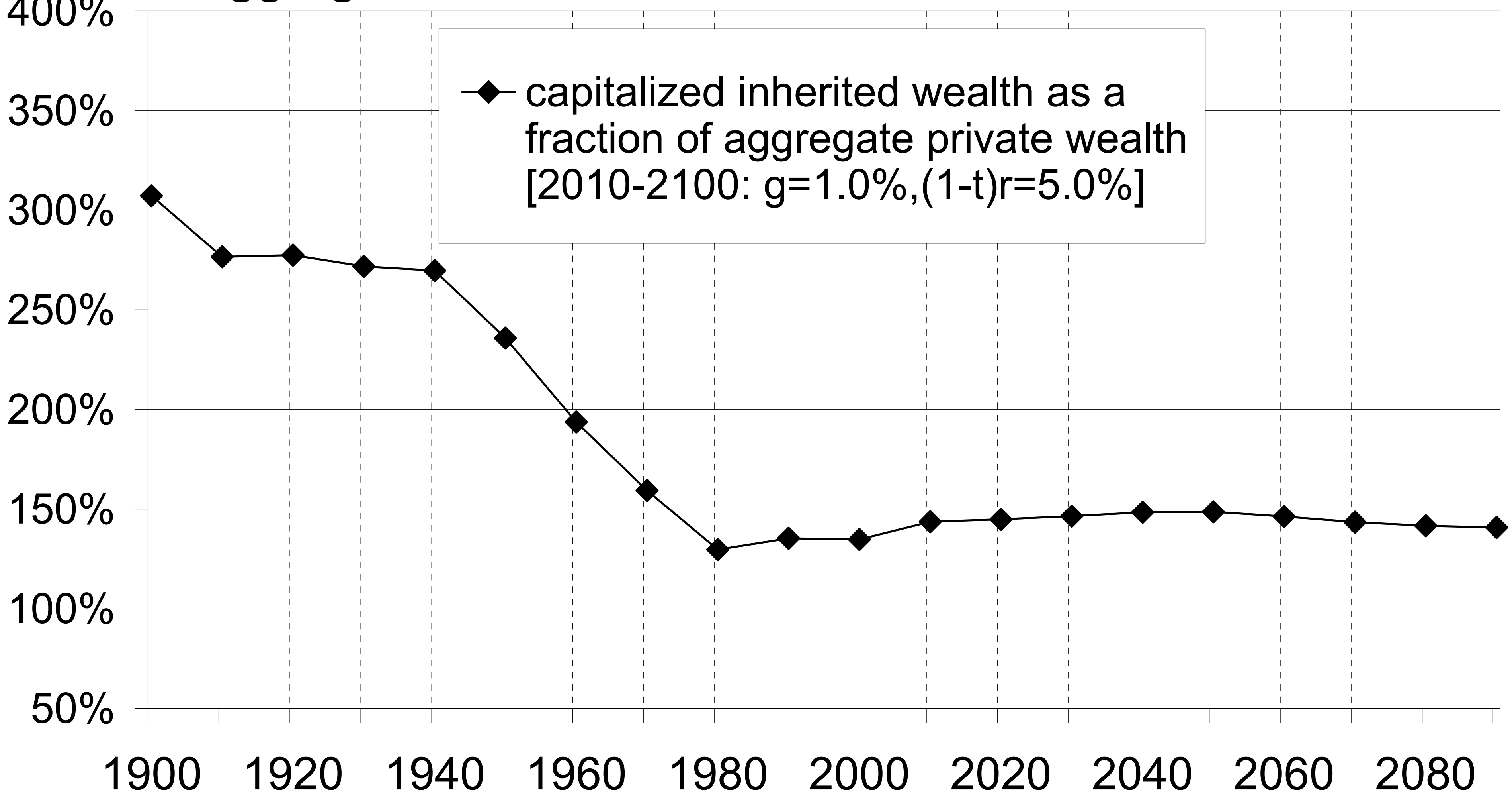


Figure 24b: The share of non-capitalized inheritance in aggregate wealth accumulation , France 1850-2100

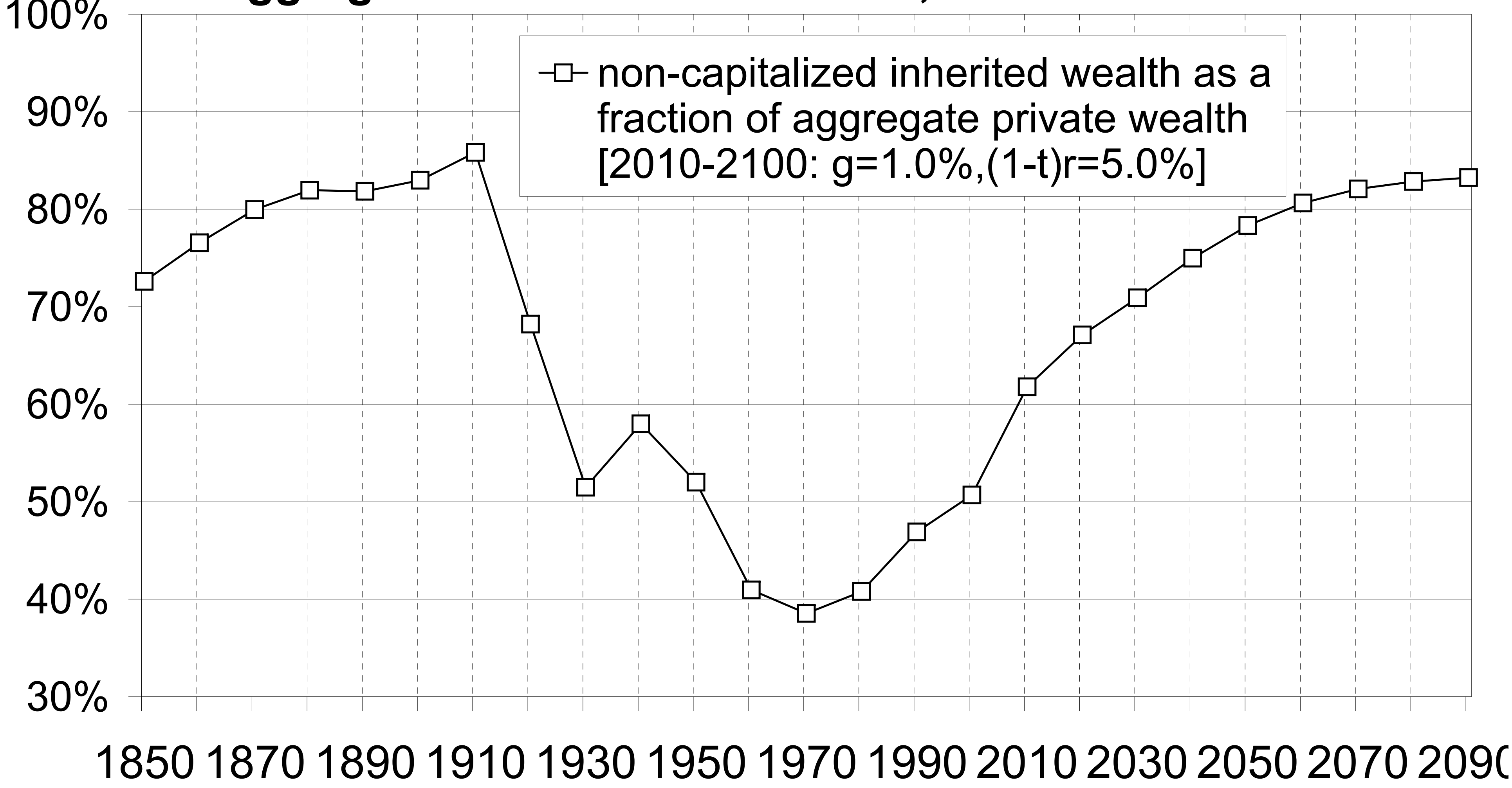


Figure 25b: The share of capitalized inheritance in aggregate wealth accumulation , France 1900-2100

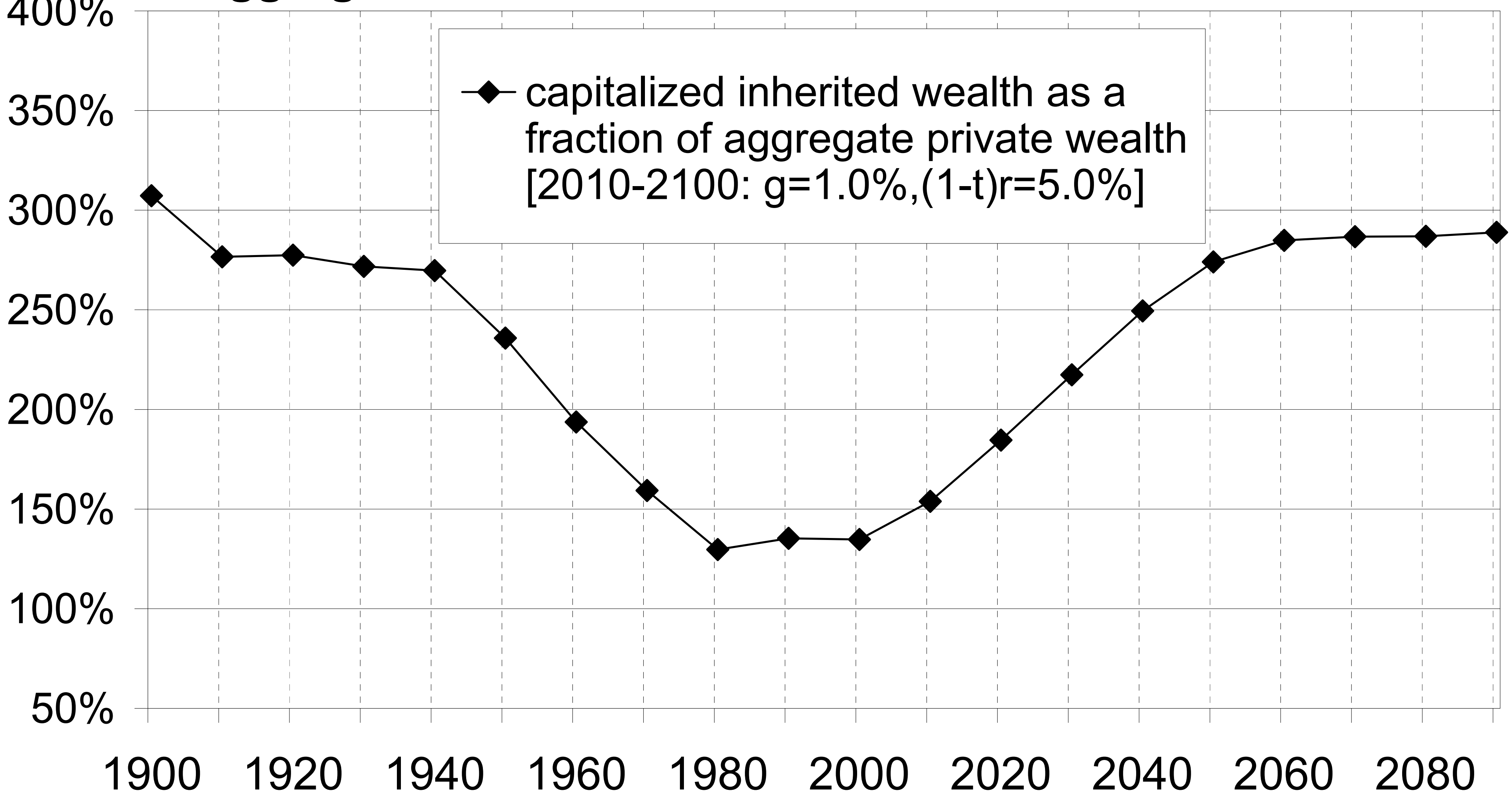


Table 1: Accumulation of private wealth in France, 1820-2009

	Real growth rate of national income g	Real growth rate of private wealth g_w	Savings-induced wealth growth rate $g_{ws} = s/\beta$	Capital-gains-induced wealth growth rate q	*Memo: Consumer price inflation* *p*
1820-2009	1.8%	1.8%	2.1%	-0.3%	*4.4%*
1820-1913	1.0%	1.3%	1.4%	-0.1%	*0.5%*
1913-2009	2.6%	2.4%	2.9%	-0.4%	*8.3%*
1913-1949	1.3%	-1.7%	0.9%	-2.6%	*13.9%*
1949-1979	5.2%	6.2%	5.4%	0.8%	*6.4%*
1979-2009	1.7%	3.8%	2.8%	1.0%	*3.6%*

Table 2: Raw age-wealth-at-death profiles in France, 1820-2008

	20-29	30-39	40-49	50-59	60-69	70-79	80+
1820	29%	37%	47%	100%	134%	148%	153%
1850	28%	37%	52%	100%	128%	144%	142%
1880	30%	39%	61%	100%	148%	166%	220%
1902	26%	57%	65%	100%	172%	176%	238%
1912	23%	54%	72%	100%	158%	178%	257%
1931	22%	59%	77%	100%	123%	137%	143%
1947	23%	52%	77%	100%	99%	76%	62%
1960	28%	52%	74%	100%	110%	101%	87%
1984	19%	55%	83%	100%	118%	113%	105%
2000	19%	46%	66%	100%	122%	121%	118%
2006	25%	42%	74%	100%	111%	106%	134%

Table 3: Rates of return vs growth rates in France, 1820-2009							
	Growth rate of national income	Rate of return on private wealth	Capital tax rate	After-tax rate of return	Real rate of capital gains	Rate of capital destruct. (wars)	After-tax real rate of return (incl. k gains & losses)
	g	$r = \alpha/\beta$	τ_K	$r_d = (1-\tau_K)\alpha/\beta$	q	d	$r_d = (1-\tau_K)\alpha/\beta + q + d$
1820-2009	**1.8%**	**6.8%**	19%	**5.4%**	-0.1%	-0.3%	**5.0%**
1820-1913	**1.0%**	**5.9%**	8%	**5.4%**	-0.1%	0.0%	**5.3%**
1913-2009	**2.6%**	**7.8%**	31%	**5.4%**	-0.1%	-0.7%	**4.6%**
1913-1949	**1.3%**	**7.9%**	21%	**6.4%**	-2.6%	-2.0%	**1.8%**
1949-1979	**5.2%**	**9.0%**	34%	**6.0%**	0.8%	0.0%	**6.8%**
1979-2009	**1.7%**	**6.9%**	39%	**4.3%**	1.0%	0.0%	**5.3%**

Table 4: Intra-cohort distributions of labor income and inheritance, France, 1910 vs 2010

Shares in aggregate labor income or inherited wealth	Labor income 1910-2010	Inherited wealth 1910	Inherited wealth 2010
Top 10% "Upper Class"	**30%**	**90%**	**60%**
incl. Top 1% "Very Rich"	*6%*	*50%*	*25%*
incl. Other 9% "Rich"	*24%*	*40%*	*35%*
Middle 40% "Middle Class"	**40%**	**5%**	**35%**
Bottom 50% "Poor"	**30%**	**5%**	**5%**

Table 5: Lifetime inequality: illustration with cohorts born in the 1970s

Lifetime ressources capitalized at age 50	**Labor income**	**Inherited wealth**	*Inherited wealth with 1910 distribution*
Top 10% "Upper Class"	**4 740 000 €**	**2 640 000 €**	3 960 000 €
incl. Top 1% "Very Rich"	*9 480 000 €*	*11 000 000 €*	*22 000 000 €*
incl. Other 9% "Rich"	*4 210 000 €*	*1 710 000 €*	*1 960 000 €*
Middle 40% "Middle Class"	**1 580 000 €**	**390 000 €**	60 000 €
Bottom 50% "Poor"	**950 000 €**	**40 000 €**	40 000 €
Cohorts averages (€ 2009)	1 580 000 €	440 000 €	440 000 €

On the Long-Run Evolution of Inheritance: France 1820-2050 Data Appendix Part 1

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Appendix A: National Accounts Data

The first key data source used in this research is national income and wealth accounts. The main conceptual and methodological issues regarding national accounts and the way we use them, in particular in order to compute the economic inheritance flow, are discussed in the working paper (see sections 3.1 and 3.2). In this appendix we provide the complete series used in this research, as well as additional details about sources, methodology and concepts.

In section A1 we describe our general series on national income Y_t and private wealth W_t in France. In section A2 we describe how we used these series in order to compute the economic inheritance flow series B_t. In section A3 we provide supplementary series on the structure of national income Y_t (including decomposition by production sector, factor income, taxes and savings, etc.). In section A4 we provide supplementary series on the structure of private wealth W_t (including decomposition by types of assets, etc.). Because of the incompleteness of available private wealth series, especially regarding the 1914-1969 period, we have to construct our own annual series, which we do by estimating an accumulation equation for private wealth in France, using savings flows from national accounts; full details on this method and resulting series are provided in section A5. Finally, in section A6 we provide supplementary series on price indexes in France, which we use at various points in the previous tables.

A.1. General national accounts series for France: Y_t and W_t (Tables A1-A2)

Our national income series Y_t and private wealth series W_t are reported on Table A1 (annual series) and Table A2 (decennial averages). Here we describe how these tables were constructed.

Col. (1) of Tables A1-A2: National income Y_t in current prices

Our basic series for national income Y_t are reported on col. (1), expressed in current billions currency, by which we mean current billions euros for the 1949-2009 period and current billions old francs for the 1820-1948 period.[1]

[1] The old franc was replaced by the new franc on January 1st 1960 (1 new franc = 100 old francs), and the new franc was replaced by the euro on January 1st 2002 (1 euro = 6.55957 new francs). In order to convert

National income Y_t is defined according to the standard international definition: it is equal to gross domestic product minus capital depreciation plus net foreign factor income.[2]

We use the official Insee series for the 1949-2009 period,[3] and the Villa (1994) retrospective series for the 1896-1949 period, with minor adjustments so as to ensure continuity in 1948-1949.[4] The various subcomponents of Y_t are given in section A3 below.

There also exists annual series for French national income covering the 1820-1896 period. But we do not feel that the year-to-year variations depicted in these series are fully reliable. In addition we do not really need annual series for our purposes. Therefore prior to 1896 we only provide decennial averages estimates of national income. I.e. the value of 11.3 billions old francs reported for 1820 on col.(1) of Table A2 corresponds to an estimated arithmetic average of national income Y_t over the years 1820-1829, the value of 13.5 billions old francs reported for 1830 corresponds to an estimated arithmetic average over the years 1830-1839, and so on.[5] We computed the average 1820-1929 to 1890-1899 estimates by using the annual series provided by Bourguignon and Lévy-Leboyer (1985), anchored to the 1900-1909 and 1910-1913 values obtained from our annual series.[6] If we were to use alternative series due to other authors such as Toutain (1997),

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1949-2001 current currency values into what we call current euros, we simply divided 1960-2001 new francs values by 6.55957, and 1949-1959 old francs values by 655.957. Current prices national accounts series released by Insee adopt the same monetary convention.

[2] See section A3 below for the corresponding equations and decompositions, using standard ESA 1995 definitions. All raw series and computations are provided in the appendix excel file.

[3] We downloaded the complete set of recently released Insee retrospective 1949-2008 national income accounts series on www.insee.fr on 15/09/2009. We used Insee tables 3.101 to 3.601 and the "tableaux économiques d'ensemble". It is preferable to use these Insee tables rather than the series released by international data collectors such as Oecd, Eurostat or the Imf, because Insee tables are more detailed and cover longer time spans. The estimates for 2007-2008 are likely to be slightly revised by Insee in the near future. For 2009-2010 we upgraded the 2008 values using the latest growth projection figures available (we assumed a nominal growth rate equal to -2.0% for 2009 and 0.0% for 2010). Official French national accounts have been established and released by Insee since 1949, and currently follow the "Base 2000" (B2000) methodology (all retrospective series were recently retropolated using B2000 concepts), which is the French version of ESA 1995 (European System of Accounts) and SNA 1993 (UN System of National Accounts). In what follows we often refer to the ESA 1995 classification codes (the ESA 1995 manual is available on-line: http://circa.europa.eu/irc/dsis/nfaccount/info/data/ESA95/en/esa95en.htm).

[4] See section A3 below for more details on the way we used the Villa (1994) series. For additional details on alternative historical national accounts series in France, see Piketty (2001, pp.693-720).

[5] All decennial averages reported on Table A2 (and on subsequent decennial tables) were computed in this way, with the exception of the 1910 decennial average, which corresponds to an arithmetic average over years 1910-1913 rather than 1910-1919 (the earlier and later parts of the 1910-1919 decade are so different that it does not make much sense to compute a decennial average; in addition it is useful to have a 1910-1913, pre-World War 1 reference point).

[6] The raw averages computed from the series provided by Bourguignon and Lévy-Leboyer (1985, pp.318-322) are slightly below our final series: they get an average national income of 38.3 billions old francs for 1910-1913 (while we get 42.7 billions) and 26.6 billions for 1900-1909 (while we get 33.9 billions). The Villa

we would obtain similar decennial averages and overall profiles of national income growth over the course of the 19th century.[7]

Col. (2) of Tables A1-A2: Aggregate private wealth W_t in current prices

Our basic aggregate series for private wealth W_t are reported on col. (2), again expressed in current billions currency, as defined above.

Private wealth W_t is defined as the market value of all tangible assets (in particular real estate assets) and financial assets owned by private individuals (i.e. households), minus their financial liabilities. Private wealth W_t is estimated at asset market prices prevailing on January 1st of each year.

We use the official Insee-Banque de France series for the 1970-2009 period. I.e. for years 1970-2009, the value of private wealth W_t reported on Table A1 is simply equal to the net worth of the personal (household) sector balance sheet published by Insee for the corresponding year.[8] Complete breakdowns of these W_t 1970-2009 series by asset categories, as well as net worth series for the government and corporate sectors, are provided in section A4 below (see Tables A13-A16).

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series are more sophisticated and more comparable to modern national accounts than the BLL series, so anchoring the entire BLL series to the Villa values for 1900-1909 and 1910-1913 appears to be the most reasonable option.

[7] Using the gross domestic product series provided by Toutain (1997, pp.54-57), again anchored to the Villa values for 1900-1909 and 1910-1913, we get an average value of 10.2 billions in 1820-1829 (vs 11.3 billions using the BLL series) and 26.2 billions in 1870-1879 (vs 28.6 billions using the BLL series); by construction, both series yield 42.7 billions in 1910-1913. The maximum gap between the Toutain and BLL series (which are based upon very different raw statistical material and methodologies) is less than 10%, which is very small over a one-century-long period, and negligible for our purposes.

[8] We downloaded the complete set of recently released Insee retrospective 1979-2009 national wealth accounts series (i.e. balance sheets) on www.insee.fr on 15/09/2009. We used Insee tables 5.407 to 5.415. As far as financial assets and liabilities are concerned, these tables are identical to those released by Banque de France (who is the primary producer of French financial accounts), except that the latter include more types of financial assets; on the other hand the advantage of Insee tables is that they also include tangible assets. It is preferable to use these Insee-Banque de France tables rather than the financial accounts released by international data collectors such as Oecd, Eurostat or the Imf, again because the former are more detailed and cover longer time spans. Insee-Banque de France balance sheets are estimated at market prices prevailing on December 31st of each year; so our January 1st 2009 estimates are in fact December 31st 2008 estimates, etc., and our January 1st 1979 estimates are in fact December 31st 1978 estimates. The estimates for 2008-2009 are likely to be slightly revised by Insee in the near future. For 2010 we assumed that asset prices between January 1st 2009 and January 1st 2010 declined as much as between January 1st 2008 and January 1st 2009 (i.e. -5.4% on average); see section A5 below. Currently available Insee-Banque de France retrospective wealth accounts series cover only the 1979-2009 period, so for the 1970-1978 subperiod we had to use series that were previously published by Insee using less sophisticated concepts and methodology (see "25 ans de comptes de patrimoines (1969-1993)", *INSEE Résultats* n°348 (Economie générale n°98), december 1994); in order to ensure continuity, these 1970-1978 series were anchored to the 1979 values; more details are given in section A4 below.

Prior to 1970, there exists no official estimate of aggregate private wealth in France, so we had to use various non-official estimates and to compute our own series. As we explain in the working paper (see section 3.2), non-official private wealth estimates are plentiful and relatively reliable for the 1820-1913 period, so we simply used the best decennial averages available in the historical literature.[9] The period 1914-1969 is the most problematic: we only have (relatively) reliable private wealth estimates for 1925 and 1954, and we computed our own annual private wealth W_t series by estimating an accumulation equation for private wealth (see section A5 below).

Col. (3)-(4) of Tables A1-A2: Aggregate Y_t and W_t in 2009 consumer prices

Col. (3) and (4) of Tables A1 and A2 were obtained by multiplying col.(1) and (2) by P_{2009}/P_t, where P_t is the consumer price index (CPI) reported on col.(1) of Table A20. This is done for illustrative purposes only. Over such long time periods, we are not sure that constant price series are really meaningful.

Col. (5)-(12) of Tables A1-A2: Per capita & per adult Y_t and W_t

Col.(5) to (12) of Tables A1 and A2 were obtained by dividing col. (1) to (4) by total population or adult population (col. (1) and (7) of Table C1). We find that per adult national income y_t rose from 602 francs in the 1820s to 1,637 francs in 1910-1913 and 36,197 euros in 2008, while per adult private wealth w_t rose from 3,302 francs in the 1820s to 10,713 francs in 1910-1913 and 203,696 euros in 2008 (see Table A2, col. (7) and (8)). Expressed in 2009 consumer prices (whatever it means), per adult national income y_t rose from 2,991 euros in the 1820s to 5291 euros in 1910-1913 and 36,342 euros in 2008, while per adult private wealth w_t rose from 16,413 euros in the 1820s to 34,626 euros in 1910-1913 and 204,511 euros in 2008 (see Table A2, col. (11) and (12)).

Col. (13) of Tables A1-A2: Wealth-income ratio $\beta_t = W_t/Y_t$

Col. (13) of Tables A1 and A2 was obtained by dividing col. (2) by col. (1). By construction, it is also equal to col. (4) divided by col. (3), or col. (6) by col. (5), etc. We find that the ratio

[9] The exact references are given in section A5 below.

β_t between aggregate private wealth W_t and national income Y_t was equal to 549% in the 1820s, 654% in 1910-1913, and 563% in 2008.

Col. (14)-(16) of Tables A1-A2: Disposable income ratios

We choose to use national income rather than (personal) disposable income as the income denominator when we compute wealth-income ratios. However it is useful to have in mind what the results of the computations would be if one were to use disposable income as denominator. On col. (14) of Tables A1-A2 we report the ratio between disposable income and national income; this ratio was equal to 95% in the 1820s and in 1910-1913 and to 70% in 2008.[10] Col. (15) of Tables A1-A2 was obtained by multiplying col.(11) by col. (14); we find that per adult disposable income y_{dt} (expressed in 2009 consumer prices) rose from 2,842 euros in the 1820s to 5,005 euros in 1910-1913 and 25,281 euros in 2008. Col. (16) of Tables A1-A2 was obtained by dividing col. (13) by col. (14); we find that the ratio between aggregate private wealth and disposable income was 578% in the 1820s, 692% in 1910-1913 and 809% in 2008.

A.2. Computation of the economic inheritance flow series B_t (Tables A3-A4)

Our economic inheritance flow series B_t and related ratios are reported on Table A3 (annual series) and Table A4 (decennial averages). Here we describe how these tables were constructed.

Col. (1) to (6) of Tables A3-A4: $b_{yt} = \mu_t^* m_t \beta_t$ and $b_{wt} = \mu_t^* m_t$

As we explain in the working paper (see section 3.1), the basic accounting equation relating the aggregate economic inheritance flow B_t and aggregate private wealth W_t is the following:

$$B_t = \mu_t^* m_t W_t \qquad \text{(A.1)}$$

Where μ_t^* is the gift-corrected ratio between average wealth of (adult) decedents and average wealth of the (adult) living, and is estimated from available data on the age profile

[10] Col. (14) of Tables A1 and A2 is borrowed from col.(1) of Table A10. See section A3 below.

of wealth (see Appendix B2); and m_t is the (adult) mortality rate and comes from standard demographic data (see Appendix C1).

Alternatively, equation (A.1) can also be expressed in terms of inheritance-income and inheritance-wealth aggregate ratios:

$$b_{yt} = B_t/Y_t = \mu_t^* m_t W_t/Y_t = \mu_t^* m_t \beta_t \qquad (A.2)$$

$$b_{wt} = B_t/W_t = \mu_t^* m_t \qquad (A.3)$$

The computations reported on Tables A3-A4 follow directly from the mechanical application of these formulas. On col. (1) of Tables A3-A4 we report the aggregate wealth-income ratio β_t, which we borrow from col. (13) of Tables A1-A2. On col. (2) of Tables A3-A4 we report the adult mortality rate m_t, which we borrow from col. (11) of Table C1. On col. (3) of Tables A3-A4 we report the gift-corrected μ_t^* ratio, which we borrow from col. (12) of Table B5. Col. (4) of Tables A3-A4 was then obtained by multiplying col. (1), (2) and (3) (i.e. $b_{yt} = \mu_t^* m_t \beta_t$). We find that the aggregate economic inheritance flow-national income ratio b_{yt} was equal to 20.3% in the 1820s, 22.7% in 1910-1913, and 14.5% in 2008. Col. (5) of Tables A3-A4 was obtained by multiplying col. (2) and (3) (i.e. $b_{wt} = \mu_t^* m_t$). We find that the aggregate economic inheritance flow-private wealth ratio b_{wt} was equal to 3.7% in the 1820s, 3.5% in 1910-1913, and 2.6% in 2008. We also report on col. (6) of Tables A3-A4 the estate multiplier ratio $e_t = W_t/B_t = 1/b_{wt}$: col.(6) is simply equal to one divided by col. (5). We find that according to our economic inheritance flow computations, aggregate private wealth was equal to 27.0 years of inheritance flow in the 1820s, 28.9 years in 1910-1913 and 38.7 years in 2008.

Col. (7) to (9) of Tables A3-A4: $B_t = \mu_t^* m_t W_t$

We also report the results of our economic inheritance flow computations expressed in billions currency and not only in ratios. On col. (7) of Tables A3-A4 we report our aggregate private wealth series W_t, which we borrow from col. (2) of Tables A1-A2. Col. (8) of Tables A3-A4 was then obtained by multiplying col. (2), (3) and (7) (i.e. $B_t = \mu_t^* m_t W_t$). We find that the aggregate economic inheritance flow was equal to 2.3 billions francs in the 1920s, 9.6 billions francs in 1910-1913, and 246.7 billions euros in 2008. For the purpose of comparison, we also report the ratio B_t/B_t^f between our economic inheritance flow and our fiscal inheritance flow series: col. (9) of Tables A3-A4 was obtained by dividing col. (8) of Tables A3-A4 by col. (10) of Tables B1-B2; we find a ratio of 105% in the 1820s, 111% in 1910-1913, and 115% in 2008.

Col. (10) to (12) of Tables A3-A4: $b_t = \mu_t^* \beta_t \ y_t$

We also report our economic inheritance flow estimates expressed in per capita terms. If we note b_t average per decedent inheritance, and y_t average per adult national income, then the equations above can also be written as follows:

$$b_t = \mu_t^* \beta_t \ y_t \qquad (A.4)$$

On col. (10) of Tables A3-A4 we report per adult income y_t, which we borrow from col. (7) of Tables A1-A2. Col. (11) of Tables A3-A4 was obtained by multiplying col. (1), (3) and (10) (i.e. $b_t = \mu_t^* \beta_t y_t$). On col. (12) of Tables A3-A4 we report the ratio b_t/y_t. We find that according to our economic inheritance flow computations average inheritance was equal to 5,497 francs in 1820s (i.e. 9.1 years of average income), 17,406 francs in 1910-1913 (i.e. 10.6 years of average income), and 453,344 euros in 2008 (i.e. 12.5 years of average income).

Col. (13) to (16) of Tables A3-A4: fiscal flow ratios

For comparison purposes we also report on Tables A3-A4 our fiscal inheritance flow estimates. On col. (13) of Tables A3-A4, we report ratios B_t^f/Y_t between fiscal inheritance flow and national income, which we borrow from col. (12) of Tables B1-B2. On col. (14) of Tables A3-A4, we report ratios B_t^f/W_t between fiscal inheritance flow and private wealth, which we borrow from col. (13) of Tables B1-B2. We also report the fiscal estate multiplier $e_t^f = W_t/B_t^f$ on col. (15) of Tables A3-A4 (equal to one divided by col. (14)) and the fiscal b_t^f/y_t ratio on col. (16) of Tables A3-A4 (equal to col. (13) divided by the mortality rate, i.e. by col. (2)). We find that according to fiscal data average inheritance was equal to 8.5 years of average income in the 1820s, 9.5 years in 1910-1913 and 10.9 in 2008.

A.3. Supplementary series on the structure of national income Y_t (Tables A5-12)

Detailed annual series on the structure of national income Y_t in France over the 1896-2008 period (including decomposition by institutional production sector, factor income, taxes and savings, etc.) are reported on Tables A5 to A11. Prior to 1896, available series are more rudimentary. The only series that we can provide for the entire 1820-2008 period are decennial-averages estimates of capital and labor shares, rates of return, aggregate tax rates and savings rates; these summary macro variables are reported on Table A12. These series are useful in order to better understand how the general structure of income and wealth has evolved in France over the past two centuries. They also play important specific roles at various points in this research. In particular, we need saving rates series for estimating the private wealth accumulation equation (see Appendix A5 below), and we need both saving rates series and rates of return series for simulating the dynamics of the age-wealth profile (see Appendix D). The computation of average macroeconomic rates of return to private wealth requires detailed series on factor income and taxes. Rates of return play a critical role in this research. So we try to explain carefully how Tables A5 to A12 were constructed.

Table A5: National income vs gross domestic product (1896-2008)

On Table A5 we report the most basic decomposition of national income Y_t :

$$Y_t = Y_{pt} + FY_t \qquad (A.5)$$
$$Y_{pt} = GDP_t – KD_t \qquad (A.6)$$

With: Y_t = national income (i.e. net national product)
Y_{pt} = net domestic product
FY_t = net foreign factor income
GDP_t = gross domestic product
KD_t = capital depreciation

On col. (1)-(3) and (10)-(11) of Table A5, we report values of Y_t, Y_{pt}, FY_t, GDP_t and KD_t expressed in billions current currency. On col. (4)-(9) and (12)-(13) of Table A5, as well as on all columns of Tables A6-A10, we report values expressed as fractions of national income Y_t (or other aggregates). All series reported on Tables A5-A10 come directly from

Insee official series for the 1949-2008 period, and from the Villa (1994) series for 1896-1948 period, with minor adjustments which we describe as they come.[11]

Col. (4)-(8) of Table A5 show that changes in net foreign factor income FY_t are almost entirely due to changes in net foreign capital income FY_{Kt} (net foreign labor income FY_{Lt} seems to have always been relatively small).[12] Most importantly, they show that net foreign capital income made up approximately 4% of national income at the eve of World War 1, then fell abruptly during war years (due to foreign assets repudiation and inflation), and never recovered: from the 1920s up until 2008, it has generally been about 0%-1% of national income (this is consistent with the fact that the net foreign asset position of France seems to have been relatively small throughout this period; see section A4 below). However gross flows have risen enormously in recent decades (due to financial globalization): in 1978, gross capital income inflow and outflow were around 1% of national income; in 2008, both were around 10% of national income.

On col. (9) we report the value of net foreign tax and transfers, which we note FT_t.[13] According to standard international definitions, this should added to national income Y_t in order to compute so-called "national disposable income". Note that FT_t has actually been negative since the 1950s up to 2008 (around -1% of national income), due mostly to the remittances of immigrant workers.[14]

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[11] For 1949-2008 we used Insee tables 3.101 to 3.601 and the "tableaux économiques d'ensemble" (downloaded from www.insee.fr on 15/09/2009). For 1896-1948 we used Villa's long.xls data base (downloaded from www.cepii.fr on 15/10/1998; these series are identical to those published in Villa (1994, pp.84-153), and have not been updated since then). All raw Insee and Villa series expressed in billions current currency are provided in the excel file AppendixTables(NationalAccountsData).xls (see Table A0). The file also includes the formulas used to construct all other tables.

[12] Net foreign capital income is equal to gross capital income inflow (capital income received by French residents on their foreign financial assets) minus gross capital income outflow (capital income received by foreign residents on their French financial assets), while net foreign labor income is equal to gross labor income inflow (labor income received by French residents while working abroad) minus labor income outflow (labor income received by foreign residents while working in France). In pre 1949 series we only observe net foreign capital income (not the gross flows), and foreign labor income was not recorded at all (given post 1949 values we set it to 0% for national income computations).

[13] I.e. gross inflow of taxes and unilateral transfers flowing from the rest of the world to French residents, minus gross outflow of taxes and unilateral transfers flowing from French residents to the rest of the world.

[14] In contrast, according to the Villa series, FT_t was positive and fairly large (2% to 6% of national income) during the 1920s, which (partly) reflects German transfer payments. Note that we included all tax flows in FT_t , including production taxes (D2 in ESA 1995 classification). According to ESA 1995 definitions, net foreign production taxes should actually be included in the primary income account (together with net foreign factor income FY_t), rather in the secondary income account (which should only include net foreign direct taxes, in addition to net foreign transfers); i.e. they should be included in the computation of national income Y_t (and not only in the computation of national disposable income). However pre 1949 series are not sufficiently detailed to properly isolate net foreign production taxes (in the current sense) within FT_t; so it made more sense to adopt a simplified definition of national income and to omit this (small) term throughout the 1896-2008 period; in addition, the conceptual difference between foreign flows of production taxes vs other taxes is somewhat obscure.

Col. (12)-(13) of Table A5 show that capital depreciation seems to have been relatively stable around 9%-11% of gross domestic product between 1900 and the 1970s, and then gradually rose during the past three decades, up to about 13%-14% today. Of course capital depreciation estimates are notoriously fragile, and some of the short-run variations reported on Table A5 might partly be due to measurement limitations (rather than to real changes in the age structure and depreciation rates of capital inputs). Given that we are mostly interested in long run evolutions, we feel that these data limitations are not really relevant for our purposes.[15]

Table A6: decomposition by institutional production sectors (1896-2008)

Net domestic product Y_{pt} can be further decomposed into the net product (net-of-capital-depreciation, net-of-production-taxes value-added) of the various institutional production sectors used in national accounts:

$$Y_{pt} = Y_{ht} + Y_{set} + Y_{ct} + Y_{gt} + T_{pt} \qquad (A.7)$$

With:

Y_{ht} = net product of the housing sector[16]

Y_{set} = net product of the self-employment sector[17]

Y_{ct} = net product of the corporate sector (non-financial + financial)[18]

[15] Currently available Insee retrospective capital depreciation series cover only the 1978-2008 period (except for the government sector, where they start in 1949). For the 1896-1977 period we used the capital depreciation series provided by Villa (1994). Detailed depreciation series (broken down at the institutional production sector level) are given in the excel file.

[16] Following standard national accounts practice, Y_{ht} is defined as the net-of-depreciation rental value of the housing fixed assets owned by households (including imputed rent). Note that this is (slightly) smaller than the total value of housing services produced in the economy, because a (small) fraction of the housing capital stock is owned by corporations and by the government.

[17] We define Y_{set} as the net product of the household sector minus Y_{ht}. Note that Y_{set} is (slightly) bigger than the net product of unincorporated businesses, since it also includes the (wage) labor income of domestic wage earners (i.e. wage earners directly employed by households in order to produce domestic services). It also includes the (wage) labor income of wage-earners employed by unincorporated businesses. This explains why the share of Y_{set} in national income is typically bigger than the share of self-employed in total employment (more on this below). The national accounts tables reported in Piketty (2001, pp.693-720) display lower estimates of Y_{set} than those reported in the more consistent series presented here. This is because Piketty (2001) used pre-1970 national accounts series based upon older concepts and definitions: the wage bill paid by unincorporated businesses (which was non negligible during the first half of the 20th century, both in the rural and urban economy) was in effect attributed to the corporate sector in these older series, thereby resulting in an upward bias in the estimate of the corporate labor share (see below).

[18] In the same way as for wealth accounts (see below), and in order to simplify notations and tables, we include in the corporate sector both non-financial corporations and financial corporations. Separate series for non-financial and financial corporations are provided in the excel file.

Y_{gt} = net product of the government sector (incl. the non-profit sector)[19]

T_{pt} = production taxes (incl. value-added taxes) [20]

As one can see from Table A6, the sectoral structure of national income has changed in important ways in France during the 1896-2008 period. First, the implicit average production tax rate, which we define as production taxes divided by factor-price national income (i.e. T_{pt} divided by Y_t - T_{pt}), was about 7%-8% prior to World War 1, then rose during the interwar and postwar period, and stabilized around 17%-18% since the 1950s up to 2008.[21]

Next, the share of the housing sector in (factor-price) national income has gone through a U-shaped pattern over the past 100 years: it was about 8% prior to World War 1, then fell abruptly to 3% in 1920, recovered during the interwar, fell again during World War 2, with a nadir at only 2% in 1945, and then gradually recovered during the past 60 years, up to 8%-9% in the 1990s-2000s.[22] These large historical variations seem to reflect (at least in part) the evolution of rent control policies.[23]

Next, the share of the government sector (whose contribution to net product in existing national accounts is simply measured by the wage bill of the government sector)[24] rose dramatically. It was only 2%-3% of (factor price) national income prior to World War 1, then rose to 5%-6% during the interwar, 12%-13% in the postwar period, before (apparently) stabilizing around 19%-20% in the 1990s-2000s.

[19] In the same way as for wealth accounts (see below), all government levels are included (central and local government, social security administrations, as well as the non-profit sector). It is somewhat arbitrary to include the non-profit sector into the government sector (it could as well be included in the personal or corporate sectors). However this simplifies notations and tables. In any case the non-profit sector has always been relatively small in France (about 1% of national income).

[20] This includes all "production taxes" in the national accounts sense (D2 in ESA 1995 classification), i.e. the sum of "product taxes" strictly speaking (D21 in ESA 1995 classification: this includes value-added taxes, excise duties, import taxes and various consumption taxes) and "other production taxes" (D29 in ESA 1995 classification: this includes a number of property taxes and non-social-contributions payroll taxes, see below), net of subsidies (D3 in ESA 1995 classification).

[21] This can be compared to the general VAT rate, which is currently 19.6% in France (the reduced rate is 5.5%). However one must keep in mind that VAT revenues strictly speaking make only about half of total production taxes revenues (in 2008,136.8 billions € out of 256.5 billions €). Note also that "factor price national income" is merely an accounting concept, and certainly does not imply that production taxes are entirely shifted to prices: first, some of the VAT itself is probably shifted to factor income, depending on sectoral supply and demand elasticities; next, some of the other taxes included in D2 ESA 1995 classification (e.g. a number of business and personal property taxes – "taxe professionelle", "taxe foncière", etc. – and non-social-contributions payroll taxes – "taxe sur les salaries", "versement transport", etc.) are closer to factor income taxes.

[22] See Figure A7.

[23] Available indexes of housing rent for France and Paris, divided by CPI, follow almost exactly the same pattern over the 20th century. See e.g. Piketty (2001, pp.89-91, graphs 1-9 and 1-10).

[24] The residual profit share of the government sector was included in production taxes (see below).

Next, the share of the self-employment sector declined even more dramatically. It was about 50% at the eve of World War 1, about 40% in the aftermath of World War 2, and gradually declined to little more than 10% in the 2000s. At the same time, the share of the corporate sector gradually rose from about 30% of (factor price) national income around 1900 to about 60% during the 1990s-2000s.

Finally, note that the long run evolution of the relative shares of the government, self-employment and corporate sectors (which are the three production sectors using labor input) is broadly consistent with the corresponding evolution of the employment structure of France.[25]

Table A7: profits & wages in the corporate sector (1896-2008)

On Table A7 we report the standard decomposition of corporate value-added into wages and profits. That is, we break down net corporate product Y_{ct} into a labor income component Y_{Lct} and a capital income component Y_{Kct} :

$$Y_{ct} = Y_{Lct} + Y_{Kct} \qquad (A.8)$$

With: Y_{Lct} = total wage bill of the corporate sector (incl. social contributions)
$Y_{Kct} = Y_{ct} - Y_{Lct}$ = net corporate profits

One can then define the corporate capital share $\alpha_{ct} = Y_{Kct}/Y_{ct}$ and the labor share $1- \alpha_{ct} = Y_{Lct}/Y_{ct}$ in net corporate product. We choose to focus upon net-of-depreciation functional shares, first because they are more meaningful from an economic viewpoint, and next because this is what we need in order to compute average rates of return on private wealth (see below). For the purpose of comparison with other studies, we also report on Table 6 series for the gross profit share in gross corporate product $(Y_{Kct}+KD_{ct})/(Y_{ct}+KD_{ct})$

[25] I.e. over the past century public employment share rose from 2%-3% to about 20% of total employment, while self-employment share declined from about 50% to less than 10% of self-employment (see Piketty (2001, p.51, graph 1-4)). The self-employment sector output share $Y_{set}/(Y_{gt}+Y_{set}+Y_{ct})$ was actually even larger than 50% around 1900 (it was as high as 65%-70%), which can be accounted for by the fact that Y_{set} also includes the wages of wage-earners directly employed by households and unincorporated businesses (see above). Also the boundaries between unincorporated and corporate businesses in early 20th century national accounts series are somewhat fragile (e.g. at that time many not-so-small manufacturing businesses were still unincorporated), so one would need to collect additional data in order to push further this kind of analysis.

(where KD_{ct} denotes capital depreciation of the corporate sector) and the corresponding labor share in gross corporate product $Y_{Lct}/(Y_{ct}+KD_{ct})$.[26] Gross functional shares are often used in policy discussions and typically deliver labor shares around two thirds and capital shares around one third.

Note that pre-1949 factor income data is definitely of lower quality than that used in post-1949 Insee series, and one should be cautious when interpreting pre-1949 variations and levels of labor and capital shares.

During the 1949-2008 period, labor and capital shares in France appear to display the standard two-thirds-one-third pattern. During the 1950s-1960s, the gross profit share is relatively stable around 30%-32% of gross corporate product; during the 1990s-2000s, the gross profit share is relatively stable around 32%-34% of gross domestic product (see Table A7, col. (8)). Two caveats are in order, however. First, there are important medium term variations. One observes large U-shaped fluctuations during the 1970s-1980s: the gross profit share suddenly falls from 32% in 1973-1974 to 25% in 1981-1982,[27] and then returns to 33% in 1986-1987.[28] Next, if one looks at net profit shares in net corporate product, then all capital shares are reduced substantially (typically by about 10 points), which makes the medium term variations look even bigger. The net profit share was about 20%-22% of net corporate product in France during the 1950s-1960s, then fell to as little as 12% in the late 1970s-early 1980s, and was again about 20%-22% during the 1990s-2000s (see Table A7, col.(2)). This is fairly different from the standard two-thirds-one-third textbook pattern.

Time variations in the way profits are used are also significant. Over the 1949-2008 period, corporate income taxes were relatively stable around 5% of net corporate product (typically between a quarter and a third of net profits), and distributed profits (dividend and interest payments) were relatively stable around 10% of net corporate product;[29] retained earnings on the other hand were highly volatile and absorbed most of the time variations in

[26] Note that because we put aside all production taxes T_{pt}, our corporate capital and labor shares series always sum up to 100%, which makes evolutions easier to interpret. The price to pay for this simplification is that we are implicitly assuming that that the component of production taxes T_{pt} that is not shifted to prices is shifted proportionally to labor and capital factor income, which seems acceptable as a first approximation, but which strictly speaking might not be true.

[27] Due to sluggish output growth and rapid wage growth after the 1973-1974 oil shock.

[28] Due to wage freeze policies implemented after 1982-1983 by the newly elected socialist government.

[29] Here we naturally look at the net outflow of divided and interest paid by the corporate sector. During the 1990s-2000s, gross outflows and inflows have increased enormously in absolute terms, reflecting a large rise in financial linkages within the corporate sector.

the profit share (resulting in large negative retained earnings in the late 1970s-early 1980s). But one can also notice that retained earnings were structurally higher in the reconstruction period than in recent decades: on average they made about 7% of net corporate product in the 1950s-1960s (3%-4% of national income), versus about 3% in the 1990s-2000s (1%-2% of national income).[30]

Available series for the 1896-1949 period broadly confirm the view of a long run stability of capital shares (with gross profit shares around 30%-35% and net profit shares around 20%-25%). They also show very large short run and medium run variations, and somewhat bigger average capital shares than contemporary levels.[31] The Villa series indicate that the net profit share was about 15%-20% around 1900, and rose to over 30% in 1910-1913.[32] It was again over 30% during the 1920s (a level unobserved in the post-1949 period), fell during the 1930s, and reached negative values in war years (when capital depreciation slightly exceeded gross profits). Prior to World War 1 there was no corporate income tax, retained earnings were small, so that distributed profits were as large as 15%-20% of net corporate product (far above all levels observed in the post-1949 period). The Villa series also indicate very large levels of retained earnings, especially during the 1920s. This seems consistent with the reconstruction story. Pre-1949 retained earnings estimates have been challenged by a number of scholars, however, and it is possible that the Villa's extremely high retained earnings levels for 1910-1913 and the interwar period are somewhat overestimated.[33]

Table A8: capital & labor shares in national income (1896-2008)

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[30] Note the relatively large "other corporate transfers" term (about 3%-4% of net corporate product, i.e. 1%-2% of national income, throughout the 1949-2008 period), which we define as the net value of various transfers paid by the corporate sector (D61+D62+D71+D72+D75 in ESA 1995 classification): D61-62 relate to employer provided social contributions and benefits transfers and sum to (close to) zero; D71-72 relate to insurance premiums and claims transfers and sum to (close to) zero; D75 is the only significant term; it relates to "miscellaneous current transfers" and typically includes unilateral transfers to the non-profit and personal sectors. This ought to be further investigated, especially given that such transfers are not properly recorded in pre-1949 series.

[31] See Figures A4 and A5. One should use the series reported here rather than the gross profit share series reported in Piketty (2001, pp.703-705; 2003, p.1022, fig. 4). Both sets of series are broadly similar, but our older functional shares series were less complete and suffered from various deficiencies. In particular, pre-1949 corporate capital shares were underestimated, due to the fact that the wage bill paid by households and unincorporated businesses was (wrongly) attributed to the corporate sector (see above).

[32] It is possible that this sharp rise is over-estimated somewhat. However all raw statistical series suggest that corporate output was indeed growing faster than corporate wages during the 1896-1913 period. We return below on 19th century functional share estimates (see Table A12).

[33] See Malissen (1953), who on the basis of interwar corporate income tax tabulations argues that the exploratory, semi-official national accounts constructed for year 1938 by Insee overestimate retained earnings. Since Villa anchors some of his series on these 1938 semi-official accounts, this criticism also applies to his series as well. See Piketty (2001, p.716).

Capital income does not come solely from the corporate sector. On Table A8 we break down the net product of the various sectors in order to compute capital and labor shares in total national income. We proceeded as follows.

Housing sector: by definition, the net product of the housing sector Y_{ht} solely generates capital income. I.e. $Y_{ht} = Y_{Kht}$ and $\alpha_{ht} = 100\%$.[34]

Self-employment sector: for simplicity, we choose to break down the net product of the self-employment sector Y_{set} into a capital income component Y_{Kset} and a labor income component Y_{Lset} by assuming the same capital share as in the corporate sector. I.e. we assume $\alpha_{set} = \alpha_{ct}$.[35]

Government sector: by definition, the net product of the government sector Y_{ht} solely generates labor income. I.e. $Y_{gt} = Y_{Lgt}$ and $\alpha_{gt} = 0\%$.[36] However, although the government does not generate capital income out of its productive economic activity,[37] it does generate capital income out of its public-finance, borrowing activity, namely government interest payments on public debt. The government also receives capital income on its financial assets (e.g. if the government owns equity shares in corporations). We define net government interest payments (which we note Y_{Kgt}) as the excess of capital income paid

[34] The fact that α_{ht}=100% is simply the consequence of the standard national-accounts definition of housing services: the value of housing services is defined is the pure rental value of housing, i.e. excluding all labor inputs that can increase the value of housing services (i.e. cleaning services, etc.).

[35] The other standard way of breaking down self-employed income into capital and labor income components is to attribute to self-employed workers the same average labor income compensation as the wage earners of the corporate sector. We found that this alternative computation delivers very similar results regarding the pattern of the aggregate capital share α_t. A third and somewhat more satisfactory way to break down self-employment income would be to attribute to self-employment capital stock the same rate of return as for the rest of the economy. This is more data demanding, however.

[36] The fact that α_{gt}=0% simply follows from the standard national-accounts definition of government net product: in national accounts, the gross value of non-market output is estimated on a cost basis, i.e. summing up labor cost, intermediate consumption and estimated capital depreciation; so that the net value-added is simply equal to labor cost. Note that the government sector also produces small (but positive) market output and receives residual payments from personal and corporate sectors for these goods and services, so that strictly speaking the net profit share of the government sector is not exactly equal to zero in national accounts. But it very small (always less than 0.5% of net government product in French accounts), so in order to simplify exposition and tables, we choose to conventionally set α_{gt}=0% and to attribute this small profit term to production taxes (see excel file for detailed series and formulas).

[37] Of course this is purely conventional: the government sector does use capital input (administrative buildings, schools, hospitals, etc.), and one could very well decide to attribute a positive return to these assets, which would raise national income Y_t. E.g. the estimated value of government tangible assets was around 75% of national income during the 2000s (see Table A13 below); if one attributes a 4% average return to these assets, this would raise national income by 3%. This not really relevant for our purposes, since this extra capital income is not distributed to any private individual (it is simply enjoyed by everyone), so this does not affect average returns to private wealth (in case the government sector uses capital inputs owned by other sectors, then the corresponding capital income flow is recorded).

by the government sector over capital income received by the government. Whether Y_{Kgt} should be taken into account in total capital income depends on the specific purpose one has in mind (see below). In order to compute average returns to private wealth (which is our primary purpose), the most consistent solution is to include net government interest payments in the definition of total capital income. In practice, this does not make a very large difference, as the detailed series reported on Table A8 illustrate (net government interest payments have usually been less about 1%-2% of national income).[38]

Foreign sector: we simply use the net foreign capital income FY_{Kt} and labor income FY_{Lt} series reported on Table A5 above.

We then define aggregate capital income Y_{Kt} (excluding government interest) and labor income Y_{Lt} by summing up the various components:

$$Y_{Kt} = Y_{Kct} + Y_{ht} + Y_{Kset} + FY_{Kt} \qquad (A.9)$$

$$Y_{Lt} = Y_{Lct} + Y_{Lset} + Y_{gt} + FY_{Lt} \qquad (A.10)$$

By construction the sum of these two terms is equal to factor-price national income:

$$Y_{Kt} + Y_{Lt} = Y_t - T_{pt} \qquad (A.11)$$

We define the aggregate capital share α_t (excluding government interest) and labor share $1-\alpha_t$ in factor price national income as follows:

$$\alpha_t = Y_{Kt} / (Y_t - T_{pt}) \qquad (A.12)$$

$$1-\alpha_t = Y_{Lt} / (Y_t - T_{pt}) \qquad (A.13)$$

[38] Except during the interwar period, following the large rise in public debt during World War 1. Also note that net government interest payments were negative during the late 1960s and early 1970s, i.e. interest and dividend on government financial assets slightly exceeded interest payments. It is maybe surprising that net capital income received by government was not more strongly positive during the period running from World War 2 to the 1980s, given the large government equity participations in corporations at that time. This could reflect the fact that the government was getting relatively low returns on its assets, and/or was keeping a large share of the profits as retained earnings to finance new investment in publicly owned companies (we know that aggregate retained earnings were very large during the 1950s-1960s, but we do not know the break down by ownership status; it seems likely that retained earnings were particularly large in publicly owned companies), and/or was implicitly using some of the returns to pay better wages in publicly owned companies. During the 2000s, the estimated value of government financial liabilities (public debt) was about 80% of national income, and that of government financial assets (e.g. shares in public utility companies) was about 50% of national income (see Table A13 below).

In order to compute average rates of return to private wealth, one needs to include government interest and to define total capital income $Y_{Kt}^* = Y_{Kt} + Y_{Kgt}$ and total capital share $\alpha_t^* = Y_{Kt}^*/(Y_t - T_{pt}) = \alpha_t + \alpha_{gt}$ (with $\alpha_{gt} = Y_{Kgt}/(Y_t - T_{pt})$).

On Table A8, we report primary (pre-tax) functional shares series using both definitions, i.e. including government interest (see col.(13)-(14)) and excluding government interest (see col.(15)-(16)). Note that when we include government interest the capital and labor shares do not exactly sum up to 100%. This is because government interest enters into the definition of total capital income Y_{Kt}^* but not in the definition of national income Y_t (it is treated as a pure transfer by national accounts, not as additional output). Both sets of series are very close and depict the same picture:[39] with the exception of the mid-century nadir, the capital share has been fairly stable over the 20th century, albeit at somewhat higher levels in the early 20th century (30%-35%) than in the late 20th century (25%-30%). This is due for the most part to the structural rise of the government sector (which does not distribute capital income out of its productive activity). Note also that the (sharp) U-shaped evolution of rental income generates a (moderate) U-shaped pattern for the overall capital share. I.e. the sharp rise of rental income explains why the capital share is now higher than what in the immediate postwar period, in spite of the fact that corporate capital shares are currently about the same level as in the 1950s-1960s.

Table A9: taxes & transfers (1896-2008)

On Table A9 we report national accounts series on taxes and transfers. Taxes raise complex general equilibrium tax incidence issues, which national accounts series alone are of course unable to solve. The computations reported in these tables rely on simple tax incidence assumptions (detailed below), which in our view are valid as a first approximation, but which would definitely deserved to be improved.

Following standard national accounts categories we distinguish four types of taxes:

$$T_t = T_{pt} + T_{ct} + T_{it} + SC_t \qquad (A.13)$$

With:

[39] See Figures A7 and A8.

T_t = total tax revenues

T_{pt} = production taxes revenues[40]

T_{ct} = corporate income and wealth taxes revenues[41]

T_{it} = personal income and wealth taxes revenues[42]

SC_t = social contributions revenues[43]

Total tax revenues rose from less than 10% of national income prior to World War 1 to about 15%-20% in the interwar, 30% by 1950, and 50% in the 1990s-2000s. In the early 20h century, tax revenues came mostly from production taxes. The interwar rise in tax revenues was largely due to the appearance of personal and corporate income taxes. The postwar rise was due to all type of taxes: production taxes, income taxes, and particularly social contributions (see Table A8, col. (1)-(5)).

We assume that corporate taxes T_{ct} fall entirely on capital, and that social contributions SC_t fall entirely on labor. Regarding personal taxes T_{it}, we proceed as follows. First we take away bequest and gift taxes T_{Bt} from T_{it}, and assume they fall on capital. Next, in order to decompose other personal taxes T_{it}-T_{Bt} (which in practice are mostly personal income taxes) into a capital tax component T_{Kit} and a labor tax component T_{Lit}, we assume that other personal taxes fall proportionally on 50% of capital income Y_{Kt}* and on 100% of labor income Y_{Lt}.[44] The 50% coefficient on capital income is supposed to take into account the fact that a large fraction of capital income is not subject to the personal income tax (imputed rent, retained earnings, tax exempt savings accounts, etc.) or benefits from lighter tax treatment or reduced rates.[45]

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[40] As explained above, we include in this category all "production taxes" (D2 in ESA 1995 classification), i.e. the sum of "product taxes" strictly speaking (D21) and "other production taxes" (D29), net of subsidies (D3).

[41] We include in this category all "current taxes on income and wealth" (D5 = D51+D59 in ESA 1995 classification) paid by the corporate sector (in practice D59=0 for corporations).

[42] We include in this category all "current taxes on income and wealth" (D5 = D51+D59 in ESA 1995 classification) paid by the personal (household) sector, as well as bequest and gift taxes, which are treated separately in national accounts (D91D in ESA 1995 classification).

[43] We include in this category all "social contributions" (actual and imputed) (D61 in ESA 1995 classification) received by the government sector.

[44] More precisely, we assume that $T_{Lit} = (T_{it}-T_{Bt}) \times (Y_{Lt}-SC_t+Y_{Rt})/(Y_{Lt}-SC_t+Y_{Rt}+0.5 \times Y_{Kt}^*)$ and $T_{Kit} = (T_{it}-T_{Bt}) \times (0.5 \times Y_{Kt}^*)/(Y_{Lt}-SC_t+Y_{Rt}+0.5 \times Y_{Kt}^*)$, where Y_{Rt} is replacement income defined below (social contributions are deductible for income tax purposes, but replacement income is taxable). Detailed computations are provided in the excel file.

[45] Assuming a constant (taxable Y_{Kt}^*)/Y_{Kt}^* factor equal to 50% throughout the 1896-2008 period is of course very rough and ought to be improved. The true factor was somewhat larger than 50% in the early 20th century (e.g. imputed rent was subject to the income tax at that time), and is somewhat below 50% in the late 20th century and early 21st century (special exemptions for capital income have become more and more numerous in recent decades). However we tried a number of alternative, less rough assumptions (such as using the observed capital income tax base), and we found that the impact on overall tax rates series was relatively limited, so we chose this simpler assumption. The complication comes from the fact that one would

Neglecting production taxes for the time being, we then define total capital taxes T_{Kt} and total labor taxes T_{Lt} as follows:

$$T_{Kt} = T_{ct} + T_{Kit} + T_{Bt} \qquad (A.14)$$

$$T_{Lt} = SC_t + T_{Lit} \qquad (A.15)$$

Note that bequest and gift taxes have generally raised about 0.5%-1% of national income, both around 1900-1910 and around 2000; at the mid 20th century inheritance nadir, it was as little as 0.1-.0.2%. This U-shaped pattern of inheritance tax revenues is for the most part the mechanical consequence of the U-shaped pattern of the inheritance flow itself. The average tax rate on bequests and gifts, defined as T_{Bt}/B_t (where B_t is the economic inheritance flow borrowed from Table A3), has been relatively stable around 5% throughout the 1896-2008 period (see Table A9, col. (15)). Prior to World War 1, bequest and gift taxes made most of capital taxes. The balance started shifting in the interwar period, and especially in the postwar period. Nowadays taxes on the capital income flows (either at the corporate or personal level) vastly dominate taxes on the transmission of capital (see Table A9, col.(6)-(7)).

By including inheritance taxes into total capital income taxes, we are in effect assuming in our simulations (Appendix D) that they are paid out of the yearly return to capital, so that they reduce after-tax returns to private wealth, just like other capital taxes. Maybe it would be preferable to treat them separately and to assume that inheritance taxes are paid out of inherited wealth, so that they reduce wealth transmission flows in the simulated model. One could then take into account the progressivity of inheritance taxes (most of the population pays inheritance taxes close to 0%, while a minority pays much more than 5%). Given our aggregate focus, however, it seems simpler as a first approximation to just include them into capital taxes.

By dividing T_{Kt} by Y_{Kt}^* and T_{Lt} by Y_{Lt} we obtain the average implicit tax rates on capital τ_{Kt0} and on labor τ_{Lt0} (excluding production taxes) reported on col.(9)-(10). Because social contributions are so large (almost half of total taxes, and about two thirds of total labor

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also need to take into account tax progressivity (capital incomes are typically higher up in the distribution than labor incomes); so a complete computation would require estimating the full joint distributions of capital income (including tax exempt capital income) and labor income. This falls far beyond the scope of the present research.

taxes), the labor tax rate vastly exceeds the capital tax rate: in the 1990s-2000s, the labor tax rate was about 45%, while the capital tax rate was less than 25%.

Note however that social contributions SC_t finance for the most part replacement income Y_{Rt}, i.e. transfers received by labor income earners when they do not work, and which are generally proportional to past labor income and social contributions (pensions, unemployment benefits). On col. (16)-(18) of Table A9 we report total government (monetary) transfers TR_t, which we break down into replacement income Y_{Rt} and "pure transfers" TR_{0t} ;[46] in the 2000s, total transfers made about 20% of national income, out of which about 18% were replacement income and 2% were pure transfers. In case one deducts "replacement taxes" from labor taxes, i.e. the fraction of social contributions financing replacement income (this amounts to treating these as forced savings rather than taxes), then the labor tax rate in the 2000s drops from about 45% to about 25%-30%, i.e. somewhat below the capital tax rate (see Table A9, col. (11)).[47]

As a first approximation, we choose to view production taxes T_{pt} as broad taxes falling proportionally on total factor income $Y_{Kt}+Y_{Lt}$ (or on total expenditures C_t+I_t, which in a closed economy setting is equivalent), with an implicit production tax rate $\tau_{pt} = T_{pt}/(Y_t-T_{pt})$. Under this assumption, the total tax rates on capital and labor (including production taxes) τ_{Kt} and τ_{Lt} are given by:[48]

$$\tau_{Kt} = 1- (1- \tau_{Kt0})/(1+ \tau_{pt}) = (\tau_{Kt0} +\tau_{pt})/(1+ \tau_{pt}) \qquad (A.16)$$

$$\tau_{Lt} = 1- (1- \tau_{Lt0})/(1+ \tau_{pt}) = (\tau_{Lt0} +\tau_{pt})/(1+ \tau_{pt}) \qquad (A.17)$$

[46] Replacement income Y_{Rt} is defined as the sum of "social security benefits in cash" (D621 in ESA 1995 classification) and "unfunded employee social benefits" (D623) paid by the governement; pure transfers TR_{0t} are defined as "social assistance benefits in cash" (D624) paid by the government; total government monetary transfers TR_t are defined as the sum of the two. D624 transfers include all means-tested cash transfers, while D621-D623 include earnings-related transfers (mostly pensions and unemployment benefits). We also report on col. (19) of Table A9 the value of in-kind government transfers, i.e. "social transfers in kind" (D63), defined as the sum of "social benefits in kind" (D631: health insurance reimbursement and benefits, housing benefits, etc.) and "transfers of individual non-market goods and services" (D632: value of free education services provided by the government, etc.).

[47] The slight superiority of capital tax rate over (net-of-replacement-taxes) labor tax rate comes from the fact that the corporate income tax is a flat tax with high tax rate (typically 30%-50% since the 1950s), while the personal income tax is progressive, with a lower average tax rate. However the many capital tax exemptions (imputed rent, etc.) tend to counterbalance this effect, and it is possible that the true capital tax rate is actually (slightly) below the labor tax rate.

[48] Alternatively, if one defines $\tau_{ft} = T_{pt}/Y_t = \tau_{pt}/(1+ \tau_{pt})$ the implicit factor income tax rate associated to production taxes, one gets the equivalent formulas $\tau_{Kt} = 1- (1- \tau_{Kt0})(1- \tau_{ft})$ and $\tau_{Lt} = 1- (1- \tau_{Lt0})(1- \tau_{ft})$.

The corresponding series for τ_{Kt} and τ_{Lt} are reported on col. (12)-(13) of Table A9. In the 2000s, the labor tax rate was about 55%, while the capital tax rate was about 35%. If one deducts from labor taxes the fraction of social contributions financing replacement income, then the labor tax rate drops to about 30% (see col. (14)).[49] It seems more justified to treat replacement income as part of (augmented) labor income (this is what we do in our theoretical and simulated models), so this second definition of the aggregate labor tax rate is more relevant, e.g. for the purpose of comparison with the capital tax rate.

Our methodological choice of treating production taxes as broad factor income taxes is not entirely innocuous, but seems like the most reasonable option, given data limitations. In practice, production taxes (in the D2 ESA 1995 national accounts classification sense) are a complex mixture of broad factor income taxes (or expenditure taxes) and pure consumption taxes.[50] Estimating their exact tax incidence would involve complicated open economy and asset pricing issues, and falls well beyond the scope of this research. In case a fraction of production taxes falls purely on consumption, then the formulas for τ_{Kt} and τ_{Lt} would still be valid, but they should be interpreted as averages over the different final uses of income: whether their income comes from capital or from labor, individuals would face higher tax rates when they use their income to purchase consumption goods than when use it purchase investment goods. In a homogenous good model, there would in effect be a price p_t=1 when the single good is purchased as a capital good, and a price p_t'=1+τ when it is purchased as a consumption good, where τ measures the fraction of production taxes falling on consumption, expressed in equivalent consumption tax rate.[51] E.g. in the 2000s, with full shifting of production taxes on consumption prices, the capital tax rate would be equal τ_{Kt0}=25% when capital income is saved, equal to τ_{Kt1}>35% when capital income is consumed, with a weighted average (using aggregate savings rate) equal to τ_{Kt} =35%. In practice less than half of total D2 revenues can be viewed as falling on consumption, so the effect would even be less strong. The overall impact on long run capital accumulation (in effect we are under-estimating the quantity of investment goods that savings can buy, whether savings come from capital or labor income) would be relatively small. In any case, this would simply lead us to revise downwards our estimate of

[49] We note τ_{Lt}* this corrected labor tax rate (i.e. after deduction of "replacement taxes").
[50] See above (footnotes 21-22).
[51] Think of the price of cars under a VAT with full deductibility of capital goods (i.e. immediate expensing, such as the French VAT system): the price is lower when you buy cars for investment purposes than when you buy cars for consumption purposes.

the residual capital gain terms in our wealth accumulation equation (see below), with no impact on W_t, and on the rest of our analysis.[52]

Table A10: disposable income & savings (1896-2008)

We define personal disposable income Y_{dt} as follows:

$$Y_{dt} = Y_t - T_t + Y_{Rt} + Y_{Kgt} \quad (A.18)$$

I.e. disposable income equals national income minus taxes plus government monetary transfers (replacement income) plus net government interest payments.[53] We find that disposable income Y_{dt} was about 95% of national income Y_t around 1900-1910, dropped to about 80% by 1950, and stabilized around 70% in the 1990s-2000s (see Table A10, col. (1)). This simply comes from the fact that taxes currently represent about 50% of national income, while transfers are only 20% of national income (see Table A9). Note however that it is somewhat arbitrary to include only monetary government transfers in the definition of disposable income. In-kind government transfers, as recorded by national accounts, make almost 20% of national income in the 1990s-2000s (see Table A9, col. (16)), mostly in the form of free health and education services provided by the government. If in-kind transfers were added to the definition of disposable income, then disposable income in the 1990s-2000s would be about 90% of national income, i.e. roughly the same level as one century ago.[54] This is why in this research we prefer to use national income rather than disposable income as the proper income denominator when we compute aggregate wealth-income ratios or inheritance-income ratios.

Disposable income Y_{dt} can be broken into three terms:

$$Y_{dt} = Y_{Kdt} + Y_{Ldt} + Y_{Rdt} \quad (A.19)$$

[52] The only noticeable impact would be on our estimates of the share of inheritance resources in total disposable resources by cohort (see Appendix D4). If productions taxes fall entirely on factor incomes, as we assume, then inheritance resources pay no production taxes. However if part of production taxes are pure consumption taxes, then they also fall on successors when they use they inheritance resources to purchase consumption goods. So our estimates of α^{x*} and γ^x should be reduced somewhat in order to take this into account.

[53] Because replacement income Y_{Rt} represents the vast majority of government monetary transfers TR_t, and in order to simply tables and notations, we omit pure transfers TR_{ot} from our definition of disposable income (see Table A9, col. (19)). We also omit "other corporate transfers" (see below).

[54] If one were to add the value of all services produced by the government (police, national defence, justice, etc.), then by definition disposable income would be as large as national income.

With:

Y_{Kdt} = after-tax capital income[55]

Y_{Ldt} = after-tax labor income[56]

Y_{Rdt} = after-tax replacement income[57]

We find that the share of after-tax capital income in disposable income has been relatively stable in the long run, albeit at somewhat higher levels in the early 20th century (30%-35%) than in the late 20th century (20%-25%), which resembles closely the evolution of the pre-tax capital share in national income.[58] Because average tax rates on capital and labor have been fairly similar as a first approximation (once one takes away replacement-income payroll taxes), the tax system as a whole had a limited impact on the functional distribution. The main change from a long run perspective is the large rise of replacement income and the corresponding decline of labor income (see Table A10, col.(12)-(13)).

Note that we include net-of-depreciation corporate retained earnings in our definitions of after-tax capital income and disposable income. This seems like the most logical way to proceed: presumably retained earnings are in the interest of the owners of corporations (otherwise shareholders would opt for bigger dividends); as a first approximation they can be viewed as capital income that is immediately saved by shareholders and reinvested in the company. In general, this does not make a big difference in terms of levels.[59] E.g. in

[55] After-tax capital income Y_{Kdt} is defined as capital income $Y_{Kt}*$ (col. (1), Table A8), minus capital taxes T_{Kt} (col. (6), Table A9), minus "other corporate transfers" (col. (14), Table A7). This latter term raises difficult interpretation issues, and it is unclear whom it should be attributed to (see above). In effect, we choose to treat "other corporate transfers" as a tax: we include this term in the definition primary capital income (this is common practice in the analysis of profit shares), and we exclude it from the definition of disposable income (this is common practice in the analysis of household capital income). We note $\tau_{Kt}*$ this corrected capital tax rate, i.e. after inclusion of "other corporate transfers" (by construction, $\tau_{Kt}* = 1-\alpha_{dt}/\alpha_t*$, where $\alpha_{dt}=Y_{Kdt}/Y_t$ is the after-tax capital income share in national income). In the 2000s, the corrected capital tax rate $\tau_{Kt}*$ appears to be over 40%, while the uncorrected capital tax rate τ_{Kt} is about 35% (see Table A11, col. (8) & (11)).

[56] After-tax labor income Y_{Ldt} is defined as labor income Y_{Lt} (col. (8), Table A8), minus social contributions SC_t (col. (5), Table A9), minus T_{Lit} x $(Y_{Lt}-SC_t)/(Y_{Lt}-SC_t+Y_{Rt})$, where T_{Lit} is the estimated labor share of personal taxes (see above). Personal taxes rely on net-of-social-contributions labor income and on replacement income, and we assume that the average tax rate is the same on the two.

[57] After-tax replacement income Y_{Rdt} is defined as replacement income Y_{Rt} (col. (17), Table A9), minus T_{Lit} x $Y_{Rt}/(Y_{Lt}-SC_t+Y_{Rt})$ (see above).

[58] See Figure A9 vs. Figure A7.

[59] Although this seems like the most logical way to proceed as a first approximation, our way of dealing with retained earnings is far from being fully satisfactory. In particular, one would need to take away the fraction of retained earnings which corresponds to government participations in the corporate sector (it is possible that this was a significant fraction in the 1950s-1960s), which unfortunately historical national accounts series do not allow to do. In principle one should also deduct the fraction which corresponds to foreign participations (and add the retained earnings of foreign companies which corresponds to the participations of French residents). Given that the net foreign asset position of France is close to zero, the net effect must be relatively small.

the 1990s-2000s, the total after-tax capital share in disposable income is about 24%-25%, with non-retained-earnings capital income around 22%-23% and retained earnings around 1%-2% (and sometime negative) (see Table A10, col. (14)-(15)). But this can affect the trends. E.g. retained earnings were higher in the 1950s-1960s (typically 3%-4% of disposable income) than they are today (typically 1%-2% of disposable income), so that if one takes away retained earnings from capital income, then the after-tax capital share would appear to be larger in the 1990s-2000s than in the 1950s-1960s.[60]

Finally, we break down disposable income between consumption and savings:

$$Y_{dt} = C_t + S_t \quad \text{(A.20)}$$

With:

S_t = private savings = personal (household) savings + corporate retained earnings

C_t = private consumption = $Y_{dt} – S_t$

For reasons explained above, we include net-of-depreciation corporate retained earnings in our definition of private savings. We find that private savings have generally fluctuated around 10% of national income over the 1896-2008 period, with the important exception of the reconstruction periods of the 1920s and the 1950s-1960s, when savings were significantly higher (in particular due to retained earnings).[61] These unusually high savings rate during reconstruction periods, especially during the 1920s, must of course be related to the large rates of capital destructions observed during war years (see Table A10, col.

[60] See Figure A10. Note that because we probably overestimate the effective tax burden falling on capital in the recent period (see above), we probably under-estimate somewhat the level of the after-tax capital share in the 2000s. In particular the apparent decline of the after-tax capital share in the late 1990s and early 2000s (and corresponding rise in the after-tax labor share) is likely to be exaggerated (it is parly due to the CSG tax reform – i.e. gradual transfer of some social contributions levied on labor income to a broad based proportional income tax – and the fraction of capital income subject to CSG is in fact smaller than our presumed constant-over-time 50% ratio). Note also the large rise of the capital income share in household income (from about 10% in the 1950s to about 20% in the 1990s) reported in our older series (Piketty (2001, pp.710-711; 2003, fig.4, p.1022) stems from the fact that we omitted in these older series to include retained earnings, and most importantly to include self-employment capital income. In our new corrected series we assumed for simplicity that the capital and labor shares were the same in the self-employment sector than in the corporate sector (which by construction implies than changes in the relative importance of the two sectors has no impact on aggregate capital share); this is imperfect, but better as a first approximation than the zero capital share assumption implicit in our older series.

[61] See Figure A11. As was noted above, it is possible that the retained earnings levels reported for the interwar period are over-estimated somewhat.

(9)); we return to this when we estimate the accumulation equation for private wealth (see section A5 below).[62]

Col. (1) to (17) of Tables A11-A12: summary macro variables (1820-2008)

On Table A11 we report the main macro variables obtained from the previous tables (capital and labor shares, tax rates, savings rates). On Table A12 we report the decennial averages corresponding to these annual 1896-2008 series, which we complete by providing decennial averages estimates covering the 1820-1900 period.

As was already noted, available national accounts series prior to 1896 are relatively rudimentary. The 19th century estimates reported on Table A12 for functional shares, tax rates and savings rates should be viewed as approximate and provisional. We proceed as follows.

Regarding capital and labor shares, there exists to our knowledge no estimate for 19th century France,[63] so we construct our own series using available wage indexes. I.e. the capital and labor shares α_t and $1-\alpha_t$ reported on col.(3)-(4) of Table A12 for years 1820-1829, 1830-1839, etc., until 1890-1899 are computed by dividing the estimated nominal wage bill for each decennial period by the corresponding national income, and by anchoring our labor share series $1-\alpha_t$ to the 1900-1909 and 1910-1913 values coming from our annual series.[64] Nominal wage bill estimates arere computed by multiplying the best available nominal wage index series by the relevant population index.[65]

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62 Col. (9) of Table A10 is defined as col. (8) of Table A9 (private savings) plus col. (15) of Table A18 (estimated war destructions as a fraction of national income).

63 In particular the 19th century national accounts constructed by Bourguignon and Levy-Leboyer (1985) and Toutain (1997) are pure production-based accounts: they offer decompositions by industrial production sectors, but not by income categories.

64 The capital share α_t was then computed as one minus the labor share. The capital share $\alpha_t^*=\alpha_t+\alpha_{gt}$ (col. (5) of Table A12) was computed by assuming for simplicity that net government interest α_{gt} was equal to 2.0% of (factor-price) national income throughout the 1820-1900 period, i.e. the same approximate value as in 1900-1913. Government accounts show that α_{gt} was indeed relatively stable around 2% over the 1820-1913 period, except during the 1870-1900 period, when it reached 3%-3.5%, following the 1870-1871 war and the ensuing rise in public debt (see e.g. Toutain (1997, p.86); see also Fontvieille (1976)). This is negligible for our purposes.

65 Detailed computations and formulas are reported on col.(3)-(4) of Table A12 and col.(13)-(14) of Table A18. We used the SGF-March manufacturing-sector nominal wage index (as reported by Toutain (1997, p.165)), and we multiplied it by total adult population in order to compute a nominal wage bill index. Of course wage earners made a smaller fraction of the labor force in the early 19th century than in the late 19th century. But because we attempt to compute the labor and capital shares in total national income, and since we do not have 19th century series on the relative shares of the corporate vs self-employment sectors in national income, this is the right thing to do, at least as a first approximation. In effect we are assuming that the SGF-March nominal wage index provides an acceptable approximation of how average individual labor

We find that the labor and capital shares in (factor-price) national income have been relatively stable in the long run over the 1820-1913 period, but with large medium run variations. According to our estimates, the capital share gradually rose from about 30%-35% in the 1820s-1830s to as much as 45% in the 1850s-1860s, then gradually declined to as little as 25%-30% around 1890-1900, and finally rose again, up to about 35% in 1910-1913. Given the data limitations we face, these series should be interpreted with caution. In particular, it is difficult (if not impossible) to estimate precisely the extent to which available 19th century wage indexes are representative of the whole workforce of the time. However the general pattern seems to be robust. In particular, all available wage series show that there was very little wage growth (if any) until the 1850s-1860s, in spite of the large growth in manufacturing output and total national income. We tried alternative series and methods, and we always find a large rise of the capital share between the 1820s-1830s and the 1850s-1860s.[66] Similarly, all series indicate very rapid wage growth during the second half of the 19th century (nominal wages almost doubled), with growth rates significantly larger than those of output and national income – thereby suggesting a marked decline in the capital share. Wage and output series also seem to indicate that the rebound of the capital share between 1900 and 1913 is statistically robust.[67] Whether the

compensation per adult (wage labor and self employment labor, urban and rural) has evolved in France over the 1820-1900 period. Note also that rental income plays no role in our simple computations: in effect we are implicitly assuming that the share of rental income in national income has remained approximately constant over the 1820-1913 period; available estimates indeed suggest that housing rents have been relatively stable around 5%-8% of national income in the 19th century, possibly with a rise during the second half of the century; see the estimates of net housing rents given by Toutain (1997, p.113)).

[66] Our nominal wage index series seem to deliver lower-bound estimates of the rise of the capital share between 1820-1830 and 1850-1860. According to alternative wage series (such as those reported by Bourguignon and Levy-Leboyer (1985, pp.333-337)), there was virtually no wage growth at all until the 1850s; using such series, one would find capital shares over 50% at mid 19th century. Of course these wage series (including the SGF-March index we are using) are fragile and are generally restricted to industrial low-skill or medium-skill workers (i.e. a relatively small fraction of the workforce of the time). However one would need to assume enormous wage growth for other segments of the workforce in order to compensate manufacturing wage stagnation and undo the capital share pattern.

[67] The capital share pattern that we find for 1890-1899, 1900-1909 and 1910-1913 using our wage index method is consistent with the Villa 1896-1913 series. Villa's series might exaggerate somewhat the rise of the capital share for this time period. But qualitatively such a pattern seems more consistent than the 1900-1913 functional shares stability postulated by Colson (1918, livre 2, p.403): Colson constructs estimates for the structure of private incomes for years 1900 and 1913, using concepts and methods similar to those used by Dugé de Bernonville in his interwar series; however Colson provides limited information on his data sources, which appear to be much less sophisticated than the detailed output and wage indexes used by Villa; in addition there are reasons to believe that Colson (like a number of economists of the time) was strongly attached to the functional stability conclusion per se. Finally, note that the findings of Bouvier, Furet and Gillet (1965), who collected and analyzed book accounts of large companies in France during the 19th century, are consistent with the rise of the capital share in 1896-1913, as well as with our pattern for earlier periods: they find high profit growth during the 1850-1873 period, low profit growth during the 1873-1896 period, and again booming profits in 1896-1913; unfortunately their data is too incomplete to compute profit and labor shares (too small sample, and imperfect distinction between wage bill and intermediate consumption in book accounts), and they have even fewer companies with proper accounts prior to 1850.

levels of capital shares estimated for the 19th century (and particularly the very high levels obtained for the 1850s-1860s) are also statistically robust, and can be compared to 20th century levels in a meaningful way, is a more complicated issue.[68]

Regarding government taxes (col. (7)-(9) of Table A12), we simply assume an aggregate tax rate equal to 8.0% of national income throughout the 1820-1899 period, i.e. approximately the same level as in our 1900-1913 annual series.[69] For simplicity we also assume that this tax rate of 8.0% fell proportionally on capital and labor income throughout the 1820-1899 period.[70] We make a similar stability assumption regarding government transfers.[71]

Regarding savings (col.(12)-(14) of Table A12), we computed average decennial private savings rates from the investment series constructed by Bourguignon and Levy-Leboyer (1985). These series do not allow to differentiate between personal savings and corporate retained earnings, so the private and personal savings rates reported on Table A12 for the 1820-1899 period are the same. We find that private savings have been relatively stable around 8%-10% of national income during the 19th century.[72]

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[68] One would need to collect new raw data on wages in larger segments of the urban and rural economy of the time in order to settle the issue. Note however that the possibility that capital shares attained levels as large as 45% (or even larger) in 19th century economies is certainly plausible. In today's less developed countries one often finds capital shares closer to 40%-50% (or even larger) than to the standard 20%-30% figures found in today's developed countries. Possible explanations for this range from technological stories (e.g. human capital might play a structurally less important role in ancient production functions than in modern ones) to institutional stories (e.g. unions and strikes were virtually banned in a country like France prior to the 1850s-1860s; it is possible that labor bargaining power was particularly low in France during the first half of the 19th century, and more generally in less developed economies). To our knowledge this is very much an open issue.

[69] The government accounts of the time indeed suggest that aggregate tax revenues during the 19th century were approximately stable around 8%-9% of national income (see e.g. Toutain (1997, p.86); see also Fontvieille (1976)). Small time variations around this approximately constant level are negligible for our purposes.

[70] For 1900-1909 and 1910-1913 we found that the average capital tax rate was slightly larger than the average labor tax rate, due to relatively large bequest and gift tax revenues. The bequest and gift tax however raised somewhat lower revenues before the 1901 estate tax reform. Note also the tax on interest and dividend income that was in force in 1900-1913 did not exist during most of the 19th century (the "impôt sur le revenu des valeurs mobilières" – IRVM – was introduced in 1872; this rudimentary income tax system was extended to other income sources in 1914-1917). In any case, the tax rates of the time were all pretty small by modern standards, and that these small variations can be neglected as a first approximation.

[71] I.e. we assumed that government transfers (replacement income) were permanently equal to 1.0% of national income throughout the 1820-1899 period, i.e. approximately the same level as in 1900-1913 (see references above). It follows from our assumptions on government interest (2.0%), taxes (8.0%) and transfers (1.0%) that personal disposable income was equal to 95.0% of national income throughout the 1820-1899 period ($Y_{dt} = Y_t - T_t + Y_{Rt} + Y_{Kgt}$).

[72] In order to compute total private savings, we summed up the net domestic investment and net foreign investment series constructed by Bourguignon and Levy-Leboyer (1985, pp.323-327 & 339-342). Note that according to these estimates, from the 1850s up until 1913, net foreign investment made a substantial part of total private savings (at least 20%-30%, and up to 40% during the 1860s and 1890s-1900s). This is qualitatively and quantitatively consistent with the rising share of foreign assets in total private wealth during

We also report on Tables A11 and A12 estimates of average rates of return on private wealth. In order to compute the pre-tax return on private wealth r_t, one simply needs to divide the primary capital share α_t^* in (factor-price) national income by the wealth-income ratio $\beta_t = W_t/Y_t$:

$$r_t = \alpha_t^*/\beta_t \qquad \text{(A.21)}$$

The after-tax rate of return to private wealth r_t is similarly defined as the ratio between the after-tax capital share α_{dt}^* in national income and the wealth-income ratio β_t :

$$r_{dt} = \alpha_{dt}^*/\beta_t = (1-\tau_{Kt}^*)\ r_t \qquad \text{(A.22)}$$

With a wealth-income ratio β_t equal to 600% and a capital share α_t^* equal to 30%, we would get a pre-tax rate of return r_t equal to 5%. If we compute a simple arithmetic average of our r_t estimates over the 1820-2009 period, we find an average pre-tax return equal to 6.8% (see Table A12, col.(6)). This reflects the fact that on average over the two centuries wealth-income ratios have actually been less than 500% (due to the low ratios which prevailed during most of the 20th century), and capital shares have actually been (slightly) above 30%. The average pre-tax rate of return was equal to 5.9% during the 1820-1913 period and 7.7% during the 1913-2009 period, again reflecting the lower average wealth-income ratios prevailing in the 20th century. Within the 1913-2009 period, the large variations in the wealth-income ratios have generated large variations in pre-tax rates of return: r_t was as large as 10% both during the 1920s and the 1950s (see Figure A12). Taxes played a relatively small role during the 19th century and a much larger role in the 20th century: on average, the after-tax rate of return r_{dt} appears to be equal to 5.4% both during the 1820-1913 period and the 1913-2009 period. Over the past thirty years (1979-2009), the pre-tax return r_t was 6.9%, while the after-tax return r_{dt} was 4.3% (see Table A12, col. (11)).[73]

this period (see section A4 below). These BLL investment series should be preferred to the investment series provided by Toutain (1997, pp.77-78), which do not include foreign investment; in addition, Toutain's domestic investment series look definitely too low (with net domestic investment rates below 5% of national income during most of the 19th century), and inconsistent with the observed pattern of private wealth-national income ratios.

[73] We might however overestimate the tax burden falling on capital during the recent period.

To the extent that asset prices rise as much as consumer prices in the long run (see section A5 below), the rates of return r_t and r_{dt} are better thought as real rates of return. In the short run and medium run, however, large variations in asset prices relatively to consumer prices often generate large capital gains and losses, which need to be added to the flow returns r_t and r_{dt} in order to compute the full real returns to private wealth. War-induced capital destructions also need to be taken into account. On Table A12, we use the (imperfect but consistent) real rates of capital gains q_t and war destructions d_t estimated in section A5 below in order to compute augmented after-tax rates of return $r_{dt}^* = r_{dt}+q_t+d_t = (1-\tau_{Kt}^*)r_t+q_t+d_t$.[74] The impact on century-long averages is small; but the impact on decennial averages can be extremely substantial, both during the chaotic world war periods and during peacetime asset price boom periods such as the 2000s. Over the 1913-1949, the after tax flow return r_{dt} was 6.4%, but the augmented return $r_{dt}^* = r_{dt}+q_t+d_t$ was only 1.9%, due to large capital losses and destructions. Conversely, in the 2000-2009 decade, the after tax flow return r_{dt} was only 3.5%, but the augmented return r_{dt}^* was as high as 7.7%, due to large capital gains. Note however that if we take averages over several decades the size of capital gains and losses is usually much smaller than the flow return itself (except naturally during destruction periods). E.g. over the past 30 years (1979-2009), the after tax flow return r_{dt} was 4.3%, and the augmented return r_{dt}^* was 5.3% (see Table A12, col. (15)-(17)).

Capital gains and losses seem to play a smaller role in explaining the 1820-1913 evolution of aggregate rates of returns, which is primarily driven by the relatively large movements of the capital share (and to a lesser extent of the wealth-income ratio). According to our computations, the aggregate rate of return r_t rose from 5%-6% in the 1820s-1830s to over 7% during the 1850s-1860s (when the profit share reached its record level), then declined to little more than 4% during the 1870-1900 period, and then rose again to 5%-6% at the eve of World War 1 (see Table A12, col. (6)). The exact levels we obtain for these 19th century rates of return are obviously fragile, given the data limitations of the time (see above); however the general pattern seems to be relatively robust, and consistent with a number of other data sources.[75]

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[74] Capital gains sometime pay (moderate) taxes. However capital gains tax revenues are already taken into account in corporate and personal income taxes (in effect we attribute them to the capital income flow), so they do not need to be added here.

[75] In particular, the book accounts of large 19th century French companies collected by Bouvier et al (1865) display high profit rates in the 1850s-1860s, declining profit rates in the 1870-1900 period, and rising profit rates from the late 1890s until 1913 (see above). According to net rental income estimates of Toutain (1997, p.113), the rate of return on housing assets was relatively stable around 4% during the 1800-1913 period. I.e. most of the 19th century movements in the overall rate of return on private wealth seems to come from

These historical rates of return, the role they have played in the wealth accumulation and transmission process, and the role they might be playing in the future, are further analyzed in the working paper (see especially section 6) and in Appendix D.

A.4. Supplementary series on the structure of private wealth W_t (Tables A13-16)

Detailed annual series on the structure of private wealth W_t in France over the 1970-2009 period (using official national wealth accounts) are reported on Tables A13 to A15. Available pre-1970, non official estimates of national and private wealth are reported on Table A16. In section A5 below we use these estimates together with savings series in order to estimate the private wealth accumulation equation and to construct continuous private wealth series. Here we describe how Tables A13 to A16 were constructed.

Table A13: private wealth vs government wealth (1970-2009)

All series reported on Tables A13-A15 come directly from official Insee-Banque de France balance sheets.[76] We report values expressed as fractions of national income Y_t (or other aggregates).[77]

On Table A13 we report the following basic decomposition of private wealth W_t :

$$W_t = K_{pt} + A_{pt} - L_{pt} \qquad \text{(A.23)}$$

With: K_{pt} = tangible (non-financial) assets of the personal sector[78]

A_{pt} = financial assets of the personal sector

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non-housing productive assets (particularly in the booming manufacturing sector). Note also that Banque de France (and Bank of England) interest rates were on average larger between the 1820s and 1860s (typically 4%, and sometime as much as 5%) than during the 1870-1900 period (when they declined to about 3%); see e.g. the series reported by Bourguignon and Lévy-Leboyer (pp.338-342). Such interest rate series raise serious interpretation issues, however: they could also reflect changes in central bank and government finances credibility, at least in part; in any case, given than public debt represents such a small part of aggregate private wealth (usually less than 10%), it seems unlikely that movements in this particular return (wherever they come from) have driven movements in the overall rate of return on private wealth.

[76] See section A1 above for exact references to the Insee-Banque de France tables. We did not make any correction to the Insee-Banque de France raw balance sheets.

[77] Raw values expressed in current billions euros are provided in the excel file.

[78] We use the words "tangible assets" for the sake of concreteness, but we actually include in this category all non-financial assets, as defined by international balance sheets official guidelines ("AN" in ESA 1995 classification code; this also includes a number of intangible assets such as computer software and patents, as well as inventories and valuables; see ESA 1995 manual).

L_{pt} = financial liabilities of the personal sector

We find that the total market value of tangible assets owned by French households was relatively stable around 200%-220% of national income between the early 1970s and the late 1990s, and then nearly doubled during the 2000s (see Table A13, col. (2)). Note that the decomposition of personal tangible assets into housing tangible assets (residential real estate) and non-housing tangible assets (typically business assets owned by the self-employed for conducting their unincorporated production activity: non-residential real estate, commercial dwellings, structures, equipment, land, etc.) has also changed a lot over the period.[79] The rise of personal financial assets was more gradual, from about 100% of national income in the 1970s and early 1980s to about 150% in the 1990s and over 200% in the 2000s. Household debt also rose gradually from 20%-30% of national income in the 1970s-early 1980s to 40%-50% in the 1990s and 60%-70% in the 2000s. Net private wealth W_t rose from 280%-300% of national income in the 1970s-early 1980s to 330%-350% in the 1990s and over 500% in the 2000s (see Table A13, col. (1)-(4)).

We also report on Table A13 the same decomposition for government wealth W_{gt} :

$$W_{gt} = K_{gt} + A_{gt} - L_{gt} \qquad \text{(A.24)}$$

With: K_{gt} = tangible (non-financial) assets of the government sector[80]
A_{gt} = financial assets of the government sector
L_{gt} = financial liabilities of the government sector

We find that net government wealth W_{gt} has always been (slightly) positive and trendless during the 1970-2009 period, usually around 20%-40% of national income, in spite of the large rise of government debt, from 30%-50% of national income in the 1970s-1980s to 60%-80% in the 1990s and 90%-100% in the late 2000s. This is because government tangible and financial assets have always been larger than government debt, and rose from about 80% of national income in the 1970s to 130%-140% in the 2000s (see Table A13, col. (5)-(8)). The value of government tangible assets (administrative buildings, public schools and hospitals, etc.), as estimated by national accounts statisticians on the basis of observed market values for land and similar buildings, has always been larger than the

[79] See Table A15 below for the decomposition between housing and non-housing tangible assets.
[80] In the same way as for income accounts (see above), we include in the government sectors all government levels, as well as the (tiny) non profit sector. Detailed series are available in the excel file.

value of government financial assets. The long term rise of government tangible assets must naturally be related to the long term rise of the government sector share in national income and employment.[81] The value of government financial assets did not decline significantly in the recent past, in spite of the large privatization waves of the late 1980s and 1990s.[82]

We also report on Table A13 the same decomposition for national wealth W_{nt}, which we define as the sum of private wealth W_t and government wealth W_{gt}:

$$W_{nt} = W_t + W_{gt} \qquad (A.25)$$

We find that private wealth has always represented the vast majority of national wealth throughout the 1970-2009 period: about 85%-90% during the 1970s-1980s, 90%-95% during the 1990s-2000s (see Table A13, col. (13)-(14)).

Table A14: corporate wealth and net foreign asset position (1970-2009)

On Table A14 we report supplementary data on the structure of corporate assets and on net foreign asset position. In principle this should be useless for our purposes: foreign assets were already counted in private wealth W_t and government wealth W_{gt} (we simply isolate them on Table A14 for illustrative purposes), and in theory the net worth of corporations should simply be equal to their equity value, which was also already counted in the balance sheets of the personal and government sector. However in practice there are many reasons why Tobin's Q ratio might differ from 100%, and it is useful to briefly

[81] From a conceptual perspective, this naturally raises the issue as to whether we should exclude the government sector net product from our national income denominator Y_t (given that the corresponding tangibles assets used to produce government net product are excluded from the private wealth numerator W_t). I.e. with our definitions a country with a rising proportion of tangible assets owned by the government (and a rising proportion of the population employed by the government) will go through a mechanical decline in W_t/Y_t and B_t/Y_t ratios (this would simply reflect the fact that public schools, hospitals, museums etc. cannot be privately owned and transmitted through inheritance). The reason why we finally decided to stick to our definitions is because in practice the large and growing tangible assets owned by the government have been approximately compensated by the rise of public debt, so that the share of government net wealth in national wealth is almost as small today as what it was one century ago. In effect, it is almost as if private individuals owned public tangible assets via public debt.

[82] This seems to be due to the fact that during the 1990s-2000s a number of public utilities services were turned into private corporations with large and rising equity capitalization (and in which the government kept important financial participations). For instance, today's government financial portfolio includes large equity positions in France Telecom and EDF. To some extent these have compensated for the privatization of financial assets in the banking and manufacturing sectors (especially given that the latter were lowly valued in the 1970s-1980s, prior to their privatization).

discuss how this might bias our private wealth estimates (and therefore our economic inheritance flow series).

We report on Table A14 the value of corporate net worth, defined according to the standard definition, and compare it to corporate equity value, in order to compute Tobin's Q ratio:

$$NW_{ct} = K_{ct} + A_{ct} - L_{ct}^{d} \qquad (A.26)$$

$$Q = L_{ct}^{e} / NW_{ct} \quad (A.27)$$

With: NW_{ct} = net worth of the corporate sector (non-financial + financial)[83]
K_{ct} = tangible (non-financial) assets of the corporate sector
A_{ct} = financial assets of the corporate sector
L_{ct}^{d} = financial (non-equity) liabilities of the corporate sector
L_{ct}^{e} = equity value of the corporate sector[84]
$Q = L_{ct}^{e} / NW_{ct}$ = ratio between corporate equity value and corporate net worth

We find that Tobin's Q ratio has been less than 100% throughout the 1970-2009 period: it was about 60% in the early 1970s, went as low as 30%-40% in the late 1970s-early 1980s, and stabilized around 70%-80% in the 1980s-1990s (see Table A14, col. (7)). As a consequence, if we compute net corporate wealth, defined as net worth minus equity value, which by definition should be equal to zero in case Tobin's Q was exactly equal to 100%, we find that net corporate wealth was positive throughout the 1970-2009 period. If we express net corporate wealth as a fraction of national wealth (defined above as the sum of private wealth and government wealth), we find that the value of net corporate wealth was the equivalent of about 20%-25% of national wealth throughout the 1970-2009 period (see Table A14, col.(8)).

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[83] In the same way as for income accounts (see above), and in order to simplify notations and tables, we include in the corporate sector both non-financial corporations and financial corporations. Separate series for non-financial and financial corporations are provided in the excel file. Note also that throughout this appendix we use unconsolidated balance sheets (i.e. financial assets and liabilities of the corporate sector include claims of French corporate entities on other French corporate entities). Consolidated balance sheets covering the 1978-2009 period were recently released by Banque de France, but are not reported here.

[84] L_{ct}^{e} is defined as the total value of "shares and other equities" financial liabilities of the corporate sector (AF5 in ESA 1995 classification codes), while L_{ct}^{d} is defined as the total value of debt-like financial liabilities, i.e. all non-equity financial liabilities (AF1+AF2+AF3+AF4+AF6+AF7 in ESA classification codes for financial assets and liabilities; see ESA 1995 manual). Note that in international balance sheets guidelines (ESA 1995), as well as in French private accounting practice, equity value is conventionally included in the financial liabilities of the corporate balance sheet.

In this research we certainly do not intend to solve the complex issue of Tobin's Q ratios and balance sheets measurement errors and statistical discrepancies. For our purposes the key question is the following: should we raise our national wealth and private wealth estimates by about 20%-25%? Or is our private wealth concept W_t (as defined above) the best available approximation that one should use in order to compute the economic inheritance flow? Of course there are lots of reasons why Tobin's Q ratios might differ from 100%: equity pricing is a notoriously complicated and uncertain business, and corporate net worth (book value) is often a poor guide to evaluate future profit prospects. Given that we care about the market value of wealth (inheritance is valued at the asset market prices of the day), we should not care too much as to whether Tobin's Q is momentarily above or below 100%. However it is a bit puzzling that Q ratios appear to be systematically below 100%, including during time periods which are generally viewed as stock market booms and equity overpricing. For instance, the Q ratio appears to be equal to 86% on January 1st 2000: this is more than in every other year, but this is still below 100%.[85]

The reason why we finally decided not to make any correction to our private wealth W_t series is the following. The most plausible explanations as to why Tobin's Q is systematically below 100% are corporate tangible assets overpricing on the one hand, and control rights valuation on the other hand; in both cases, this is not relevant for our purposes.

The corporate tangible assets overpricing story has been recently advocated by Wright (2004) using U.S. data.[86] Many tangible assets owned by corporations (e.g. the Paris headquarters of a large financial firm or the specific machinery and infrastructure used by

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[85] This is particularly puzzling if one considers the fact that many non-financial assets (typically intangible assets such trade marks, firm reputation, etc.) are not properly taken into account in the balance sheets of corporations. In principle the stock market should take these assets into account, which should push measured Tobin's Q ratios structurally above 100%. Note also that Q ratios seem to be approximately the same for publicly traded and non publicly traded firms (following ESA 1995 guidelines, the value of private equity in Insee-Banque de France balance sheets is estimated using observed valuations for quoted shares and Q ratios, controlling for industrial sector and company size, and including a discount for lower liquidity, based upon recent private equity transactions; this is of course imperfect, but we have no reason to believe that we can improve these estimates).

[86] Wright finds Tobin's Q ratios around 70%-80% for the US corporate sector in the 1990s, i.e. approximately the same levels as those we find for France. Wright uses balance sheets released by corporations (i.e. book accounts relying upon private accounting concepts and methods) rather than national accounts balance sheets, but to a large extent his arguments also apply to the latter. Note that one also finds U.S. Q ratios around 70%-80% in the 2000s if one uses the balance sheets released by the Federal Reserve (see e.g. *Flows of Funds Accounts of the United States*, Sept. 18 2008, p.95, table B102, line 38). For such computations it is important to use Federal Reserve balance sheets (which include all tangible assets, including land values, using concepts and methods that are broadly similar to the Insee-Banque de France balance sheets) rather than NIPA fixed assets tables (which exclude land values).

manufacturing or utilities company) are difficult to value: readily available market prices are often missing, so that national accounts statisticians (as well as private accountants) generally use a mixture of perpetual inventory methods and market valuation methods in order to put a market price on these assets. Wright argues that on average this might lead to systematic overvaluation of corporate tangible assets (and therefore of corporate net worth), e.g. because rates of capital depreciation on these assets are underestimated. If this is the explanation as to why Q ratios are below 100%, then we should definitely not correct upwards our national wealth and private wealth estimates.[87]

The control rights valuation story is the following. Estimates of aggregate equity value are based upon observed stock market prices, which typically reflect prices for small marginal transactions. In practice, one typically needs to pay a premium as large as 20%-25% in order to purchase sufficient stock to take the control of a corporation, e.g. in order to liquidate its book value. This could mechanically explain why Tobin's Q ratios might be structurally lower than 100%. More generally, the fact that equity values are lower than book values might reflect the fact that shareholders have imperfect control over corporations (and in particular over future profit streams): depending on the country and the specific time period and institutional set-up, other stake holders (such as wage earners or the broader public opinion) might have a say on how corporations should behave, shareholders might have various beliefs about future tax policies or expropriation threats, etc.[88] But whatever the exact story might be, we feel that it is justified for our purposes to use our market value based definition of private wealth W_t (inheritance is valued at prevailing market prices). For other purposes, e.g. if one wants to compute the fundamental economic value of personal wealth, one might prefer to re-attribute the corporate value that is not included in marginal stock market valuation to the ultimate

[87] Except if the national accounts statisticians overvaluation of corporate tangible assets also applies to personal tangible assets, in which case our private wealth estimates should actually be corrected downwards. It is likely however that the valuation problems for personal tangible assets (which currently consist mostly of real estate property) are less severe than for corporate assets. Also one additional reason explaining the overvaluation of corporate assets might be that private companies have an obvious incentive to make their book value look larger than their equity value (national accounts statisticians are in principle immune to corporate creative accounting, since they develop their own methods and concepts to estimate corporate balance sheets; but in practice they have little choice except relying – at least in part – on values reported in corporate book accounts). Clearly this problem does not apply to the personal sector (if anything, private individuals tend to under-report their assets in wealth surveys; but national accounts statisticians rely very little on wealth surveys anyway, at least in France).

[88] This kind of political threat argument can hardly explain why Tobin's Q ratios are lower than 100% in the 1990s-2000s. But it certainly contributes to explain the very low Q ratios observed in France in the late 1970s-early 1980s (when a socialist-communist alliance came to power with a large nationalization programme), and more generally the historically low levels of asset prices observed in the West during the Cold War period (and particularly in the immediate postwar period).

owners of corporations, and raise personal wealth accordingly (see e.g. Atkinson (1972)).[89]

We also report on Table A14 the value of net foreign assets W_{Ft}, defined as the difference between total foreign financial assets owned by French residents FA_t and and total French financial assets owned by foreign residents FL_t. The net foreign asset position of France appears to have been (slightly) positive during most of the 1970-2009 period, except in 1990-1994 and 2009, when it was (slightly) negative. Most importantly, it has always been extremely small. Expressed as fraction of national wealth, the value of net foreign assets has been in the -1% to +5% range throughout the 1970-2009 period (see Table A14, col. (14)).[90] Note however that gross asset positions appear to have risen enormously in recent decades (due to financial globalization): in the 1970s, gross capital foreign asset positions were around 30% of national income; in the 2000s, they were around 300% of national income (see Table A14, col. (9)-(13)). This is qualitatively and quantitatively consistent with the income account data reported on Table A5 above.

Tables A15a & A15b: composition of private wealth (1970-2009)

On Tables A15a-A15b, we report detailed series describing the changing composition of private wealth, using asset categories that can be compared to the categories available in bequest and gift tax returns. Values are expressed as a fraction of national income on Table A15a, and as a fraction of private wealth on Table A15b.

We find that the value of housing assets (residential real-estate tangible assets, net of mortgage debt) has increased significantly over the period, from about 30% of total private wealth in the 1970s to about 50% in the 2000s. The value of non-housing personal tangible assets, which mostly consist of business assets owned by the self-employed for conducting their unincorporated production activity (non-residential real estate, commercial

[89] According to Atkinson (1972, pp.6-7), such a correction can lead to upgrade aggregate U.K. personal wealth by as much as 25%. In the case of France, our best guess is that a substantial part of the upgrade (if any) should be attributed to the government sector rather than to the personal sector (it is likely that government equity participations in a number of public or quasi public unquoted corporate entities are undervalued). In any case, note that measurement errors of the order of 20%-25% of private wealth (at the very most) would not seriously affect our key results regarding long run patterns.

[90] Note that by definition the net foreign asset position is equal to total financial assets minus total financial liabilities of French resident sectors (personal, government and corporate sectors). I.e. $W_{Ft} = FA_t - FL_t = A_{pt} + A_{gt} + A_{ct} - L_{pt} - L_{gt} - L_{ct}$. E.g. on January 1st 2009 the negative foreign asset position equal to -5% of national income is equal to +135% (positive financial asset position of personal sector) – 50% (negative financial asset position of government) – 90% (negative financial asset position of corporate sector, including equity value in liabilities).

dwellings, structures, equipment, land, etc.), has declined enormously, from over 35% of private wealth in the 1970s to about 10% in the 2000s. This largely reflects the sharp decline of self employment in France during the past 40 years.[91] The share of financial assets in private wealth was about 35% in the 1970s and gradually rose over 50% by 2000, and went down to about 40% during the 2000s, due to the housing market boom (see Table A15b, col. (2), (5) and (6)).

The composition of financial assets has also changed in important ways since 1970. The share of equity assets has always been around one third of total financial assets (with public equity and mutual funds gradually taking over private equity), and the non-equity share has always been around two thirds.[92] This reflects the fact private individuals in France have limited direct stock market ownership. Within non-equity assets, one observes a very large rise of life-insurance assets, which made only 2% of private wealth in the 1970s, up to about 15% in the 2000s, i.e. about a third of total financial assets (see Table A15b, col. (7)-(12)).

The large development of life insurance in France has certainly been encouraged by its very favourable tax treatment. In particular, life insurance has always been (almost) entirely exempt from bequest and gift tax: the corresponding wealth can be transmitted tax free to children, surviving spouses and other beneficiaries. Note also that in France life insurance is often used as a long term, old-age saving vehicle, in the absence of explicit

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[91] The share of self-employment in total employment was as large as 25%-30% in France during the 1960s, and it is now less than 10% (see Piketty (2001, p.51, graph 1-4)). Note however the share of non-housing personal tangible assets in private wealth (as we measure it) is almost certainly an overestimate of the true share of the productive assets of the self-employed in private wealth. First, non-housing personal tangible include many assets (e.g. valuables, non-agricultural land, etc.) that have little to do with self-employed productive assets. We computed the value of housing tangible assets K_{pt}^h as the value of "residential dwellings" (AN1111 in ESA 1995 classification codes), plus an estimate of the corresponding land value (we allocated the value of "land underlying buildings and structures" AN2111 proportionally to AN1111 and to AN1112 "other buildings and structures"); non-housing tangible assets K_{pt}^n was then simply computed as a residual K_{pt} - K_{pt}^h (see excel file for raw data and formulas). So by construction K_{pt}^n includes all non-housing, non-self-employed assets. Also, we attributed total personal financial liabilities to housing assets, thereby assuming that household debt consists entirely of mortgage debt. This is an acceptable approximation for the 1990s-2000s, but in the 1970s it is likely that a larger fraction of personal debt should be attributed to the self-employed. As a consequence the series reported on Tables A15a-A15b probably underestimate the net value of housing assets and over-estimate the value of non-housing assets in the early 1970s. Finally, as was noted above, pre-1978 balance sheets are more rudimentary and less precise than post-1978 series.

[92] Equity assets are defined as "shares and other equities" (AF5 in ESA 1995 classification codes). Public equity and mutual funds are defined as the sum of "quoted shares" (AF511) and "mutual funds shares" (AF52); private equity is defined as the sum of "unquoted shares" (AF512) and "other equity" (AF513). Non-equity assets are defined as the sum of all other financial assets: "currency and deposits" (AF2), "securities other than shares" (AF3), "loans" (AF4), "insurance technical reserves" (AF6), and "other accounts" (AF7).

pension funds.[93] In principle, we should make a correction for the annuitized fraction of life-insurance assets, i.e. for the fact that a fraction of what is counted as life-insurance assets cannot be bequeathed at death. However this annuitized fraction is difficult to estimate, and in any case appears to be relatively small (at most 20%).[94] Life-insurance assets currently represent about 15% of aggregate private wealth W_t, so this implies that the non-bequeathable fraction of aggregate private wealth W_t is at most 3%. In addition, note that we did not attempt to make corrections for the fact that a number of bequeathable assets are not included in our private wealth W_t estimates. In particular, consumer durables (such as cars or furnitures), which usually represent less than 5% of total wealth,[95] are excluded from the Insee-Banque de France balance sheets,[96] and therefore are also excluded from our private wealth W_t, in spite of the fact that durables are in principle subject to the estate tax. Because these two corrections terms (annuitized fraction of life insurance assets, consumer durables) are small, hard to estimate with precision, and tend to compensate one another, we feel that it is more reasonable not to make any explicit correction at this stage, and to leave these issues for future research.[97]

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[93] According to ESA 1995 classification, “insurance technical reserves” (AF6) can be broken down into the value of “life insurance reserves” (AF611) and the value of “pension funds reserves” (AF612). However in the French balance sheets compiled by Insee-Banque de France, “pension funds reserves” are equal to zero by construction, i.e. ‘insurance technical reserves” are entirely allocated to “life insurance reserves”. We took the full value of “insurance technical reserves” (AF6) as our estimate of life insurance assets (col. (11) of Tables A15a-A15b), with no correction.

[94] Unfortunately, the data published by insurance companies (FFSA) appears to be insufficient to compute a precise estimate of the annuitized fraction of life-insurance assets. One could think of using published payment flows to beneficiaries at the death of policy-holders. These annual flows currently appear to be relatively small, typically less than 1% of total life insurance reserves (around 5-10 billions euros, out of over 1200 billions euros in life insurance reserves; see *Rapport annuel FFSA 2008*, pp.31-33), i.e. slightly less than the aggregate mortality rate m_t, and substantially less than the aggregate inheritance-wealth ratio $B_t/W_t = \mu_t^* m_t$ (see Table A3 above). However it is unclear how exactly insurance companies compute these payment flows to non-policy-holders beneficiaries: they apparently include only the payments corresponding to the explicit death insurance clause stipulated in life insurance contracts (i.e. the lump sum payment to beneficiaries conditional upon the death of the policy-holder). Most life insurance contracts in France are merely temporary term savings contracts (typically 8-year-long), with a small explicit death insurance dimension, so that most payment flows mechanically return to policy-holders themselves, and possibly to their heirs in case they die (but these payments to heirs then do not seem to be counted as “death insurance” payments). Also note that we do not know from available data which fraction of the payment flows going to policy holders is used to repurchase new life insurance contracts and which fraction is used to purchase other assets, which may end up being transmitted to heirs (life insurance assets in France carry tax advantages not only at the time of wealth transmission, but also during accumulation: for the most part flow returns are being re-capitalized net of income tax).

[95] According to wealth surveys and to estate tax returns.

[96] This is because consumer durables do not generate flow returns in income accounts, and therefore are not treated as investment goods.

[97] Note that in their computation of bequeathable aggregate wealth using Federal Reserve balance sheets, Kopczuk and Saez (2004, NBER WP version, pp.44-47) keep the full value of life insurance reserves (as we do here), i.e. they assume that 100% of the value of life insurance reserves is bequeathable; but they keep only the cash surrender value (CSV) of pension funds reserves (i.e. the value of pensions that remains upon death), ranging from 5% of pension funds reserves for traditional defined benefits pension schemes to 100% for recent defined contributions pension schemes. Social security pensions cannot be transmitted to heirs and are naturally excluded from bequeathable wealth, both by Kopczuk-Saez and in the present research.

We also report on Table A15b estimated fractions of assets that are subject the bequest and gift tax. These estimates are used in Appendix B1 in order to upgrade the fiscal inheritance flow series; they were computed on the basis of estate tax law and of asset composition observed in estate tax returns.[98]

Table A16: Raw national wealth estimates in France (1820-2008)

On Table A16 we report the various non-official, pre-1970 national and private wealth estimates that we used in this research (for comparison purposes we also report official estimates for 1978, 1990 and 2008). Pre-1970 national and private wealth estimates are more rudimentary and offer fewer (and less homogeneous) break downs than post-1970 Insee-Banque de France balance sheets, so we only report the decomposition between private and government wealth, as well as estimates of the share of foreign assets in private wealth.

As we explain the working paper (see section 3.2), national and private wealth estimates for the 1820-1913 are plentiful and relatively reliable. The national and private wealth concepts used by the economists of the time are broadly similar to the concepts of W_{nt} and W_t that we defined using modern, post-1970 official balance sheets. In particular, 19th century and early 20th century economists defined aggregate private wealth ("fortune privée") as the market value of all tangible and financial assets owned by private individuals, minus their financial liabilities. They relied mostly upon the decennial censuses of tangible assets organized by the tax administration (the tax system of the time relied extensively on the property values of real estate, land and business assets, so such censuses played a critical role). They took into account the growing stock and bond market capitalisation and the booming foreign assets, and they usually explained in a precise and careful way how they made all the necessary corrections in order to avoid all forms double counting. The most sophisticated estimates, e.g. those of Colson (1903), compare explicitly the equity value of corporations obtained from stock market capitalization (deducting cross holdings), to the book value of corporations obtained by summing up the value of tangible assets (minus debt), and find similar results using both methods (i.e. they find that Tobin's Q ratios were close to 100% on average). The most important point to be careful about is the following: one should use only the national wealth estimates that were

[98] See Appendix B1.

explicitly based upon wealth-census-type methods, and ignore estimates based upon estate-multiplier-type computations.[99] All estimates reported on Table A16 are based upon wealth-censuses methods.

For 1913, we take the reference estimate due to Colson, with aggregate private wealth of 297 billions old francs, including an estimated 41 billions in foreign assets.[100] For 1896, there are variations across authors within the 190-230 billions range, and we take an average estimate of 205 billions.[101] For earlier decades (1820-1829, …, 1880-1889), the confidence interval between the various authors is usually less than 10%, and we report on Table A16 the average estimates of private wealth available in the literature, from about 62 billions old francs in the 1820s to about 195 billions old francs in the 1880s.[102] The published estimates usually include separate computations for government wealth (government tangible and financial assets, minus government debt), showing that government wealth was a positive but small fraction of national wealth throughout the 1820-1913 period: between 2% and 5%, i.e. private wealth always represents 95%-98% of national wealth (see Table A16, col. (8)-(9))).[103] All estimates also show a large and gradual rise of foreign assets, from about 2%-3% of aggregate private wealth in the 1820s-1840s to about 10% in the 1860s-1870s and almost 15% in 1900-1913 (see Table A16, col.(3)).[104]

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[99] It would indeed make no sense at all to use estate-multiplier-based national wealth estimates in order to compute the inheritance flow. Nineteenth century economists were so confident in the W/B=H estate multiplier formula (see working paper, section 2.4) that they often mixed up both methods. For instance, following Foville (1893), Colson (1903, vol.2, pp.282-283) presents a census-based estimate of national wealth for 1898, then notes that it is roughly equal to 30-35 times the inheritance flow, and a few pages later presents national wealth estimates for the 1820s, 1840s, 1860s, 1880s and 1890s based on the estate multiplier method, i.e. by multiplying by 30-35 the inheritance flow. We did not use such estimates.

[100] See Colson (1918, livre 2, p.372). See also Divisia, Dupin and Roy (1956, vol.3, p.69), who start their 1954 computations from this 1913 Colson estimate.

[101] E.g. Colson provides an estimate of 230 billions for 1898 (see Colson (1903, vol.2, pp.282-283), while Leroy-Beaulieu provides an estimate of 195 billions for 1900 (see Danysz (1934, p.141)).

[102] For a compilation of various national wealth estimates from 1800 to 1913, see e.g. Fovile (1893, pp.604-605), Danysz (1934,p.141); "Quelques données statistiques sur l'imposition en France des fortunes privées", unsigned article, *Bulletin Mensuel de Statistique*, Insee, 1958, p.34; and Lévy-Leboyer (1977, p.396).

[103] The estimates for government assets and debt reported on Table A16 for the 1820-1880 should be viewed as approximate and illustrative (the corresponding raw estimates are less sophisticated than the Colson-type estimates computed around 1890-1913).

[104] The other asset categories used in these estimates are not sufficiently homogenous through time to produce detailed composition series. Around 1900-1913, the total value of real estate and land was typically about 45%-50% of aggregate private wealth in most estimates (roughly 20%-25% for real estate, and 25% for land); around 1800-1820, the total value of real estate and land was as large as 65%-75% of aggregate private wealth in most estimates (roughly 20%-25% for real estate, and as much as 45%-50% for land). This appears to be consistent with the decline of the agricultural sector and the rise of the manufacturing and services sector. It is difficult to go much beyond this at this stage, because the frontiers between cultivated land, rural and urban real-estate properties and non-land, non-real-estate tangible business assets are not fully homogenous over time in the raw data coming from the tax administration decennial censuses of

The 1914-1969 period is the most problematic one from the viewpoint of national and private wealth estimates in France. This was a chaotic time for wealth (war destructions, large inflation, wide variations in real estate and stock prices, not to mention the fact that large segments of banking and manufacturing sector were nationalized in 1945). This certainly discouraged the economists of the time from pursuing the private wealth computations that were so popular until 1913. We used only two estimates of private and national wealth over the 1914-1969 period. Both are based upon methods and concepts that are broadly similar to the 1820-1913 and 1970-2009 estimates: one for year 1925 due to Colson (1927), and one for year 1954 due to Divisia, Dupin and Roy (1956). Both are reported on Table A16.

The advantage of the 1925 estimate that it was constructed by Colson using the same methods and concepts as his estimates for years 1898 and 1913. One central difficulty with this period is that asset prices declined significantly relatively to consumer prices between 1913 and 1925, with large movements in the relative prices of various assets.[105] Colson carefully explains how he computed the market value of 1925 private wealth W_t using the asset prices prevailing in 1925 for the various assets, which is what we want.[106] Colson uses the same method to estimate the net market value of government wealth W_{gt}, which for the only time in our long run series appears to be negative in 1925: the French government accumulated so much public debt during the World War 1 and the early 1920s that by 1925 the value of government debt significantly exceeded the value of government tangible and financial assets (see Table A16, col. (4)-(6)). According to these computations, private wealth W_t according to these computations was equal to 293% of national income, but national wealth $W_{nt}= W_t+W_{gt}$ was equal to 241% of national income (see Table A16, col. (10)-(14)). This 1925 Colson estimate could possibly be improved by returning to the raw statistical material of the time.[107] But at this stage one can consider

property values (and consequently in the national and private wealth estimates constructed by the economists of the time).

105 See the raw price index series reported on Tables A20-A22 below.

106 See Colson (1927, pp.484-486). Colson then converted his 1925 private wealth estimates expressed in 1925 asset prices (1060 billions francs) into an estimate expressed in 1913 prices using consumer price inflation between 1913 and 1925 (he assumes consumer prices were multiplied by 4.0 between 1913 and 1925, which is very close to the 4.1 ratio we obtain with our CPI series, see Table A20, col.(1)), and found that 1925 private wealth was equal to 265 billions 1913 francs, i.e. about 10% less than his 1913 estimate. The subsequent literature usually refers to this 265 billions number (see e.g. Danysz 1934 p.141 and *BMS* 1958 p. 34), but it is important to realize that it was computed by Colson using 1925 relative asset prices, not 1913 relative asset prices.

107 We made two important downward corrections to the Colson raw estimate. Fist, for the sake of consistency with modern estimates, we took durable goods and furnitures (20 billions out of the 265 billions

that this is relatively reliable and well documented estimate – and in any case by far the best available estimate for the interwar period.

Similarly, the advantage of the 1954 estimate is that Divisia-Dupin-Roy use the same methods and concepts as Colson, and make a systematic comparison with the 1913 Colston estimates for the different types of assets. Also, Divisia-Dupin-Roy are very careful at distinguishing between market values and book values (including for unincorporated businesses). The estimate that we report on Table A16 for private wealth W_t corresponds to their market value of private wealth (i.e. evaluated at the asset prices prevailing in 1954).[108] They also provide interesting estimates of government wealth W_{gt}, which unlike in 1925 was significantly positive in 1954: this comes from the fact that public debt vanished in the immediate postwar period (due to inflation), while at the same time government tangible and financial assets rose substantially (due to 1945 nationalisation policy). In effect, the government was the owner of substantial segments of the French corporate sector in the 1950s. According to the Divisia-Dupin-Roy estimates, the share of government wealth W_{gt} in national wealth $W_{nt}=W_t+W_{gt}$ was as large as 32% in 1954, while the share of private wealth W_t was only 68% (see Table A16, col. (8)-(9)).[109] It took several decades for government debt to build up again (and also for corporate privatizations to occur) and finally for the government share in national wealth to return to about 5% in the 1990s-2000s, i.e. about the same level as during the 1820-1913 period (see Figure A14).

We also borrowed to Divisia et al (1956) their estimates of physical capital destructions during both world wars. After a careful review of the various existing computations on wartime physical destructions (real estate, structures, equipment, machinery, etc.), Divisia-Dupin-Roy come with the conclusion that total capital destructions represented the equivalent of about 11% of 1913 aggregate private wealth W_t during World War 1, and the

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total). Next, although Colson does attempt to use current equity value for publicly traded corporations, it is apparent that he did not make the corresponding correction for private equity and unincorporated businesses: in effect he uses the book value of tangible assets for non-public traded firms, which is problematic at a time when Tobin's Q ratios were probably substantially below 100%. In order to take this into account, we applied a 30% downward correction to the corresponding values (see excel file for formulas).

[108] See Divisia, Dupin and Roy (1956, vol.3, and particularly pp.65-67). More precisely, we used their market value ("valeur vénale") of private wealth of 32 000 billions old francs, minus durable goods and furnitures (6 400 billions), plus net foreign assets (500 billions), plus government debt (4 500 billions), so that W_t = 30 600 billions old francs (i.e. 47 billions euros). See formulas in the excel file.

[109] More precisely, we used the Divisia-Dupin-Roy estimate of 24 600 billions old francs of government tangible and financial assets; unfortunately this is a book value estimate ("valeur d'inventaire"; see Divisia et al (1956, p.47)); we converted into a market value by assuming the same market-to-book-value ratio as for private wealth, i.e. we multiplied 24600 by 32000/42300 (this is the "valeur vénale"-"valeur d'inventaire" ratio found by Divisia-Dupin-Roy for private wealth). See formulas in the excel file.

equivalent of about 22% of 1913 aggregate private wealth W_t during World War 2.[110] We also added to these physical destruction numbers available estimates for foreign assets losses during World War 1 (typically, Russian bonds repudiation), which to some extent can be assimilated capital destruction. Total foreign assets losses during World War 1 appear to be as large as physical capital destructions strictly speaking: the equivalent of about 12% of 1913 aggregate private wealth.[111] Overall, total private wealth destructions (including foreign assets losses) amount to about 23% of 1913 aggregate private wealth W_t during World War 1, and about 22% during World War 2. We use these estimates when we compute the private wealth accumulation equation below.[112]

How reliable are our aggregate private wealth estimates for the chaotic 1914-1969 period? With our data we find that private wealth W_t was 660% of national income Y_t in 1913, 293% in 1925, 203% in 1954, and 289% in 1970 (see Table A16, col. (10)). We certainly do not pretend that the 1925 and 1954 numbers are perfectly comparable to the pre-1913 and the post-1970 numbers: the quantitative precision of such ratios should not be over-

[110] Expressed in 1913 old francs, total destructions are estimated to 34 billions in 1914-1918 and 61 billions in 1939-1945 (see Divisia et al (1956, pp.62-63)). Physical fights were shorter during World War 2 (there was no fighting in 1941-1943) than during World War 1, but the bombing technology used in 1940 and 1944-1945 was much more devastating than that used during World War 1. Note that these Divisia-Dupin-Roy estimates of total physical destructions during wars (about 10% of aggregate wealth during World War 1 and about 20% during World War 2) are much more plausible than the Cornut-Sauvy estimates, according to which as much as one third of the capital stock was destroyed during World War 1, and as much as two thirds during World War 2. We (carelessly) reported these Cornut-Sauvy estimates in our previous work (see Piketty (2001, p.137; 2003, p.1020)). These estimates are dubious, because they are entirely based on estate-multiplied methods, rather than on census-based national wealth estimates, and should therefore be ignored. Cornut (1963, p.399) computed national wealth estimates for 1908, 1934, 1949 and 1954 by multiplying observed fiscal inheritance flows by a sequence of somewhat arbitrary estate multiplier coefficients (Cornut realized that the estate multiplier coefficient should be upgraded over time, but was uncertain as to how this should be done; in the end he picked upgraded coefficients pretty much on a ad hoc basis, or at least with no clear written justification); Sauvy (1984, p.323) then divided these Cornut national wealth estimates by national income estimates, and found wealth-income ratios of 570% for 1908, 350% for 1934, 120% in 1949 and 140% in 1953; from which he concluded that the war-induced wealth destruction rate was about one third during World War 1 and two thirds during World War 2. Our new, consistent series show that Sauvy probably underestimates wealth-income ratios in 1908 and 1949-1953 (and overestimates the 1935 ratio). Most importantly, our new series show that wartime physical destructions explain a much smaller fraction of the overall decline in wealth-income ratios than what was implicitly assumed by Sauvy, and that asset price changes played a bigger role. See below.

[111] Total foreign assets losses during World War 1 are estimated to as much as 90% of the 1913 foreign asset portfolio, i.e. about 37 billions francs (see Divisia et al (1956, pp.62-63)). Note that this includes not only foreign asset repudiation (exemplified by the pure case of Russian bonds), but also the loss in foreign asset values due to inflation and stock market collapse. The exact decomposition between wealth destruction via repudiation and wealth destruction via inflation is dfficult to compute, and inrrelevant for our puposes, so we simply add up all foreign asset losses to wartime physical destructions. National income and national wealth data consistently show that foreign assets never recovered from the Wolrd War 1 shock and remained relatively low in the interwar and at the eve of World War 2 (see Tables A5 and A16), so we neglect foreign asset losses during Wolrd War 2.

[112] In order to annualize the destruction estimates we assumed that these private wealth destructions could be splitted equally (in real terms, as measured by 1913 consumer prices) over the four years 1915-1918 and over the six years 1940-1945. See the excel file for the resulting raw series (Table A0).

estimated, especially in times of economic crises. However, there are several reasons to believe that these numbers provide a relatively accurate quantitative picture of changes in the wealth-income ratio (at least as a first approximation). First and foremost, as we show below, this 1913-1925-1954-1970 profile of the wealth-income ratio is broadly consistent with the aggregate accumulation equation for private wealth, i.e. with the savings rates coming from national income accounts and the (imperfect) asset price indexes at our disposal (see section A5 below). Next, our 1954 private wealth total is consistent with a number of independent computations that were made in France in the 1960s-1970s, at the time when Insee was starting to construct official balance sheets.[113] Finally, it is reinsuring to see that economic inheritance flows that we obtain from our national wealth estimates are consistent with the fiscal inheritance flows, including during the 1914-1969 period. Note however that the gap between our fiscal and economic inheritance flow series is significantly larger in the 1920s-1930s and 1950s-1960s than in the pre-World War 1 and post-1970 period.[114] If anything, this suggests that our wealth-income W_t/Y_t for 1925 (293%) and 1954 (203%) are over-estimated, i.e. that aggregate private wealth was even lower than what the Colson-Divisia-Dupin-Roy computations indicate. In order to obtain the same economic flow-fiscal flow ratios as for the other periods, one would need to assume that the aggregate wealth-ration W_t/Y_t was as low as 210%-230% in 1925 (instead of 293%), and as low as 150%-170% in 1954 (instead of 203%).[115] Given the very large asset price movements of the time, and the data imperfections we face, this is certainly a possibility that cannot be excluded. However it is likely that the higher economic-fiscal flow ratios also reflect higher estate tax evasion during this period, and/or higher unmeasured

[113] In particular, it is reinsuring to note that our final estimate for 1954 private wealth (30 600 billions old francs) turns out to be almost identical to the private wealth estimate given by Masson and Strauss-Kahn (1978, p.38), who find 30 700 billions old francs for 1954. Note however that the fact that both estimates turn out to be so close is largely a coincidence, since Masson and Strauss-Kahn use a completely different method: they start from a 1975 estimate of national wealth and work it backwards through savings until 1949; given that they do not take into account capital gains, they should find a smaller number than ours for 1954; the explanation seems to be that on the other hand they underestimate savings with their pre-B2000 national accounts. See also Masson (1986), and Babeau (1983), who uses a similar method. To our knowledge these Masson-Strauss-Kahn-Babeau papers are the only attempt to construct private wealth estimates in France for 1950s-1960s, i.e. prior to the introduction of official Insee balance sheets in 1970. The only other attempt (based on direct evaluation method close to national wealth accounts) seems to be due to Campion (1971), who gives estimates of total private wealth for 1962 (967 billions francs), 1965 (1242 billions francs) and 1967 (1465 billions francs), which are very close to our estimates (slightly bigger).

[114] The B_t/B_t^f ratio is generally about 110% both in 1820-1910 and 1980-2010, but is as large as 130%-150% between the 1920s and the 1970s. See Table A4, col. (9). Note also that the B_t/B_t^f ratio reaches 125% in the 1850s: it could be because our private wealth estimate for the 1850s is 10%-15% too high (as compared to other 19th century estimates), and/or because we under-estimate legal estate tax exemptions in this period, and/or because we over-estimate the μ_t coefficient (see Appendix B).

[115] The Cornut-Sauvy wealth-income ratios are as low as 120%-140% in 1949-1953, but this of course is tautological and uninformative, since they were computed by applying estate multiplier coefficients to the fiscal inheritance flow (see above).

legal estate tax exemptions.[116] So these alternative wealth-income ratios for 1925 and 1954 should probably be viewed as absolute lower bounds, and our Colson-Divisia-Dupin-Roy-based ratios should be viewed as more realistic and consistent. Available data does not allow us to push this analysis much further. Given that this (limited) residual uncertainty has little consequence for our overall long run empirical and theoretical analysis, we leave this issue for future work.

A.5. Computation of the private wealth accumulation equation (Tables A17-A19)

On Tables A17-A19 we report the series resulting from the computation of the private wealth accumulation equation. We need to estimate such an accumulation equation in order to overcome the incompleteness of historical national wealth accounts and to obtain annual series for private wealth W_t (especially regarding the data-poor 1914-1969 period). More generally, estimating such an accumulation equation in the long run offers an opportunity to assess the internal consistency between national income and wealth accounts, and also to test standard capital accumulation models. Here we describe how Tables A17-A19 were constructed. We start by describing the basic accumulation equations, and then explain how they were applied to the 1896-2008 period (annual series) and to the 1820-1913 period (decennial averages).

A.5.1. Capital accumulation equation with no price inflation

In a world with no price inflation, the relationship between private wealth at the beginning of year t (W_t), private savings during year t (S_t) and private wealth at the beginning of year t+1 (i.e. end of year t) (W_{t+1}) would be straightforward:

$$W_{t+1} = W_t + S_t \qquad \text{(A.28)}$$

[116] In principle estate tax law always required taxpayers to report market value of assets (at the time of death or gift). In practice, however, it is possible that the tax administration allowed taxpayers to report lower values during times of large inflation, which were numerous during the 1920-1970 period. It is very difficult to estimate the magnitude of this effect, but it can be large. Also, many temporary, asset-specific estate tax exemption regimes were created in the aftermath of both world wars (e.g. for specific public bonds or savings accounts, or for new real estate constructions), and some of them applied for several decades. We attempt to take these into account, but it is possible that we underestimate the fraction of tax exempt assets during this period. The fact that the B_t/B_t^f ratio appears to be almost as large in the 1970s (when we use official Insee-Banque de France balance sheets) than in the 1920s-1930s and 1950s-1960s (when we rely on Colson-Divisia-Dupin-Roy estimates) suggests that the under-evaluation of the fiscal flow (due to tax evasion and exemption, broadly understood) plays a larger role than the over-evaluation of national wealth in Colson-Divisia-Dupin-Roy estimates (unless the official balance sheets of the 1970s are also over-evaluated).

Dividing both terms by national income Y_{t+1}, and re-arranging the terms, one gets the following equation:

$$\beta_{t+1} = W_{t+1}/Y_{t+1} = [\beta_t + s_t]/[1+g_{t+1}]$$

I.e.: $$\boldsymbol{\beta_{t+1} = \beta_t\ [1+s_t/\beta_t]/[1+g_{t+1}]} \qquad \textbf{(A.29)}$$

With: $\beta_t = W_t/Y_t$ = (private wealth)/(national income) ratio
$s_t = S_t/Y_t$ = savings rate (private savings as a fraction of national income)
$1+g_{t+1} = Y_{t+1}/Y_t$ = growth rate of national income between t and t+1

Intuitively, equation (A.29) says that the wealth-income ratio $\beta_{t+1}>\beta_t$ iff $s_t/\beta_t > g_{t+1}$ (i.e. if $\beta_t < s_t/g_{t+1}$). Note that $s_t/\beta_t = S_t/W_t$ is simply equal to private savings as a fraction of private wealth, which can be labelled "savings-induced wealth growth rate". E.g. if s_t=10% and β_t =500%, then s_t/β_t = 2%: private savings during year t represent 2% of wealth at the beginning of year t, and therefore allow wealth to grow at 2% per year between t and t+1. Intuitively, he wealth-income ratio rises if and only the savings-induce wealth growth rate exceeds the growth rate of national income. In case s_t and g_t are stationary (i.e. s_t=s g_t=g), then β_t converges toward a steady-state value β^* = s/g. E.g. if s=10% and g=2%, then β^* = 500%. This is simply the standard Harrod-Domar formula (see working paper, section 5).

In order to clarify this interplay between income growth and wealth growth, it is useful to note $g_{t+1}{}^{s}$ the savings-induced wealth growth rate between t and t+1, and to rewrite equation (A.29) in the following manner:

$$\boldsymbol{\beta_{t+1} = \beta_t\ [1+g_{wst+1}]/[1+g_{t+1}]} \qquad \textbf{(A.30)}$$

With: $g_{wst+1} = s_t/\beta_t = S_t/W_t$ = savings-induced growth rate of private wealth

A.5.2. Capital accumulation equations with capital gains

Taking price inflation into account complicates the capital accumulation equation. We note P_t the consumer price index (average consumer prices during year t), and Q_t the asset price index (asset prices at the beginning of year t). In practice, we observe nominal national income Y_t (measured at current market prices for consumer goods and investment goods), nominal private wealth W_t (measured at current market prices for assets) and nominal wealth/income ratios $\beta_t=W_t/Y_t$. The year-to-year variations of β_t generally reflect both relative volume effects (as determined by savings S_t) and relative price effects (as determine by the evolution by the relative asset vs goods price index Q_t/P_t). We do have (reasonably) good series on consumer price indexes P_t, which allow us to compute consumer price inflation p_t and real growth rate of national income g_t:

$1+p_t = P_t/P_{t-1}$ = consumer price inflation

$1+g_t = (Y_t/P_t)/(Y_{t-1}/P_{t-1}) = (Y_t/Y_{t-1})/(1+p_t)$ = real growth rate of national income

However, we usually do not have good measures of the asset price index Q_t: we do have all sorts of price series for various assets (real estate prices, stock prices, etc.), but it is very difficult to weight them properly, especially given the very large variations in asset price inflation over different types of assets (more on this below). If we know the evolution of W_t, then we can define an implicit asset price index Q_t directly from the wealth accumulation equation:

$$W_{t+1} = (Q_{t+1}/Q_t)\ (W_t + S_t)$$

$$\text{I.e.}\quad W_{t+1} = (1+q_{t+1})\ (1+p_{t+1})\ (W_t + S_t)$$

Dividing both terms of the equation by Y_{t+1}, and re-arranging the terms, one gets the following equation:

$\beta_{t+1} = [1+q_{t+1}]\ [\beta_t+s_t] / [1+g_{t+1}]$

I.e. :

$$\boldsymbol{\beta_{t+1} = [1+q_{t+1}]\ \ \beta_t\ [1+s_t/\beta_t]/[1+g_{t+1}]} \qquad \textbf{(A.31)}$$

With:

$1+q_{t+1} = (Q_{t+1}/P_{t+1})/(Q_t/P_t)$ = asset price inflation relatively to consumer price inflation[117]

[117] Note that P_{t+1}/P_t measures inflation between average consumer prices during year t and average consumer prices during year t+1, while Q_{t+1}/Q_t measures inflation between asset prices on January 1st of year t and January 1st of year t+1. Given our long run focus, this six-month time inconsistency does not really matter (one solution would be to re-compute national wealth accounts in average year prices, but that did not seem worth while).

In case asset prices increase (or decrease) just as much as consumer prices, then q_t=0%, and equation (A.31) boils down to equation (A.29): capital accumulation involves pure volume effects, as determined by savings. However, in case wealth holders experience real capital gains (q_t>0), then equation (A.31) says that the wealth-income ratio can increase even though there is little savings (i.e. even though $s_t/\beta_t < g_{t+1}$, providing that real capital gains are strong enough), and conversely in case of real capital losses (q_t>0).[118] Alternatively, one could view real unrealized capital gains or losses as capital income that is being saved at a 100% rate. I.e. if we note $Y_{Kqt} = q_{t+1}\ (W_t+S_t)$ the real unrealized capital gains (or losses) made during year t, and if we define a corrected saving rate $s_t^* = (s_tY_t+Y_{Kqt})/Y_t$, i.e. $s_t^* = s_t + q_{t+1}\ (\beta_t+s_t)$, then equation (A.31) can simply be rewritten as follows: $\beta_{t+1} = \beta_t\ [1+s_t^*/\beta_t]/[1+g_{t+1}]$.

In order to clarify this interplay between income growth and wealth growth, it is again useful to rewrite equation (A.31) in the following manner:

$$\boldsymbol{\beta_{t+1} = \beta_t\ [1+g_{wt+1}]/[1+g_{t+1}]} \qquad \textbf{(A.32)}$$

Where $g_{wt+1} = (W_{t+1}/P_{t+1})/(W_t/P_t) = (W_{t+1}/W_t)/(1+p_{t+1})$ is the real (relative to CPI) total growth rate of private wealth between t and t+1, which by construction can be decomposed into two terms, a savings effect and a capital gain effect:

$$\mathbf{1+g_{wt+1} = (1+q_{t+1})\ \ (1+g_{ws+1})} \qquad \textbf{(A.33)}$$

With:

[118] Note that in writing equation (A.31) above, we assumed implicitly that savings S_t are used to purchase assets at the beginning of year t (i.e. at Q_t prices). Taken literally, this assumption does not make much sense, given that production and savings are supposed to take place throughout year t. Again, the consistent way to deal with this would be to re-compute mid-year national wealth estimates, but this did not seem worth while given our long run focus (in order to analyze short term fluctuations, one would need to be more careful about this). One advantage of our modelling is that savings and capital gains enter multiplicatively (rather than additively) into the wealth growth equation (see equation (A.33) below), which facilitates growth decomposition. Had we assumed that savings S_t were used to purchase assets at the end of year t (i.e. at Q_{t+1} prices), then the accumulation equation would have been: $W_{t+1} = (Q_{t+1}/Q_t)W_t + S_t$. That is, equation (A.31) would become: $\beta_{t+1} = \beta_t\ [1+q_{t+1}+s_t/\beta_t]/[1+g_{t+1}]$. Equation (A.33) would then be: $1+g_{wt+1} = (1+q_{t+1}+g_{wst+1})$, rather than$1+g_{wt+1} = (1+q_{t+1})\ (1+g_{ws+1})$. I.e. the equation for total wealth growth would become additive rather than multiplicative. In practice, given that these annual growth rates are usually very small (g_{wst+1} is typically 1%-2% per year), opting for the multiplicative or additive formulation makes virtually no difference (i.e. capital gains on current-year savings are negligible as compared to both aggregate capital gains and aggregate savings).

g_{wt+1} = total real growth rate of private wealth between t and t+1

q_{t+1} = capital-gain-induced growth rate of private wealth

$g_{wst+1} = s_t/\beta_t = S_t/W_t$ = savings-induced growth rate of private wealth

A.5.3. Applying the equations to France 1896-2009

We can now apply these equations to French series. On Table A17 we report the findings using two alternative methods. In method n°1, we use total private savings (personal savings plus corporate retained earnings) in order to compute the accumulation equation. In method n°2, we use personal savings alone. For reasons explained above (see section A3), we prefer method n°1, which is conceptually more consistent. The corresponding savings rate used on Table A17 (col. (5) & (11)) are borrowed from Table A10, col.(7)-(8). National income Y_t, expressed in 2009 euros using the CPI deflator, reported on Table A17 (col.(1)) is taken from Table A1, col.(1).

Regarding the 1970-2009 period, we observe the true annual series for the wealth-income ratio β_t, thanks to the Insee-Banque de France private wealth series, so we do not need to estimate annual β_t series. We can instead use the above equations in order to compute the implicit real rate of capital gains q_t on an annual basis:[119]

$$\mathbf{1+q_t = \beta_t[1+g_t] / \beta_{t-1}[1+s_{t-1}/\beta_{t-1}] = (1+g_{wt})/(1+g_{wst}) \qquad (A.34)}$$

For years 1971-2009, the q_t series reported on col. (7) and (13) of Table A17 were obtained by applying mechanically equation (A.34).[120] Unsurprisingly, the real rate of capital gains displays very large year-to-year variations, and capital gains effects often largely dominate savings effects for any given year. For instance the real rate of capital gains was strongly positive during the asset price boom of the mid-2000s (e.g. q_t=+10.0% in 2005), and strongly negative the asset price collapse of the late 2000s (e.g. q_t= -5.3% in 2009).[121] However the important point is that these large year-to-year asset price variations tend to compensate each other if one looks at longer time periods. If we

[119] Note that the detailed balance sheets released by Insee-Banque de France (and available on-line) actually include for each asset category (using ESA 1995 classification codes) the yearly decomposition of asset variation into a saving flow effect and a valuation effect (i.e. an asset specific capital gain). By construction our aggregate real rate of capital gains q_t is simply the average Insee-Banque de France valuation effect (weighted over all asset categories), minus CPI inflation.

[120] All formulas used to estimate the wealth accumulation equation are available in the excel file.

[121] On Table A17 we assumed that the same real rate of capital loss prevailed for t=2010 (i.e. between January 1st 2009 and January 1st 2010) as for t=2009 (i.e. between January 1st 2008 and January 1st 2009).

compute the average over the 1970-2009, we find that the average rate of capital gains q_t=+0.6%, while the average rate of savings-induced real wealth growth was g_{wst}=+3.2%, thereby generating a total real wealth growth g_{wt}=+3.8% (see Table A17, line 1970-2009). That is, over the entire 1970-2009 period, savings explain 85% of total wealth growth, while capital gains explain only 15%. When we do the same computations using personal savings (method n°2), then the average rate of capital gains rises to q_t=+0.9%, while the average rate of savings-induced real wealth growth was g_{wst}=+2.9%. That is, the savings share in total wealth accumulation declines to 76%, while the capital gains share rises to 24% (see Table A17, line 1970-2009). This can be interpreted as saying that about one third of total capital gains over the 1970-2009 can be accounted for by corporate retained earnings (through additional investment and increased shareholder value).[122]

For the pre-1970 period, we observe the wealth-income ratio β_t only for a few isolated years (1896, 1913, 1925, 1954, 1970), and we want to use the equations above to construct annual series passing through these observations. We proceeded as follows. We first consider the 1954-1970 sub-period. We start from our estimated wealth-income ratio β_t=203% for 1954, and we compute the constant rate of capital gains q_t over the 1955-1970 period which generates the observed wealth-income ratio β_t=289% for 1970, given observed growth rates and savings rates over the 1955-1970 period and dynamic equations (A.32) and (A.33). We find that in order to reproduce the observed 1954-1970 pattern of wealth-income ratios we need to assume constant capital gains q_t=+2.4%. Given that the savings-induced wealth growth rate over this period was g_{wst}=+5.5%, this means that savings explain 69% of aggregate wealth accumulation between 1954 and 1970, while capital gains explain 31%. In case we use personal savings (method n°2), we find a savings share of 55%, and a capital gains share of 45% (see Table A17, line 1954-1970). Retained earnings again seem to account for about a third of capital gains.

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[122] The existence of corporate retained earnings is the simplest explanation as to why asset prices might grow structurally faster than consumer prices, thereby generating permanent real capital gains. E.g. in the Gordon-Shapiro equity pricing formula, $Q_t=D_t/(r-g)$, with Q_t = equity price index and D_t = dividend flow), dividend payments are supposed to grow at the same rate as national income ($D_t=D_0e^{gt}$ & $Y_t=Y_0e^{gt}$), and the equity price index is also supposed to grow at the same as national income ($Q_t=Q_0e^{gt}$), thereby generating a permanently positive real rate of capital gains q equal to the real growth rate g. But this can be a steady-state growth path only if the corporate capital stock K_t also grows at rate g, i.e. if the representative corporation permanently saves and invests a fraction g/r of its profits $\pi_t=rK_t=\alpha Y_t$ as retained earnings (i.e. $E_t=(g/r)\pi_t=gK_t$), and distributes a fraction 1-g/r as dividends (i.e. $D_t=(1-g/r)\pi_t=(r-g)K_t$). In effect the total equity return r is the sum of a dividend yield equal to r-g and of a real capital gain term equals to g generated by retained earnings. Our series show that retained earnings do indeed explain a significant fraction of capital gains, but are too small to generate permanent real capital gains q as large as g. See Gordon (1959) for the original derivation of the formula (Gordon explicitly assumes that companies keep a fraction g/r of their profits as retained earnings). See Baker, DeLong and Krugman (2005) for a discussion of how the formula can be used to think about the long term macro relationship between r and g.

We then consider the 1925-1954 sub-period and proceed in the same manner. We start from our estimated wealth-income ratio β_t=293% for 1925, and we compute the constant rate of capital gains q_t over the 1925-1954 period which generates the observed wealth-income ratio β_t=293% for 1970, given observed growth rates and savings rates over the 1929-1954 period, wealth destructions rates observed during World War 2, and dynamic equations (A.32) and (A.33).[123] We find that in order to reproduce the observed 1925-1954 pattern of wealth-income ratios we need to assume constant negative capital gains q_t = -1.2% during those years. We do the same for the 1913-1925 period, and we find that we need to assume constant negative capital gains q_t = -5.6% during those years in order to reproduce the decline from β_t=660% in 1913 to β_t=293% in 1925. Finally, we do the same for the 1896-1913 period, and we find that we only need to assume negligible capital gains (q_t=0.0%) during those years in order to reproduce the observed pattern of β_t between 1896 and 1913: observed savings rates are sufficient to predict almost perfectly aggregate wealth accumulation during this period.

This estimation method delivers annual series for the wealth-income ratio β_t and aggregate private wealth W_t over the 1896-1970 period. We keep the series obtained under method n°1 (private savings), i.e. col. (2) of Table A1 is equal to col. (4) of Table A17 times col. (1) of Table A1. Note that the series obtained under method n°2 (personal savings) are almost identical.[124]

A.5.4. Applying the equations to France 1820-1913

In order to further test the consistency of our method and of our simple wealth accumulation model, we also applied the accumulation equations to the 1820-1913 period. On Table A18 we report the results obtained with decennial averages.[125] Real rates of capital gains q_t reported on col. (8) of Table A18 were obtained by applying equation

[123] With wealth destruction rates d_t, equation (A.33) simply becomes: $1+g_{wt+1} = (1+q_{t+1})(1+g_{ws+1})(1+d_t)$. See excel file for simulation formulas.

[124] See Table A17, col. (4) vs col. (10). By construction both methods deliver similar results for years 1896, 1913, 1925, 1954 and 1970-2009, and differ only in the relatively short run. To the extent that short-run variations in corporate retained earnings are informative about short run variations in corporate market values, method n°1 delivers more precise series than method n°2. Also, the savings vs capital gains decomposition of wealth accumulation obtained under method n°1 is arguably more consistent from a conceptual viewpoint. But as far as estimating decennial-averages wealth-income and inheritance-income ratios is concerned, the choice between the two series is virtually irrelevant.

[125] In the simulation appendix (see Appendix D, Tables D1-D2), we use the results obtained on Table A18 in order to annualize our 1820-1913 series on national income and private wealth.

(A.34) above. That is, $1+q_t$ is again defined as a residual fraction of total private wealth growth rate that cannot be accounted for by savings, i.e. as the ratio between total private wealth growth rate $1+g_{wt}$ and savings-induced wealth growth rate $1+g_{wst}$. We find that the observed 1820-1913 pattern of wealth-income ratios β_t is very well accounted for by observed savings flow, and that capital gains seem to play a negligible role during the entire 1820-1913 period. The real rate of capital gains q_t appears to be sometime positive and sometime negative, but in any case relatively small, i.e. between -0.4% and +0.4% per year during each decennial period, with the single exception of the 1870s (-1.3%).[126] Between 1820 and 1913, the average real growth rate of national income was g_t=1.0%, while average the real growth rate of private wealth was g_{wt}=1.3%, which can be decomposed into a savings-induced private wealth growth rate g_{wst}=1.4% and a real capital gains effect q_t=-0.1% (see Table A18). Given that we face data limitations regarding the measurement of wealth-income ratios and savings rates, it is fairly obvious that real rates of capital gains as small as -0.1% cannot really be distinguished from zero.[127] It could well be that our 19th century savings rates are slightly over-estimated, or that the rise in the wealth-income ratio is slightly under-estimated. In any case, the important finding is that both during the 19th century and during the 20th century, the bulk of private wealth accumulation seems to be well accounted for by savings flows.[128]

A.5.5. Two centuries of wealth accumulation

We report on Table A19 summary statistics on the sources of wealth accumulation (saving vs capital gains) in France over the entire 1820-2009 period. The main lesson is that there does not seem to be large movements in the relative price of assets in the very long run. However the decompositions by subperiod reported on Table A19 also show that over a few decades capital gains and losses matter a lot. If we examine the 1913-1949 period as a whole, the main conclusion is that most of the decline in the wealth-income ratio is due to the decline in the relative price of assets, rather than by war destructions. If we add up

[126] The relatively large capital losses of the 1870s seem to be due the capital shocks incurred by French private wealth holders following the 1870-1 war with Germany. We did not attempt to investigate how much can be accounted for by the large capital payment subsequently made to Germany, vs the annexation of Alsace-Moselle (about 5% of the French territory, population-wise), vs physical capital destructions due to the war (which appear to be limited). In any case, it is apparent that such 19th century-style conflicts had a limited impact on aggregate wealth accumulation, as compared to the devastating effects of 20th century wars and ensuing government interventions.

[127] Taken literally, this would mean that while consumer prices have increased at 0.5% per year during the 1820-1913, asset prices have increased at 0.5%-0.1%=0.4% per year.

[128] We also report on Table A18 (col. (13)-(14)) the raw wage series used to estimate our 19th century capital and labor shares series (see Table A12 above).

war destructions estimates for World Wars 1 and 2, total destructions seem to represent the equivalent of about 30% of the 1913 capital stock. Given that the wealth-income ratio declined by about 60% between 1913 and 1949, one might be tempted to conclude that destructions explain about half of the fall. However this is misleading, because savings were relatively high during this period, particularly in the 1920s and late 1940s, presumably as a response to the destructions (as least in part). On the basis of destructions and savings flow, private wealth should have risen at about 0.9% per year between 1913 and 1949, i.e. only slightly less than national income (1.3%). However in fact it declined by 1.7% per year, due to a negative asset price effect (-2.6%). So relatively to national income, private wealth declined at a rate of 3.0% per year, out of which only 0.4% can be attributed to volume effects (destructions and savings), i.e. about 10%, and 2.6% can be attributed the decline in the relative price of assets, i.e. about 90%.

Regarding the recent period, the interesting lesson from Table A19 is the following. The recovery of asset prices has played an important role in the rebound of the wealth-income ratio, but the bulk of private wealth accumulation and private wealth recovery came from saving. Between 1949 and 1979, national income grew at 5.2% per year, while private wealth grew at 6.2% per year. Out of these 6.2% per year, 5.4% can be accounted for by savings, and 0.8% are left for capital gains. Between 1979 and 2009, national income grew at 1.7% per year, while private wealth grew at 3.8% per year. Out of these 3.8% per year, 2.8% can be accounted for by savings, and 1.0% are left for capital gains.

Of course, if one looks at the detailed decennial and annual data, one can see much bigger contributions of capital gains (or capital losses). E.g. between 1999 and 2009, national income grew at 1.4% per year, while private wealth grew at 6.7% per year, out of which 2.3% can be accounted for by savings and 4.3% by capital gains. The large rise of asset prices during the 2000s is largely responsible for the booming wealth-income ratio, which was gradually rising from about 200% in the 1950s to about 350% in the 1990s, before suddenly reaching 500%-550% in the 2000s. According to the latest data (January 1st 2009), the wealth-income ratio declined from 563% in 2008 to 552% in 2009. How far this is going to continue and whether asset prices are going to keep falling is certainly a complicated issue. The important point that we would like to stress, however, is that when we take a medium run perspective, one should not exaggerate the importance of the asset price boom of the 2000s. During each single decade of the 1949-2009 period (including the 2000s), the growth rate of national income was substantially below the savings-induced growth rate of private wealth. The only exception was the 1960s: the savings rate was high (13.8%), but the growth rate of national income was so high (6.2%) that this was not sufficient to make private wealth grow faster. More generally, the savings rate was somewhat bigger during the 1949-1979 period (13.4%) than during the 1979-2009 (9.5%), but growth was so much smaller during the second period that the gap between income growth and savings-induced wealth growth was substantially bigger in the 1979-2009 period than in the 1949-1979 period. This is what explains – in an accounting sense – why the wealth-income ratio grew faster during the 1979-2009 period than during the 1949-1979 period. The capital gains effect appears to have been similar during the two subperiods (1.0% vs 0.8%). If we take the 1949-2009 period as a whole, the recovery of asset prices relatively to consumer prices appears to have been relatively steady – or at least less chaotic than one might think at first stance. The 1949-2009 increase in asset prices (at 0.8%-1% per year) seems to have almost fully compensated the 1913-1949 fall in asset prices (at -2.4% per year), so that the overall capital gain effect between 1913 and 2009 appears to be fairly modest (-0.3%).

A.5.6. Discussion of the method and comparison with asset price indexes

How reliable is our estimation method? We feel that it is reasonably reliable, given our purposes in this research. First, as long as our raw wealth-income ratio estimates for 120-1896, 1913, 1925, 1954 and 1970-2009 are reliable, the choice of what is essentially an interpolation method for missing years is not going to make an enormous difference – at least as far as decennial averages are concerned.

Next, and most importantly, we find it reinsuring – and interesting in its own right – that the wealth accumulation equation works so well in the medium and long run. In particular, the average real rates of capital gains that we need to assume in order to reproduce the pattern of wealth-income ratios over each sub-period (1820-1896, 1896-1913, 1913-1925, 1925-1954, 1954-1970) are consistent with available asset price series. Take the 1954-1970 sub-period. Consumer prices grew on average by 4.9% a year during this period. But available real estate and stock market indexes show that nominal housing prices (17.4% a year) and equity prices (7.0%) grew substantially faster (see Table A22, line 1954-1970). So it is not surprising that we need to assume positive real rates of capital gains to account for observed wealth accumulation over this period. Conversely, during the 1913-1925 and 1925-1954 sub-periods, consumer price inflation was very large (resp. 12.4% and 13.4%

per year during each sub-period), and available asset price indexes show that nominal housing price inflation (resp. 5.4% and 9.0%) and equity price inflation (resp. 6.0% and 10.1%) stood at substantially lower levels (see Table A22, lines 1913-1925 and 1925-1954). So it is not surprising that we need to assume negative real rates of capital gains to account for observed wealth accumulation during the 1913-1954 period, and particularly so in the 1913-1925 sub-period.[129] Prior to 1913, and in fact during the entire 1820-1913 period, both consumer and asset price inflation was generally low (usually less than 1%-2% a year from a decennial average perspective), so it is not surprising that we only need to assume negligible rates of capital gains to reproduce the observed pattern of wealth-income ratios between 1896 and 1913, and more generally during the entire 1820-1913 period (see below).

Of course it is highly unsatisfactory and arbitrary to assume fixed real rates of capital gains q_t during each sub period 1896-1913, 1913-1925, 1925-1954 and 1954-1970 (this is probably less important for the 1820-1896 period). Annual wealth accounts available for the 1970-2009 period show that real rates of capital gains can vary enormously on a year-to-year basis, and available asset price indexes show that the same conclusion certainly applies as well to the 1914-1969 chaotic period. The reason why we finally decided to use our simple method to construct our annual private wealth series, and not to use annual asset price indexes, is because is the latter appear to be of insufficient quality.

There are two conceptual and practical problems with existing historical asset price indexes (see Tables A20-A22). First, they typically cover a limited set of broad asset categories, and it is unclear how one should weight them in order to reproduce the average asset portfolio owned by private individuals at a given point in time. In France, economic historians and statisticians have constructed an index for Paris housing prices starting in 1840, an housing price index for the all of France starting in 1936, and an aggregate index for equity prices starting in 1886.[130] Using these raw indexes, we attempted to construct a composite asset price index. By assuming a simple, constant

[129] Note that the much higher capital losses estimated over 1913-1925 than over 1925-1954 (q_t=-5.6% vs q_t=-1.2%) reflects the fact that the prices of private assets (real estate and equity) lagged behind consumer prices during the first sub-period (possibly because consumer price inflation in 1913-1925 came after a century-long period of almost complete price stability), and the fact that public debt reached very high levels in France in the 1920s (see Table A16 above): private individuals lent a lot of money to the French government during World War 1 and the early 1920s, and suffered enormous implicit capital losses on this investment (the real rate of capital gains q_t on nominal assets such as public debt is by definition equal $-p_t$). We did not attempt to disentangle the shares of each effect.

[130] We also have various indexes for total returns on stocks and bonds (see Tables A20-A22). See section A6 below for the various sources where these raw indexes can be found.

portfolio allocation,[131] one can easily generate a composite index which broadly resembles our real rates of capital gains q_t over each sub period.[132] However in order to match perfectly our real rates of capital gains q_t, one would need to make somewhat arbitrary assumptions about changing portfolio shares.

Most importantly, we noticed that using such a composite price index in order to construct annual series for wealth-income ratios β_t and aggregate private wealth W_t would generate series with implausibly large year-to-year variations (both downwards and upwards). This seems to be due to the fact that existing asset price indexes give excessive weights on a few specific assets (real estate indexes typically rely on a limited set of housing sales in Paris and a few other cities; equity indexes exclusively rely on quoted shares), while private individuals taken as a whole own a very diversified portfolio of assets, whose short run price variations tend to offset one another, at least partly. Using such a method would also lead us to overestimate some of the medium-run, asset-prices-induced changed in aggregate private wealth. In particular, the 1913-1954 fall in real estate and equity prices (relative to CPI) is so large in raw asset price indexes that such series are bound to lead to implausibly small wealth-income ratios β_t in the 1950s, even if we put very small portfolio weight on real estate and equity.[133] Given that we are mostly interested in decennial averages in the context of this research on long run trends, we decided to leave this complicated issue for further work and to keep our simplifying assumptions about constant real rates of capital gains during each sub-period.

Together with the fact that they tend to overestimate short-run and medium-run variations, the other important problem with existing asset price indexes is that they seem to overestimate the long term rise of asset prices relatively to consumer prices. According to our q_t series, which were computed as the residual term to the wealth accumulation

[131] Namely 30% real estate, 30% equity, 20% CPI-type assets (i.e. assets with prices rising like consumer prices), and 20% nominal assets (i.e. assets with fixed nominal prices like public debt or checking accounts). See Table A21.

[132] See Table A22, col. (11) vs col. (14), lines 1896-1913, 1913-1925, 1925-1954 and 1954-1970.

[133] Expressed as a fraction of CPI, raw real estate and equity indexes on the early 1950s are worth about 10% their 1913 value. See Table A20, col. (1)-(4). If we were to use such indexes we would find wealth-income ratios substantially below 200% in the early 1950s. There are several reasons why these indexes might overstate the 1913-1949 fall in asset prices: Paris housing prices probably fell more than average French housing prices, and there exists no national index before 1936; even after this date it is unclear whether the index relies on a truly representative sample of housing units sales, or whether large cities are oversampled; also, the tough rent control policies applied in the aftermath of world wars led to a dual price system for occupied and non-occupied housing (typically rents can be raised only after a change in tenants, which also explain why rent recovery can span over several decades after the end of rent control), and it is unclear how this was dealt with by sales-based indexes (biases can go both ways); finally, it is likely that the 1913-1949 fall in public equity prices largely overstates the aggregate fall in (public and private) firm value.

equation (i.e. without using asset price indexes), asset prices have risen approximately at the same pace as consumer prices over the course of the 20th century. The real rate of capital gains q_t was equal to 0.0% in 1896-1913, -2.8% in 1913-1949, +0.8% in 1949-1979 and +1.0% in 1979-2009, so that the 1913-1949 fall and the 1949-2009 rise almost exactly compensate one another: the cumulated annualized rate of capital gains over the entire 1896-2009 period appears to be as small as -0.3% (see Table A19, col. (5)). To put it differently: savings appear to be the primary determinant of aggregate private wealth accumulation in the long run; if anything, capital gains have played a (small) negative role over the 1896-2009 taken as a whole.

Note that if we do the same computations using method n°2 (with the personal savings definition, i.e. excluding corporate retained earnings), then the small negative real rate of capital gains q_t = -0.3% becomes a small positive real rate of capital gains q_t = +0.4% (see Table A19, col. (9)). Taken literally, these estimates mean that assets prices are about 40% larger in 2009 than what they were at the eve of World War 1 (relatively to consumer prices), but that if we take into account the value of accumulated retained earnings within corporations, then they are actually 30% smaller. Of course, given the data limitations, and particularly given the uncertainty about savings rates and depreciation rates, it does not make much sense to pretend that one can really distinguish between a -0.3% and +0.4% annualized average real rate of capital gains over a century-long period. What these findings indicate is simply that the average real rate of capital gains over the 20th century was apparently relatively close to 0%. We certainly do not infer from this finding that real capital gains will be 0% during the 21st century. The experience of the 20th century certainly show that major shocks can create large gaps between asset and consumer prices that last over several decades. Also, one can easily construct theoretical wealth accumulation models with two goods and long run divergence between the price of the asset good (say, real estate) and the price of consumer good. We have nothing to say as to whether such models might be relevant for the future. At a more modest level, the conclusion we draw from our computations is that the 1913-1949 drop in asset prices seems to have been more or less compensated by the 1949-2009 rise in asset prices, and that over the whole 1896-2009 aggregate wealth accumulation seems to be well accounted for by measured savings flows.

In any case, we feel that this conclusion (and the national-accounts-based computations leading to this conclusion) is more meaningful than the conclusions and computations one can draw from existing historical asset price indexes. E.g. according to available real estate price indexes, housing prices in Paris grew 1.2% faster than consumer prices on average over the 1896-2009 period: real housing price inflation (relatively to CPI) was +0.6% in 1896-1913, -6.9% in 1913-1949 and +7.1% in 1949-2009 (+11.1% in 1949-1979, +3.1% in 1979-2009), but on the whole the balance stood positive at +1.% (see Table A22, col. (8)). This can look like a small number, but this is much larger than 0.3%-0.4%: if we cumulate 1.2% over 113 years, we obtain about 400%, i.e. the Paris real estate price index is currently four times larger than the consumer price index (relatively to 1896-1913 levels).[134] If this kind of long run asset price movement was representative of average asset prices, this would imply that wealth-income ratios $\beta_t = W_t/Y_t$ should have risen enormously over the 20th century, even in the complete absence of savings. This does not make much sense.

One key reason why such computations are not really meaningful is because historical real estate indexes generally include no adjustment whatsoever for quality improvement: in effect we are comparing the price of a 1900 Paris apartment with no toilet and limted water and heating supply with the price of 2000 Paris apartment with multiple bathrooms and cable tv. Consumer price indexes do include substantial corrections for quality improvements (otherwise consumer price inflation would look much larger, and real growth in living standards would look much smaller). Assuming that quality improvements are not properly included in price indexes for capital goods such as housing (and they are arguably even more difficult to include for capital goods than for consumer goods), then it is not too surprising to find that the price of assets mechanically rises in the long run relatively to consumer prices. Long run biases regarding equity prices involve other effects generally going in the same direction.[135] Generally speaking, there are good reasons to believe that existing historical asset price indexes (both real estate indexes and stock indexes) do not properly take into account quality and composition effects in the long run,

[134] See Table A20, col. (1)-(3). The national real estate index currently looks even bigger (about six-seven times the CPI), but this is simply because it starts in 1936 (at a time when real estate prices were already very low as compared to 1913).

[135] One standard reason why existing stock price indexes might rise structurally faster than consumer prices in the long run is of course the existence of corporate retained earnings. Other explanations include a structural rise in the share of the national economy quoted in the stock market (either because of the share of publicly quoted firms in national output rises, or because publicly quoted firms start to rely more on equity finance than on debt finance; such a structural evolution seems to have occurred since the 1970s-1980s) and the rise of cross holdings within the corporate sector (which can create an artificial rise in stock market capitalization, and possibly a rise in stock price indexes, depending on how weights are computed in commonly available stock indexes). Also, because in practice the set of publicly traded firms changes many times over the course of a century, long run stock indexes necessarily rely upon fairly specific assumptions about portfolio reallocation and reweighting; such assumptions are relatively innocuous in the short run, but can have huge effects in the long run.

and are therefore ill suited for volume vs price decomposition analysis. We feel that it is conceptually and practically more consistent to compute implicit real rates of capital gains q_t from the wealth accumulation equation, i.e. from the observed patterns of wealth-income ratios and savings flows, as measured by national accounts.[136]

<u>A.6. Supplementary series on price indexes</u> (Tables A20-A22)

On Tables A20-A22 we report supplementary series on long run price indexes in France. We use these series at various points in this appendix, particularly in the previous section. Here we briefly describe how Tables A20-A22 were constructed.

The consumer price index (CPI) reported on col. (1) of Table A20 is the official Insee-SGF consumer price index.[137] The real estate price indexes for Paris and the whole of France reported on col. (2)-(3) of Table A20 are borrowed to Friggit (2007), whose important work represents the most systematic historical data collection effort on real estate markets in France so far.[138] The Friggit data base also includes historical indexes for total stock returns (dividend reinvested) and total bond returns (interest reinvested), which we report on col. (5)-(6) of Table A20.[139] We also report on col. (4) a simple equity price index (no dividend reinvested) based upon series from Friggit (2007) and Villa (1994).[140] All other series reported on Tables A20-A22 were computed from these raw series (and/or from previous tables).

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[136] Note that our savings-based method implicitly takes quality improvements into account. E.g. if the raw (non-quality-corrected) price of Paris apartments doubles between 1900 and 2000, and if observed savings flows appear to be sufficient to account for the observed doubling of the wealth-income ratio, then it is reasonable to infer that the doubling of the real estate price is entirely due to savings-financed quality improvements in Paris apartments (i.e. savings flows were implicitly used to finance investment in Paris housing so as to improve their quality).

[137] We borrowed 1891-1998 annual CPI inflation rates from Piketty (2001, pp.690-691, Table F1, col. (5)). We updated the series by using the latest 1999-2008 CPI inflation rates released on www.insee.fr (15/09/2009). For 2009 we used the latest projections available (0.4%). For 1800-1890 we used the consumer price inflation series included in the Friggit data base (see below).

[138] The Friggit historical data base (ltseries.v4.0.xls, available on-line, downloaded on 15/09/2009) ends in 2005, so for 2006-2009 we uptaded the Notaries-Insee (BMS) official real estate indexes. This is the same data source as the one used by Friggit for the recent period.

[139] For 2006-2009 we updated the historical Friggit series by using the SBF 250 total stock return index released by Euronext.com (15/09/2009); this is the same data source as the one used by Friggit for the recent period. Euronext does not seem to release total bond return indexes, so we updated the Friggit series by assuming 5.0% returns for 2006-2009 (this is consistent with previous years).

[140] Unfortunately the Friggit data base does not include the decomposition of the total stock return index into a pure price index and a dividend index. Euronext series do provide such a breakdown (on average over the 1991-2009 period the total stock return of 6.8% can be broken down into a 3.8% price effect and a 3.0% dividend effect), but do not go beyond 1991. So we used the 1890-1985 equity price index published by Villa (see Villa (1994, p.146, series "Q: Indice du cours des valeurs françaises à revenus variables"), which we complete for 1856-1890 using the equity price index published in AR 1966, Insee, p.541. For 1986-1990 we used Friggit's total return index, minus 3.0% (i.e. the average dividend yield over 1991-2009).

Appendix B: Estate Tax Data

The other key data source used in this research is estate tax data. The main data sources and methodological issues regarding French estate tax data and the way we use it, in particular in order to compute the fiscal inheritance flow B_t^f and the μ_t ratio, are discussed in the working paper (see sections 3.1 and 3.3). In this appendix we provide the complete series used in this research, as well as additional details about sources, methodology and concepts.

In section B1 we describe how we computed our fiscal inheritance flow series B_t^f. In section B2 we describe how we used estate-tax-based age-wealth profiles $w_t(a)$ in order to compute our μ_t ratio series.

B.1. Computation of the fiscal inheritance flow B_t^f series

Our fiscal inheritance flow series are reported on Tables B1 (annual series) and B2 (decennial averages). We start from the raw fiscal series B_t^{f0} (col.(1)), to our final corrected series B_t^f (col. (10)). Here we describe the data sources and methods used to make the relevant corrections and construct these tables.

Tables B1-B2, col. (1) : B_t^{f0} = raw fiscal bequest flow

We start from the raw bequest flow reported on estate tax returns (with no adjustment whatsoever), which we note B_t^{f0} (col. (1)). In the same way as in the national accounts appendix, all money values reported on Tables B1 and B2 are expressed in current billions currency, by which we mean current billions euros for the 1949-2009 period and current billions old francs for the 1820-1948 period.[141]

The raw bequest flow series B_t^{f0} reported on col.(1) come directly from the estate tax data published by the French Finance Ministry during the 1826-1964 period, and from the so-called "DMTG" micro-files of estate tax returns compiled by the French Ministry of Finance

[141] The old franc was replaced by the new franc on January 1st 1960 (1 new franc = 100 old francs), and the new franc was replaced by the euro on January 1st 2002 (1 euro = 6.55957 new francs). In order to convert 1949-2001 current currency values into what we call current euros, we simply divided 1960-2001 new francs values by 6.55957, and 1949-1959 old francs values by 655.957. Current prices national accounts series released by Insee adopt the same monetary convention.

during the 1977-2006 period.[142] Throughout the period, we use a net wealth concept: the raw bequest flow B_t^{f0} is defined as the aggregate market value of all tangible and financial assets (minus financial liabilities) transmitted at death during a given year, as reported by heirs to tax authorities.[143] I.e. in 1826 a total net wealth value of 1.270 billions francs was left by decedents; in 1913 this total value was equal to 5.612 billions francs; in 2006 it was equal to 58.850 billions euros.

Between 1826 and 1964, detailed estate tax data was published quasi-annually by the French Finance Ministry. In particular, the basic annual series on aggregate bequest flows cover the entire 1826-1964 period on a continuous, annual basis (with the single exception of years 1914-1920, 1923-1924, 1961 and 1963). Complete retrospective 1826-1964 series on aggregate flows were published in the historical statistics yearbook compiled in 1966 by Insee, which constitutes our basic source for col. (1) of table B1.[144] One can also find the same aggregate series in the annual tabulations reporting the number and value of estates broken down by estate bracket. The French Finance Ministry started compiling such tabulations in 1902, when the estate tax became progressive, and published them until 1964.[145]

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[142] "DMTG" stands for "Droits de mutation à titre gratuit" (the official name of the estate tax in France).

[143] The aggregate (net wealth)/(gross assets) ratio has varied very little in the long run, from about 93%-94% prior to 1914 to about 94%-95% during the interwar period, 96%-97% during the 1950s-1960s and again 94%-95% in the 1980s-2000s. I.e. aggregate liabilities have always been around 5% of aggregate gross assets transmitted at death in France. In the DMTG files, there are very few cases where liabilities exceed assets. In these cases we set net wealth equal to zero (heirs generally choose not to take up such negative bequests). In published Finance Ministry data, bequests with negative net wealth were excluded. Because published net wealth series start in 1903 (prior to the 1901 estate tax reform liabilities were not deductible from gross assets, so we only observe gross assets series in 1826-1902), we assumed a constant (net wealth)/(gross assets) ratio equal to 95% over the 1826-1913 period, and reduced accordingly the published gross assets series for this period.

[144] See "Annuaire statistique de la France 1966, Résumé Rétrospectif", Insee 1966 (thereafter AR 1966), p.530. The numbers reported on col.(1) of Table B1 for 1826-1964 are taken directly from AR 1966 p.530. More precisely: for 1826-1913 we took 95% of col. "Successions – Valeur totale de l'actif brut" (gross assets) (see excel file for formulas and original raw gross assets series); for 1924-1964, we took 100% of col. "Successions – Valeur totale de l'actif net" (net wealth). For 1921-1922 the bequest flow was not published, so we take the gift flow series, divided by the estimated (gift flow)/(bequest flow) ratio (see below). For 1949-1959 we divided the raw numbers published in AR 1966 by 655.957, and for 1960-1964 we divided the raw numbers published in AR 1966 by 6.55957 (e.g. in 1964: 8.427 billions francs divided by 6.55957 equals 1.285 billions euros).

[145] These quasi-annual 1902-1964 tabulations were used in Piketty (2001, 2003) in order to estimate top estate fractiles using Pareto interpolation techniques. The exact references of the French Finance Ministry statistical bulletins were these tabulations were originally published ("Bulletin de Statistique et de Législation Comparée" (thereafter BSLC) for years 1902-1938, "Bulletin Statistique du Ministère des Finances" (thereafter BSMF) for years 1939-1946, and "Statistiques et Etudes Financières" (thereafter S&EF) for years 1947-1964) are given in Piketty (2001, Appendix J, p.749). The wealth concept used in these tabulations was net wealth until 1956, and gross assets afterwards (but we know aggregate net wealth from the aggregate AR 1966 series). Note also that the aggregate bequest flow reported in 1902-1956 tabulations is sometime slightly smaller than 100% of the aggregate bequest flow series published in AR 1966 (e.g. the ratio is about 96%-99% in 1902-1905), which indicates that a small fraction of estate tax returns was not included in size tabulations. For the entire 1826-1964 period we used the AR 1966 series, as explained

In 1964, the French administration stopped compiling and publishing annual estate tax statistics altogether. The only data available on an annual basis since 1964 are the total number of estate tax returns and the value of aggregate estate tax receipts – from which it is impossible to infer the value of the aggregate bequest flow in a reliable way, given tax progressivity.[146] Fortunately, the French Finance Ministry has been collecting every 6-7 years since 1977 nationally representative samples of estate tax returns, primarily for internal tax simulation purposes. These DMTG micro files exist for years 1977, 1984, 1987, 1994, 2000 and 2006.[147] Each file contains between 3,000 and 5,000 individual estate tax returns (as compared to a total of about 300,000 estate tax returns filed each year, i.e. the average sampling rate is typically slightly above 1/100), but is heavily stratified, with a sampling rate as high as 1/4 within the top percentile of decedents. Each file includes all variables reported in the estate tax return, and in particular detailed information on the value of the estates (broken down using a large number of asset categories: residential vs non-residential real estate, public vs private equity, bonds, cash, etc.), the share of total estate going to each successor, as well as basic socio-demographic information on the decedent and on each heir.

These DMTG files provide very rich information on intergenerational wealth transmission in France, and the present research relies heavily on this data source. Although these files have been compiled by the tax administration primarily for internal purposes, they have regularly been used by researchers outside the tax administration since 1984, both at Insee and outside Insee.[148] The 1977 DMTG file has apparently not been archived in an accessible computer format, so we used the aggregate bequest flow estimated and published by Insee researchers who had access to this file during the 1980s.[149] The 2006

above. The French Finance Ministry also compiled tabulations broken down by age of decedents, which we use in section B.2 below.

146 These rudimentary estate tax statistics are currently published in the « Annuaire Statistique de la DGI » (the yearly statistical publication of the French tax administration, available on-line).

147 In addition to the first DMTG file compiled in 1977, the tax administration and Insee also attempted to link up the income tax returns files compiled in 1975 and 1979 with the bequests and gifts that occurred since 1962 (i.e. since the time annual estate tax tabulations were abandoned by the tax administration). See Canceill (1979) and Lollivier (1986). However these files only cover real estate transmission and include too few annual observations to be of interest for our purposes.

148 See e.g. Arrondel and Laferrère (1992, 1994, 2001) and Arrondel and Masson (2006) for examples of research work using the DMTG files for 1984, 1987, 1994 and 2000.

149 See Laferrère (1990, p.5) and Laferrere and Monteil (1992, p.11): (81/95) x (57.8-9.0)/6.55957 = 6.3 billions €. The 81/95 adjustment factor comes from the fact that Fouquet and Meron chose to upgrade the raw fiscal values reported in tax returns by a 95/81 corresponding to their estimated average inflation rate between time of death and year 1977 (see Fouquet and Meron (1982, pp.86-87)), while we choose to use raw fiscal values (see below). The -9.0 term is an estimate of tax exempt assets made by these authors, which we later include (here we look only at the taxable bequest flow).

DMTG file has not been made available to researchers outside the Finance Ministry yet, so we used the aggregate bequest flow recently estimated and published in an official tax administration report.[150] The raw fiscal flows reported on col.(1) of Table B1 for years 1984-1987-1994-2000 come from our own computations using the corresponding DMTG micro files, and are consistent with available published estimates.[151]

Finally, note that we did not make any adjustment in order to correct for the time gap between time of death and time of tax filing. That is, throughout the period of study, estate tax data always refers to the calendar year when the estate tax return was filed, rather than the calendar year of death. Both calendar years do not perfectly correspond, because successors are given by law a six-month delay following the date of death in order to fill an estate tax return. E.g. the aggregate bequest flow of 58.9 billions euros reported on Table B1 for year 2006 represents the total value of bequests reported in estate tax returns filed in 2006, and includes a number of estates of individuals who died in early 2006 and a number of individuals who died in late 2005 (and in some rare cases in early 2005 or even in 2004, when successors are running late). Estate values are always estimated at the time of death (rather than at the time the return is filled and registered), this can potentially create a non-trivial downward bias in our estimated fiscal flows during periods of rapid asset price inflation. Our fiscal inheritance flows are primarily meant to be compared with economic inheritance flows based upon national wealth estimates (which are estimated on January 1st of each year, see Appendix A), so we decided that the simplest strategy was to make no adjustment whatsoever: if successors take about six months to fill their return, then on average asset values correspond approximately to January 1st prices. Detailed data from the DMTG files for the recent period (unlike published statistics, micro-files do include full details about date of death and date of registration) suggests however that the

[150] See "La repartition des prélèvements obligatoires entre generations et la question de l'équité intergénérationnelle", Rapport du Conseil des Prélèvements Obligatoires, 2008 (thereafter Rapport CPO 2008), p.227. See also « Le patrimoine des ménages », Rapport du Conseil des Prélèvements Obligatoires, 2009 (thereafter Rapport CPO 2009), p.151.

[151] Basic summary statistics extracted from DMTG files have regularly been published in official Finance Ministry reports. See e.g. "L'imposition du capital", Rapport du Conseil des Impôts, 1986, pp.69-83 ; « L'imposition du patrimoine », Rapport du Conseil des Impôts, 1998, pp.210-211 ; « Les mutations à titre gratuit », Notes Bleues de Bercy n°148, 2002 ; Rapport CPO 2008 pp. 225-230 ; Rapport CPO 2009, p.151. Other extractions from DMTG files are also occasionally published in parliamentary reports. See e.g. "Rapport d'information sur la fiscalité des mutations à titre gratuity", Rapport du Sénat n°65, 2002 (thereafter Rapport Senat 2002), pp.15-27. The only substantial inconsistency between the numbers reported in these publications and our own estimates is the following: the 2000 aggregate bequest flow published in Rapport CPO 2009 p.151 (34.5 billions €) is about 10% lower than our own estimate computed from the 2000 DMTG file (38.9 billions €), and also about 10% lower than the estimate published in Rapport Senat 2002 p.19. There are other statistical inconsistencies in Rapport CPO 2009, including inconsistencies with the numbers published in Rapport CPO 2008, which provides more complete and reliable tables and should be viewed as the reference source for recent French estate tax statistics.

six-month delay rule is not being enforced very strictly, and therefore that our simplifying assumption probably results into a slight downward bias for our fiscal inheritance flow estimates.[152]

Tables B1-B2, col. (2) to (4): correction for non-filers

The first adjustment that needs to be made to the raw fiscal series has to do with non-filers, i.e. with the fact that in a number of cases successors do not file an estate tax return. That is, we upgraded the raw fiscal series B_t^{f0} (col. (1)) in order to obtain corrected estimates B_t^{f1} (col. (3)) of the aggregate fiscal flow including non-filers. Our estimated upgrade factor B_t^{f1}/B_t^{f0} is reported on col. (2), and the corresponding share of non-filers in the corrected aggregate flow $(B_t^{f1}-B_t^{f0})/B_t^{f1}$ is reported on col. (4). Col. (3) of Table B1 was obtained by multiplying col. (1) by col. (2). Although our estimated upgrade factor B_t^{f1}/B_t^{f0} is fairly small (usually 105%-110% at most, except in the late 1950s-early 1960s, when it reaches 120%-130%), with no long run trend, we try to be precise about where our estimates come from. Before we describe the formulas we use for the non-filers corrections, it is useful to briefly summarize how and why the fraction of non-filers decedents has evolved over time.

Until 1956, all successors were required by law to fill an estate tax return, no matter how small the estate was. In particular, there was no tax exemption threshold of any kind. Tax rates – and graduated tax schedules, following the introduction of estate tax progressivity in 1901 – did vary widely, both over time and across categories of successors, as they have always done in France (children and spouses have always faced much lower tax rates than other heirs). But the key point is that until 1956 every positive bequest was subject to a positive tax, i.e. there was no base exemption, no zero rate bracket, no matters who the heirs were. So in principle there should be no need to make any correction for non-filers prior to 1956. In practice, the number of estate tax returns filled each year fluctuated around 50%-70% of the annual number of decedents aged 20-year-old during the 1826-1955 period (typically, about 300,000-400,000 annual tax returns, vs

[152] For instance, 57.9% of of estate tax returns filled in 1977 actually correspond to individuals who died in 1977, 26.0% to individuals who died in 1976, 8.1% to individuals who died in 1975 and another 8.0% to individuals who died in 1974 or before (see Fouquet and Méron (1982, p.86)). According to Fouquet-Meron, reported estate values should be increased by as much as 17% (95/81) in order to correct this bias and express all values in 1977 prices. In 2006, tax filling delay still seems to be higher than 6 months for a significant proportion of estate tax returns (see Rapport CPO 2008, p.227). However we know very little on average delay prior to 1977, and in order to preserve the continuity of our series it seemed more appropriate to make no adjustment at all.

about 500,000-600,000 adult decedents per year).[153] Given that the bottom 50% of the population generally holds very little wealth (always less than 10% of aggregate wealth, and usually about 5%), this suggests that the law was indeed applied very strictly: only successors with very small estates could escape their tax filing duties. I.e. the effective filling threshold was probably positive but extremely small.[154] For the sake of consistency, however, we do compute a non-filers upgrade factor for the 1826-1955 period, using the same method as for the 1956-2006 period (see below).

In 1956, for the very first time, a tax exemption threshold was introduced into the French estate tax system. The number of estate tax returns suddenly dropped from 250,000 in 1955 to 65,000 in 1956, i.e. from 50% of the number of adult decedents to less than 15%.[155] However, the nominal exemption threshold introduced in 1956 was updated very rarely since then – and in any case much less rapidly than inflation. As a consequence the annual number of estate tax returns gradually returned to its original level: 25% of the number of adult decedents by 1964, about 50% in the 1970s-1980s, and approximately 60%-70% during the 1990s-2000s (i.e. again around 300,000-350,000 annual returns, vs 500,000-550,000 adult decedents). Note that many of these estate tax returns are currently facing no tax liability.[156] E.g. during the 1990s-2000s, the number of taxable estate tax returns (i.e. with returns with positive tax liability) was only about 100,000-150,000 each year, i.e. approximately 20% of the number of adult decedents.[157] This is

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[153] See Table B1, col. (8)-(9). The annual number returns reported on col. (8) are taken from published tabulations for 1902-1964, and from DMTG files for 1977-2006. Prior to 1902, the tax administration did not bother collecting data on total numbers of returns. However according to the so-called TRA survey (which follows the estate tax returns of descendents of all couples married in France between 1800 and 1830 and whose family name started with the letters "TRA" up to 1940), the annual number of estate tax returns has been relatively stable around 50%-60% of the annual number of adult decedents throughout the 1820-1910 period (at least as a first approximation). See Bourdieu, Postel-Vinay and Suwa-Eisenmann (2002, 2003). Note that in Paris (where wealth concentration has even been more extreme than in the rest of France at that time), the tax-filing fraction of decedents was as low as 30% during the 1820-1910 period, before slowly converging towards the national average in the interwar and postwar periods. See Piketty, Postel-Vinay and Rosenthal (2006).

[154] It is difficult to know precisely how tax inspectors dealt in practice with successors of decedents with very little wealth. E.g. in case a decedent only leaves low value furniture worth a few months income, are tax inspectors going to chase the children until they fill a return? According to the law, they should: they start from the list of deceased individuals in their city and are supposed to make sure that all transmitted wealth gets recorded. In practice there has probably always been some tolerance with very poor individuals. E.g. the costs of funerals (which for poor individuals often exceed the net estate value) have apparently always been treated as being deductible from the estate (though this is formally not written in the law). The exact effective filling threshold probably varied over time and space. What really matters for our purposes is that given the functioning of the tax administration it has always been impossible to transmit real estate property or non-cash financial assets without filling a return. This is confirmed by the very large tax filers fractions observed throughout this period.

[155] See Table B1, col. (8)-(9).

[156] See Table B1, col. (8)-(9).

[157] Annual series on the number of taxable estate tax returns are currently published in the « Annuaire Statistique de la DGI » (see above). Note that non-spouse, non-children heirs are over-represented in

because the filling threshold (i.e. the wealth level above which all estates need to be reported to tax authorities, whether or not heirs end up paying a positive tax) is currently much lower than the tax exemption threshold (i.e. the wealth level above which one starts paying estate taxes), which for spouses and children heirs was raised much faster than the filling threshold since 1956, particularly in the most recent period. For children heirs, following a series of increases in the 2000s (most recently in 2007), the tax filing threshold is currently 50,000 euros (in terms of total gross assets left by the decedent), while the tax exemption threshold is currently to 150,000 euros (in terms of per children bequest).[158] Note that the latest rise in the tax filling threshold (2007) was not in force at the time of our latest data point (2006). The number of returns (338,000 returns in 2006, i.e. 66% of the number of decedents) probably declined somewhat in 2007 and subsequent years (no data is available yet). Of course, in case the tax filling threshold of 50,000 euros (about 25% of average per adult wealth, currently around 200,000 euros)[159] is further raised importantly in the future, then the tax filers fraction of decedents might decline more significantly. In case this happens, the non-filers correction would then become a more

taxable estate tax returns (and in aggregate estate tax receipts): although other heirs (i.e. non-spouse, non-children heirs) receive only 15%-20% of the aggregate inheritance flow (see Appendix C, section C.2), they benefit from no or little base exemption (see below), i.e. almost all of them pay positive taxes. Among children heirs, the fraction paying taxes has fluctuated a lot over time, because of large changes in the real value of the children tax exemption (see below). In the 1990s-2000s, it was typically around 5%-10%; following the 2007 tax reform (increase in tax exemption thresholds, new rules regarding inter vivos gifts), it could fall below 1%-2%, depending on how intensively future decedents use the new legal provisions regarding inter vivos gifts (see below).

[158] From a strict legal viewpoint, the threshold introduced in 1956 was actually a tax exemption threshold, not a filling threshold: all estates with gross assets below one million old francs (i.e. 10,000 new francs, i.e. 1,524 euros, at a time when per adult average wealth in current currency was about 2,000 euros; see Appendix A, Table A1, col. (6)) were entirely exempted from estate taxation (no matter who the heirs were); in principle, the universal tax filling obligation was unaffected by this reform; but in practice, tax inspectors received instructions not to chase heirs with gross assets below this threshold, and the (presumably very few) tax returns filled after 1956 with gross assets below 10,000 new francs were entirely excluded from tax publications and statistics. This nominal 10,000 new francs threshold was never updated since 1956 (it simply became 1,500 euros with the 2002 currency change), and it remained until 2004 the only general tax exemption threshold for non-spouse, non-children heirs. In 1960, a tax exemption threshold of 100,000 new francs (15,240 euros) was introduced for spouses and children heirs; it was raised to 175,000 francs in 1974, 200,000 francs (175,000 for children) in 1980; 275,000 francs (250,000) in 1981; 300,000 francs (275,000) in 1984; 330,000 francs (300,000) in 1992; 400,000 francs (300,000) in 1999; 500,000 francs (400,000) in 2000; 76,000 euros (50,000 for children) in 2005; finally, in 2007, spouses were wholly exempted from estate taxation, and the tax exemption threshold for children heirs was raised to 150,000 euros (with automatic CPI adjustment for subsequent years). An official tax filling threshold of 10,000 euros (in total gross assets) was also introduced in 2004 for spouses and children heirs; this threshold was raised to 50,000 euros in 2006. It does not apply however in case the same heirs benefited from inter vivos gifts from the decedent (in which case all estates must be reported to tax authorities; see below). An official tax filling threshold of 3,000 euros for non-spouse, non-children heirs was introduced in 2004 (not upgraded since then); a tax exemption threshold of 5,000 euros was created in 2006 for brothers/sisters; it was raised to 15,000 euros in 2007, together with the introduction of a 7,500 euros threshold for nephews/nieces.

[159] See Appendix A, Table A1, col. (6).

serious issue, and French estate tax data would loose some of its exceptional quality in comparison to other countries.[160]

To summarize: except during a brief period in the late 1950s-early 1960s, the fraction of tax filers has generally been about 50%-60% of the annual number of adult decedents throughout the 1820-2006 period.

In order to compute the non-filers correction factor we proceed as follows. We note N_{dt}^{f} the number of estate tax returns, N_{dt}^{20+} the total number of adult decedents, $n_{dt}^{f} = N_{dt}^{f}/N_{dt}^{20+}$ the fraction of tax-filers decedents, and $w_{dt}^{f} = B_t^{f0}/N_{dt}^{f}$ the average wealth reported by tax filers. All we need to estimate is the average wealth of non-filers w_{dt}^{nf}. We note $z_{dt}^{nf} = w_{dt}^{nf}/w_{dt}^{f}$ the ratio between non-filers and filers average wealth. Once we know z_{dt}^{nf}, we can simply compute the non-filers correction factor by applying the following equation:

$$B_t^{f1} = N_{dt}^{f}\, w_{dt}^{f} + (N_{dt}^{20+}-N_{dt}^{f})\, w_{dt}^{nf} = B_t^{f0}\, [\, 1 + (1-n_{dt}^{f})\, z_{dt}^{nf}\,]$$

I.e.: $$B_t^{f1}/B_t^{f0} = 1 + (1-n_{dt}^{f})\, z_{dt}^{nf} \qquad \text{(B.1)}$$

As a first approximation, one could think of the non-filers as decedents with wealth below some effective filling threshold w_{dt}^*, with $1-F_t(w_{dt}^*)= n_{dt}^{f}$, where $F_t(w)$ is the cumulative distribution function for wealth-at-death (i.e. $F_t(w)$ is the fraction of decedents with wealth-at-death less than w, and $1-F_t(w)$ is the fraction with wealth above w). Ideally, it would certainly be interesting to model explicitly the functional form of the wealth distribution $F_t(w)$ and its endogenous dynamics, and then from there to derive explicit estimates for the wealth ratio z_{dt}^{nf} between the bottom and upper parts of the distribution. However such an explicit modelling of distributions would fall far beyond the scope of the present research, where we concentrate primarily upon aggregate ratios and their evolution. Also we know that the effective filing threshold w_{dt}^* has always been relatively small, but we do not know its exact value: in the 1826-1955 period, it was officially supposed to be equal to zero, but in practice it was probably slightly positive; in the 1956-2006 period, it was officially slightly positive, but varied with the family structure (in particular the existence of children heirs),

[160] For the purpose of comparison, note that the estate tax filling threshold in the U.S. was 2,000,000$ (gross assets) in 2008, and that the number of returns was less than 2% of the total number of adult decedents (less than 40,000 returns, out of a total of 2.5 millions decedents). See IRS estate tax statistics available on-line. The US estate tax has always been an elite tax since its creation in 1916 (with a tax filers fraction typically less than 2%-3%; see Kopczuk-Saez (2004)). It seems unlikely that the French tax filers fraction of decedents drops to such low levels in the foreseeable future.

so the observed wealth distribution is actually truncated downwards at slightly different levels for different sub-populations.

So instead we make the following simple approximate assumptions about the wealth ratio z_{dt}^{nf} (which in any case is bound to be very small). For the recent decades, we have several data sources to estimate the average wealth of non-filers. First, the wealth surveys carried out by Insee in the 1990s-2000s (similar to the U.S. Survey of consumer finances) consistently show that the bottom half of the population owns at most 5%-10% of aggregate wealth (this is true at all ages).[161] In the U.S., the bottom 50% wealth share, as estimated in the SCF surveys of the 1990s-2000s, is even less than 5%.[162] By definition, note that a 5% aggregate wealth share for the bottom 50% means that the bottom half average wealth w_{dt}^{b} is equal to 10% of aggregate average wealth w_{dt}, and to about 5.3% of the upper half average wealth w_{dt}^{u}.[163] I.e. this corresponds to a bottom-top wealth ratio $z_{dt}^{b} = w_{dt}^{b}/w_{dt}^{u}$ = 5.3%. Similarly, a 10% aggregate wealth share for the bottom 50% means that w_{dt}^{b} is equal to 20% of aggregate average wealth w_{dt}, and that the bottom-top wealth ratio $z_{dt}^{b} = w_{dt}^{b}/w_{dt}^{u}$ is about 11.1%.[164] So on the basis of wealth surveys, and considering that the non-filers approximately correspond to the bottom half of the wealth distribution, one might be tempting to assume values of about 5%-10% for the z_{dt}^{nf} ratio. However a special survey conducted by the tax administration in 1988 in order to estimate the wealth of non-filers suggests that the true ratio is somewhat higher, with z_{dt}^{nf} around 15%.[165] This

[161] Using the raw wealth levels reported by households (with no correction whatsoever) in the wealth surveys conducted by Insee in 1986, 1992, 1998 and 2004 (about 10,000 households per survey), we find a bottom 50% wealth share of about 7.5% of aggregate wealth in all three surveys. E.g. in 2004 the average net wealth reported by all households was approximately 200,000€, while average wealth reported by the bottom 50% of the distribution was about 30,000€, i.e. 15% of 200,000€. There are good reasons to believe that high-wealth individuals under report their wealth in surveys (omission of various assets such as life insurance, top coding issues, etc.), and the true wealth share of the bottom 50% is probably closer to 5% than to 7%-8%. If we compute the bottom 50% share for the various age groups, we find a slightly rising profile (from about 5% for lower age groups to slightly above 10% for older age groups), but the pattern is not entirely clear cut, and in any case pretty small.

[162] The bottom 50% wealth share appears to be about 2% of aggregate wealth in all SCF surveys conducted between 1989 and 2007. See Kennickell (2009, p.35, table 4). Note that the exact figure one obtains for bottom half wealth shares depends on a number of measurement issues, e.g. how one counts negative net wealth individuals. In this research we conventionally set them to zero, since negative net wealth cannot be transmitted (see above). Kennickell also adopts this convention.

[163] (5/0.5)/(95/0.5) = 5.3%.

[164] (10/0.5)/(90/0.5) = 11.1%.

[165] See Laferrère and Monteil (1994) and Accardo and Monteil (1995). This 1988 “Wealth at death” was carried out jointly by Insee and the tax administration, and its specific purpose was to learn more about the wealth of non-filers decedents. It was based on a representative sample of all adult deceasing in 1988, for which the tax administration gathered not only the estate tax returns of the tax filers subsamble (about 50% of dedecents at that time), but also all other tax forms available for non tax filers (past income tax and local tax returns, bank forms on assets and asset returns, past bequest and gift tax returns, registration duties for sales of real estate assets, etc.), so as to compute relatively precise estimates of the average non-filers wealth w_{nf}. They found that the aggregate wealth share of non-filers was about 13%, which corresponds to a z_{dt}^{nf} ratio of about 15%: (13/0.5)/(87/0.5) = 14.9%.

seems to due to the fact that in the recent decades the effective filling threshold has been substantially higher for a sub-fraction of decedents (particularly those with children), thereby raising somewhat the non-filers average wealth.

So for the 1977-2006 sub-period we assume z_{dt}^{nf} = 15%. For the 1826-1955 period, given that filling obligations were the same for all decedents and were applied very strictly, and given that the bottom 50% wealth share was probably at most 5% during this period (at that time top wealth shares were even larger than they are today),[166] we assume z_{dt}^{nf} = 5%. For the 1956-1964 period, on the basis of the Finance Ministry tabulations by estate size, we also find that the best approximation is z_{dt}^{nf} = 5%.[167]

The non-filers upgrade factor B_t^{f1}/B_t^{f0} was therefore computed by applying equation (B.1) and by assuming z_{dt}^{nf} =5% for 1826-1964 and z_{dt}^{nf} =15% for 1977-2006. We find an upgrade factor B_t^{f1}/B_t^{f0} around 103%-105% throughout the 1826-1955 period;[168] the upgrade factor then jumps to over 130% in 1956-1957, but quickly diminishes towards 115%-120% in the late 1950s-early 1960s, and then stabilizes around 110%-115% in the period going from the 1970s to 2000s (see Table B1, col. (2)). We tried several alternative assumptions, and we found that the impact on upgrade factors was relatively small (less than 5%).

<u>Tables B1-B2, col. (5) to (7): correction for tax-exempt assets</u>

The second adjustment that needs to be made to the raw fiscal series has to do with tax-exempt assets, i.e. with the fact that a number of assets are legally exempt from estate taxation and are generally not reported on estate tax returns. That is, we upgraded the

[166] On the historical evolution of top and middle wealth shares, see working paper, section 7.2, and Piketty, Postel-Vinay and Rosenthal (2006, appendix tables A4 and A7). These top wealth share estimates rely on estate tax data (and crudely estimated aggregate wealth series), so by construction they do not give very precise estimates of the bottom shares. But with top 10% wealth shares as large as 80%-90% in 1820-1913 and as large as 70%-80% in the interwar period and the 1950s, bottom 50% wealth shares are bound to be very small, probably less than 5% (today top decile wealth shares are about -60%, and bottom 50% shares are about 5%-10%)

[167] Comparing the estate-size tabulations for 1950-1955 and 1956-1960 one can approximately compute the average wealth of the non-filers of the second sub-period (who were filers during the first sub-period), and one finds z_{dt}^{nf} ratios around 5% (for the raw tabulations, see Piketty (2001, appendix J)). Alternatively, note that the filers fraction of decedents was about 20% in the late 1950s, and that the top 20% wealth share was approximately 80%-85% at that time (see Piketty et al (2006, appendix table A7)); if one assumes that the non-filers were the bottom 80% of the distribution, then one again finds a bottom-top wealth ratio z_{dt}^{nf} around 5%: (15/0.8)/(85/0.2) = 4.4%, and (20/0.8)/(80/0.2) = 6.3%.

[168] Our annual series on tax filers fractions n_{dt}^{f} start in 1902, but we know that the filers fraction was approximately stable during the 19th century (see above), so we assume that n_{dt}^{f} was the same in 1826-1901 as in 1902 (see formulas in excel file).

non-filers-corrected fiscal series B_t^{f1} (col. (3)) in order to obtain corrected estimates B_t^{f2} (col. (6)) of the aggregate fiscal flow including non-filers and tax-exempt assets. Our estimated upgrade factor B_t^{f2}/B_t^{f1} is reported on col. (5), and the corresponding share of tax exempt assets in the corrected aggregate flow $(B_t^{f2}-B_t^{f1})/B_t^{f2}$ is reported on col. (7). Col. (6) was obtained by multiplying col. (3) by col. (5).

In order to estimate the fraction of tax exempt assets in the corrected aggregate flow, we proceed as follows. For the 1970-2009 period, we have detailed annual series on aggregate private wealth broken by asset categories coming from Insee-Banque de France balance sheets (see Appendix A, Table A15b). On the basis of estate tax law, and by comparing the asset composition of aggregate private wealth and the asset composition of the fiscal estate flow (as measured by 1977-2006 DMTG files),[169] we make the following assumptions about the taxable and tax-exempt fractions of each asset category.[170] We assume that 80% of the value of housing assets (residential real estate), as estimated by Insee-Banque de France balance sheets, was subject to the estate tax, and that 20% was tax exempt.[171] For non-housing tangible assets (which include unincorporated business assets), we assume a taxable fraction of 70% and a tax exempt fraction of 30%.[172] For financial assets other than private equity and life insurance (i.e. for

[169] Using 1984-2000 DMTG micro files we obtained the following break down for the aggregate bequest flow. The share of residential real estate went from 44% of total gross assets in 1984, 47% in 1987, 42% in 1994 and 39% in 2000. The share of non-housing tangible assets went from 13% of total gross assets in 1984 to 9% in 1987, 6% in 1994 and 4% in 2000. The share of financial assets (including private equity) went from 44% of total gross assets in 1984 to 44% in 1987, 51% in 1994 and 57% in 2000. The share of financial liabilities went from 5% of total gross assets in 1984 to 7% in 1987, 5% in 1994, and 5% in 2000. Note that these series cannot easily be broken down in a more detailed manner, because asset categories used in DMTG files are not fully homogenous over time.

[170] These estimated fractions are reported on Table A15b.

[171] This 20% tax exemption coefficient might be somewhat underestimated, especially at the beginning of the 1970-2009 period. First, housing assets currently benefit from a 20% rebate on market values whenever the asset serves as the primary residence of the decedent and the surviving spouse, or of the decedent and one of the children. In DMTG micro files we do not know how often this rebate is used (reported values are after-rebate values, if applicable), but this is probably a very large fraction. Next, in order to foster reconstruction a general estate tax exemption was introduced in 1947 for the first intergenerational transmission of all real estate properties built between 1947 and 1973. According to some estimates, the loss in estate tax revenues due to this specific exemption was as large as 25% in the 1970s (see Rapport du Conseil des Impôts, 1986, p.44). See also Laferrère (1990, p.5), who on the basis of the DMTG 1977 micro-file estimates that this specific exemption accounts for an aggregate loss in bequest tax base as large as 20%.

[172] Family firms have always benefited from various exemptions and special tax rebates, whether they take the form of unincorporated businesses (e.g. commercial dwellings or agricultural assets directly owned by self-employed individuals) or the form of corporate unquoted firms (private equity financial assets). The rules required to qualify for the "biens professionnels" tax rebates have been repeatedly relaxed in the 1990s-2000s (e.g. currently successors only need to commit to operate the family business for two years after the decedent passed way in order to obtain a 100% tax rebate, with no ceiling). We did not attempt to enter into the complicated history of these special exemptions (for more details, see e.g. Rapport CPO 2008 and 2009). Given the very low levels of business assets reported in estate tax returns (see above), our estimated 30% tax exempt fraction for non-housing tangible business assets and 50% tax exempt fraction for private equity appear to be reasonable (and probably slightly under-estimated at the end of the 1970-2009 period).

public equity, mutual funds, bonds, checking and savings accounts, etc.), we assume a taxable fraction of 90% and a tax exempt fraction of 10%.[173] For private equity financial assets, we assume a taxable fraction of 50% and a tax-exempt fraction of 50%.[174] Finally, for life insurance financial assets (the major tax exempt asset), we assume a taxable fraction of 5% and a tax-exempt fraction of 95%.[175] We then weighted these tax exempt fractions by the relative importance of each asset category in aggregate private wealth in order to estimate the overall fraction of tax-exempt assets in total wealth, which according to these computations gradually rose from about 24%-25% in the 1970s to about 33%-34% in the 2000s (see Table B1, col. (7)).[176] This is mostly due to the rise of life insurance.

These estimates are approximate – and if anything are probably conservative, especially for the more recent period. In particular, we implicitly assume that average asset composition is the same for decedents and for aggregate private wealth.[177] Insee wealth surveys suggest that the elderly actually own a larger fraction of their wealth in tax exempt assets such as life insurance, so that we probably underestimate our upgrade factor.[178] Also, note that the top estate tax rate for children heirs was raised from 20% to 40% in

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Note also that a number of non-housing, non-business tangible assets have long benefited from special exemption regimes in France, e.g. a number of specific rural assets like forests (see Rapport du Conseil des Impôts, 1986, p.44).

173 In principle, all non-private-equity, non-life-insurance financial assets are subject to estate taxation, on the basis of their full market value. In particular, the general exemption for public bonds was suppressed in 1850, and never re-introduced. However, a number of special exemption schemes were introduced by various governments for specific assets, especially for specific public bonds issued at a given point time (many governments used this as a debt policy tool during and in the aftermath of both world wars, and the habit continued afterwards: e.g. the "emprunt Pnay" issued in the 1950s was wholly exempted from estate taxation, and so was the "emprunt Balladur" in the 1990s). In order to take this into account, we assume that 90% of the overall market value of non-equity, non-life-insurance financial assets (as measured by Insee-Banque de France balance sheets) is subject to tax, and that 10% is tax exempt. This is of course approximate and ought to be refined.

174 See above.

175 Between 1930 and 1990, life insurance assets were entirely tax free (i.e. 100% exemption rate). Since 1991, the fraction of life insurance premiums paid after age 70 and above 30,500€ is subject to estate tax (not the corresponding interest). In order to take this into account we assume that a 5% fraction of life insurance assets is taxable (according to DMTG files for 1994-2000, which include virtually no life insurance assets, this is probably even lower than 5%). Also note that a special 20% tax on the fraction of life insurance payments to successors above 152,500€ was instituted in 1998. However this special tax is administered completely separately from the general estate tax, and the corresponding asset values are not reported on estate tax returns.

176 See formulas in excel file.

177 We attempted to compute the tax exempt fractions for various assets so as to match the observed composition of taxable estates, so in principle we correct for such biases. However the asset categories used in Insee-Banque de France balance sheets and in DMTG estate tax returns files are not exactly the same, so such computations are bound to be approximate. Also, there are virtually no life insurance assets in estate tax returns, so the age bias correction does not work for this asset.

178 It is also possible that the annuitized (non-bequeathable) fraction of life-insurance assets rises with age (an issue on which we know very little), in which case the bias would go in the other direction. Given however that the overall annuitized fraction of life insurance assets is relatively small in France (see Appendix A.5), it seems unlikely that this second effect dominates.

1984:[179] this possibly raised incentives for straight tax evasion, which by choice we do not attempt to include in our legal tax exemption upgrade factor.[180]

For the pre-1970 period we proceed as follows. We use the detailed decomposition by asset categories (including estimated tax exempt assets) regularly published by the Finance Ministry during the 1898-1964 period. These estimates show that tax-exempt assets were relatively small in 1898-1899 (about 5% of total assets, taxable and tax-exempt), then fastly rose to about 15%-20% following the 1901 estate tax reform (the introduction of tax progressivity was accompanied by the development of legal exemptions, and according to some observers of the time by the rise of tax evasion, which we do not take into account), then stabilized at about 20% during the interwar period, and finally rose somewhat during the 1950s and early 1960s.[181] Since these numbers are consistent with our independent 1970-2009 estimates, we simply link them up by assuming that the aggregate fraction of tax exempt assets rose gradually rose from 20% in 1950 to 25% in 1970.[182] For the 1826-1897 period we have very limited data to compute the fraction of tax exempt assets. However we know from estate tax law that the major exemption during the 19th century was public debt: government bonds were entirely exempted from estate tax until 1850, while bonds issued after 1850 were all subject to tax.

[179] See working paper, section 3.3.

[180] In our methodology, the gap between our economic and fiscal inheritance flows can be interpreted as an indirect measure of tax evasion. From that perspective, tax evasion would appear to be trendless in the long run: in particular the gap between the two series does not seem to increase after 1984 (see working paper, Figures 1 and 2). However the gap between the two series also reflects all other measurement errors, so it is hard to reach precise conclusions about tax evasion from this kind of comparison (apart from the fact that it does not seem to affect long run patterns).

[181] See AR 1966, p.530. Here we look at the ratio between the sum of all taxable and tax-exempt gross assets (i.e. “valeurs soumises ou non aux droits”, defined as the sum of “valeurs mobilières – fonds d’Etat, actions, obligations”, “autres biens meubles”, “biens immeubles urbains et ruraux”) and the value of taxable gross assets (“valeur total de l’actif brut”). The tax administration started compiling estimates on tax exempt assets only in 1898; until 1897 the tax administration asset composition series solely refer to taxable assets; so by construction this ratio is equal to 100% over the 1826-1897 period. The ratio is always above 100% over the 1898-1964 period and offers the best available estimate of tax exempt assets for this period. Note however that this ratio displays intriguing variations around World War 2, e.g. it is as high as 140% in 1943 and 1949, while it is about 120%-125% for all surrounding years; it is possible that for these years the tax administration wrongly included into tax exempt assets the fraction of community assets belonging to surviving spouses; this would need to be further investigated; we neglected these high ratios and assumed that tax exempt assets were a constant 20% fraction of total assets over the 1910-1950 period; but it is possible that by doing so we under-estimate somewhat the importance of tax exempt assets in the 1940s. Note also that according to these asset composition series the overall fraction of real estate (urban and rural properties, including land values) in the aggregate bequest flow gradually declined from as much as 60%-70% in the 1820s to about 50% around 1900-1910, which is consistent with the evolution of asset composition observed in national wealth estimates (see Appendix A, section A.5).

[182] That is, we assumed that the ratio $(B_t^{f2}-B_t^{f1})/B_t^{f2}$ was rose from 5% in 1900 to 20% in 1910 (using Finance Ministry ratios), then stabilized at 20% in 1910-1950, then rose linearly from 20% in 1950 to our estimate of about 25% in 1970 (see formula for col. (7) of Table B1 in excel file). The 1950-1970 rise if consistent with the development of new exemption regimes for specific housing and public bonds assets during this period (see above).

Based on approximate estimates on the total value and maturity structure of government bonds,[183] we assumed that the aggregate fraction of tax exempt assets rose gradually from 15% in 1826 to 20% in 1840, stabilized at 20% between 1840 and 1855, and then declined gradually from 20% in 1855 to 5% in 1880, before stabilizing at 5% until 1900.[184]

Tables B1-B2, col. (8) to (12): correction for inter vivos gifts

The third and last adjustment that needs to be made to the raw fiscal series has to do with inter vivos gifts, i.e. with the fact that a number of assets are transmitted before death and are therefore not included in the bequest flow strictly speaking. As was explained in the working paper (section 3.1), the simplest way to take gifts into account is to add the gift flow of a given year to the bequest flow of the same year.[185] This is what we do on Table B1. That is, we report on col. (8) the raw fiscal gift flow V_t^{f0}, the total net wealth value transmitted via inter vivos gifts during year t, as reported to tax authorities. We then compute the raw gift-bequest ratio $v_t = V_t^{f0}/B_t^{fo}$ by dividing col.(8) by col.(1). We find the gift-bequest ratio was relatively stable around 30%-40% from the 1820s to the 1850s, then declined somewhat and stabilized around 20%-30% from the 1870s to the 1970s, and then gradually rose to about 40% in the 1980s, 60%-70% in the 1990s and over 80% in the 2000s (see Table B1, col.(9)). We compute the corresponding upgrade factor $1+v_t$ (col. (11)), which we multiply by non-filers-and-tax-exempt-assets-corrected fiscal series B_t^{f2} (col. (6)) in order to obtain our final estimates B_t^{f2} of the fiscal inheritance flow (col.(10)). In effect, we are assuming that the same upward correction for non-filers and tax-exempt assets apply to bequests and gifts, which as a first approximation seems like the most natural assumption (though it probably understates the true economic importance of gifts).[186]

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[183] See Appendix A, section A.5.

[184] For simplicity we again assumed linear trends. See Table B1, col. (7).

[185] In the simulations, we re-attribute gifts to the proper generation of decedents. See Appendix D.

[186] Regarding tax exempt assets, the same rules apply to bequests and gifts, so it makes sense to assume the same correction factor (though the 1977 estimates published by Laférrère (1990, p.5) suggest a significantly larger fraction of tax exempt assets for gifts than for bequests; unfortunately we do not have similar estimates for other years, so we decided that it was more reasonable to keep the same correction for bequests and gifts for the entire period under study). Regarding non filers, note that there has never been any official filling threshold for inter vivos gifts: in principle, from 1791 up until the present day, all gifts are supposed to be reported to tax authorities in France, no matter how small they are (otherwise individuals could just fractionalize gifts indefinitely and transmit large wealth levels entirely tax free). In practice however, according to French case law, it is of course allowed to make birthday presents and other “small gifts” (as long as they are of “reasonable” value, which according to case law should be interpreted as varying with the living standards of the donor, among other things) without reporting them to tax authorities. It is likely that many not-so-small gifts never get reported, so that the true non-filers upgrade factor is probably larger for gifts than for bequests.

Our raw fiscal gift flow series (col.(8)) comes from the same data sources as the raw fiscal bequest flow, i.e. published Finance Ministry aggregate annual series for the 1826-1964 period,[187] and DMTG micro files estimates for the 1977-1984-1987-1994-2000-2006 period.[188] Given the importance of the gift-bequest ratio parameter v_t, it would obviously be preferable to have annual series on the gift and bequest flows for the entire period.[189] However we feel reinsured by the fact that the data points at our disposal do show a relatively regular and gradual evolution of the gift-bequest ratio in the long run, including during the recent decades.[190]

Note that inter vivos gifts have always benefited from a number of tax advantages in the French system of bequest and gift taxation. Prior to 1901, there was no explicit tax advantage for gifts: bequests and gifts were subject to similarly low proportional tax rates (varying only with the identity of the heir or donee). The main tax advantage was due to capital gains (and capitalized interest): by giving an asset earlier in life one pays lower taxes, simply because its value is generally lower than at the time of death. With the

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[187] For 1826-1964, we simply reported on col. (8) of Table A1 the raw gift flow series published in AR 1966, p.530, col. "Donations". Note that the Finance Ministry sadly did not compile gift flow series for years 1923-1943 (i.e. the annual 1826-1964 series published in AR 1966 p.530 display years 1923-1943 as missing years, and the Finance Ministry publications of the interwar period do not provide any gift data either). Since the gift-bequest ratio appears to be relatively stable around 20%-30% both in the 1870s-1910s and in the 1940s-1970s, we simply assumed a 25% ratio for the 1920s-1930s (see col. (9), Table B1). Gift tax receipts vs bequest tax receipts series (which are available on an annual basis since the 1820s up until today, and in particular are available for the interwar period) seem to be consistent with this approximate assumption (because of tax progressivity, it is unfortunately difficult to obtain precise tax base estimates from tax receipts series, particularly for the interwar period). The gift flow data published for 1921-1922, as compared to the bequest flow data published after 1925, suggests that the gift-bequest ratio was closer to 25% than to 20% during the interwar period (i.e. was intermediate between pre World War 1 and post World War 2 levels).

[188] For 1984-2000 we report gift flow estimates coming from our own computations using DMTG micro-files. The series we obtain, and the corresponding evolution of the v_t ratio, are similar to those published in various official reports. See e.g. Rapport du Conseil des Impôts, 1998, pp.210-211, for gift and bequest flows similar to ours (corresponding to v_t=29% in 1984 and v_t=64% in 1994). For 2006, we take the estimates published in Rapport CPO 2008: V_t^{f0} = 48.0 billions was computed as the sum of the regular gift flow (39.4 billions) (see Rapport CPO 2008 p.273) and the average yearly 2004-2006 flow under the special cash-gifts regime (8.6 billions) (see CPO 2008 p.241; apparently this extra flow was not included in the regular flow statistics; if we were to exclude it, we would find v_t=67% rather than v_t=82%, which would still be high by historical standards; given the regular flow v_t=81% obtained in the DMTG 2000 micro file, at a time when there was no such special regime, it seems more justified to look at the full flow in 2006). For 1977, the gift and bequest flow estimates computed by Laferrère (1990, p.5) correspond to a gift-bequest ratio v_t=49% (=(37.7-14)/(57.8-9)). However this does not seem fully consistent with the gift tax receipts vs bequest tax receipts series, which suggest that the gift-bequest ratio in the 1970s was similar to the levels observed in the 1964 and in 1984 (i.e. v_t=25%-30%). So we did not use this 1977 gift estimate and instead assumed that the ratio v_t evolved linearly between 1964 and 1984 (see Table B1, col. (10)). This would need to be further investigated.

[189] In 2006 the Finance Ministry started to computerize all gift tax returns on an annual basis, so in principle data quality should improve soon. So far this however does not apply to bequest tax returns.

[190] We need annual series on the gift-bequest ratio v_t for the economic inheritance flow computation (see Appendix A, section A2), which we obtained by simple linear interpolation (see Table B1, col. (9)). Given the data at our disposable, this looks like the most reasonable approximation.

introduction of tax progressivity in 1901, another implicit tax incentive was created: by splitting an estate into several pieces one could end up in lower tax brackets and hence pay lower total taxes.[191] With the rise of top tax rates in the interwar period, this became increasingly problematic, and in 1942 a major reform was enacted in order to unify the bequest and gift taxes. Since 1942 until the present day, the general rule is that the same graduated tax schedules apply to both bequests and gifts, and most importantly that all inter vivos gifts are "recalled" when the donor dies and are added to the bequest left at death, so that each heir ends up paying taxes on the basis of the total estate he or she received from the decedent. In principle, the system is designed so as to achieve full tax neutrality between gifts and bequests: if you want to transfer a given asset to your kid, then the total tax burden is the same whether you transmit half now and half at your death or you transmit it entirely at your death.[192]

In practice, however, gifts remained less taxed than bequests after 1942, and these tax advantages were significantly reinforced in the late 1990s and in the 2000s. First, the 1942 reform did not eliminate the capital gains (and capitalized interest) tax advantage: recalled gifts have always been valued at the time they were made, not at the time of death. In times of high inflation and even more rapidly rising asset values, this can make a big difference.[193] Next, the 1942 reform created a special 25% tax rebate for so called "sharing gifts" ("donations-partages"), i.e. inter vivos gifts with equal sharing between all children. This special 25% tax rebate regime was abolished in 1981, but then re-introduced in 1986 for "sharing gifts" made by donors aged less than 65-year-old (no such age condition existed in the 1942-1981 regime). This was then extended in 1996-1998 to all gifts made

[191] In addition the tax rates themselves differed: between 1901 and 1942, bequests were subject to graduated tax schedules, while gifts were subject to quasi-proportional tax rates (always varying with the identity of the donee).

[192] The tax paid at the time of the gift is deducted from the tax liability computed at the time of death on the sum of gift and bequest. I.e. if t(.) is the relevant tax schedule, v is the gift and b is the bequest, then one pays tax t(v) at the time of the gift, and t(b+v)-t(v) at the time of death, so that the total tax payment is t(b+v), independently of the b vs v split, for given b+v. Note that although so-called "recalled gifts" ("donations rappelées") play an important role for tax computation, they are never included in the Finance Ministry estate tax statistics we used (i.e. the tax administration always compiled separate statistical tables for bequests and gifts, both before and after 1942). The bequest flow reported on col. (1) of Table B1 is the bequest flow strictly speaking, excluding recalled gifts ("hors donations rappelées"). In 1977-2006 DMTG micro-files, we do observe all variables necessary to reproduce the tax computations, and in particular we observed recalled gifts (together with the year of gifts), but we did not add them to the bequest flow. We did check though the reported recalled gifts are consistent with observed past gift flows (given mortality rates and other special rules applying to gifts, see below); they are consistent, i.e. the system seems to be applied relatively strictly.

[193] Also, note that within the realm of the 1942 law, donors can choose (but are not obliged) to pay the gift tax in place of the donee, and this tax gift t(v) is not recalled at the time of death (but is deducted from the tax t(b+v) paid by the heir). For large estates and high tax rates, this can be significant.

by donors aged less than 65-year-old; it is still in place today.[194] In effect, this special regime became a policy tool to favour early estate transmission to children, together with other temporary regimes enacted in the late 1990s and the 2000s.[195] Finally, the so-called "10 year rule" was introduced in 1992, which significantly altered the general principle of "recalled gifts" instituted in 1942. Since 1992, gifts made more than 10 years before the time of death are not recalled any more. I.e. they still pay gift tax at the time they are made, but they are not added any more to the estate when the bequest tax is computed. In 2006, the "10 year rule" became a "6 year rule".[196]

It is plausible that the increased tax advantages given to gifts in the 1990s-2000s did contribute to the recent rise of the gift-bequest ratio v_t. Because we do not have annual data, it is difficult however to isolate the impact of tax incentives per se, as opposed to the many non-tax-related reasons that could explain the rise in v_t. In particular, it is equally plausible that rising age expectancy alone can explain why parents start giving away larger fractions of their wealth in inter vivos gifts (e.g. so as to help their children to buy a home at a reasonably early age), quite independently from tax incentives. Given that the rise of the gift-bequest ratio v_t appears to start in the 1980s and early 1990s, i.e. before the

[194] The exact parameters have changed a lot. In 1987-1996, "sharing gifts" made by donors aged less than 65 benefited from a 25% tax rebate, and those made under age 75 had a 15% tax rebate. These same rules were extended to all inter vivos gifts in 1996; the 25%/15% rates became 50%/30% in 1998; they still apply today, except that the age limits are now 70/80 rather than 65/75.

[195] In 1998-2001 a general tax rebate of 30% was applied to all gifts (with no age condition). This was reiterated in 2003-2005 (with a 50% tax rebate, again with no age condition). In addition, a new special regime for cash gifts below 30,000€ given to children and grand-children was applied in 2004-2006 (full tax exemption); this special regime was made permanent in 2007 (but with an age condition: the donor needs to be less than 65-year-old). These frequent changes in tax incentives have generated significant short-run variations in the volume of gifts, as one might expect, and as one can see from annual gift tax receipts series (see Rapport CPO 2008, pp.240-242). Similar phenomena already occurred in the past (e.g. gift tax receipts rise in 1981, prior to the repeal of the sharing gifts regime and the creation of the wealth tax). Generally speaking, gift flows are structurally more volatile than bequest flows, and one must be careful when using non-annual gift series (which can easily be contaminated by purely temporary, tax-induced variations). Our 1964-1984-1987-1994-2000-2006 aggregate gift flow estimates appear however to be representative of the long run tendency (i.e. by using gift tax receipts annual series we did our best to ensure that these are not particularly high v_t or low v_t years; e.g. we smoothed over three years the large extra flow generated by the cash-gifts special regime in 2004-2006, see above), to the extent of course that there exists a long run tendency (see below the discussion on the long run sustainability of high v_t ratios).

[196] Together with the 2007 increase in the tax exemption threshold (from 50,000€ to 150,000€ per children, see above), this implies that one can now transmit relatively large estates to children without paying any tax, assuming one starts making gifts sufficiently early. The way the "x year rule" works is indeed that one can in effect benefits from the base exemption every x years. So, to consider an extreme case, under the "6 year rule", by starting making gifts at age 50 a parent dying at age 80 can now transmit six times 150,000€ tax free to a given children, i.e. 900,000€. Each parent can do that with each children, so in effect a sufficiently forward looking (and tax-phobic) married couple with two children can transmit 3.6 millions € tax free to its children. This is comparable to the base exemption threshold currently applied in the U.S. (2 million $ in 2008, for each parent), but requires relatively sophisticated behaviour, and high parental willingness to give away assets relatively early in life. This new legal regime has been applied only since September 2007, and it will take several decades (and much better data than that currently available) before one can estimate its full long run effects.

changes in tax incentives, one is tempted to conclude that non-tax factors played a dominant role. Also note that parents did not start making gifts earlier in life in recent decades: the average age gap between decedents and donors appears to have been relatively stable around 7-8 years since the 1960s, and in particular during the 1980s-1990s-2000s.[197] This suggests that the new tax incentives (most of which decline with age) did not play a major role, or at least did not have the impact expected by policy makers. In any case, note that whether tax factors or non-tax factors explain the observed rise of the gift-bequest ratio v_t since the 1970s, and in particular the very high levels observed in the 2000s (over 80%), is not really relevant for our purposes in this research. What is potentially more relevant is to know whether there has been some kind of "overshooting" of gifts in the recent past in France, in the sense that the relatively large bequests-plus-gifts flows observed in the 2000s might not be sustainable (i.e. because the cohorts who made unusually large gifts in the 2000s will also leave unusually small bequests in the 2010s). We address this issue when we present the results from the simulated model (see Appendix D).

B.2. Data on the age profile of wealth $w_t(a)$ and computation of the μ_t ratio

Our series on age-wealth profiles $w_t(a)$ and our resulting estimates of μ_t ratios are reported on Tables B3 to B5. Here we describe the data sources and methods used to construct these tables.

Table B3: Raw data on the age-wealth profile of decedents $w_{dt}(a)$, 1820-2006

On Table B3 we report our raw data on the age-wealth profiles of decedents. We note $w_{dt}(a)$ the average wealth at death of decedents of age a (i.e. the average estate left by decedents of age a),[198] and $w_t(a)$ the average wealth of living individuals of age a. In case decedents of each age group are a representative sample of the living, i.e. under the uniform mortality assumption, then by definition $w_{dt}(a)=w_t(a)$. However, in practice, there exists extensive empirical evidence showing that differential mortality between the rich and the poor is quantitatively important and age-varying, i.e. $w_{dt}(a)$ is smaller than $w_t(a)$ and the gap varies with age. So it is critical to correct our raw wealth-at-death age profiles $w_{dt}(a)$

[197] See Table B6 below or Appendix C…

[198] Of course with annuitized wealth the average wealth of decedents of age a (right before death) and the average estate left by decedents of age a (right after death) could differ, and so would the age profiles. However the fraction of annuitized wealth is very small in France, and this can be ignored here. On this issue, see Appendix A, section A5.

(Table B3) in order to compute corrected wealth-of-the-living age profiles $w_t(a)$ (Table B4), before we can properly compute the μ_t ratio (Table B5). For now we present the raw wealth-at-death age profiles $w_{dt}(a)$ reported on Table B3.

Our raw data on the age profile of wealth-at-death $w_{dt}(a)$ comes from published estate tax tabulations and from estate tax micro-files (see below). Given that we are solely interested in the relative age profile of wealth (and not in the absolute wealth levels per se), and in order to ensure easy comparability of the profiles over time, we choose to express our data on age-wealth profiles in terms of $w_{dt}(a)/w_{dt}^{50\text{-}59}$ ratios, i.e. we express the average wealth of all age groups as a fraction of average wealth of decedents aged 50-to-59-year-old. E.g. in 2006 the average wealth of decedents aged 80-year-old and over was equal to 134% of the average wealth of decedents aged 50-to-59-year-old, the average wealth of decedents aged 70-to-79-year-old was equal to 106% of the average wealth of decedents aged 50-to-59-year-old, etc.

Our raw data suffers from a number of limitations. First, because published estate tax tabulations used age brackets 0-9, 10-19, 20-29,…, 70-79, 80 and over, and also because of the limited sample size of DMTG micro-files, we also used these decennial age brackets to estimate μ_t ratios, i.e. we did not attempt to estimate the shape of continuous $w_{dt}(a)$ age-wealth profiles.

Next, age-wealth profiles are available only for a limited number of years. For the 1977-2006 period, we used the age-wealth profiles coming from the DMTG micro files. Unfortunately the age data from the initial DMTG 1977 file is not usable,[199] so for the post-1977 period we only report on Table B3 raw age-wealth profiles for years 1984, 1987, 1994, 2000 and 2006.[200]

[199] The DMTG 1977 age table published by Fouquet and Meron (1982, p.88) only reports the number of estate tax returns by age bracket (not the value of these estates), which is insufficient to reliably estimate the age-wealth profile.

[200] Note that the “raw” age-wealth profiles reported on Table B3 all include a correction for non-filers (see below). For 1984-2000, we report profiles coming from our own computations using DMTG micro-files. For 2006, we use the age table (indicating numbers and values of estates by age bracket) computed from the DMTG 2006 survey and published in Rapport CPO 2008, p.251. Note that this table actually reports average individual bequest shares (“parts successorales moyennes”) by age-of-decedent brackets (rather than average estate). To the extent that the average number of successors rises with decedent age (which we observe for other years), this suggests that we under-estimate somewhat the steepness of the 2006 age-wealth profile (and hence the μ_t ratio in 2006).

For the 1902-1964 period, we can use the Finance Ministry tabulations broken down by age bracket. Similarly to the tables indicating the number and value of estates broken down by estate bracket, the Finance Ministry tables indicating the number and value of estates broken down by age bracket rely on the exhaustive set of all estate tax returns during a given year, so the resulting age-wealth profiles are extremely reliable. Unfortunately, while the estate-bracket tables were compiled and published by the French tax administration on a quasi-annual basis during the entire 1902-1964 period, the age-bracket tables were established solely during the 1943-1964 period.[201] Prior to 1943, age tables were compiled and published in 1906, 1908, 1928 and 1934, but they solely report the number (and not the value) of estates broken down by age bracket.[202] So for the pre-1943 period, the age-wealth profiles reported on Table B3 rely primarily the exhaustive micro files of all individual estate tax returns filed in Paris in 1807, 1812, 1817, etc., 1937 compiled every 5 years by Piketty, Postel-Vinay and Rosenthal (2006). This is certainly a very rich data base (we know full individual-level details about assets, decedents and heirs), and Paris alone was a pretty big part of France wealth-wise during the 19th century and the first half of the 20th century.[203] However there is no reason to believe that Paris age-wealth profile are representative of the whole of France, so we used several other sources in order to carefully convert our observed Paris profiles into the national profile estimates reported on Table B1 for the pre-1943 period.

First, thanks to the Finance Ministry 1943-1964 tabulations and to the DMTG 1977-2006 micro files, we do observe separately Paris and France-minus-Paris age-wealth profiles for the whole post-1943 period.[204] We find that the Paris profile has always been more strongly upward sloping than the national profile (relatively to the 50-to-59-year-old, the 60-to-69, 70-to-79 and 80-and-over-year-old groups have always been richer in Paris than in the rest of France), but that the gap is relatively constant over time, so that one can relatively easily estimate the national profile from the Paris profile and from the Paris share

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[201] Tables broken down by age brackets compiled during the 1943-1964 period were published in the same statistical bulletins (BSLC, BSMF and S&EF) as the tables broken down by estate brackets. See Piketty (2001, Appendix J, p.749) for exact references. Just like the estate-bracket tables, these age-bracket tables were also compiled and published at the department-level (not only at the national level). Between 1943 and 1954, the tax administration also compiled and published cross tabulations indicating the number and values of estates broken down by estate and age cross brackets.

[202] The 1906-1908-1928-1934 age tables were published in the same BSLC bulletins as other tables.

[203] Around 1890-1930, the Paris share in the aggregate national bequest flow was over 25%. Earlier in the 19th century, it was about 15%-20%. See Piketty et al (2006, table 1, p.240).

[204] The 1943-1964 age-bracket tables compiled by the tax administration were also compiled and published at the department-level (about 90 departments in France, including Paris) (see above). The 1977-2006 DMTG micro samples are too small in size to compute reliable department-level age tables, but sufficiently large to compare Paris profiles with France-minus-Paris profiles, which we did with the 1984-2000 micro-files.

in the national bequest flow, which we know from our Paris 1807-1937 micro files. In order to test the accuracy of this method, we used the Finance Ministry 1906-1908-1928-1934 national age tables, as well as the detailed cross tabulations by estate and age brackets (with numbers and values of estates) compiled for Paris and for the Manche department (relatively representative of rural France, according to later years) compiled in a special survey organized by the tax administration in 1931.[205] These tests show that our Paris-France extrapolation method is consistent. So we feel that the estimated national age-wealth profiles $w_{dt}(a)$ reported on Table B1 for the period going from the 1890s to the 1930s are as reliable as the post-1943 profiles.[206] For the earlier parts of the 19th century, there exists no Finance Ministry national age table, and one must be careful about the fact the relative importance and wealth structure of Paris vis-à-vis the rest of France changed extensively between the 1820s and the 1890s. We used the same data sources as those used by Piketty et al (2006) in order to convert Paris wealth concentration estimates into national wealth concentration estimates.[207] The resulting national age-wealth profiles reported on Table B3 for the 1820s to 1880s are certainly less precise than for the 1890-2006 period, and they ought to be improved. However we tried several alternative assumptions and found that these had little consequence for the 19th century levels and patterns of the μ_t ratio (the key parameter of interest in the context of this research), which appear to be reliable.[208]

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[205] The full results of this 1931 special survey were published by Danysz (1934).

[206] The raw Paris profiles (see Piketty et al (2006, table 5, p.253)) display the same evolution as the national profiles reported on Table B3 for the 1890-1930 period, except that they are always more steeply upward sloping. E.g. around 1890-1910, we estimate that $w_{dt}^{80\text{-}89}$ was about 200%-250% of $w_{dt}^{50\text{-}59}$ for the whole of France, vs as much as 350%-400% in Paris; in the 1920s-1930s, we estimate that $w_{dt}^{80\text{-}89}$ was about 150%-180% of $w_{dt}^{50\text{-}59}$ for the whole of France, vs 200%-300% in Paris. The steeper Paris profiles reflect the extremely high level of wealth concentration prevailing in Paris at that time, and the fact that most top wealth holders were very old (see Piketty et al (2006)).

[207] Namely, housing tax tabulations (which are available for Paris and France throughout the 19th century) and the TRA survey (which includes representative samples of estate tax returns for the all of France starting in the 1820s). Note that the survey suffers from insufficient sample size to properly measure top estates, but is reliable for over 90% of the population; it offers an imperfect but useful source to evaluate how the gap between the Paris wealth structure and the France-minus-Paris wealth structure has evolved over the 19th century. See Piketty et al (2006, pp.248-249).

[208] In particular, the fact that the age-wealth profile gradually became more steeply upward sloping between the 1820s-1850s and the 1870s-1880s (with a corresponding rise in the μ_t ratio) seems to be extremely robust. Note that according to our computations the age-wealth profile was actually more steeply rising in the whole of France than in Paris in the early 19th century (while the opposite occurs in the late 19th century and in the 20th century). E.g. the raw Paris profiles even show hump shaped profiles in 1817 and 1827 (with $w_{dt}^{70\text{-}79}$ and $w_{dt}^{80\text{-}89}$ around 60%-90% of $w_{dt}^{50\text{-}59}$ 1817 and 1827; the Paris profiles then take the standard upward sloping shape from the 1830s onwards; see Piketty et al (2006, table 5, p.253)), while our national estimates show upward-sloping profiles from the 1820s towards. This is consistent with the view that old, wealthy Parisians were hit by strong negative shocks during the Revolutionary years, while in the rest of France the old and wealthy were hit by less strong shocks. However, given the data limitations we face, it is certainly possible that we over-estimate somewhat the steepness of the national age-wealth profile in the 1820s-1830s (i.e. that the old of the 1820s-1830s were somewhat poorer than what it suggested on Table B3).

Finally, note that another limitation of our raw age-wealth data throughout the 1820-2006 period is that by construction we only observe the wealth of estate tax filers. Since the proportion of decedents filling a tax return (whose heirs filled a tax return) varies with age (generally it rises with age, especially among the younger age groups), it is critical to correct for this, otherwise the age-wealth profiles could be severely biased.[209] We proceed as follows. In our raw estate tax data – both in the Finance Ministry 1943-1964 tabulations and in the 1807-1937 Paris micro-files and 1977-2006 DMTG micro-files – we observe the number of estate tax returns $N_{dt}^{f}(a)$ filled for decedents of age group a, as well as the corresponding total estate value $W_{dt}^{f}(a)$ and average reported estate $w_{dt}^{f}(a) = W_{dt}^{f}(a)/N_{dt}^{f}(a)$. We also know from basic demographic data (see Appendix C) the total number of decedents of age group a $N_{dt}(a)$, from which we know the number of non-filers $N_{dt}^{nf}(a) = N_{dt}(a) – N_{dt}^{f}(a)$, and the proportion of filers $n_{dt}^{f}(a) = N_{dt}^{f}(a)/N_{dt}(a)$. What we do not directly observe is the average wealth of non-filers $w_{dt}^{f}(a)$. In the same way as for the computation of the non-filers correction to the aggregate fiscal bequest flow (see section B.1 above), we make simple assumptions about the value of the wealth ratio $z_{dt}^{nf} = w_{dt}^{nf}(a)/w_{dt}^{f}(a)$. I.e. we assume that z_{dt}^{nf} = 5% for years 1820-1964 and z_{dt}^{nf} = 15% for years 1977-2006. We then compute average wealth $w_{dt}(a)$ of all age-a decedents (filers and non-filers) by applying the following equation:

$$w_{dt}(a) = [\ n_{dt}^{f}(a) + (1-n_{dt}^{f}(a))\ z_{dt}^{nf}\ ]\ w_{dt}^{f}(a) \qquad \text{(B.2)}$$

It is apparent from equation (B.2) that the exact value of z_{dt}^{nf} has a limited impact on the overall age-wealth profile $w_{dt}(a)$, and even less on the resulting μ_t ratio.[210] The dominant effect comes from the filers fraction $n_{dt}^{f}(a)$. Typically, when the aggregate fraction n_{dt}^{f20+} of tax filers among adult decedents is about 50%, the observed age-level fraction of tax filers $n_{dt}^{f}(a)$ can be as large as 60%-70% for the older groups (60-69, 70-79 and 80-and-over), and as low as 30%-40 for the younger groups (20-29, 30-39 and 40-49). The pattern varies over time, and generally tends to reinforce the effects of the average reported

[209] In the data reported in Piketty et al (2006, table 5, p.253), we forgot to make this correction for year 1994. As a consequence, the reported national profile does not look as upward sloping as it is really (the reported profile even looked – wrongly – slightly hump shaped at high ages). Also, for year 1947, we wrongly reported the Paris profile (in spite of the fact that we refer to it as the national profile), which was at that time slightly upward sloping (while the national profile was hump shaped). For consistent national age-wealth profiles, one should use the new, revised estimates reported on Table B3 of the present paper rather than the estimates reported in Piketty et al (2006) for 1947 and 1994 (the 1807-1902 Paris profiles reported in this paper are correct, though).

[210] We performed several alternative computations with z_{dt}^{nf} varying in the 5%-15% range (and varying with age), and the resulting impact on the level and pattern of μ_t ratios was less than 1%.

wealth pattern.[211] Note that for very young decedents (0-9 and 10-19), the fraction of tax filers is very small (less than 5% in the postwar period, and generally less than 10% in the earlier periods): it is quite rare that children die, and it is even rarer that they die after having already inherited an estate at such an early age; so most of the time for children decedents there is no estate to report to the tax administration. As a consequence, the average wealth estimates for children decedents rely on a limited number of observations and should be viewed as approximate (they are very small anyway).[212]

Table B4: Corrected age-wealth profile $w_t(a)$, 1820-2006

On Table B4 we report our corrected age-wealth-of-the-living profiles $w_t(a)$. These were obtained from the raw age-wealth-at-death profiles $w_{dt}(a)$ reported on Table B3, by applying the differential mortality parameters indicated on Table B4.[213]

On the basis of available empirical evidence (see below), we model differential mortality as follows. For each age group a, we assume that the poor (defined as the bottom half of the wealth distribution for this age group) have a higher mortality rate than the rich (defined as the upper half of the wealth distribution for this age group). That is, we note $m_t^P(a)$ the mortality rate of the poor, $m_t^R(a)$ the mortality rate of the rich, and $\delta_t(a) = m_t^P(a)/m_t^R(a) > 1$ the differential mortality ratio. By construction, $(m_t^P(a)+m_t^R(a))/2 = m_t(a)$, where $m_t(a)=N_{dt}(a)/N_t(a)$ is the mortality rate of age group a during year t, $N_{dt}(a)$ is the number of decedents of age a, and $N_t(a)$ is the number of living individuals of age a. So we have:

$$m_t^P(a)/m_t(a) = 2\delta_t(a)/(1+\delta_t(a)) \quad (> 1) \qquad (B.3)$$

$$m_t^R(a)/m_t(a) = 2/(1+\delta_t(a)) \quad (< 1) \qquad (B.4)$$

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[211] E.g. in the immediate postwar period, when the pattern of average wealth $w_{dt}^f(a)$ reported to the tax administration is hump shaped, the pattern of tax filers fractions $n_{dt}^f(a)$ is also hump shaped (the very old more often with wealth so small that it does not get reported), thereby making the pattern of $w_{dt}(a)$ (which we report on Table B3) even more hump-shaped.

[212] Because $N_{dt}^f(a)$ is usually extremely small for age groups 0-9 and 10-19, the corresponding average wealth $w_{dt}^f(a)$ can be very volatile across years (especially with the DMTG samples). So the $w_{dt}(a)$ estimates reported on Table B3 for age groups 0-9 and 10-19 are based upon approximate moving averages (e.g. for 1984-2006 we report the averages obtained for all years 1984-2006). We checked in the simulated model that these young-age $w_{dt}(a)$ estimates were consistent with the observed patterns of parental age at death and children age at parental death over the entire 1820-2006 period; they are consistent, in the sense that the relative wealth that we attribute to children for various time periods (e.g. during the 19th century) is approximately equal to what they should own according to the simulation model (see Appendix C and D).

[213] See formulas in the excel file.

We also note $sh_t^P(a)$ the poor's share in total wealth of age group a at time t. By construction, the average wealth of the poor $w_t^P(a)$ is equal to $2sh_t^P(a)w_t(a)$, and the average wealth of the rich $w_t^R(a)$ is equal to $2(1\text{-}sh_t^P(a))w_t(a)$. For a given age group the ratio $w_{dt}(a)/w_t(a)$ between the average wealth of decedents and average wealth of the living can then be computed as follows:

$$w_{dt}(a)/w_t(a) = [2\ sh_t^P(a)\ m_t^P(a) + 2(1\text{-}sh_t^P(a))\ m_t^R(a)] / [m_t^P(a) + m_t^R(a)]$$

I.e.:

$$w_{dt}(a)/w_t(a) = m_t^P(a)/m_t(a)\ sh_t^P(a) + m_t^R(a)/m_t(a)\ (1\text{-}sh_t^P(a)) \qquad (B.5)$$

Our preferred differential mortality parameters are reported on the upper part of Table B4. That is, we assume that throughout the period of study the differential mortality ratio $\delta_t(a)$ is equal to 200% for age groups 0-9 to 40-49 year-old, and then declines to 180% for 50-59 year-old group, 150% for 60-69 year-old group, 130% for 70-79 year-old and 110% for 80-year-old and over. I.e. the mortality rate of the poor is twice as large as that of the rich below 50-year-old, and then the gap slowly declines towards 10% for the very old. Next, for simplicity we assume that throughout the period of study the wealth share of the poor is equal to $sh_t^P(a)$=10% for all age groups.[214]

Applying these parameters and the above formulas, we obtained ratios $w_{dt}(a)/w_t(a)$ ratios equal to 73% below 50-year-old, and then rising until 96% for the 80-year-old and over (see Table B4). I.e. because the poor are over-represented among decedents (especially among young-age decedents), the average wealth of decedents at any given age is below the average wealth of the living (and especially so at young age). Alternatively, one can see that the $w_t(a)/w_{dt}(a)$ ratios are above 100% for all age groups and declining with age, from 136% below 50-year-old to 104% for the 80-year-old and over (see Table B4). I.e. if one observes the average wealth of decedents of a given age group, then one needs to upgrade this value by a factor ranging from 136% to 104% (depending on age) in order to compute the average wealth of the living for this given age group.

[214] As was already discussed (see section B1 above), the bottom 50% wealth share probably rose somewhat in the long run (say, from less than 5% in the 19th century early 20th century to about 5%-10% today), and it also rises slightly with age (within the 5%-15% range). These are relatively small variations, however, on which we do not have very good data, so we thought it was clearer to make this simplifying assumption ($s_t^P(a)$=10% for all years and age groups). We checked that the resulting μ_t ratio estimates are very robust with respect changes in the assumed patterns $s_t^P(a)$. E.g. if one assumes that $s_t^P(a)$ rises over time and/or with age (within the 5%-15% range), then the pattern of μ_t ratios hardly changes, as one can check by changing the parameters in the corresponding excel file.

Multiplying this profile of $w_t(a)/w_{dt}(a)$ ratios by the raw age-wealth-at-death profiles $w_{dt}(a)$ reported on Table B3 yields the corrected age-wealth profiles $w_t(a)$ reported on Table B4. Unsurprisingly, the corrected profiles look less strongly upward-sloping (or more hump-shaped, in the immediate postwar period) than the raw profiles: the differential mortality correction leads to increase the wealth of the 50-to-59-year-old relative to the 80-to-89-year-old (because the poor are more massively over-represented in the former group than in the latter).

The way we model differential mortality is relatively standard in the literature,[215] and is consistent with the best available empirical evidence. In particular, Attanasio and Hoynes (2000) compute mortality rates broken down by wealth quartiles and by age groups. They find that bottom quartile mortality rates are significantly larger than those of other quartiles, and that the mortality ratio is a strongly declining function of age (i.e. differential mortality is larger at low age). The differential mortality parameters used in our computations are directly taken from this paper.[216] We also tried several alternative formulations (e.g. mortality differentials defined at the wealth quartile level, rather than at the bottom half vs upper half level), but we found that this made very little difference in terms of final μ_t ratios estimates, and decided that the extra complexity associated to there more sophisticated formulations was not really justified given our purposes in this research.

There is also an issue as to whether the quantitative importance of differential mortality has changed significantly in the long run. Here we simply assumed constant differential mortality parameters over the entire 1820-2006 period. In order to test for the consistency of this assumption, we computed the average age at the death of the poor and the rich predicted by our differential mortality parameters, given observed average mortality rates by cohort since 1820. We found that the predicted age-at-death gap between rich and poor was relatively stable at about 4-5 years over the 1820-2006 period, and that the predicted

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[215] See e.g. Kopczuk and Saez (2004), who carefully review the evidence, and adopt the following age profile of differential mortality: they assume that the ratio between the mortality rate of the rich and the aggregate mortality rate is equal to about 60%-70% below age 50, up to about 80%-90% at age 70 and 100% above age 90 (see Kopczuk-Saez, 2004, working paper version, pp.37-39 and Figure A4). This is very close to the profile adopted here (see Table B4).

[216] See Attanasio and Hoynes (2000, p.9, table 4). They find that the ratio between the bottom quartile mortality rate and the other three quartiles mortality rate can be as high as 200%-300% at low age (below 50-60), and then declines towards 150% at higher ages (70-80). Within the top three quartiles, differential mortality seems to be more limited (gaps are usually not significant). If one computes the ratio between the bottom half and upper half mortality rates from these Attanasio-Hoynes results, one finds the pattern reported on Table B4 (i.e. from 200% below age 50 to 110%-130% at age 70-80).

gap between the rich and the average was relatively stable at about 2-3 years, both with a slight downward time trend.[217] Using estate tax data, we can compute the average age at death of tax filers (i.e. approximately the upper half of the wealth distribution) over the 1906-2006 period, and compare it the average age of decedents. We again find a relatively stable rich vs average gap of about 2 years over the past century.[218] We conclude from this that our simple assumption of stable differential mortality parameters is acceptable as a first approximation. If anything, we might slightly overstate differential mortality, especially in the recent period, which would imply that our μ_t ratio is slightly underestimated for the recent decades.

<u>Table B5: Computation of μ_t and μ_t* ratios in France, 1820-2006</u>

On Table B5 we report our estimates for the ratio μ_t. By definition, μ_t is the ratio between average wealth of decedents and average wealth of the living, so it can easily be computing by weighting by the relevant population the age-wealth-at-death profiles $w_{dt}(a)$ reported on Table B3 and the age-wealth-of-the-living profiles $w_t(a)$ reported on Table B4, and by dividing one by the other. As we explained in the working paper (section 3.1), we find it more convenient to exclude children from our basic accounting equation relating the aggregate bequest flow to aggregate wealth, which we wrote as follows:

$$B_t = \mu_t \ m_t \ W_t \qquad \text{(B.6)}$$

With: B_t = annual bequest flow

W_t = aggregate private wealth

m_t = adult mortality rate = N_{dt}^{20+}/N_t^{20+} = $[\sum_{a\geq 20} N_{dt}(a)] / [\sum_{a\geq 20} N_t(a)]$

We chose to do so because children usually own very little wealth (except in the few cases where they have already inherited). The advantage of this formulation is that this makes both the levels and evolutions of the coefficients μ_t and m_t easier to interpret. In particular this allows us to abstract from the large historical variations in infant mortality (which was

[217] See appendix do-file domortadiff.txt.

[218] See Appendix C, Table C7, col. (1)-(3). The age-at-death gap between the rich and the average seems to be somewhat lower in the mid 20th century (as little as 0.5-1 years) than at the beginning and at the end of the century (2-2.5 years). Note however the average ages for tax filers were computed using the Finance Ministry tables with decennial age brackets, and are therefore not very precise. Note also the abnormally high age gap of 4 years in 1943: this is clearly due to the abnormally high number of relatively young age decedents in this year (most of which did not file a tax return). All average ages reported on Table C7 of course solely refer to adult decedents (20-year-old and over).

much higher in the 19th century than it is today). However strictly speaking children wealth is not exactly equal to zero (because children sometime inherit), so in order to ensure the full consistency of the accounting equation (B.6) we need to introduce a small correction factor cf_t in the definition of the μ_t ratio so as to correct for the existence of positive children wealth. Taking children into account, the accounting equation is actually the following:

$$B_t = \mu_t^{0+} m_t^{0+} W_t \qquad (B.7)$$

Where $m_t^{0+} = N_{dt}^{0+}/N_t^{0+} = [\sum_{a\geq 0} N_{dt}(a)] / [\sum_{a\geq 0} N_t(a)]$ is the average mortality rate for the entire population (including children), and μ_t^{0+} is the ratio between average wealth of the deceased and average wealth of the living computed for the entire population (including children), i.e.:

$$\mu_t^{0+} = w_{dt}^{0+}/w_t^{0+} \qquad (B.8)$$

With: $w_{dt}^{0+} = (\sum_{a\geq 0} N_{dt}(a)w_{dt}(a))/N_{dt}^{0+}$ = average wealth of all decedents (incl. children)
$w_t^{0+} = (\sum_{a\geq 0} N_t(a)w_t(a))/N_t^{0+}$ = average wealth of all living individuals (incl. children)

This differs from the μ_t^{20+} ratio defined over adults (20-year-old and over):

$$\mu_t^{20+} = w_{dt}^{20+}/w_t^{20+} \qquad (B.9)$$

With: $w_{dt}^{20+} = (\sum_{a\geq 20} N_{dt}(a)w_{dt}(a))/N_{dt}^{20+}$ = average wealth of adult decedents
$w_t^{20+} = (\sum_{a\geq 20} N_t(a)w_t(a))/N_t^{20+}$ = average wealth of adult living individuals

By combining equations (B.6) and (B.7), one obtains a simple formula for the children-wealth correction factor cf_t:

$$\mu_t = cf_t \ \ \mu_t^{20+} \qquad (B.10)$$

$$\text{With:} \qquad cf_t = [W_t^{20+}/W_t] / [B_t^{20+}/B_t] \qquad (B.11)$$

With:
W_t^{20+} = total wealth of adult living individuals = $\sum_{a\geq 20} N_t(a)w_t(a)$
W_t = total wealth of all living individuals (incl. children) = $\sum_{a\geq 0} N_t(a)w_t(a)$

B_t^{20+} = total bequests left by adult decedents = $\sum_{a\geq20} N_{dt}(a)w_{dt}(a)$

B_t = total bequests left by all decedents (incl. children) = $\sum_{a\geq0} N_{dt}(a)w_{dt}(a)$

I.e. the correcting factor cf_t is equal to the ratio between the share of living individuals aged 20-year-old-and-over in aggregate private wealth W_t^{20+}/W_t and the share of decedents aged 20-year-old-and-over in the aggregate bequest flow B_t^{20+}/B_t. Of course if children own no wealth at all, then both shares are equal to 100%, the correcting factor cf_t is also equal to 100%, and the μ_t ratio is simply equal to the μ_t^{20+} ratio defined over the adult population: i.e. there is no need for a correction factor.

Applying the equations above to the age-wealth-at-death profiles $w_{dt}(a)$ and the age-wealth-of-the-living profiles $w_t(a)$ reported on Tables B3-B4, and to the demographic series $N_{dt}(a)$ and $N_t(a)$ provided in Appendix C, we obtain the series for the various ratios reported on Table B5 (col. (6)-(12)).[219] As one can see, adult shares are not exactly equal to 100%, but they are very close. According to our computations, the share owned by adults in the aggregate wealth of the living W_t^{20+}/W_t gradually grew from about 95% in the 19th century to about 99% in the early 21st century (see Table B5, col. (10)). The fact that the children wealth share declines over time reflects the fact that children successors have become rarer over time. According to our computations, the share left by adults in aggregate bequest flow B_t^{20+}/B_t also grew in the long run, from about 98% in the 19th century to almost 100% in the 20th century (see Table B5, col. (9)). The fact that the latter is always somewhat smaller than the former reflects the fact that children leave bequests even more rarely than they receive bequests. Consequently, the correcting factor cf_t is always slightly smaller than 100%. As expected, it is however very close to 100%: about 97% in the 19th century, and about 98%-99% during the 20th century (see Table B5, col. (8)). The children wealth correction factor is virtually irrelevant for our aggregate series.[220]

Multiplying the adult ratio μ_t^{20+} (col. (7)) by the children correction factor cf_t (col.(8)), we get our children-corrected ratio μ_t (col.(11)). We find that μ_t was about 120%-140% from 1820 to 1913, then dropped to less than 90% in the immediate postwar period, then gradually increased to over 120% in the 2000s. Multiplying μ_t by $1+v_t$, where v_t is the gift-bequest ratio (see section B.1 above), we get our gift-corrected ratio $\mu_t^*=(1+v_t)\mu_t$ (col. (12)). We find

219 See excel file for formulas.

220 An alternative strategy would have been to forget about children wealth altogether (and to attribute to adults the small share of national wealth owned by children in the real world). However in our simulations we do model explicitly the full age structure of decedents and heirs (see Appendices C and D), and it would have been somewhat arbitrary to truncate distributions of heirs age at 20.

that μ_t* was about 150%-160% from 1820 to 1913, then dropped to little more than 100% in the immediate postwar period, then gradually increased to over 220% in the 2000s. We use these μ_t* series to compute the economic inheritance flow in Appendix A (section A.2).

We also report on Table B5 the ratio between the average wealth of living individuals aged 50-to-59-year-old w_t^{50-59} and the average wealth of all adults w_t^{20+} (see col. (13). Note that the average wealth w_t^{20+} is slightly smaller than per adult wealth w_t, which we defined in Appendix A (Tables A1-A2, col. (8)) as aggregate private wealth W_t divided by the number of adults N_t^{20+}: $w_t^{20+} = w_t \times [W_t^{20+}/W_t]$. On Table B5 we also report the ratio between w_t^{50-59} and per adult wealth w_t (see col. (14)). We use it in the simulated model (see Appendix D).

Finally, we also report on Table B5 (col.(1)-(5)) the estimates for the μ_t ratios that one would obtain under uniform mortality assumptions, i.e. ignoring differential mortality. Col. (1)-(5) of Table B5 were obtained by applying the same formulas as above, but by assuming that the age-wealth-of-the living profile $w_t(a)$ is the same as the age-wealth-at-death profile $w_{dt}(a)$.[221] As one can see, differential mortality has a strong impact on estimated μ_t ratios. Under uniform mortality assumptions, the μ_t^{20+} ratio would be as large as 160%-180% from 1820 to 1913 (instead of 120%-130% under differential mortality assumptions), and would be over 150% in the 2000s (instead of over 120%) (see Table B5, col. (2) vs col.(7)). Throughout the period 1820-2006, the μ_t ratio would be about 25%-30% larger under uniform mortality assumptions. I.e. according to our computations, differential mortality (the fact that the rich dies less often than the poor) makes aggregate bequest flows about 25%-30% lower than they would otherwise be.

[221] See formulas in excel file.

Appendix C: Demographic Data

In addition to national accounts data and estate tax data, this research also relies intensively on demographic data. First, at various points we need a relatively complete demographic file with annual numbers of living individuals $N_t(a)$ and decedents $N_{dt}(a)$ by exact age and cohort, which we constructed using available historical population tables for the 1820-2009 period and existing population projections for the 2010-2100 period. The way we assembled this basic demographic data base is described in section C1. Next, in order to simulate the age-level dynamics of wealth accumulation and inheritance, we also need relatively complete data on the age structure of decedents, successors, donors and donees. The way we constructed this supplementary data base is described in section C2.

C.1. Basic demographic data (population tables)

We report on Tables C1-C4 a number of demographic series which we use repeatedly in Appendix A and B.[222] These series are directly extracted from our basic demographic data base, which takes the form of a Stata format data base, which we describe below.

Notations

We use the same demographic notations as in Appendices A and B:

N_t = total living population in France on 1/1 of year t (t=1820,1821,…,2100).
By convention population is always estimated on 1/1 (January 1st) of year t.

$n_t = N_{t+1}/N_t - 1$ = population growth rate during year t

N_t can be decomposed by birth cohort x:

$$N_t = \sum_{x<t} N_t^x \qquad \text{(C.1)}$$

With: N_t^x = total living population on 1/1 of year t and born during year x<t

[222] In the same way as in Appendix A and B, the decennial averages reported on Table C2 refer to years 1820-1829 for "1820", 1830-1939 for "1830". The only exceptions are the 1910s (we took the average of years 1910-1913) and the 1940s (we took the average of years 1946-1949): excluding war years clarifies long run evolutions of demographic ratios (particularly mortality rates). Of course in all annual series and in the simulated annual models, we use all yearly data, including war years.

Since N_t is measured on 1/1 of each year t, then by convention $N_t^t = 0$, i.e. nobody is born during year t and alive on 1/1 of year t.

Alternatively, N_t can be decomposed by age group a:

$$N_t = \sum_{a \geq 0} N_t(a) \qquad (C.2)$$

With: $N_t(a)$ = total living population aged a-year-old on 1/1 of year t.

By convention, we measure age on 1/1 of each year, so that a(t,x) = t-x-1
With: a(t,x) = age on 1/1 of year t of individuals born during year x
Alternatively: x(t,a) = t-a-1

E.g. in 1900, the individuals aged 0-year-old are the individuals born during year 1899, the individuals aged 1-year-old are the individuals born during year 1898, etc., and the individuals aged 99-year-old are the individuals born during year 1800.

Due to data limitations, the age distribution is censored at a=99: the age of all individuals with age a≥99 is set to a=99; the birth cohort all individuals with birth cohort x≤t-100 is set to x=t-100 (see below).

We also note $N_t^{20+} = \sum_{a \geq 20} N_t(a)$ the total number of living individuals aged 20-year-old and over on 1/1 of year t.

We use similar notations for decedents:

N_{dt} = total number of decedents in France during year t

N_{dt} can be decomposed by birth cohort x or by age group a:

$$N_{dt} = \sum_{x \leq t} N_{dt}^x = \sum_{a \geq -1} N_{dt}(a) \qquad (C.3)$$

With: N_{dt}^x = number of individuals born during year x and deceased during year t

$N_{dt}(a)$ = number of individuals aged a-year-old on 1/1 of year t (a=t-x-1) and deceased during year t

$N_{dt}^{20+} = \sum_{a\geq 20} N_{dt}(a)$ = total number of individuals aged 20-year-old on 1/1 of year t (a=t-x-1) and deceased during year t

Note that $N_{dt}^{t} = N_{dt}(-1) > 0$: these are the individuals born during year t and deceased during year t (such individuals are therefore not counted in populations N_t or N_{t+1}).

We can then define mortality rates:

$$m_t = N_{dt}^{20+}/N_t^{20+} = \sum_{a\geq 20} N_{dt}(a) \,/\, \sum_{a\geq 20} N_t(a) \qquad \text{(C.4)}$$

(= aggregate mortality rate of individuals aged 20-year-old and above during year t)

$$m_t^{0+} = N_{dt}/N_t = \sum_{a\geq -1} N_{dt}(a) \,/\, \sum_{a\geq 0} N_t(a) \qquad \text{(C.5)}$$

(= aggregate mortality rate of the entire population (including the population aged 0 to 19-year-old) during year t)

$$m_t^{x} = N_{dt}^{x}/N_t^{x} \qquad \text{(C.6)}$$

(= mortality rate of birth cohort x during year t)

$$m_t(a) = N_{dt}(a)/N_t(a) \qquad \text{(C.7)}$$

(= mortality rate of individuals aged a-year-old during year t)

We use similar notations for birth and migrants.

N_{bt} = total number of births in France during year t

$f_t = N_{bt}/N_t$ = fertility rate in France during year t

N_{it} = net number of immigrants entering France during year t

$N_{it} = \sum_{x\leq t} N_{it}^{x} = \sum_{a\geq -1} N_{it}(a)$

With: N_{it}^{x} = net number of immigrants born during year x and entering during year t

$N_{it}(a)$ = net number of immigrants aged a-year-old on 1/1 of year t (a=t-x-1) and entering during year t

$i_t = N_{it}/N_t$ = net migration rate during year t

$i_t^x = N_{it}^x/N_t^x$ = net migration rate of birth cohort x during year t

$i_t(a) = N_{it}(a)/N_t(a)$ = net migration rate of individuals aged a-year-old during year t

By construction, our data base is dynamically consistent:

$$N_{t+1} = N_t + N_{bt} - N_{dt} + N_{it} \qquad \text{(C.8)}$$

I.e. $n_t = f_t - m_t + i_t$

(population growth rate = fertility rate – mortality rate + net migration rate)

Similarly, by birth cohort:

For t-99<x<t, $N_{t+1}^x = N_t^x - N_{dt}^x + N_{it}^x$

For x=t, $N_{t+1}^x = N_{bt} - N_{dt}^t + N_{it}^x$

For x=t-99, $N_{t+1}^x = N_t^x + N_t^{x-1} - N_{dt}^x - N_{dt}^{x-1} + N_{it}^x + N_{it}^{x-1}$

Or, alternatively, by age group:

For 0<a<99, $N_{t+1}(a) = N_t(a-1) - N_{dt}(a-1) + N_{it}(a-1)$

For a=0, $N_{t+1}(a)= N_{bt} - N_{dt}(a-1) + N_{it}(a-1)$

For a=99, $N_{t+1}(a) = N_t(a-1) + N_t(a) - N_{dt}(a-1) - N_{dt}(a) + N_{it}(a-1) + N_{it}(a)$

<u>Raw data sources for 1900-2050</u>

The raw data for our demographic data base comes primarily from Insee official population tables for the 1900-2007 period and Insee official population projections for the 2008-2050 period. We then extended this 1900-2050 data base to the past (down to 1820) and to the future (up to 2100) (see below).

Current population tables are published every year by Insee.[223] Complete retrospective 1900-2007 population tables for living individuals $N_t(a)$,[224] for decedents $N_{dt}(a)$,[225] and for births N_{bt}, are easily available on-line.[226]

[223] See e.g. "La situation démographique en 2007" (Insee-Résultats août 2008, Société n°84, C. Beaumel and M. Vatan, www.insee.fr). The relevant table for the age structure of the living population ($N_t = \sum_{x<t} N_t^x =$

Note that all these population and demographic series refer to mainland France (i.e. excluding overseas territories), and more specifically to the historical territory of mainland France, i.e. the current territory for the 1820-1870, 1920-1938 and 1946-2007 periods, and the current territory minus Alsace-Moselle for the 1871-1919 and 1939-1945 periods. This territorial change explains the large population growth in 1920 and 1946, and the large fall in 1871 and 1939 (see Table C1). Note also that migration figures are to a large extent residual estimates, and should be used with caution, especially during the war years.[227]

Overall, the only missing data for the 1901-2007 period is the data on the age structure of the living population for the 1915-1919 period. We completed this missing data by using the data on the age structure of the living population for 1914, the age structure of decedents for the 1914-1918 period, the number of births for the 1914-1918, and by assuming zero migration during the 1914-1918 period. In effect, this is assuming that all cumulated migrations during the 1914-1919 period occurred in year 1919. This approximation has no impact on subsequent years.

$\sum_{a\geq-1} N_{dt}(a)$) is “Tableau 6 : Population totale par sexe, âge et état matrimonial au 1er janvier …”. The relevant table for the the age structure of decedents ($N_{dt} = \sum_{x\leq t} N_{dt}^{x} = \sum_{a\geq-1} N_{dt}(a)$) is “Tableau 71: Décès par sexe, année de naissance, âge et état matrimonial du décédé“.

[224] The full set of retrospective tables for the living population covering the 1901-2007 period (with the exception of years 1915-1919) is available on-line at www.insee.fr.

[225] The tables for decedents are also available on-line at www.insee.fr, but only since 2002. For previous years we used the Vallin-Mesle data base on decedents. This data base is available on-line at www.ined.fr, and is fully consistent with the more recent Insee tables. See J. Vallin and F. Mesle, “Décès par âge et par génération, de 1899 à 1997 » (www.ined.fr). One additional advantage of the Vallin-Mesle data base is that they attempt to include all decedents during war years (while Insee official estimates only refer to civilian decedents). For the 1997-2002 period we used the decedents tables published in the paper publications “La situation démographique en …”.

[226] See "Un siècle de fécondité française" (INSEE-Résultats juin 2007, Société n°66, www.insee.fr). This publication includes updated series from F. Daguet, "Un siècle de fécondité française, Caractéristiques et évolution de la fécondité de 1901 à 1999", 2002, INSEE Résultats, Société n° 8, 2002. Table 35 of this publication provides 1901-2007 series on the number of births broken down by gender. However these series refer to the current territory (as opposed to the historical territory) for the 1901-1919 and 1939-1945 periods. So in order to make these series consistent with the series on living population and decedents, we did the following. For 1901-1913 and 1939-1945, we used the historical-territory total number of births reported on table 1.1B, and we assumed that the gender decomposition of births reported on table 35 for the current territory also applied to the historical territory. For 1914-1919, the total number of births reported on table 1.1B was not usable (it refers to an even smaller territory), so we had to estimate the total number of births assuming that the 94.4% (historical territory)/(current territory) ratio observed in 1913 also applied to 1914-1919 (in practice, this ratio is pretty stable around 94%-95%); we also assumed that the gender decomposition of births reported on table 35 for the current territory applied to the historical territory.

[227] Like most statistical institutes, Insee independently computes living population estimates from censuses and household surveys, while decedents and birth estimates come from administrative, etat-civil data ; although direct sources on migrations are also used for control purposes, aggregate migration figures are basically obtained by differentiating these two sources.

Regarding the 2008-2050 period, we used the latest official population projections, which were published by INSEE in 2007, mostly for pension planning purposes.[228] These projections include a full set of annual tables on the age structure of the living population and decedents and on births. This set of projected population tables for 2008-2050 is also available on-line,[229] and is fully consistent with the pre-2008 demographic series.[230]

Finally, because the raw data uses varying top age censoring over the 1900-2050 period (from 100 to 120), we recoded all the series using a uniform maximum age a=99. I.e. the age of all individuals with age a≥99 was set to a=99, the birth cohort all individuals with birth cohort x≤t-100 is set to x=t-100, and we assumed zero migration for this age group. In effect, the age group (a=99, x=t-100) is a terminal point where individuals can spend several years. Given the relatively small numbers of individuals involved, and the very high annual mortality rate for this category (from about 50% in the early 20th century to about 30% in the early 21st century), this approximation is innocuous for our purposes.

Resulting data base 1900-2050 and extension to 1820-2100

The data base resulting from official population tables and projections takes the form of a rectangular Stata file pop19002050.dta. At various points in this research, and particularly for the simulations, we also need population projections running until year 2100, and a population data base starting in 1820. We used an extended population file pop18202100.dta, which was obtained from file pop19002050.dta by assuming that aggregate fertility and age-level mortality rates and migration rates remain the same during the 2050-2100 as those projected for 2050, and by using available mortality tables and birth data prior to 1900. All details are provided in the do-file dopopulation18202100.txt, which transforms the basic population file pop19002050.dta into the extended population file pop18202100.dta. According to these future projections, French population will be almost stationary after 2050, with total population rising from 70.2 millions in 2050 to 72.2 millions in 2100. Our 1820-1900 data replicates by construction observed total population

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[228] See "Projections de population active pour la France métropolitaine 2006-2050" (Insee-Résultats avril 2007, Société n°63, www.insee.fr). Note that these projections take into account the higher-than-expected fertility figures observed since 2001, and were therefore revised upwards as compared to the previous population projections published in 2001.

[229] See www.insee.fr and www.ined.fr.

[230] More precisely : the 2008-2050 projections published in 2007 used 2005 as a base year and underestimated somewhat base year population, so that total living population on 1/1 2007 is equal to 61.365949 millions according to the projections series, vs 61.538322 millions according to the latest Insee estimates. In order to ensure full continuity, we therefore multiplied all 2008-2050 projected series by a uniform factor equal to 1.00281=61.535322/61.365949 (i.e. projections series were upgraded by 0.281%).

during the 19th century (30.3 millions in 1820, 35.4 millions in 1850, vs 38.5 millions in 1900) and observed trends in mortality rates by age group. However, because raw mortality data is not available at the age level prior to 1900 (we had to use raw mortality rates for 5-year-wide age groups), our demographic data base is less precise for the pre-1900 period, especially for the early cohorts born during the 18th century (annual fertility data starts in 1800 in France, so we do not know very precisely the size of earlier cohorts).[231]

We use the population file pop18202100.dta as background demographic data at various points in this paper. In particular, by applying the do-file dotableC1.txt to this data base, one can obtain the summary statistics on population growth and mortality rates reported on Table C1. By applying the do-files dotableC3-C4.txt, one can obtain the summary statistics on the age structure of living individuals and of decedents reported on Tables C3 and C4.

The population file pop19002050.dta contains 15,251 observations (151 years x 101 cohorts = 15,250 year x cohort pairs) and 15 variables.

The population file pop18202100.dta contains 25,351 observations (281 years x 101 cohorts = 28,381 year x cohort pairs) and 15 variables.

The list of 15 variables is the following:

year = t = 1900, 1901, …, 2050 = year of observation

cohort = x = year of birth of the cohort under consideration; for a given *year*, *cohort* takes the following values: *year-100*, *year-99*,…, *year*. I.e. in *year* = 1900, we observe cohorts born in *cohort* = 1800, 1801, …, 1900.

age = a= t-x-1 = *year - cohort - 1* = age a on 1/1 of the year. I.e. *age* = -1,0,1,..,99

[231] We started from an estimate of the age structure of the 1820 population computed from the survival tables published in AR 1966 pp.80-81. We used the 1820-1900 series on annual numbers of births published in AR 1966 pp.66-69. We used the age-level mortality rates observed in 1900-1910 and assumed that each age-level mortality rate followed the same linear evolution during the 1820-1900 period as the five-year-age-group-level mortality rates published in AR 1966 p.77. Starting with the 1851 census, we have detailed age-group data (see AR 1966 p.43), and we find that our date base replicates very well this observed data. See do-file dopopulation18202100.txt.

ntot = N_t^x = number of individuals born during year x and alive on 1/1 of year t

nmen = number of male individuals born during year x and alive on 1/1 of year t

nwomen = number of female individuals born during year x and alive on 1/1 of year t

ndec = N_{dt}^x = number of individuals born during year x and deceased during year t

ndecmen =number of male individuals born during year x and deceased during year t

ndecwomen =number of female indiv. born during year x and deceased during year t

nbirth = N_{bt} = total number of births during year t

nbirthmen = total number of male births during year t

nbirthwomen = total number of female births during year t

nmigr = N_{it}^x = net number of individuals born during year x and migrating to France during year t (i.e. living in France on 1/1 t+1 and not living in France on 1/1 t)

nmigrmen = net number of male individuals born during year x and migrating to France during year t

nmigrwomen = net number of female individuals born during year x and migrating to France during year t

C.2. Supplementary data on age of decedents, heirs, donors and donees

In order to simulate the age-level dynamics of wealth accumulation and inheritance, we need relatively complete data not only on the age structure of decedents, but also on the age structure of heirs (the successors receiving bequests from decedents), donors (the living individuals making inter vivos gifts) and donees (the living individuals receiving inter vivos gifts). This information is not available in standard demographic data, so we had to construct our own data base. Some of raw material and resulting series are reported on Tables C5 to C8. The complete data base is available in the form of Stata format data sets bequestshares.dta and giftshares.dta. Here we describe how we constructed these data sets.

Estimating the age structure of decedents and heirs

The annual inheritance flow B_t can be decomposed in two different ways, either from the decedents' or from the heirs' perspective:

$$B_t = \sum_{x \le t} B_t^x = \sum_{y \le t} B_{ty} \qquad \text{(C.9)}$$

With: B_t = total inheritance flow transmitted/received during year t
B_t^x = inheritance flow transmitted during year t by cohort $x \le t$
B_{ty} = inheritance flow received during year t by cohort $y \le t$

The decedents decomposition $B_t = \sum_{x \le t} B_t^x$ is known from estate tax data (see Appendix B2). However the heirs decomposition $B_t = \sum_{y \le t} B_{ty}$ is harder to estimate. Ideally, one would like to have systematic demographic data base relating directly the cohort of the decedents and the cohort of the heirs. I.e. one would like to know for each decedents' cohort x the distribution of heir's cohorts y(x). Unfortunately, it seemed overly complicated to estimate such distributions on an annual basis over two centuries. Because not all heirs are children, purely demographic data is not enough: one needs very detailed data from estate tax returns. We actually do have individual-level data relating decedents' cohorts and heirs' cohorts in a systematic way for the recent period, thanks to the DMTG micro-files 1977-1984-1987-1994-2000-2006. But no such data exists for the earlier periods. The estate tax statistics published by the tax administration during the 1902-1964 period include tabulations by decedents age (see Appendix B2), but never include tabulations by heirs age (not to mention cross-tabulations by decedents age and heirs age). Therefore we decided to adopt a more modest strategy, namely we estimated the decomposition $B_t = \sum_{y \le t} B_{ty}$ without attempting to relate directly which decedents cohort gives to which heirs cohorts. I.e. we took as given the aggregate inheritance flow B_t, and estimated the shares $bshare_{ty} = B_{ty}/B_t$ of aggregate inheritance flow received by each cohort $y \le t$. There are several steps in our estimation strategy.

First, available demographic data on fertility shows that the average age at which men and women have children has been relatively stable since the 19th century, around 33-year-old for men and around 29-year-old for women (see Table C5, col. (1) and (2)).[232] Available fertility data published by Insee also provides for each female cohort starting in 1870 the full distribution of fertility rates broken down by female age.[233] We used this detailed data to compute the average age of parenthood as a function of parental year of birth (see Table C5, col. (4) and (5)), and as a function of parental year of death (see Table C5, col. (6) and (7)).[234] This detailed data also shows that the standard deviation of the distribution of age at parenthood has been fairly stable over the 20th century, around 5.5-6.5 years.[235]

Next, we used this data to compute the evolution of the average age of children heirs at the time their parents die (see Table C6, col. (4)-(6)), and the average age difference between parents and children heirs at the time of inheritance (see Table C6, col. (8)).[236] Unsurprisingly, we find that the average age difference has been relatively stable around 30 years: average age of decedents has gone up from about 60-year-old in 1900 to 75-year-old in 2000 and 85-year-old by 2050, while the average age of children heirs has gone up from about 30-year-old in 1900 to 45-year-old in 2000 and 55-year-old by 2050 (see Table C6). Unsurprisingly, children heirs tend to be older when they inherit from their mothers than when they inherit from their fathers, simply because the former tend to die later (and also because they tend to have children at an earlier age). Note that although these computations are based solely upon pure demographic data, they deliver estimates of average age of children heirs which are fully consistent with the estimates one can obtain using the DMTG micro-files of estate tax returns available for the recent period.[237]

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[232] This data is taken from F. Daguet, "Un siècle de fécondité française, Caractéristiques et évolution de la fécondité de 1901 à 1999", INSEE-Résultats, 2002, Societe n° 8 (updated version available at www.insee.fr), table 1. Note that on table C5 age at birth of children is defined as the generational diffence (i.e. children birth year minus parental birth year). The average age at parenthood has actually been following a slight U-shaped curve in the long-run: both men and women had children slightly earlier in life at mid 20th century than in the early 20th century and early 21st century.

[233] See F. Daguet, op.cit., table 4.4.

[234] Strictly speaking, the Insee data (Daguet, op.cit., table 4.4) provides complete age-level fertility data only for female cohorts born between 1885 and 1955. However assuming stationary evolutions of age-level fertility rates one can use this data to compute average age at parenthood for female cohorts born between 1870 and 1980. For cohorts born before 1870 we assumed that the average age at parenthood was the same as for cohort 1870; for cohorts born after 1980 we assumed that the average age at parenthood was the same as for cohort 1980.

[235] See F. Daguet, op.cit., table 2.2.

[236] Note that on table C6 average age of decedents and heirs is defined in the usual way, i.e. a=t-x-1. The detailed computations leading to tables C5 and C6 are provided in do-files dotableC5.tx and dotableC6.txt.

[237] The average age of children heirs that we obtain by using 1984-2000 DMTG micro-files are slightly higher (about 0.5-1 year higher) than those reported on table C6 (col.(4)), which corresponds to the fact that the average age of decedents with estate tax returns is slightly higher than the average age of all decedents (see Table C7). We did not attempt to correct for this.

Finally, available estate tax data shows that the fraction of the aggregate inheritance flow B_t received by children has been relatively stable over the 20th century, around 70%. More precisely, if we divide heirs into three categories, i.e. children, surviving spouses, and other heirs, then we find that the decomposition of the aggregate inheritance flow B_t into these three categories has been relatively stable around 70% for children, 10% for spouses, and 20% for others.[238] This is true both when we compute this decomposition using the DMTG micro-files 1984-1987-1994-2000 and when we use the available tabulations by heir category published by the tax administration during the 1902-1964 period. There are slight variations in this decomposition, but there is no clear trend, and given that this data is available for a limited number of years, it seems pointless to attempt to give precise estimates of the time variations of this decomposition.[239]

We therefore proceed in the following manner. We estimate the average age of all heirs (see Table C6, col. (7)) by computing a weighted average of the average age of children heirs (with weight 70%), the average age of surviving spouses (with weight 10%), and the average age of other heirs (with weight 20%). In the absence of better data, we assumed the average age difference between decedents and surviving spouses to be equal to 7 years (this is the stable difference observed with the 1984-2000 DMTG micro-files),[240] and the average age difference between decedents and other heirs to be equal to 20 years (this is the stable difference observed with the 1984-2000 DMTG micro-files). By construction, this method delivers series on average age of heirs that are fully consistent with those observed in DMTG micro files over the 1984-2006 period.[241] For the rest of the

[238] We define “other heirs” as all non-children, non-surviving spouse heirs. In practice, these are mostly brothers/sisters and nephews/nieces.

[239] Note that the proportion of spouses in the total number of heirs (about 15%) is typically larger than the share of spouses in the aggregate inheritance flow (about 10%); this corresponds to the fact that the average bequest received by spouses is typically lower than that received by children. Note also that the share of spouses in the aggregate inheritance flow seems to have been somewhat larger at mid-century than at both extremes of the 20th century. The “children vs spouses vs others” decomposition of the inheritance flow was 72%-10%-19% in 1902 (using data from BSLC oct.1903 tome 5 p.38), 70%-16%-14% in 1962 (using data from S&EF dec.1965 supp. n°204 pp.1696-1697), and 68%-11%-21% in 2000 (using the DMTG 2000 micro-file). Given our aggregate perspective in this paper, it did not seem worth trying to take into account such time variations, and we chose to simplify matters by assuming a constant 70%-10%-20% sharing rule (we re-did all simulations using a 70%-15%-15% constant sharing rule, and no result was significantly affected). It would be interesting however to explore this spouse issue in more details in the future.

[240] Note that 7 years is the average age gap between the average age of all decedents (including those with no surviving spouses) and the average age of surviving spouses. This 7-year gap can be decomposed between a 4.5-year gap between the average age of decedents and the average age of decedents with surviving spouses (who unsurprisingly tend to be younger than average) an a 2.5-year gap between those decedents and their surviving spouse.

[241] Except for the slight bias described above. Note that the estimates reported on table C5 are also fully consistent with the 1984-2006 estimates of average age of children heirs and all heirs recently published by

period, one would need to gather relatively sophisticated demographic data (data on the distribution of age differences at marriage, on the age patterns of remarriage, on the distribution of age difference with siblings and nephews/nieces, not to mention the heirs that are fully exterior to the extended family) in order to detect possible historical changes in the pattern of age difference between decedents and surviving spouses and other heirs. Given that we are primarily concerned with aggregate trends, and given that the remaining uncertainty can only affect a relatively small part of the aggregate estate flow (70% of the flow goes to children, on which we have very reliable information), we felt that this was not worth it. Our resulting estimates show that the average age difference between decedents and heirs has been stable around 25 years, as opposed to 30 years if one only considers children heirs (see Table C6, col. (8)-(9)).

We use the same methodology to estimate the full distribution of heirs age. That is, we estimated separately the distributions $bshare_{ty}^{c}$, $bshare_{ty}^{s}$, $bshare_{ty}^{o}$ using DMTG micro-files, and we then computed then computed the distribution $bshare_{ty}$ as a weighted average of the three distributions:

$$bshare_{ty} = 0.7\ bshare_{ty}^{c} + 0.1\ bshare_{ty}^{s} + 0.2\ bshare_{ty}^{o} \qquad \text{(C.10)}$$

With: $bshare_{ty} = B_{ty} / B_t$ = fraction of aggregate inheritance flow received by cohort y
$bshare_{ty}^{c}$ = fraction of the children inheritance flow received by cohort y
$bshare_{ty}^{s}$ = fraction of the spouse inheritance flow received by cohort y
$bshare_{ty}^{o}$ = fraction of the other inheritance flow received by cohort y

According to the DMTG 1984-2000 micro-files, the three distributions $bshare_{ty}^{c}$, $bshare_{ty}^{s}$, $bshare_{ty}^{o}$ follow relatively simple and stable functional forms approximately centered around their respective mean. Regarding children we find that the best fit is obtained with the following functional form:

$$bshare_{ty}^{c} = bshare_{t}^{c}(a) = b^{cmaxt}/[1 + ((a-a_t^{c}-a^{0c})/a_{sd}^{c})^{\delta c}] \qquad \text{(C.11)}$$

with: a = t-y-1 = age of cohort y at time t

the tax administration (see Rapport 2008 du Conseil des Prélèvements Obligatoires, nov.2008, p.279). The tax administration estimates for all heirs are slightly higher than our estimates (about 1 year higher), presumably because they did not weight their estimates by average bequest.

a_t^c = average age of children heirs at time t

and where b^{cmaxt}, a_{sd}^c , a^{0c}, δ_c are parameters satisfying the following condition: $\sum_{0\leq a\leq 80}$ $bshare_t^c(a) = 1$

The parameters minimizing the average age-level gap with the observed distributions turn out to be the following: $a_{sd}^c = 14.3$, $a^{0c} = 2.5$, $\delta_c = 3$, and b^{cmaxt} computed each year so as to meet condition $\sum_{0\leq a\leq 80}$ $bshare_t^c(a) = 1$ (in practice b^{cmaxt} is always very close to 3.1%).[242]

Regarding spouses and other heirs, we use similar functional forms:

$$bshare_{ty}^s = bshare_t^s(a) = b^{smaxt}/[1 + ((a-a_t^s-a^{0s})/a_{sd}^s)^{\delta s}] \qquad (C.12)$$

with: a_t^s = average age of spouse heirs at time t

and where b^{smaxt}, a_{sd}^s , a^{0s}, δ_s are parameters satisfying the condition $\sum_{20\leq a\leq 99}$ $bshare_t^s(a) = 1$. The gap minimizing parameters are: $a_{sd}^s = 16.0$, $a^{0c} = -1.0$, $\delta_s = 4$, and b^{smaxt} computed each year so as to meet condition $\sum_{20\leq a\leq 99}$ $bshare_t^s(a) = 1$ (in practice b^{smaxt} is always very close to 2.9%).

$$bshare_{ty}^o = bshare_t^o(a) = b^{omaxo}/[1 + ((a-a_t^o-a^{0o})/a_{sd}^o)^{\delta o}] \qquad (C.13)$$

with: a_t^o = average age of spouse heirs at time t

and where b^{omaxo}, a_{sd}^o , a^{0o}, δ_o are parameters satisfying the condition $\sum_{0\leq a\leq 99}$ $bshare_t^o(a) = 1$. The gap minimizing parameters are: $a_{sd}^o = 20.0$, $a^{0o} = 5.5$, $\delta_o = 3.5$, b^{omaxt} computed each so as to meet condition $\sum_{0\leq a\leq 99}$ $bshare_t^o(a) = 1$ (in practice b^{cmaxt} close to 2.3%).

The details of the computations are given in the do-file dobequestshares.txt, and the resulting series are given in the Stata file bequestshares.dta.

Estimating the age structure of donors and donees

[242] Note that it is important to include the a^{0c} term in the functional form, because in practice the distribution $b_y^c(a)$ is not exactly centered around mean age a_t^c. This is mostly due to the fact that average bequest varies with heir age. For instance, older children heirs tend to receive slightly bigger bequests, so that the weighted average age of children heirs $\sum_{0\leq a\leq 80}$ a $b_t^c(a)$ is slightly larger than a_t^c by about 2 years. The gap is about 4 years of other heirs. For surviving spouses, the gap is slightly negative: older surving spouses have slightly lower average bequests. All these effects are relatively small quantitatively, but we decide to take them into account in order to fit as closely as possible the observed distribution of heirs age.

We also use similar computations to estimate the distribution of donors and donees age. Inter vivos gifts are relatively simpler to deal with than bequests, because the recipients of gifts are almost exclusively children.[243] Moreover, available estate tax data shows the average age of donors has always been about 7 years below the average age of decedents (see Table C7), so we make this assumption for the entire 1900-2050 period (see Table C8, col. (1)).[244] Using DMTG 1984-2000 micro-files, we adopt the following functional form for the distribution of donors age:

$$donor_{ty} = donor_t(a) = donor^{maxt}/[1 + ((a\text{-}adonor_t\text{-}a^{donor})/a_{sd}^{donor})^{\delta donor}] \qquad \text{(C.14)}$$

with: $donor_{ty}$ = share of total gift flow at time t given by donors from cohort y
a = t-y-1 = age of cohort y at time t
$adonor_t$ = average age of donors at time t
and where $donor^{maxt}$, a_{sd}^{donor} , a^{0donor}, δ_{donor} are parameters satisfying the condition $\sum_{0\leq a\leq 99}$ $donor_t(a)$ =1

The parameters minimizing the average age-level gap with the observed distributions turn out to be the following: a_{sd}^{donor} =12.0, a^{0donor}=0.5, δ_{donor}=5.0, and $donor^{maxt}$ computed each year so as to meet condition $\sum_{0\leq a\leq 99}$ $donor_t(a)$ = 1 (in practice $donor^{maxt}$ is always very close to 3.9%).

Regarding donees age, available estate tax data shows the difference with average donors age is unsurprisingly very close to the average age at parenthood for the relevant donors' cohorts, so we make this assumption for the entire 1900-1950 period (see Table C8, col.(2)).[245] Using DMTG 1984-2000 micro-files, we adopt the following functional form for the distribution of donees age:

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[243] Decomposition by donee category are not available on a yearly basis, but whenever we have data, either through the DMTG micro-files for the 1977-2006 period or through published tabulations for the 1900-1964 period (see e.g. S&EF déc. 1965 pp.1698-1699), we find that the children share in the total gift flow is about 97%-98%.

[244] Available historical data on donors age is limited, so we cannot exclude the possibility of significant historical changes in the age difference between decedents and donors. For the recent period, DMTG-based evidence seems to suggest that this age difference might have been rising somewhat, from about 6 years in the 1977-1984 to about 9 years in 1994-2000; however the most recent data indicates an age difference of 7 years for 2006 (see Table C7), so it is clear whether there is a time pattern or not. In the absence of better data, and as a first approximation, we choose to assume a stable 7-year age difference between dedecents and donors.

[245] Our DMTG computations, as well as the most recent published data from the 2006 DMTG survey (see Rapport du Conseil des prélèvements obligatoires, nov.2008, pp.268 and 279), shows during the 1990s-2000s the average age of donees stabilized at about 37-38 year-old, while on the basis of the rising age of donors and of the age at parenthood of relevant donors' cohorts, it should have increased by about 2 years.

$$donee_{ty} = donee_t(a) = donee^{maxt}/[1 + ((a\text{-}adonee_t\text{-}a^{donee})/a_{sd}^{donee})^{\delta donee}] \qquad (C.15)$$

with: $donee_{ty}$ = share of total gift flow at time t received by donees from cohort y

a = t-y-1 = age of cohort y at time t

$adonee_t$ = average age of donees at time t

and where $donee^{maxt}$, a_{sd}^{donee} , a^{0donee}, δ_{donee} are parameters satisfying the condition $\sum_{0\leq a\leq 99} donee_t(a) = 1$

The parameters minimizing the average age-level gap with the observed distributions turn out to be the following: a_{sd}^{donee} =12.0, a^{0donee}=0.0, δ_{donee}=3.5, and $donee^{maxt}$ computed each year so as to meet condition $\sum_{0\leq a\leq 99} donee_t(a) = 1$ (in practice $donee^{maxt}$ is always very close to 3.7%).

The details of the computations are given in the do-file dogiftshares.txt, and the resulting Stata file is giftshares.dta. Note that these estimates of the average of donors and donees also allow us to compute the average of "givers" (decedents and donors) and "receivers" (heirs and donees) for any given year, simply by weighting the relevant age averages by the (gift flow)/(bequest flow) aggregate ratio. Given the large increase in the gift/bequest aggregate ratio during the 1980s-1990s (see Appendix B, Table B1), the average age of "receivers" appears to have stabilized during this period (see Table C8, col. (5)). Post-2008 series on Table C8 (col. (5) to (7)) were computed assuming the gift/bequest ratio remains constant after 2008, which of course is uncertain (we explore this further in Appendix D).

Note that although we used this same methodology to compute age-level bequest shares and gift-shares for the entire 1820-2100 period, it is clear that the 19th century and early 20th century estimates rely on a number of approximations. In particular, the assumption of a constant age gap between decedents and donors throughout the period is probably not valid in the very long run. E.g. our series indicate that donees were very young in the early

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This might be due to the fact that donors have started to give slightly earlier, or to give to slightly younger children. In order to fit the observed age distributions of donors and donees as closely as possible, we assumed a gradual 2.4-year downward adjustment on the average of donees over the 1994-2006 period; for the pre-1994 and post-2006 period, we just assumed the average age of donees followed the series implied by age of donors and average age at parenthood of the relevant donors' cohors. Computation details are given in do-files dogiftshares.txt and dotableC6.txt.

19th century (less than 20-year-old on average, see Table C8), which is probably an exaggeration. We return to this in the simulations.

C.3. List of Stata format data files and do-files

pop19002050.dta : basic population data file containing numbers of living individuals and decedents by year and birth cohort

pop18202100.dta: population date file extended to the 1820-2100 period

dopop18202100.txt: do-file generating pop19002050.dta from pop18502100.dta

dotableC1.txt and dotableC3-C4.txt: do-files generating Tables C1 and C3-C4 from pop18202100.dta

ageatbirth.dta: data file with series on parental age at the birth of their children

dotableC5.txt and dotableC6.txt : do-file generating Table C5 from pop18202100.dta and ageatbirth.dta

bequestshares.dta and giftshares.dta: data files containing estimates of the shares of aggregate bequest and gift flows received by each cohort

dobequestshares.txt and dogiftshares.txt: do-files generating bequestshares.dta and giftshares.dta from pop18202100.dta and ageatbirth.dta

dotableC8.txt: do-file generating Table C8 from giftshares.dta

dodiffmort.txt = do-file generating poor vs rich average age at death implied by differential mortality parameters (using data file pop18502100.dta)[246]

[246] See Appendix B, section B2.

Appendix D: Simulations

In this appendix we present the results of our simulations of the age-level dynamics of wealth accumulation and inheritance. The main conceptual issues and conclusions related to these simulations are presented in the working paper (sections 6 and 7). Here we provide additional information about the methodology and we present the detailed results.

The transition equations and simulation parameters are presented in section D1. The simulation results under various variants are described separately for the 1820-1913 period (section D3) and the 1900-2100 period (section D4). We then present supplementary simulation results on the structure of lifetime resources by cohort (section D5) and on the share of capitalized and non-capitalized inheritance in aggregate wealth accumulation (section D6).

D.1. Transition equations and simulation parameters

The basic principle of our simulations is the following. We start from the observed age-wealth profile $w_t(a)$ for a given base year $t=t_0$ (in practice, either t_0=1820 or either t_0=1900). We then write down a transition equation for age-level wealth $w_t(a)$. We want to know whether we can correctly predict the future evolution of the age-wealth profile and of the aggregate inheritance flow. By construction, since we use the observed rates of aggregate savings (and capital gains), we always predict perfectly well the evolution of aggregate private wealth. The name of the game is to see whether simple assumptions on saving behaviour (such as uniform savings or class savings) can also allow us to correctly predict the age structure of wealth, and therefore the macroeconomic magnitude of inheritance flows, via the μ_t effect. More precisely, the transition equation can be written as follows:

$$W_{t+1}(a+1) = (1+q_{t+1})\ [\ W_t(a) + s_{Lt}Y_{Lt}(a) + s_{Kt}\, r_t\, W_t(a) + d_t\, W_t(a)\ ] \\ - B_t^T(a) + B_t^R(a) - V_t^T(a) + V_t^R(a) \qquad \text{(D.1)}$$

With:

$W_t(a)$ = aggregate wealth of individuals of age a at time t

$w_t(a) = W_t(a)/N_t(a)$ = average wealth of individuals of age at time t

$Y_{Lt}(a)$ = aggregate labor income of individuals of age a at time t

$y_{Lt}(a) = Y_{Lt}(a)/N_t(a)$ = average labor income of individuals of age a at time t

$B_t^T(a)$ = aggregate bequest flow transmitted by individuals of age a at time t
$B_t^R(a)$ = aggregate bequest flow received by individuals of age a at time t
$V_t^T(a)$ = aggregate inter vivos gift flow transmitted by individuals of age a at time t
$V_t^R(a)$ = aggregate inter vivos gift flow received by individuals of age a at time t

The simulation parameters are reported on Tables D1 and D3-D4. These parameters were converted into Stata format data files simulationparameters18201913.dta and simulationparameters19002100.dta. The do-files dosimul18201913.txt and dosimul19002100.txt use these data files, together with the demographic data files described in Appendix C, in order to generate the simulation results reported on Tables D5-D6. In principle all results can be easily reproduced by anyone using these files.

The simulation parameters include macroeconomic series (see Tables D1 and D3) and series on age-labor income profiles (see Table D4). We describe them in turn.

The macroeconomic series are directly taken from the national accounts tables reported Appendix A (see formulas in excel files). The only noticeable feature is that in order to run annual level simulations we annualize the decennial-averages macro series of the 1820-1913 period. We did so by assuming constant growth rates, saving rates and rates of return within each decade (see Table D1). Of course the decennial averages of annualized series do not perfectly coincide with the initial decennial averages. But the gaps due to non linearities are extremely small (see Table D2), and irrelevant for our purposes.

The age-labor income profiles reported on Table D4 should be viewed as approximate. We checked that simulation results are robust with respect to alternative assumptions about these profiles; they are robust. For the recent period, income tax return micro files provide us with very reliable data on age-labor income profiles. We started from the observed tax profile in 2006. In the same way as in the theoretical model (see working paper, section 5), the profiles refer to "augmented labor income", i.e. the sum of net-of-payroll-tax labor income and replacement income (pension income and unemployment benefits). We assumed a constant profile over the 2006-2100 period. Given the observed tax profile appears to be relatively stable during the 1990s-2000s, this seems to be the most reasonable assumption as a first approximation. For the 1820-2006 period we proceeded as follows (all details are given on the excel file).[247] We assumed that the profile below age 60 was constant throughout the period. Thanks to our national accounts series, we know the annual 1896-2006 evolution of aggregate replacement income and net-of-payroll-tax labor income. We then used historical estimates on labor force participation rates of individuals aged 60-to-69-year-old in order to allocate aggregate replacement income to the 60-to-69, 70-to-79 and 80-and-ver age groups.[248]

In order to compute the bequest and gift terms entering into transition equation (E.1), we proceeded as follows. We start from the age-level mortality rates coming from our demographic data base: $m_t(a)=N_{dt}(a)/N_t(a)$. We use the same modelling of differential mortality as that introduced in Appendix B2. That is, we assume that:

$$m_t^P(a) = 2\delta_t(a)m_t(a)/(1+\delta_t(a))$$
$$m_t^R(a) = 2m_t(a)/(1+\delta_t(a))$$
$$m_t^*(a) = sh_t^P(a)\, m_t^P(a) + [1- sh_t^P(a)]\, m_t^R(a)$$

With: $m_t^P(a)$ = mortality rate of the poor (bottom 50%)
$m_t^R(a)$ = mortality rate of the rich (upper 50%)
$m_t^*(a)$ = wealth-weighted average mortality rate

We use the same differential mortality parameters $\delta_t(a)$ and $sh_t^P(a)$ as in Appendix B2.

We then compute the predicted aggregate bequest flow $B_t^T(a)$ transmitted by individuals of age a at time t by multiplying their aggregate wealth by the wealth-weighted mortality rate:

$$B_t^T(a) = m_t^*(a)W_t(a)$$

We then compute the aggregate bequest flow transmitted at time t: $B_t = \sum_{a\geq0} B_t^T(a)$

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[247] Income tax return micro files are not available prior to the 1970s-1980s, and historical tax tabulations published by the tax administration since 1915 do not break down taxable income by age bracket (only by income bracket). So unfortunately there exists no direct historical data source on age-labor income profiles.

[248] The labor participation rate among the 60-to-69 was about 60%-70% in France in the 1950s-1960s, and then declined quasi linearly to about 20% in 1995, and then stabilized (and is currently rising somewhat, which does not make a big difference for our profiles, given that replacement rates are very high). See e.g. Bozio (2006, figure 3.1, p.117). So we simply assume a linear downward trend from 100% in 1910 (when there was virtually no pension system) to 65% in 1960 and 20% in 1995. We assume that nobody works above age 70, and that nobody receives pension income prior to age 60.

We then compute the aggregate bequest flow $B_t^R(a)$ received by individuals of age a at time t by multiplying B_t by the shares $bshare_t(a)$ computed in Appendix C2:

$$B_t^R(a) = bshare_t(a)\ B_t$$

We do the same for inter vivos gifts. We take as given the aggregate ratio $v_t=V_t/B_t$ (either we take the observed v_t, or we run simulations for alternative v_t values, see below). We then use the shares $donor_t(a)$ and $donee_t(a)$ computed in Appendix C2 in order to compute the aggregate gift flows $V_t^T(a)$ and $V_t^R(a)$ transmitted and received by individuals of age a at time t:

$$V_t = v_t\ B_t$$
$$V_t^T(a) = donor_t(a)\ V_t$$
$$V_t^R(a) = donee_t(a)\ V_t$$

Finally, the gift-corrected aggregate bequest flow is given by: $B_t^* = B_t + V_t$.

We have now fully described our dynamic system. Starting from a given age-wealth profile $w_t(a)$ at time $t=t_0$, we compute the endogenous sequence of aggregate bequest flows B_t^* for all $t \geq t_0$ and age-wealth profiles $w_t(a)$ for all $t>t_0$, by applying the transition equation (D.1) and the above equations to simulation parameters. We are particularly interested in the endogenous evolution of the inheritance flow-national income ratio $b_{yt} = B_t^*/Y_t$ and of the ratio $\mu_t^* = b_{yt}/m_t\beta_t$ (as well as the pre-gift ratio $\mu_t = \mu_t^*/(1+v_t)$). The economic forces at play in this dynamic process are exactly the same as those analyzed in the theoretical model with exogenous saving model (see working paper, section 5.2), except that we are now out of steady-state, and except that we take into account all macroeconomic and demographic shocks (on the basis of observed data), as well as inter vivos gifts.[249]

[249] We also attempted to simulate endogenous saving behaviour, as predicted by the utility maximizing models analyzed in sections 5.3 and 5.4 of the working paper (dynastic model and wealth-in-the-utility-function model). However the short run and medium run predictions of utility maximizing models are very sensitive to the assumptions one makes about agents' expectations on future growth rates and rates of return, particularly during the chaotic 1914-1945 period (for which it would not make much sense to assume perfect foresight). Also these models generally tend to predict far more age variations in consumption profiles and savings rates than one typically observes (actual age-saving rates profiles are not very far from being flat, just like in the exogenous saving model). In order to obtain plausible predictions, authors using utility maximizing models often end up making simplifying ad hoc assumptions, e.g. they directly assume that the growth rate g_c of consumption profiles is the same as the income growth rate g (see for instance Gokhale and Kotlikoff (2001)). Given that there are already so many other effects going on in our two-century-long dynamic model, we find it more natural to simply assume exogenous saving rates, see how much one can explain with such assumptions, and leave the issue of endogenous saving behaviour to future research.

D.2. Simulation results for the 1820-1913 period

Simulation results for the 1820-1913 period are summarized on Table A5. The detailed simulation results, with the endogenous annual dynamics of the age-wealth profile $w_t(a)$, are reported on separate tables (one for each scenario).

The main findings from these simulations are discussed in the working paper (section 6). Here we discuss additional technical details. First, in all variants, we approximately reproduce the relative stability of b_{yt} around 20% of national income during the 1820-1913 period. This simply shows that the 19th century was close to a steady-state, and that with low growth rates and high rates of return, the steady-state inheritance flow tends to be close to 20% irrespective of the specific saving behaviour. The key assumption here is the flatness of the age-saving rates of profile: with dissaving at old age, one would never be able to reproduce such levels of inheritance flows.

Next, if one wants to obtain a better fit for the b_{yt} pattern, and most importantly if one wants to be also able to reproduce the full observed age-wealth profile $w_t(a)$, then one needs to assume class saving. The observed age-wealth profile at the end of the period is steeply rising at old age: around 1900-1910, individuals aged 70-to-79 and 80-and-over own as much as 180%-200% of the average wealth owned by the 50-to-59-year-old (see Appendix B, Table B5). By comparing with the simulated age-wealth profiles under scenario a1-a3 and b1-b3, one can see that the only way to get close to this is to assume that savings entirely come from capital income. With uniform saving, and even more so with reverse class saving, the simulated profile is far too flat, and the resulting pattern of b_{yt} and μ_t ratios is somewhat too low.

In fact, in order to fully reproduce the steepness of the age-wealth profile and the very high levels of b_{yt} around 1900-1910, one would need to assume not only that (most) savings come from capital income, but also that the average saving rate $s_K(a)$ actually rises with age. This would be consistent with a simple consumption satiation effect among elderly wealth holders. This interpretation is also consistent with the fact that the age-wealth profile in Paris (where top wealth levels were particularly high) was in 1900-1910 even more steeply rising than in the rest of France: the average wealth of the 70-to-79 and 80-

and-over age groups was as large as 300% of that of the 50-to-59 age group, which cannot be accounted for without a steeply rising $s_K(a)$ profile.[250]

Finally, we are particularly interested in the simulation results under the zero gift assumption. In scenario a1-a3, we take as given the observed gift-bequest ratio v_t. This generates bizarre predictions on the age-wealth profiles at mid-19th century. For instance, the 50-to-59 age group appears to be unplausibly poor. This seems to be due to the fact that gifts are very important at that time (v_t is about 40% in the 1840s, and then gradually falls to about 20% in the 1860s-1870s), and that we probably attribute an excessive fraction of these gifts to donors in their 50s (our estimates on the age structure of donors and donees are highly approximate for the 19th century). So in order to abstract entirely from the issue of inter vivos gifts (which raise interesting and complex issues on their own right), we assume in scenario b1-b3 that there was no gift at all throughout the 1820-1913 period (v_t=0%). Of course this implies that we significantly underestimate the aggregate bequest flow at the beginning of the period (since by assumption we miss the gift part). But this clarifies considerably the dynamics of the age-wealth profile, and confirms that one needs to assume class saving in order to reproduce observed profiles.

Most importantly, by the end of the period (around 1900-1910, and in fact as early as the 1850s-1860s), we generate as much total bequests under the zero gift assumption than with the observed gift ratio (compare scenario b1-b3 with a1-a3). In other words, if wealth holders stop making gifts and hold on to their wealth until their death, then their wealth at death will be higher, and total wealth transmission will eventually be approximately the same as what it would have been in the presence of gifts. This finding justifies the fact that as a first approximation we chose to simply add up cross sectional gifts and bequests in order to compute the total flow of wealth transmission.

D.3. Simulation results for the 1900-2100 period

Simulation results for the 1900-2100 period are summarized on Table A6. The detailed simulation results, with the endogenous annual dynamics of the age-wealth profile $w_t(a)$, are reported on separate tables (one for each scenario).

[250] It is possible that we underestimate somewhat the importance of differential mortality at high age around 1900-1910. But differential mortality would have to be enormous in order to explain such a steeply rising age-wealth profile, which would be consistent with the fact that the fraction of zero-wealth decedents is almost flat (i.e. there seems to be almost as many poor people among the very old decedents than among younger decedents). See Piketty, Postel-Vinay and Rosenthal (2006).

The main findings from these simulations are discussed in the working paper (section 6). Here we give additional technical details. First, by comparing the results obtained under scenario a1-a3, one can see that the fact that pensions and replacement rates were relatively low at mid 20th century does contribute to make inheritance flows smaller, but that this is a relatively small effect. This is consistent with the theoretical results obtained in the exogenous saving model.

Next, by comparing scenario a1 with scenario b1-b2, one can see that class saving is no longer adequate to account for 20th century patterns. Uniform saving offers a better fit. As far as reproducing the 1950s nadir is concerned, reverse class saving offers an even better fit. In order to fully reproduce the extremely low inheritance flow observed in the 1950s (about 4% of national income), one would actually need to assume non-age-neutral war-induced capital shocks (i.e. the elderly might have suffered from more than proportional shocks, e.g. because they held a larger fraction of their wealth in public bonds or other nominal assets), and/or negative saving from wealth holders (e.g. because a number of rentiers did not adjust downwards their living standards sufficiently fast following the fall in asset values and returns), and/or negative saving from the elderly in general (because of particularly low pensions around that time). In order to settle the issue, one would need to explicitly introduce distributional considerations into the analysis and to use micro level data, which we plan to do in future research.

Maybe the most interesting simulations are scenario c1 (where we freeze the gift parameter v_t at its 1980 level for the 1980-2100 period) and scenario c2 (where we set v_t=0% throughout the 1900-2100 period). The key finding is we still reproduce observed patterns relatively well. This shows that the large rise in gifts which occurred since the 1980s is not driving the recent rise in measured inheritance flows. In particular, by looking at the predicted age-wealth profiles, one can see that if gifts had not risen since 1980 (or if they had been absent throughout the period) then the age-wealth profile would have been substantially more steeply rising at old age by 2000-2010, thereby generating large extra wealth transmission at death, thereby compensating the absence of a larger gift flow. Note however that the compensation is not complete (i.e. long run levels of b_y* are somewhat smaller in the small-gift or zero-gift scenarios c1-c2), which suggests that there was a little bit of overshooting in the rise of gifts since the 1980s (possibly due to tax incentives), and that a (small) fraction of the observed gift level is not sustainable.

Regarding the 2010-2100 period, we explored several scenarios corresponding to various assumptions about future growth rates g, net-of-tax rates of returns $(1-\tau)r$, and saving rates s (which might or might not react to changes in g and $(1-\tau)r$). Variants a1-c3 correspond to our baseline scenario: g=1.7% (average 1979-2009 growth rate), $(1-\tau)r=3.0\%$ (capital share fixed at 2008 level), and s=9.4% (average 1979-2009 saving rate). In variants d1-e4 we explore the consequences of growth slowdown (g=1.0%) and/or rise in the net-of-tax rate of return ($(1-\tau)r=5.0\%$). In variants f1-g4 we explore the consequences of rise in the growth rate (g=5.0%), possibly accompanied by a rise in the net-of-tax rate of return. The main findings are discussed in the working paper. Here we mention two additional points.

First, it is equivalent in the model whether the rise in the net-of-tax rate of return comes from a rise in the capital share or from a decline in the capital tax rate. This is because we assume in all variants that the overall tax rate remains constant after 2010 (i.e. the disposable income-national income ratio is supposed to be fixed), so in effect any capital tax cut must be compensated by a corresponding rise in labor taxes.

Next, if saving rates do not adjust in our model, then changes in the growth rate will have large long run impact on the wealth-income ratio $\beta^*=s/g$. In the baseline scenario, with g=1.7% and s=9.4%, the long run β^* is about 560%, i.e. approximately the same level as in 2008-2009. In other scenarios, we consider variants where the saving rates adjust so as to keep the long-run wealth-income ratio approximately constant around 500%-600%. This allows us to disentangle the impact of g on b_y going through changes in β from the impact of g on b_y going through changes in μ.

For instance, a substantial part of the rise of b_y to 22%-23% in scenarios d1-d2 is due to the fact that the growth slowdown leads to a rise in the wealth-income ratio to about 650% by 2050 and 750% by 2100 (about two thirds of the rise comes from this channel). This is a plausible outcome. But in order to separate the various effects, we also consider in scenarios d3-d4 the possibility that the saving rate adjusts downwards to 6%, so that the wealth-income ratio remains stable at 550%-600%. The rise of b_y is then limited to 17%-18% in 2100. By comparing scenario a1 with scenarios d3-d4, one can also compute the relative impacts of g and r on steady-state μ^*. E.g. in the baseline scenario a1, b_y=16.0% in 2050. In scenario d3, b_y=16.9%; in scenario d4, b_y=17.3%. That is, the growth slowdown appears to explain about two thirds of the total rise of μ^* by 2050, while the rise in the rate of return explains about one third. This is consistent with the theoretical results obtained with the exogenous saving model: the r effect is multiplied s_k, and is therefore smaller than the g effect. Note however that other saving specifications would deliver different results. E.g. in the wealth-in-the-utility-function models, where individuals save a fixed fraction of their lifetime resources, changes in g and r have the same quantitative impact (only the difference r-g matters). This should be more closely investigated in future research.

D.4. Estimation and simulation results on lifetime resources by cohort

We use the simulated model in order to compute lifetime resources by cohort $\tilde{y}^x = \tilde{b}^x + \tilde{y}_L{}^x$, for all cohorts born between 1800 and 2030. The main findings from these computations are discussed in the working paper (sections 7.1-7.2). Here we present the full results (see Table D7-D8) and provide technical details (see the do-file dolifetimecohorts18002000.txt for the corresponding computer code).

For all cohorts $x \in [1800,2030]$, we compute the aggregate value of inherited resources and labor incomes resources received during the entire lifetime of cohort x (i.e. between age a=0 and age a=100), capitalized at age 50:

$$\tilde{B}^x = \sum_{x \leq t \leq x+100} (1+r_{ts})\ (B_t^x + V_t^x) \qquad (D.2)$$

$$\tilde{Y}_L{}^x = \sum_{x \leq t \leq x+100} (1+r_{ts})\ Y_t^x \qquad (D.3)$$

With: B_t^x = aggregate value of bequest flows received at time t by cohort x
V_t^x = aggregate value of inter vivos gift flows received at time t by cohort x
Y_t^x = aggregate value of labor income flows received at time t by cohort x
$1+r_{ts}$ = cumulated rate of return between year t and year s=x+50

We then compute average values $\tilde{b}^x = \tilde{B}^x / N^x$ and $\tilde{y}_L{}^x = \tilde{Y}_L{}^x / N^x$ by dividing aggregate values by cohort size N^x (we use cohort size at birth). The corresponding values, expressed in 2009 euros, are reported on Table D7 (benchmark scenario) and Tables D8 (low-growth, high-return scenario).[251] We also report the inheritance share in total lifetime resources

[251] We use the simulated inheritance flows to do these computations, not the observed flows. Since they are very close, this makes little difference. However we overpredict somewhat the levels of inheritance flows in the 1950s-1960s, this implies that our lifetime resources series tend to overestimate the share of inheritance

$\hat{\alpha}^x = \tilde{b}^x/(\tilde{b}^x + \tilde{y}_L{}^x)$ and the inheritance-labor ratio $\psi^x = \tilde{b}^x/\tilde{y}_L{}^x$, as well as the capitalization factors $\lambda_B{}^x$ and $\lambda_L{}^x$ (i.e. the ratios between capitalized lifetime resources and the uncapitalized resources obtained by replacing $1+r_{ts}$ by 1 in equations (D.2)-(D.3)), and the ratio $\lambda^x = \lambda_L{}^x/\lambda_B{}^x$. For 19th century cohorts, age 50 happens relatively late in life, so the capitalization factors $\lambda_B{}^x$ and $\lambda_L{}^x$ are far above 100%. For 20th century cohorts, age 50 is closer to mid life, so the capitalization factors are closer to 100%. In both cases, the ratio $\lambda^x = \lambda_L{}^x/\lambda_B{}^x$ is always relatively close to 100%.[252] Of course the choice of age a=50 has no consequence on the ratios $\hat{\alpha}^x$, ψ^x and λ^x, since we use the same rates of return for inheritance and labor ressources.[253]

We also report on Tables D7-D8 the values for the two-dimensional inequality indicators discussed in the working paper (section 7.2). These were computed by applying directly the ratio ψ^x to the intra-cohort distributions of inherited wealth and labor income indicated in the working paper (Table 4).[254] In order to compute ε^x (i.e. the proportion of cohort x with inheritance ressources larger than bottom 50% labor resources), we assume that the fraction fraction $p^x(b)$ of cohort x with inheritance resources larger than b can be approximated by a simple type-1 Pareto distribution, and we borrow Pareto coefficients from our previous work on wealth concentration.[255]

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in the lifetime resources of the cohorts who inherited in the 1950s-1960s. I.e. the true U-shaped pattern is somewhat more marked than what our series indicate.

[252] The fact that we assume the same age-labor income profile throughout the 1820-2008 period (below age 60) probably leads us to overestimate the value of λ^x for the recent cohorts (as compared to 19th century and early 20th century cohorts), and therefore to overestimate the labor share of the lifetime resources of recent cohorts (and underestimate the inheritance share), again relatively to earlier cohorts. It is indeed very likely that the age-labor income profile has become more and more upward sloping over time (i.e. in the 19th century workers in their 20s and 30s were probably not earning much less than workers in their 40s and 50s, and in a large number of cases they were actually earning more). I.e. all resources (not only inheritance, but also labor resources) now tend to accrue later in life. Unfortunately we have little systematic information on age-labor income profiles in the 19th century, so we did not try to correct for this.

[253] For the benchmark estimates reported on Tables D7-D8, we did not include real rates of capital gains $1+q_{ts}$ into the capitalization factors (i.e. the $1+r_{ts}$ factors only include the normal after-tax rates of return, see do-file). We also re-did all computations with real rates of capital gains: the λ^x ratio remains very close to 100%, and the shares $\hat{\alpha}^x$ and ψ^x are virtually unaffected (unless of course one applies capital gains and losses only to inheritance resources; in which case inheritance shares would be substantially larger to the recent period, and substantially lower for the mid-20th century; but we do not want in this paper to deviate from the assumption of a common rate or return for all individuals and types of ressources). The monetary values $\tilde{b}^x$ and $\tilde{y}_L{}^x$ however would be affected and would become more volatile and difficult to interpret, for purely artificial reasons (i.e. cohorts who happen to turn 50 in a year with high asset prices would appear as having higher lifetime resources – both inheritance and labor income resources – in euros 2009 than cohorts who happen to turn 50 in a year with low asset prices), so we prefer to present the results this way. The same remarks apply to the rates of capital destructions $1+d_{ts}$ (which were not included in the benchmark estimates reported on Tables D7-D8. One can easily redo the computations by adding the q and d factors in the corresponding line of the do-file.

[254] See formulas in excel file.

[255] Namely, we assume that the inverted Pareto coefficient is equal to 5 for cohorts 1820-1870 and equal to 3 for cohorts 1930-2030 (and declined linearly in between), which approximately corresponds to the observed

D.5. Estimation and simulation results on inheritance shares in wealth accumulation

We also use the simulated model in order to compute the non-capitalized and capitalized inheritance shares in aggregate wealth φ_t^M and φ_t^{KS} for all years between 1850 and 2100. The main findings from these computations are discussed in the working paper (section 7.3). Here we present the full results (see Table D9-D10) and provide technical details (see the do-file doinheritanceshare18502100.txt for the corresponding computer code).

For all years $t \in [1850,2100]$, we compute φ_t^M and φ_t^{KS} by dividing the cumulated value of past bequests and gifts $\hat{B}_t$ and $\tilde{B}_t$ by aggregate wealth W_t :

$$\varphi_t^M = \hat{B}_t/W_t \text{ , with: } \hat{B}_t = \sum_{t-100 \leq s \leq t} (B_{st}+V_{st}) \qquad \text{(D.4)}$$

$$\varphi_t^{KS} = \tilde{B}_t/W_t \text{ , with: } \tilde{B}_t = \sum_{t-100 \leq s \leq t} (1+r_{st})\,(B_{st}+V_{st}) \qquad \text{(D.5)}$$

With: B_{st} = aggregate bequests received at time s by individuals who are still alive at time t
V_{st} = aggregate gifts received at time s by individuals who are still alive at time t
$1+r_{st}$ = cumulated rate return between year s and year t

In order to compute B_{st} and V_{st}, we need to know which fraction of the various cohorts is still alive at in year t, so we computed survival rates using the same differential mortality parameters as in the general simulations (see do-file). The corresponding wealth aggregates, expressed in 2009 billions euros, are reported on Table D7 (benchmark scenario) and Tables D8 (low-growth, high-return scenario). We actually report three series $\hat{B}_{t0}$, $\hat{B}_t$ and $\tilde{B}_t$ for cumulated inherited wealth, as well as the three corresponding series φ_{t0}^M, φ_t^M and φ_t^{KS} for shares in aggregate wealth. The raw series $\hat{B}_{t0}$ correspond to nominal inherited wealth and are reported only for illustrative purposes: we did not even adjust past bequest and gifts flows B_{st} and V_{st} for price inflation, so of course the corresponding wealth shares φ_{t0}^M are artificially low, especially following periods of rapid inflation (e.g. φ_{t0}^M is less than 10% around 1950). The uncapitalized series $\hat{B}_t$ were

values at the 90th percentile level (see Piketty et al (2006, data appendix, Tables A3-A6)). See formulas in excel file. In order to obtain a better fit, one should use type-2 Pareto distributions for wealth distributions rather than type-1 Pareto distributions. But here this would have little effect on the pattern of ε^x.

computed by adjusting past bequest and gifts flows B_{st} and V_{st} by cumulated consumer and asset price inflation $1+p_{st}$ and $1+q_{st}$ between year s and year t. This seems to be the most reasonable way to define uncapitalized inherited wealth $\hat{B}_t$, and the corresponding uncapitalized inheritance wealth share in aggregate wealth φ_t^M.[256] In the capitalized series $\tilde{B}_t$ and φ_t^{KS}, we also apply to past bequest and gift flows the cumulated rate of return $1+r_{st}$, as indicated by equation (D.5).

We also report on Tables D7-D8 the average capitalization factor, i.e. the ratio $\tilde{B}_t/\hat{B}_t$. Note that with the deterministic demographic structure used in the stylized model, everybody inherits at age a=I, so the capitalization factor only depends on r, g and generation length H, and is given by simple steady-state formulas.[257] However here we use the observed demographic structure of bequests and gifts, with full demographic shocks, i.e. individuals receive bequests and gifts at all ages. So for instance in each cohort there is a fraction of individuals who inherited very early in life (much before age I, e.g. because their parents died early), and a fraction of individuals who inherited very late (or even died before their parents). Because capitalized returns are a convex function of time, this tends to push upwards the average capitalization factor $\tilde{B}_t/\hat{B}_t$, i.e. the few individuals in each cohort who inherited very early in life have an enormous capitalized inherited wealth and can have a substantial impact on aggregate capitalized inherited wealth. In effect, non-deterministic demography makes the capitalized definition φ_t^{KS} even more sensitive to r-g than it naturally is. We see no obvious reason why we should exclude or truncate early successors, however, so the series reported on Table D7-D8 do not make any such truncature. For illustrative purposes, we indicate the shares of non-capitalized and capitalized inherited wealth which were received more than 30 years or 50 years before the current year. So for instance, as of 2010, bequests and gifts received before 1980 represent 13% of non-capitalized inherited wealth $\hat{B}_t$ and 39% of capitalized inherited wealth $\tilde{B}_t$; those received before 1960 represent 2% of non-capitalized inherited

[256] If we were only adjusting for consumer price inflation $1+p_{st}$, then the corresponding wealth shares φ_t^M would be artificially high following periods of relative asset price decline (such as the 1950s-1960s). For the same reason, we also adjust past bequest and gift flows by cumulated capital destruction rates $1+d_{st}$ (otherwise the corresponding wealth shares φ_t^M would be artificially high following war periods: in effect we would be including in inherited wealth assets that were destroyed during wars). One can easily redo the computations by adding or substracting the p, q and d factors in the corresponding line of the do-file.

[257] See formulas (7.6)-(7-7) (working paper, section 7.3) and Table E12 for illustrative computations.

wealth $\hat{B}_t$ and 15% of capitalized inherited wealth $\tilde{B}_t$ (see Table D9). As compared to the steady-state formulas, there are other effects going in the opposite direction: we take into account all observed bequests and gifts, so for instance this includes bequests and gifts to surviving spouses and/or siblings, which often occur not very long before the receiver's death (and typically less than H=30 years before the receiver's death, so that average capitalization length is effectively less than 30). Overall, the average capitalization factor $\tilde{B}_t / \hat{B}_t$ is relatively close to the theoretical steady-state level in the benchmark scenario (it is actually a bit lower), and it is significantly higher in the low-growth, high-return scenario (reflecting the strength of the convexity effect).[258]

D.6. List of Stata format data files and do-files

simulationparameters18201913.dta: data file containing the parameters used for the 1820-1913 simulations (see Tables D1 and D4)

simulationparameters19002100.dta: data file containing the parameters used for the 1900-2100 simulations (see Tables D3 and D4)

dosimul18201913.txt: do-file generating 1820-1913 simulation results

dosimul19002100.txt: do-file generating 1900-2100 simulation results

simulresults18201913.dta, simulresults19002100.dta, simulwealth18201913.dta, simulwealth19002100.dta, simulwealth19002100(scenariod2), simulwealth18202100.dta: data files containing 1820-1913 and 1900-2100 simulation results

dolifetimecohorts18002000.txt: do-file generating lifetime resources by cohort

lifetime18002000.dta: data file containing the results on lifetime resources by cohort

[258] With H=30, g=1.7%, and (1-τ)r=3.0%, the theoretical steady-state capitalization factor should be 207% (see Table E12), and we find that the average capitalization factor converges towards about 195% during the 21st century (see Table D9). With H=30, g=1.0% and (1-τ)r=5.0%, the theoretical level is 269% (see Table E12), and we find convergence towards 350% during the 21st century (see Table D10).

doinheritanceshare18502100.txt: do-file generating capitalized and non-capitalized inheritance shares in aggregate wealth accumulation

inheritanceshares18502100.dta: data file containing the results on inheritance shares

Appendix E: Steady-state inheritance formulas

In the working paper we develop a stylized model of wealth accumulation, inheritance and growth, and present a number of theoretical results and steady-state formulas on inheritance flows (see section 5). Omitted proofs for these results and formulas are provided here, together with a number of tables and figures illustrating how the various steady-state formulas can be used with real numbers (sections E1-E5). We then show how the main theoretical results and formulas can be extended to more general demographic structures, and in particular to the case with population growth (section E6).

E.1. Proof of Proposition 3 (section 5.2)
(exogenous savings model, closed economy)

With exogenous saving rates $s_L \geq 0$ & $s_K \geq 0$, the steady-state wealth-income ratio $\beta_t = w_t/y_t$ is equal to $\beta^* = s/g$ and the steady-state rate of return r_t is equal to $r^* = \alpha/\beta$ (see Proposition 1). We are looking for the steady-state ratio $\mu_t = b_t/w_t = w_t(D)/w_t$.

(i) Case ρ=1. First consider the case ρ=1 (i.e. 100% replacement rate). Because savings are assumed to be linear, the average wealth $w_t(a)$ of a-year-olds at time t can be broken down into two components, i.e. an inherited wealth component $w_{Bt}(a)$, and a labor wealth component $w_{Lt}(a)$:

If $a \in [A,I[$ $\quad w_t(a) = w_{Lt}(a) = \int_{t+A-a \leq s \leq t} s_L\, y_{Ls}\, e^{s_K r^*(t-s)}\, ds$

If $a \in [I,D]$ $\quad w_t(a) = w_{Bt}(a) + w_{Lt}(a) = b_{t+I-a}\, e^{s_K r^*(a-I)} + \int_{t+A-a \leq s \leq t} s_L\, y_{Ls}\, e^{s_K r^*(t-s)}\, ds$

Since y_{Lt} and b_t grow at rate g in steady-state, we have: $y_{Ls} = y_{Lt}\, e^{-g(t-s)}$ and $b_{t+I-a} = b_t\, e^{-g(a-I)}$.

Therefore we have:

If $a \in [A,I[$ $\quad w_t(a) = w_{Lt}(a) = s_L\, y_{Lt}\, [1-e^{-(g-s_K r^*)(a-A)}]/(g-s_K r^*)$

If $a \in [I,D]$ $\quad w_t(a) = w_{Bt}(a) + w_{Lt}(a) = b_t\, e^{-(g-s_K r^*)(a-I)} + s_L\, y_{Lt}\, [1-e^{-(g-s_K r^*)(a-A)}]/(g-s_K r^*)$

Since $g - s_K r^* = (s-\alpha s_K)/\beta = (1-\alpha)s_L/\beta$, one can replace $s_L y_{Lt}/(g-s_K r^*)$ by w_t and obtain:

If $a \in [A,I[$ $\quad w_t(a) = w_{Lt}(a) = [1-e^{-(g-s_K r^*)(a-A)}]\, w_t$

If $a \in [I,D]$ $\quad w_t(a) = w_{Bt}(a) + w_{Lt}(a) = b_t\, e^{-(g-s_K r^*)(a-I)} + [1-e^{-(g-s_K r^*)(a-A)}]\, w_t$

It follows that the steady-state ratio $\mu_t = b_t/w_t = w_t(D)/w_t$ is given by:

$$\mu^* = \mu(g) = \frac{1-e^{-(g-s_K r^*)(D-A)}}{1-e^{-(g-s_K r^*)H}} \qquad \textbf{(E.1)}$$

Alternatively, instead of assuming that $\mu_t=b_t/w_t$ is in steady-state, we can write the transition equation for μ_t as a function of the μ_{t-H} of the previous generation:[259]

$$\mu_t = \mu_{t-H}\, e^{-(g-s_K r^*)H} + [1-e^{-(g-s_K r^*)(D-A)}]$$

As long as $s_L>0$, $g-s_K r^*>0$, so this dynamic process converges: $\mu_t \rightarrow \mu^* = \mu(g)$ as $t\rightarrow+\infty$.

Since $g-s_K r^*=g(1-\alpha)s_L/s$, formula (E.1) can also be rewritten as follows:

$$\mu^* = \mu(g) = \frac{1-e^{-\frac{(1-\alpha)s_L}{s}g(D-A)}}{1-e^{-\frac{(1-\alpha)s_L}{s}gH}} \qquad \textbf{(E.2)}$$

Note that as $s_L\rightarrow 0$, $\mu(g)\rightarrow \bar{\mu}=(D-A)/H$: we are back to the class savings case.

•$s_L>0$, $\mu'(g)<0$, with $\mu(g)\rightarrow\bar{\mu}$ as $g\rightarrow 0$ and $\mu(g)\rightarrow 1$ as $g\rightarrow+\infty$.

Note also that for given g, a rise in $(1-\alpha)s_L/s$ (the share of total savings coming from labor income) has the same impact on steady-state μ^* as a rise in g (and conversely for a rise in the share of total savings coming from capital income $\alpha s_K/s$).

In the uniform savings case ($s_L=s_K=s$), $g-s_K r^*=(1-\alpha)g$, so we have:

$$\mu^* = \mu(g) = \frac{1-e^{-(1-\alpha)g(D-A)}}{1-e^{-(1-\alpha)gH}} \qquad \textbf{(E.3)}$$

For illustrative purposes, numerical examples of age-wealth profiles for bequest wealth $w_{Bt}(a)/w_t$ and labor wealth $w_{Lt}(a)/w_t$ are represented on Figures E1-E2.[260] Because $g-s_K r^*>0$, i.e. the growth effect dominates the savings effect, bequest wealth $w_{Bt}(a)/w_t(a)$ declines with age a (above inheritance age). Labor wealth $w_{Lt}(a)/w_t(a)$ naturally rises with age. By definition, the total wealth profile $w_t(a)/w_t$ is the sum of the two profiles: it is rising until age a=I and then declining (see Figure E3). I.e. the cross-sectional wealth profile is hump-shaped (this is because of the growth effect), in spite of the fact that longitudinal profiles are always upward sloping in the exogenous saving model (there is no old-age dissaving).[261] As $g\rightarrow 0$, both profiles become almost flat and the relative importance of

[259] Here we implicitly assume that the aggregate wealth accumulation process has already converged, i.e. $\beta_t=w_t/y_t$ is permanently equal to $\beta^*=s/g$, so that w_t and y_t grow exactly at rate g. Otherwise one could not replace $s_L y_{Lt}/(g-s_K r^*)$ by w_t. and the transition equation for μ_t would look more complicated.

[260] We used the following parameters for Figures E1-E2 (see formulas in excel file): A=20, H=30, D=70, 1-α=70%. We assumed uniform savings (in which case s has no impact on age-wealth profiles). With g=2%, we get μ*=147% (see Figure E1); with g=5% we get μ*=127% (see Figure E2).

[261] The fact that growth effects can mechanically deliver hump-shaped cross-sectional profiles, even in the absence of any lifecycle saving behaviour, was first pointed out by Shorrocks (1975). Here however the growth effect comes from inheritance (older individuals are poorer because they received lower bequest) rather than from labor income: with ρ=1 older individuals have the same labor income as younger ones.

labor wealth declines; so that in the limit the total age-wealth profile looks like the profile prevailing in the class saving case (see working paper, Figure 12), and $\mu^* \to \overline{\mu}$. Conversely, as $g \to +\infty$, the bequest wealth profile becomes more and more downward sloping, and the labor wealth profile more and more upward sloping; so that in the limit the total wealth profiles displays two peaks at ages I and D, and $\mu^* \to 1$.

<u>(ii) Case ρ<1.</u> Now consider the case $\rho \leq 1$ (less than 100% replacement rates). Labor wealth $w_{Lt}(a)$ of retired individuals ($a \in [R,D]$) is now given by:

$$w_{Lt}(a) = \frac{D-A}{(R-A)+\rho(D-R)} \left[\int_{t+A-a\leq s\leq t+R-a} s_L y_{Ls} e^{s_K r^*(t-s)} ds + \int_{t+R-a\leq s\leq t} s_L \, \rho \, y_{Ls} e^{s_K r^*(t-s)} ds \right]$$

That is:

$$w_{Lt}(a) = \frac{D-A}{(R-A)+\rho(D-R)} \, w_t \left[\left[e^{-(g-s_K r^*)(a-R)} - e^{-(g-s_K r^*)(a-A)} \right] + \rho \left[1-e^{-(g-s_K r^*)(a-R)} \right] \right]$$

And the steady-state ratio $\mu_t = b_t/w_t = w_t(D)/w_t$ is given by:

$$\mu^* = \mu(g,\rho) = \frac{D-A}{(R-A)+\rho(D-R)} \frac{e^{-(g-s_K r^*)(D-R)} - e^{-(g-s_K r^*)(D-A)} + \rho(1-e^{-(g-s_K r^*)(D-R)})}{1-e^{-(g-s_K r^*)H}} \qquad \textbf{(E.4)}$$

With $\rho=1$, we are back to the above formula. With $\rho<1$, $\mu(g,\rho) \to \overline{\mu}$ as $g \to 0$.
Note also that $\mu(g,\rho) \to \mu_0(\rho) < 1$ as $g \to +\infty$, with $\mu_0(\rho)$ given by:

$$\mu_0(\rho) = \frac{\rho(D-A)}{(R-A)+\rho(D-R)}$$

$\mu_0'(\rho) > 0$. $\mu_0(\rho) \to 1$ as $\rho \to 1$. $\mu_0(\rho) \to 0$ as $\rho \to 0$.

The key difference with the case $\rho=1$ is that retired individuals now do not fully benefit from labor income growth, so for ρ small and g high the labor wealth profile $w_{Lt}(a)/w_t$ becomes downward sloping above retirement age. In the extreme case $\rho=0$ and $g \to +\infty$, the relative

When we introduce $\rho<1$, then the Shorrocks labor income effect shows up (older indidivuals are poorer because they do not fully benefit from labor income growth), which reinforces the total growth effect and makes the cross-sectional profile even more hump-shaped (see below).

wealth of the elderly μ^* tends toward 0% (they become infinitely poor as compared to workers), and inheritance vanishes. But for this effect to be quantitatively significant, growth rates need to be enormous. E.g. for ρ=0% and g=10%, then μ^*=40% and b_y^*=4%. For more reasonable values of g, μ^* and b_y^* are much closer to class saving levels. On Table E1 we provide numerical illustrations of the $\mu(g)$ and $\mu(g,\rho)$ formulas for various parameter values.[262]

E.2. Proof of Proposition 4 (section 5.2)

(exogenous savings model, open economy)

(i). Wealth-income ratio. We first solve for the long-run $\beta_t=W_t/Y_t$. In the closed economy case, steady-state $\beta^*=s/g$ and $r^*=\alpha g/s$ (with $s=(1-\alpha)s_L+\alpha s_K$) follow directly from the wealth accumulation equation $dW_t/dt=sY_t$, i.e. $d\beta_t/dt=s-g\beta_t$. The open economy case introduces two complications into this equation: the capital share (incl. net foreign asset income) generally differs from α, so the aggregate saving rate is now endogenous (except in the uniform saving case $s=s_L=s_K$); the long run growth rate of national income can differ from g, in case the world rate of return r is larger than $\bar{r}=g/s_K$ (in which case it will be equal to $s_K\bar{r}>g$). To solve the model, we use the following notations. Private wealth W_t is now equal to the sum of the domestic capital stock K_t and net foreign assets W_{Ft} (≥0 or ≤0): $W_t=K_t+W_{Ft}$. National income Y_t is equal to the sum of domestic income (domestic output, i.e. net domestic product) $Y_{pt}=F(K_t,H_t)$ and net foreign asset income rW_{Ft}: $Y_t=Y_{pt}+rW_{Ft}=(1+r\beta_{Ft})Y_{pt}$ (with $\beta_{Ft}=W_{Ft}/Y_{pt}$ = foreign wealth-domestic income ratio). We maintain the Cobb-Douglas assumption for domestic production ($Y_{pt}=F(K_t,H_t)=K_t^{\alpha}\ H_t^{1-\alpha}$), so the domestic capital/output ratio $\beta_{Kt}=K_t/Y_{pt}$ is permanently equal to $\beta_K^*=\alpha/r$, and the growth rate of domestic output is permanently equal to g. The wealth-national income ratio $\beta_t=W_t/Y_t$ is equal to $\beta_{pt}/(1+r\beta_{Ft})$, where $\beta_{pt}=W_t/Y_{pt}=\beta_{Kt}+\beta_{Ft}$ is the wealth-domestic income ratio. The wealth accumulation equation can be written as follows:

$$dW_t/dt = dW_{Ft}/dt + dK_t/dt = s_L Y_{Lt} + s_K Y_{Kt}$$

$$\text{With: } Y_{Lt} = (1-\alpha)Y_{pt} = \text{labor income}$$

$$Y_{Kt} = rW_t = \alpha Y_{pt} + rW_{Ft} = \text{corrected capital income (incl. net foreign asset income)}$$

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262 The values for $\mu^*=\mu(g,\rho)$ reported in Table E1 apply for all savings rates s_K and s_L (all what matters for $\mu^*=\mu(g,\rho)$ is the relative share of labor income savings in total savings $(1-\alpha)s_L/s$). In order to illustrate the impact of μ^* on b_y^*, we also report the corresponding $b_y^*=\mu^*m^*\beta^*$ assuming a fixed β^*=600% (this is implicitly assuming that levels of s_K and s_L adapt to changes in g so as to keep β^* constant; this allows us to focus upon the pure age profile effect on b_y^*, shutting down the aggregate wealth accumulation β^* effect).

Note that $dK_t/dt = gK_t = g\alpha Y_{pt}/r$.

By differentiating $\beta_{Ft} = W_{Ft}/Y_{pt}$ one then obtains the following dynamic equation:

$$d\beta_{Ft}/dt = (1-\alpha)s_L + (\alpha + r\beta_{Ft})s_K - g\alpha/r - g\beta_{Ft} = (s - g\alpha/r) - (g - s_K r)\beta_{Ft}$$

Where $s=(1-\alpha)s_L + \alpha s_K$ is again the aggregate closed economy saving rate.

If $r>\bar{r}=g/s_K$ t, i.e. if the rate of wealth reproduction $s_K r$ is larger than g, then this dynamic equation admits no (stable) steady-state: $\beta_{Ft}\rightarrow+\infty$ as $t\rightarrow+\infty$. I.e. in the long run domestic output Y_{pt} becomes negligible as compared to foreign asset income rW_{Ft}, and national income $Y_t \approx rW_t$ grows at rate $s_K r>g$. It follows that $\beta_t=W_t/Y_t \rightarrow 1/r$ as $t\rightarrow+\infty$.

If $r<\bar{r}$, i.e. if $g-s_K r>0$, then this dynamic equation admits a unique steady-state β_F^*, with:

$$\beta_F^* = (s-g\alpha/r)/(g-s_K r).= s(1-r^*/r)/(g-s_K r)$$

Note that $\beta_F^*>0$ if $r>r^*$ and $\beta_F^*<0$ if $r<r^*$ (where $r^*=\alpha g/s \leq \bar{r}$ is the closed-economy steady-state). $\beta_F^*\rightarrow+\infty$ as $r\rightarrow\bar{r}$.

Finally, we have: $\beta^{**} = (\beta_K^*+\beta_F^*)/(1+r\beta_F^*) = s_L/[g-r(s_K-s_L)]$.

With uniform savings ($s=s_L=s_K$), then $\beta^{**} = s/g = \beta^*$. I.e. the open economy steady-state wealth-income ratio is the same as the closed economy ratio, and does not depend on the world rate of return r.

If $s_K>s_L$ (resp. $s_K<s_L$), then β^{**} is an increasing (resp. decreasing) function of r, and is larger than the closed economy ratio iff $r>r^*$ (resp. $r<r^*$).

Note that $\beta^{**}\rightarrow 1/r$ as $r\rightarrow\bar{r}$. Note also that the class saving case ($s_L=0$ & $s_K>0$) is degenerate: if $r>\bar{r}=r^*$ then $\beta_{Ft}\rightarrow+\infty$ as $t\rightarrow+\infty$; if $r<\bar{r}$ then $\beta_{Ft}\rightarrow 0$ as $t\rightarrow+\infty$.

<u>Example</u>: g=2%, $s=s_K=s_L=12\%$, α=30%. In the closed-economy, $\beta^*=s/g=600\%$ and $r^*=\alpha/\beta^*=5\%$. Now assume the economy opens up and faces a world rate of return r=6%. Then the domestic capital-output ratio β_K^* declines to α/r=500%, and wealth-holders accumulate foreign assets equivalent to $\beta_F^*=156\%$ of domestic output, bringing $r\beta_F^*=9\%$ additional income. The wealth-income ratio $\beta^{**}=(\beta_K^*+\beta_F^*)/(1+r\beta_F^*)$ is unchanged at 600%.

Now assume g=2%, $s_K=24\%$ and $s_L$such that s=12% ($s_L\approx 9\%$). Then as the economy opens up, β_K^* still declines from 600% to 500%, but β_F^* now rises to 250% (bringing that $r\beta_F^*=15\%$ additional income), so that the wealth-income ratio β^{**} rises to 652%.

<u>(ii). Inheritance ratios</u> The formulas for the age-wealth profile $w_t(a) = w_{Bt}(a) + w_{Lt}(a)$ are the same as in the closed economy case, except that r* needs to be replaced by r. In the case $r>\bar{r}$, then labor income y_{Lt} vanishes in the long run, i.e. $y_{Lt}/w_t \to 0$ as $t \to +\infty$, and so does labor wealth $w_{Lt}(a)$ relatively to bequest wealth $w_{Bt}(a)$. So we are back to the class saving case, and $\mu_t \to \bar{\mu}$ as $t \to \infty$. In the case $r<\bar{r}$, $\mu_t \to \mu^*=\mu(g,r,\rho)$ as $t \to \infty$, with $\mu(g,r,\rho)$ given by the same formulas as in the closed economy case (except that r* is replaced by r):

$$\mu(g,r) = \frac{1-e^{-(g-s_K r)(D-A)}}{1-e^{-(g-s_K r)H}} \qquad \textbf{(E.5)}$$

The limit results as $g \to 0$ apply for the same reasons. The limit results as $r \to \bar{r}$ follow from the fact that $\beta_F^* \to +\infty$ as $r \to \bar{r}$, so labor wealth $w_{Lt}(a)$ again vanishes relatively to bequest wealth $w_{Bt}(a)$. The results for b_{wt} and b_{yt} follow directly from the μ_t results.[263] On Table E2 we provide numerical illustrations of the $\mu(g,r)$ for various parameter values.[264]

E.3. Proof of Proposition 6 (section 5.3)

(dynastic model, ρ=1, with borrowing)

We assume ρ=1. In case young agents (A≤a<I) cannot borrow against future inheritance receipts, then the cross-sectional age-wealth profile $w_t(a)$ is the same as with class saving:

If If $a \in [A,I[$ $w_t(a) = 0$

If If $a \in [I,D]$ $w_t(a) = \bar{w}_t = \bar{\mu}\ w_t$

But in case young agents are allowed to borrow against future inheritance, then they will choose to do so as soon as they become adult. We assume perfect foresight and solve for the corresponding steady-state. Consider agents belonging to a given cohort x. They know from the beginning of their adult life that they will receive (average) inheritance b^x at age a=I. They choose a consumption path $c^x(a)$ (A≤a≤D) in order to maximize dynastic utility, anticipating that their offspring will do the same.[265] Utility maximization implies that they will choose a consumption path growing at rate $g_c=(r_t-\theta)/\sigma$, i.e. at rate $g_c=g$ since we look

[263] Here we refer to $b_{yt}=\mu_t m_t \beta_t$, i.e. to the inheritance flow-national income ratio. If we were instead using domestic income as the denominator, then the inheritance-income ratio would naturally $\to +\infty$ in the case $r>\bar{r}$ (in the same way as in the wealth-in-utility-function model, see below).

[264] The values for $\mu^*=\mu(g,r)$ reported in Table E2 were computed for a fixed s_K and for ρ=1. In order to illustrate the impact of μ^* on b_y^*, we again report the corresponding $b_y^*=\mu^* m^* \beta^*$ assuming a fixed β*=600% (this is implicitly assuming that s_L adapt to changes in g so as to keep β* constant).

[265] Here we write wealth and consumption equations at the aggregate cohort level, but because of linearity they are exactly the same at the same at the individual level (i.e. everything applies proportionally to each dynasty i with inheritance b_i^x within cohort x). Also note that we do not need to worry about labor income since with ρ=1 it is entirely consumed (irrespective of the bequest level, again because of linearity).

at steady-state paths with $r_t=r^*=\theta+\sigma g$. That is, they choose a consumption path of the form: $c^x(a) = c^x(A)\ e^{g(a-A)}$. One possibility would be to set their initial consumption level $c^x(A)$ equal to a fraction r*-g of the present value of their bequest ($c^x(A)=(r^*-g)\ b^x\ e^{-r^*(I-A)}$), which by definition corresponds to a consumption path that can be sustained for ever. But they need to anticipate that their children will do the same, i.e. they will also start consuming their bequest before they receive it.[266] So the time-consistent utility maximizing consumption path $c^x(a) = c^x(A)\ e^{g(a-A)}$ must be such that cohort x leaves bequest b^{x+H} allowing the next generation to pursue the same consumption path, i.e. such that $b^{x+H} = b^x\ e^{gH}$. Now, for given $c^x(A)$, the wealth path $w^x(a)$ followed by cohort x will look as follows:

If $a\in[A,I[\quad w^x(a) = -\int_{A\leq a'\leq a} c^x(A)\ e^{g(a'-A)}\ e^{r^*(a-a')}\ da'$

If $a\in[I,D]\quad w^x(a) = b^x\ e^{r^*(a-I)} - \int_{A\leq a'\leq a} c^x(A)\ e^{g(a'-A)}\ e^{r^*(a-a')}\ da'$

That is:

If $a\in[A,I[\quad w^x(a) = -\ c^x(A)\ \dfrac{e^{r^*(a-A)}-e^{g(a-A)}}{r^*-g}$

If $a\in[I,D]\quad w^x(a) = b^x\ e^{r^*(a-I)} - c^x(A)\ \dfrac{e^{r^*(a-A)}-e^{g(a-A)}}{r^*-g}$

Note that wealth $w^x(a)$ is negative until inheritance age (as cohort x borrows against future inheritance) and positive afterwards. Wealth at death $w^x(D)$ left by cohort x is by definition equal to the bequest b^{x+H} received by the next generation:

$$b^{x+H} = w^x(D) = b^x\ e^{r^*H} - c^x(A)\ \frac{e^{r^*(D-A)}-e^{g(D-A)}}{r^*-g}$$

The consumption path is time consistent iff $b^{x+H} = b^x\ e^{gH}$, i.e. iff:

$$c^x(A) = (r^*-g)\ \frac{e^{r^*H}-e^{gH}}{e^{r^*(D-A)}-e^{g(D-A)}}\ b^x$$

Note that this is lower than $(r^*-g)\ b^x\ e^{-r^*(I-A)}$), i.e. time consistency forces to choose lower consumption path.

We can now compute the resulting cross-sectional wealth profile $w_t(a)$. Individuals who are a-year-old at time t belong to cohort x=t-a, and they will receive (or have received) inheritance $b^x = b_t\ e^{g(I-a)}$ at time t+I-a (at age I). So we have:

If $a\in[A,I[\quad w_t(a) = -\ b_t\ e^{g(I-A)}\ \dfrac{e^{r^*H}-e^{gH}}{e^{r^*(D-A)}-e^{g(D-A)}}\ [e^{(r^*-g)(a-A)}-1]$

266 Parents derive utility only from what their children consume after age I; but children also care about what they consume between age A and age I; in perfect foresight steady-states, parents end up internalizing this borrowing behavior (this is of course assuming that parents cannot disallow their children to borrow against inheritance, which does not seem very realistic; see discussion in working paper, section 7.3).

If $a \in [I,D]$ $w_t(a) = = b_t \left[e^{(r^*-g)(a-I)} - e^{g(I-A)} \frac{e^{r^*H} - e^{gH}}{e^{r^*(D-A)} - e^{g(D-A)}} [e^{(r^*-g)(a-A)}-1] \right]$

If we now compute average wealth $w_t = \int_{A\leq a\leq D} w_t(a)\,da$ and the ratio $\mu_t = \frac{w_t(D)}{w_t}$, we obtain the following formula for steady-state μ* :

$$\mu^* = \frac{e^{(r^*-g)(D-A)} - 1}{e^{(r^*-g)H} - 1} \qquad \textbf{(E.6)}$$

Note that $\forall\, r^*-g>0$, $\mu^* > \bar{\mu} = (D-A)/H$.

Steady-state μ* is an increasing function of r*-g.

$\mu^* \rightarrow \bar{\mu}$ as $r^*-g \rightarrow 0$ (which can occur only if $\theta \rightarrow 0$ and $g \rightarrow 0$).

The reason why μ* is always larger than $\bar{\mu}$ when we allow for borrowing is fairly intuitive. Because young agents borrow against future inheritance, the cross-sectional age-wealth profile $w_t(a)$ is negative and downward sloping from age A to I, then jumps to positive levels at age I, and then is upward sloping from age I to age D (see Figure E4).[267] This pushes upwards the relative wealth of decedents μ_t and the steady-state inheritance flows. A larger r*-g differential will make the downward-sloping part more steeply declining, and the upward-sloping part more steeply rising, thereby pushing μ_t further up. The formula shows that the effect can become very large and push steady-state μ* towards very high levels, especially if life expectancy is large. E.g. with A=20, D=70, H=30, g=2% and r*=5%, one gets μ*=239% (instead of $\bar{\mu}$=167% in the case with no borrowing). But with A=20, D=80, H=30, g=0% and r*=5%, one gets μ*=548% (instead of $\bar{\mu}$=200% in the case with no borrowing). With β*=600%, this would imply an aggregate inheritance flow equal to b_y^*=55% of national income (instead of 20% with no borrowing). We view this extreme case merely as an intellectual curiosity.

E.4. Proof of Proposition 7 (section 5.3)

(dynastic model, ρ≤1, no borrowing)

(i) Computation of lifecycle saving rates. We now consider the case ρ<1. That is, instead of getting (average) labor income y_{Lt} during their entire adult lifetime (R≤a≤D), agents now receive $y_{Lt}(a)=(1-\tau_\rho)\,\hat{y}_{Lt}$ when they are working (A≤a<R) and $y_{Lt}(a)=\rho(1-\tau_\rho)\,\hat{y}_{Lt}$ when they are retired (R≤a≤D), with:

[267] We used the following parameters for Figure E4 (see formulas in excel file): A=20, H=30, D=70, g=2%, r*=5%. Applying the formulas we get $\bar{\mu}$=167% (no borrowing) and μ*=239%.

$\hat{y}_{Lt} = \frac{D-A}{R-A} y_{Lt}$ = average pre-tax labor income of adult workers at time t

τ_ρ = budget-balanced pension tax rate = $\frac{\rho(D-R)}{R-A+\rho(D-R)}$

With ρ=0 they receive no pension at all. With ρ=1 we are back to the previous case.

Consider agents belonging to a given cohort x. We assume that young agents cannot borrow against future inheritance. More precisely, we assume that they behave until age I as if they were not going to receive any inheritance; so in effect they maximize twice their dynastic utility function: once at age A (under the anticipation that they will receive no inheritance), and once at age I (in case they receive inheritance they revise their plan).[268] Utility maximization at age A implies that they will choose a consumption path $c^x(a)=c^x(A)e^{g(a-A)}$ growing at rate g during their entire lifetime.[269] To achieve this goal, they save a fraction $s_L y_L^x(a)$ of their labor income when they are working ($A \le a < R$), in order to finance an extra consumption flow $c_L^x(a)$ when they are retired ($R \le a \le D$). Since $y_L^x(a)=y_L^x(A)e^{g(a-A)}$ for $a \in [A,R[$ and $y_L^x(a)=\rho y_L^x(A)e^{g(a-A)}$ for $a \in [R,D]$, the extra consumption flow picked by utility maximizing agents will simply be equal to $c_L^x(a)=c_L y_L^x(A)e^{g(a-A)}$, with $c_L+\rho=1-s_L$, i.e. agents will save whatever it takes in order to complement the pension replacement rate and ensure an effective replacement rate of 100% at retirement age.[270] In order to equilibrate the saving and dissaving flows, the saving rate s_L must be such that:

$$s_L \int_{A \le a \le R} e^{(r^*-g)(R-a)}\, da = c_L \int_{R \le a \le D} e^{(r^*-g)(R-a)}\, da \quad \text{(E.7)}$$

Replacing c_L by $1-s_L-\rho$, we get the following formula for the lifecycle saving rate s_L:

$$s_L = (1-\rho)\,\bar{s}_L$$

$$\text{With: } \bar{s}_L = \frac{1-e^{-(r^*-g)(D-R)}}{e^{(r^*-g)(R-A)}-e^{-(r^*-g)(D-R)}} \qquad \textbf{(E.8)}$$

In case the pension system offers 100% replacement rate (ρ=1), then there is no need for lifecycle saving (s_L=0). Conversely if there is no pension system (ρ=0), then lifecycle

[268] If we instead assume perfect foresight on inheritance receipts and full maximization at age A, then individuals with high expected inheritance will save less between age A and I (and possibly not at all) than the formulas below (which would only apply to individuals with zero inheritance). This might be relevant empirically (borrowing against future inheritance is difficult in practice, but lowering saving is easy). So the formulas below should be viewed as an upper bound for lifecycle wealth.

[269] We look at steady-state paths ($r^*=r+\theta\sigma$), so the desired consumption growth rate $g_c=(r-\theta)/\sigma$ is equal to g.

[270] Here we again write wealth and consumption equations at the aggregate cohort level, but because of linearity they are exactly the same at the same at the individual level (i.e. everything applies proportionally to each dynasty i with labor income y_{Li} within cohort x). Again because of linearity we can look separately at lifecycle wealth and forget about bequest wealth.

savings takes its maximal value $\bar{s}_L$. Note that as long as r*-g>0, $\bar{s}_L < \bar{\tau}_p = \frac{D-R}{D-A}$, i.e. the private savings rate delivering 100% replacement rate at retirement is less than the pension tax rate delivering the same outcome. This is a direct consequence of the fact that the internal rate of return of unfunded pay-as-you-go pension system is equal to g, while the rate of return on private savings is equal to r*. In case r*-g→0 (which in the steady-case of the dynastic model requires r*=g=θ=0), then $\bar{s}_L \to \bar{\tau}_p = \frac{D-R}{D-A}$. Conversely, other things equal, the higher r*-g, the lower $\bar{s}_L$.

Example: Take A=20, R=60, D=80. Then if r*-g=0, $\bar{s}_L = \bar{\tau}_p$=33%. If r*-g=1%, then $\bar{\tau}_p$ is still equal to 33%, but $\bar{s}_L$=27%. If r*-g=3% (say, g=2, r*=5%), then $\bar{s}_L$=16% (see Table E3).

(ii) Computation of lifecycle wealth. Once we know s_L, the longitudinal age profile of lifecycle wealth $w_L^x(a)$ follows:

If $a \in [A,R]$ $\quad w_L^x(a) = s_L\, y_L^x(A) \int_{A \le a' \le a} e^{g(a'-A)}\, e^{r^*(a-a')}\, da'$

If $a \in [R,D]$ $\quad w_L^x(a) = s_L\, y_L^x(A) \int_{A \le a' \le R} e^{g(a'-A)}\, e^{r^*(a-a')}\, da' \ - \ c_L\, y_L^x(A) \int_{R \le a' \le a} e^{g(a'-A)}\, e^{r^*(a-a')}\, da'$

Replacing c_L by $1-s_L-\rho$ and s_L by $(1-\rho)\bar{s}_L$, we get:

If $a \in [A,R]$ $\quad w_L^x(a) = (1-\rho)\bar{s}_L\ y_L^x(A)\, e^{g(a-A)}\ \frac{e^{(r^*-g)(a-A)}-1}{r^*-g}$

If $a \in [R,D]$ $\quad w_L^x(a) = (1-\rho)\, y_L^x(A)\, e^{g(a-A)}\ \left[\bar{s}_L\ \frac{e^{(r^*-g)(a-A)}-1}{r^*-g} - \frac{e^{(r^*-g)(a-R)}-1}{r^*-g}\right]$

With ρ=1 there is no lifecycle wealth. With ρ<1, lifecycle wealth $w_L^x(a)$ has the usual hump-shaped profile: it rises from zero at age a=A to a maximum $w_L^x(R)$ at retirement age a=R, and then declines towards zero at death age a=D. In case r*-g→0, then we get the standard Modigliani triangle:

If $a \in [A,R]$ $\quad w_L^x(a) = (1-\rho)\bar{s}_L\ y_L^x(A)\,(a-A) = (1-\rho)\ \frac{D-R}{D-A}\, y_L^x(A)\,(a-A)$

If $a \in [R,D]$ $\quad w_L^x(a) = (1-\rho)\, y_L^x(A)\,[\bar{s}_L\ (a-A) - (a-R)\ ] = (1-\rho)\ \frac{R-A}{D-A}\, y_L^x(A)\,(D-a)$

We can now compute the resulting cross-sectional age profile of lifecycle wealth $w_{Lt}(a)$. Individuals who are a-year-old at time t belong to cohort x=t-a, and they received labor income $y_L^x(A) = y_{Lt}\, e^{-g(a-A)}$ at time t+A-a (at age A). So we have:

If $a \in [A,R]$ $w_{Lt}(a) = (1-\rho)\,\bar{s}_L\ y_{Lt}\ \frac{e^{(r^*-g)(a-A)}-1}{r^*-g}$

If $a \in [R,D]$ $w_{Lt}(a) = (1-\rho)\ y_{Lt}\ [\bar{s}_L\ \frac{e^{(r^*-g)(a-A)}-1}{r^*-g} - \frac{e^{(r^*-g)(a-R)}-1}{r^*-g}]$

From these equations we can compute average lifecycle wealth $w_{Lt} = \int_{A\leq a\leq D} w_{Lt}(a)da$, and define $\beta_L = \frac{w_{Lt}}{y_{Lt}}$ the ratio between average lifecycle wealth and average labor income. We obtain the following formula:

$$\beta_L = \frac{w_{Lt}}{y_{Lt}} = (1-\rho)\,\bar{\beta}_L$$

With:

$$\bar{\beta}_L = \frac{1}{D-A}\,[\bar{s}_L\ \frac{e^{(r^*-g)(D-A)}-1-(r^*-g)(D-A)}{(r^*-g)^2} - \frac{e^{(r^*-g)(D-R)}-1-(r^*-g)(D-R)}{(r^*-g)^2}] \qquad \textbf{(E.9)}$$

β_L measures the number of years of labor income which is being accumulated in lifecycle wealth in this economy. $\bar{\beta}_L$ is the maximum value of β_L, i.e. the value prevailing in the absence of a pay-as-you-go pension system (ρ=0). As the pension system becomes more and more generous ($\rho\to1$), $\beta_L=(1-\rho)\,\bar{\beta}_L$ declines linearly towards zero.

In case $r^*-g\to0$, then $\bar{\beta}_L \to = \frac{1}{D-A}\,[\bar{s}_L\ \frac{(D-A)^2}{2} - \frac{(D-R)^2}{2}] = \frac{(D-R)(R-A)}{2(D-A)}$

This is the standard Modigliani triangle formula: in an economy with zero growth and zero rate of return, then in order to consume as much during retirement as during their working life, then individuals need to accumulate lifecycle wealth equivalent to (D-R)/2 years of labor income, where D-R is retirement length.[271]

<u>Example</u>: Assume r*-g=0%, A=20, R=60. With D=70, then $\bar{\beta}_L$ = 400%. That is, lifecycle wealth equals 400% of aggregate labor income. With D=80, then $\bar{\beta}_L$ = 667%. If r*-g>0, then the capitalization effect allows to lifecycle savers to save less, and the economy as a

[271] See e.g. Modigliani (1986). The intuition for this well known formula is very simple: at the top of their wealth accumulation trajectory (at age a=R), lifecycle savers need to own the equivalent of D-R years of labor income in order to finance retirement consumption; by linearity, individuals on the rising and declining segments of the triangle (below and above age a=R) own on average (D-R)/2 years. The reason why (D-R)/2 needs to be multiplied by (R-A)/(D-A) is because we divide lifecycle wealth w_{Lt} by per adult labor income y_{Lt} (rather than by per worker labor income=$(D-A)y_{Lt}/(R-A)$). This makes more sense from an aggregate wealth accumulation viewpoint. So for instance if R is fixed and D goes to infinity, then $\bar{\beta}_L \to$ (R-A)/2 (not to infinity).

whole to accumulate lower lifecycle wealth. So for instance if r*-g=3% (say, because g=2% and r*=5%), then $\overline{\beta}_L$ = 332% with D=70 and $\overline{\beta}_L$ = 568% with D=80 (see Table E3).

Note that $\overline{s}_L$ and $\overline{\beta}_L$ depends solely on the differential r*-g, and not on the absolute level of either r* or g. Also note that a rise in r*-g does not have a huge impact on the quantitative magnitudes: $\overline{\beta}_L$ declines, but not that much.[272]

Note also that if we want to compute maximal lifecycle wealth w_{Lt} as a fraction of national income y_t rather than labor income y_{Lt}, then we need to multiply $\overline{\beta}_L$ by the labor share 1-α. So for instance with α=30% and r*-g=3%, we have $(1-\alpha)\overline{\beta}_L$ = 232% with D=70 and $(1-\alpha)\overline{\beta}_L$ = 398% with D=80. If we now want to compute actual lifecycle wealth (given the existence of a pay-as-you-go pension system in the model), then we need to multiply $(1-\alpha)\overline{\beta}_L$ by 1-ρ. So for instance with ρ=80%, α=30% and r*-g=3%, we have $(1-\alpha)\overline{\beta}_L$ = 46% with D=70 and $(1-\alpha)\overline{\beta}_L$ = 80% with D=80. With ρ=50%, we get 116% and 199%.

(iii) Computation of inheritance ratios. Finally, we can compute the total age-wealth profile $w_t(a)$ and the μ_t ratio. The utility-maximizing profile of consumption must grow at rate g, so after they receive their inheritance, agents save a fraction s_K=g/r* of the corresponding flow return (and consume the rest). So the growth and saving effect again compensate each other, and the age profile of bequest wealth $w_{Bt}(a)$ is flat above inheritance age, in the same way as in the class saving model:

If $a \in [A,I[$ $\quad w_{Bt}(a) = 0$

If $a \in [I,D]$ $\quad w_{Bt}(a) = b_t$

The total age-wealth profile $w_t(a)$ is given by summing up the two profiles:

$\forall a \in [A,D]$ $\quad w_t(a) = w_{Bt}(a) + w_{Lt}(a)$

Computing the averages over all ages we have:

$$w_t = \frac{H}{D-A} b_t + w_{Lt}$$

Replacing w_{Lt} by $(1-\alpha)\beta_L y_t$ and w_t/y_t by its steady-state value β*, we obtain that $\mu_t=b_t/w_t$ has a unique steady-state level μ* given by:

[272] Intuitively, this is because a rise in r*-g makes everybody richer (workers now receive labor income and capital income, while with r*=g=0 there was no capital income at all, i.e. saving was a pure storage technology); to obtain given absolute living standards during retirement, workers could afford accumulating a lot less lifecycle wealth; but because they seek the have the same relative consumption during work and retirement years, lifecycle wealth does not decline all that much as r*-g rises.

$$\mu^* = \bar{\mu}\ [1-\frac{(1-\alpha)\beta_L}{\beta^*}] = \bar{\mu}\ [1-\frac{(1-\rho)(1-\alpha)\bar{\beta}_L}{\beta^*}] \qquad \textbf{(E.10)}$$

On Table E4 we provide numerical illustrations for this formula, using various values of the replacement rate ρ.[273] On Figures E5-E8 we show the steady-state age-wealth profiles: with ρ close to 100%, then hump-shaped lifecycle wealth is not very large and has little impact on the overall age-wealth profile; but as ρ→0% lifecycle wealth plays a larger role and the overall profile becomes more and more hump-shaped.[274] Note that μ* is always higher for lower growth rates g. This is because the ratio $\frac{(1-\alpha)\bar{\beta}_L}{\beta^*}$ (i.e. the share of maximal lifecycle wealth in aggregate wealth) is an increasing function of the growth rate.[275] The intuition is again that higher growth favours new savings relatively to inheritance. However the impact of g on μ* is smaller than in the exogenous saving model. In particular, as g→0, μ* does not converge toward $\bar{\mu}$: lifecycle wealth remains strictly positive, so μ* remains strictly below $\bar{\mu}$.

E.5. Proof of Propositions 8-9 (section 5.4)
(wealth-in-the-utility model)

(i) open economy, ρ=1, with borrowing. We start with the open economy case, which is easier to solve in the wealth-in-the-utility model, and we assume ρ=1 (i.e. we shut down the lifecycle saving motive). We also start by assuming that young agents can borrow against future inheritance, and we assume perfect foresight about future inheritance receipts. Consider agents belonging to a given cohort x. During their lifetime ($a \in [A,D]$) they receive (average) labor income flows $y_L^x(a)=y_L^x(A)e^{g(a-A)}$. At age a=I they receive

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273 We again report the corresponding $b_y^*=\mu^* m^* \beta^*$ assuming a fixed β*=600% (this is implicitly assuming that θ adapts to changes in g so as to keep β* constant).

274 We use the following parameters for Figures E5-E8 (see formulas in excel file): A=20, H=30, R=60, D=80, g=2%, r*=5%. Applying the formulas we get μ*=173% (ρ=80%), μ*=134% (ρ=50%) and μ*=67% (ρ=0%) (see Table E4).

275 See Table A3 for detailed computations on the lifecycle wealth share. Note that this is true both a given r* (a rise in g then implies a fall in r*-g, and therefore a rise in $\bar{\beta}_L$), and for an endogenous r*=θ+σg: a rise in g then leads to a rise in r*-g (assuming σ>1) and a decline in $\bar{\beta}_L$, but the rise in r* means an even bigger decline in β*, so that the lifecycle wealth share rises. Note also that for extreme parameter values (g above 4%-5%, endogenous r* above 10%), then lifecycle wealth may exceed aggregate wealth: strictly speaking this would imply negative bequests, i.e. borrowing from future generations, but this is impossible.

(average) bequest b^x, with capitalized end-of-life value $b^x e^{rH}$. We note $\tilde{y}_L{}^x$ the end-of-life capitalized value of their labor income flows $y_L{}^x(a)$:

$$\tilde{y}_L{}^x = \int_{A\leq a\leq D} e^{r(D-a)}\, y_L{}^x(a)\, da \; = y_L{}^x(A)\, e^{r(D-A)} \, \frac{1-e^{-(r-g)(D-A)}}{r-g}$$

We note $\tilde{y}^x = \tilde{y}_L{}^x + b^x e^{rH}$ their total lifetime resources (capitalized at the end of life). At age a=A they maximize $V(U_c,w^x(D))$ in order to allocate $\tilde{y}$ between their lifetime consumption flows $c^x(a)$ ($a\in[A,D]$) and their end-of-life wealth $w^x(D)$.With $U_C=[\int_{A\leq a\leq D} e^{-\theta(a-A)} c^x(a)^{1-\sigma} da\,]^{\frac{1}{1-\sigma}}$, standard first-order conditions imply that they will that they will choose a consumption path $c^x(a)=c^x(A)e^{g_c(a-A)}$ growing at rate $g_c=(r-\theta)/\sigma$ during their lifetime. Note that $(1-\sigma)g_c-\theta=g_c-r$. The utility value U_c of this consumption flow is given by:

$$U_c = [\int_{A\leq a\leq D} e^{-\theta(a-A)}\, c^x(a)^{1-\sigma}\, da\,]^{\frac{1}{1-\sigma}} \; = c^x(A)\, \left(\frac{1-e^{-(r-g_c)(D-A)}}{r-g_c}\right)^{\frac{1}{1-\sigma}}$$

We note $\tilde{c}^x$ the end-of-life capitalized value of consumption flows $c^x(a)=c^x(A)e^{g_c(a-A)}$:

$$\tilde{c}^x = \int_{A\leq a\leq D} e^{r(D-a)}\, c^x(a)\, da \; = c^x(A)\, e^{r(D-A)} \, \frac{1-e^{-(r-g_c)(D-A)}}{r-g_c}$$

The lifetime budget constraint is: $\tilde{c}^x + w^x(D) \leq \tilde{y}^x$

Maximization of $V[U_c,w^x(D)]=(1-s_B)\log(U_C)+s_B\log[w^x(D)]$ implies:

$w^x(D)=s_B\,\tilde{y}^x$ and $\tilde{c}^x=(1-s_B)\,\tilde{y}^x$.

Thanks to linearity, the consumption profile can be broken down into bequest-financed and labor-financed consumption (each flow growing at rate g_c): $c^x(a) = c_B{}^x(a) + c_L{}^x(a)$. We have:

$c^x(A)= c_B{}^x(A) + c_L{}^x(A)$

$c_B{}^x(A) = (1-s_B)\dfrac{r-g_c}{1-e^{-(r-g_c)(D-A)}}\; b^x e^{-r(I-A)}$

$c_L{}^x(A) = (1-s_L)y_L{}^x(A)$

with:[276] $$1\text{-}s_L=(1\text{-}s_B)\ \frac{(r-g_c)(1-e^{-(r-g)(D-A)})}{(r-g)(1-e^{-(r-g_c)(D-A)})} \qquad \text{(E.11)}$$

The wealth profile $w^x(a)$ can be be written: $w^x(a) = w_B{}^x(a)+w_L{}^x(a)$, where $w_B{}^x(a)$ is bequest wealth (i.e. the non-consumed part of capitalized bequest ressources at age a) and $w_L{}^x(a)$ is labor wealth (i.e. the non-consumed part of capitalized labor ressources at age a):

$\forall a\in[A,D]$, $w_L{}^x(a) = \int_{A\le a'\le a} e^{r(a-a')}y_L{}^x(a')da - \int_{A\le a'\le a} e^{r(a-a')}c_L{}^x(a')da$

I.e. $\forall a\in[A,D]$, $w_L{}^x(a) = y_L{}^x(A)\ e^{r(a-A)}\left[\frac{1-e^{-(r-g)(a-A)}}{r-g} - (1\text{-}s_L)\ \frac{1-e^{-(r-g_c)(a-A)}}{r-g_c}\right]$

$\forall a\in[A,I[$, $w_B{}^x(a) = -\int_{A\le a'\le a} e^{r(a-a')}c_B{}^x(a')da = -\ b^x e^{r(a-I)}\ (1\text{-}s_B)\ \frac{1-e^{-(r-g_c)(a-A)}}{1-e^{-(r-g_c)(D-A)}}$

$\forall a\in[I,D]$, $w_B{}^x(a) = b^x e^{r(a-I)} - \int_{A\le a'\le a} e^{r(a-a')}c_B{}^x(a')da = b^x e^{r(a-I)}\left[1 - (1\text{-}s_B)\ \frac{1-e^{-(r-g_c)(a-A)}}{1-e^{-(r-g_c)(D-A)}}\right]$

Wealth-at-death $w^x(D)$ left by cohort x to cohort x+H follows a simple dynamic equation:

$w^x(D) = w_B{}^x(D)+w_L{}^x(D) = b^{x+H} = s_B\,\tilde{y}^x = s_B(\tilde{y}_L{}^x + b^x e^{rH})$

I.e. $b^{x+H} = s_B\,\tilde{y}_L{}^x + s_B e^{rH}\ b^x$

At time t, the cohort receiving bequest b_t is the cohort born at time x=t-I. This cohort started working with labor income $y_L{}^x(A)=y_{Lt}e^{-g(I-A)}$ and their lifetime labor resources can be rewritten as follows:

$\tilde{y}_L{}^x = y_L{}^x(A)\ e^{r(D-A)}\ \frac{1-e^{-(r-g)(D-A)}}{r-g} = \lambda\ (D\text{-}A)\ e^{rH}\ y_{Lt}$

With: $$\lambda = \frac{e^{(r-g)(I-A)} - e^{-(r-g)(D-I)}}{(r-g)(D-A)} \qquad \text{(E.12)}$$

The dynamic equation can be rewritten: $b_{t+H} = s_B\ \lambda\ (D\text{-}A)\ e^{rH}\ y_{Lt} + s_B e^{rH}\ b_t$

Noting that $y_{Lt}=(1-\alpha)y_{pt}$ (where y_{pt} is per adult domestic income, which in the open economy case differs from per adult national income $y_t=y_{pt}+r(w_t-k_t)$),[277] we find the following dynamic equation for the inheritance flow-domestic income ratio $b_{yt}=m_tb_t/y_{pt}$:

$$\mathbf{b_{yt+H} = s_B\lambda(1-\alpha)e^{(r-g)H} + s_B e^{(r-g)H}\ b_{yt}} \qquad \textbf{(E.13)}$$

This process converges iff $s_B e^{(r-g)H} < 1$, i.e. iff $r<\bar{r}(g)=\bar{r}+g$, with $\bar{r} = -\log(s_B)/H$.

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[276] In case $g_c=g$ (i.e. in case $r=\hat{r}$, where $\hat{r}=\theta+\sigma g$ is the dynastic model steady-state rate of return), then $s_L=s_B$. However in the wealth-in-the-utility-function model there is no reason why r should be equal to $\hat{r}$: the closed-economy steady-state r can be larger or smaller than $\hat{r}$ depending on the value of s_B (see below).

[277] We use the same open economy notations as those introduced in the proof of proposition 4 (see above).

Example: With s_B=10% and H=30, then $\bar{r}$=7.7%. With g=0% the process converges iff the world rate of return r is less than 7.7%. With g=1%, it needs to be less than 8.7%.

If $r>\bar{r}(g)$, then as $t\to+\infty$, $b_{yt}\to+\infty$.

If $r<\bar{r}(g)$, then as $t\to+\infty$, $b_{yt}\to b_y^*$, with: $b_y^* = b_y(g,r) = \frac{s_B\lambda(1-\alpha)e^{(r-g)H}}{1-s_B e^{(r-g)H}}$ (E.13)

One can see that $b_y'(g)<0$ and $b_y'(r)<0$. Note that the steady-state inheritance-income ratio b_y^* depends only on the gap r-g, not on the absolute levels of r and g. Numerical computations show that b_y^* is a steeply rising function of r-g. E.g. with s_B=10% and H=30, then b_y^*=8% if r-g=0%, b_y^*=26% if r-g=3% and b_y^*=81% if r-g=5% (see Table E5).
Note however that the very high values of b_y^* obtained for r-g=5% are partly due to the fact that the b_y^* ratio given by equation (E.13) uses the domestic income denominator (rather than national income, which for high r-g is much larger than domestic income). When we look at the $\hat{b}_y^*$ ratio (which we define using the national income denominator), then we find less extreme quantitative impact of r-g.[278]

One can then use the longitudinal profile $w^x(a)$ equations in order to compute cross-sectional age-wealth profiles $w_t(a)$, and from there obtain closed form analytical formulas for the steady-state ratios $\mu_t=b_t/w_t$ and $\beta_t=w_t/y_t$. This is what we do below for the case without borrowing, which we view as more realistic. The b_y^* formula turns out to be the same without or with borrowing. However the formulas for μ^* and β^* are different. One can easily adapt the no-borrowing μ^* and β^* formulas given below to the borrowing case. In particular, in the same way as in the dynastic model, μ^* will be larger in the borrowing case. When borrowing from future inheritance is allowed, then $w_B^x(a)<0$ for a<I (i.e. young agents borrow in order to raise their consumption, see formulas above), which pushes upwards the steady-state relative wealth of decedents. The difference with the dynastic model is that there will also be less aggregate wealth accumulation (β^* will be lower in the borrowing case), so that b_y^* is unaffected.

(ii) open economy, ρ=1, no borrowing. We now assume that young agents cannot borrow against future inheritance. More precisely, in the same way as in the dynastic model, we assume that they behave until age I as if they were not going to receive any inheritance;

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278 See Tables E6 and E7 below.

so in effect they maximize twice their utility function $V(U_c,w(D))$: once at age A (under the anticipation that they will receive no inheritance), and once at age I (in case they receive inheritance, they revise their consumption plans accordingly).

Consider agents belonging to a given cohort x. Utility maximization at age A implies that they again choose a consumption path $c^x(a)=c^x(A)e^{g_c(a-A)}$ growing at rate $g_c=(r-\theta)/\sigma$. The utility value U_c of this consumption flow is the same as before. The formulas for end-of-life capitalized values $\tilde{c}^x$ and $\tilde{y}_L{}^x$ are the same as before. The only difference is that $\tilde{y}^x=\tilde{y}_L{}^x$, i.e. there is no anticipated bequest, so total expected resources are equal to labor income resources. So we have $\tilde{c}^x=(1-s_B)\tilde{y}_L{}^x$, i.e. $c_L{}^x(A)=(1-s_L)y_L{}^x(A)$ (with $1-s_L$ is given by the same formula as in the borrowing case) and $c_B{}^x(A)=0$. The longitudinal age-wealth profile $w^x(a)$ can again be written $w^x(a) = w_B{}^x(a)+w_L{}^x(a)$, but $w_B{}^x(a)=0$ (for all $a\in[A,I]$), so that:

For all $a\in[A,I]$, $w^x(a) = w_L{}^x(A) = y_L{}^x(A)\ e^{r(a-A)}\left[\frac{1-e^{-(r-g)(a-A)}}{r-g} - (1-s_L)\ \frac{1-e^{-(r-g_c)(a-A)}}{r-g_c}\right]$

At age a=I, cohort x receives average bequest b^x, with capitalized end-of-life value b^xe^{rH}. They revise their plans and choose a new consumption path $c^x(a)=c^x(I)e^{g_c(a-I)}$ growing at rate g_c. The rest-of-life budget constraint is: $\tilde{c}' + w^x(D) \leq \tilde{y}' = \tilde{y}_L' + w^x(I)e^{rH} + b^xe^{rH}$

With: $\tilde{y}_L' = \int_{I\leq a\leq D} e^{r(D-a)}\, y_L{}^x(a)da = y_L{}^x(I)\ e^{rH}\ \frac{1-e^{-(r-g)H}}{r-g}$,

$\tilde{c}' = \int_{I\leq a\leq D} e^{r(D-a)}\, c^x(a)\, da\ =\ c^x(I)\ e^{rH}\frac{1-e^{-(r-g_c)H}}{r-g_c}$

Utility maximization leads to: $w^x(D)=s_B\tilde{y}'$ and $\tilde{c}=(1-s_B)\tilde{y}'$, i.e.:

$c^x(I)=c_B{}^x(I)+c_L{}^x(I)$

with: $c_B{}^x(I) = (1-s_B)\frac{r-g_c}{1-e^{-(r-g_c)H}}\ b^xe^{rH}$

$c_L{}^x(I) = c_L{}^x(A)e^{g_c(I-A)} = (1-s_L)\ y_L(A)\ e^{g_c(I-A)}$

Note that this latter equation simply follows from time consistency: individuals who do not receive any bequest at age a=I have no reason to change their initial consumption plan. However individuals with positive bequests do adjust upward their initial consumption plan. Again thanks to linearity we can concentrate on cohort-level aggregates.

The longitudinal age-wealth profile $w^x(a)$ after age a=I is given by:

For all $a\in[I,D]$, $w^x(a)=w_B{}^x(a)+w_L{}^x(a)$, With: $w_B^x(a) = b^x e^{r(a-I)} [1-(1-s_B)\frac{1-e^{-(r-g_c)(a-I)}}{1-e^{-(r-g_c)H}}]$

$w_L^x(a) = y_L^x(A)e^{r(a-A)} [\frac{1-e^{-(r-g)(a-A)}}{r-g} -(1-s_L)\frac{1-e^{-(r-g_c)(a-A)}}{r-g_c}]$

Note that for a=D, we again have: $w^x(D) = w_B^x(D)+w_L^x(D) = b^{x+H}=s_B(\tilde{y}_L^{\,x}+b^x e^{rH})$

I.e. wealth at death $w^x(D)$ is the same as in the case with borrowing: allowing young agents to borrow against future inheritance alters the time pattern of consumption and wealth accumulation, but does not affect end of life wealth, which is always equal to a fraction s_B of total lifetime resources.[279] So the dynamic equation for the inheritance-income ratio is the same as before ($b_{yt+H}=s_B\lambda(1-\alpha)e^{(r-g)H} +s_B e^{(r-g)H}b_{yt}$), and we obtain the same convergence results: if $r>\bar{r}(g)$, then as $t\to+\infty$, $b_{yt}\to+\infty$.

If $r<\bar{r}(g)$, then as $t\to+\infty$, $b_{yt}\to b_y^*$, with: $b_y^* = b_y(g,r) = \frac{s_B\lambda(1-\alpha)e^{(r-g)H}}{1-s_B e^{(r-g)H}}$

In order to compute $\mu_t=b_t/w_t$ and $\beta_t=w_t/y_t$, we now need to compute the cross-sectional age-wealth profile $w_t(a)$. At time t, a-year-old individuals belong to cohort x-a, and their beginning of life labor income was $y_L^x(A) = y_{Lt}\, e^{-g(a-A)}$. Assuming we are in (non-explosive) steady-state ($b_{yt}=b_y^*$), at age I they receive bequest $b^x = b_t e^{-g(a-I)}$. So we have:

$\forall a\in[A,I]$, $w_t(a) = w_{Lt}(a) = y_{Lt}\ [\frac{e^{(r-g)(a-A)}-1}{r-g} - (1-s_L)\ \frac{e^{(r-g)(a-A)}-e^{-(g-g_c)(a-A)}}{r-g_c}]$

$\forall a\in[I,D]$, $w_t(a) = w_{Bt}(a) + w_{Lt}(a)$

With: $w_{Bt}(a) = b_t\, e^{(r-g)(a-I)}[1-(1-s_B)\frac{1-e^{-(r-g_c)(a-I)}}{1-e^{-(r-g_c)H}}]$

$w_{Lt}(a) = y_{Lt}\ [\frac{e^{(r-g)(a-A)}-1}{r-g} - (1-s_L)\ \frac{e^{(r-g)(a-A)}-e^{-(g-g_c)(a-A)}}{r-g_c}]$

Average wealth w_t is given by: $w_t = w_{Bt} + w_{Lt} = \frac{1}{D-A}\ [\int_{I\leq a\leq D} w_{Bt}(a)da + \int_{A\leq a\leq D} w_{Lt}(a)da]$

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[279] This is partly due to the specific functional form we use for utility functions: the utility value of lifetime consumption flows U_C is proportional to capitalized end-of-life consumption $\tilde{c}$, so the log form for $V(U_C,w(D))$ implies that the multiplicative term does not matter. I.e. the marginal utility derived from extra $\tilde{c}$ does not depend on the length of time available to consume $\tilde{c}$. So for instance even if one cannot consume inheritance before age I (i.e. no borrowing), agents will keep consuming the same fraction of their bequest $(1-s_B)b^x e^{rH}$, no matter how short the time span D-I left for consumption. With other functional forms (e.g. CES), one would get consumption time effects, and typically agents would end up consuming a lower fraction of their bequest in the no-borrowing case. In effect, the s_B factor will be higher for inheritance resources than for labor resources, which might be more realistic (see e.g. Masson (1988)). A higher s_B for inheritance resources could also be due to the fact that individuals might feel less comfortable eating up a large fraction of their inherited resources rather than eating up a large fraction of the product of their own labor. Here we adopt standard preferences with a single budget constraint (no separate mental account), so agents treat both types of resources identically.

We use the same open economy notations as those introduced in proposition 4. We note $\beta_t=w_t/y_t$ the wealth-national income ratio, $\beta_{pt}=w_t/y_{pt}$ the wealth-domestic income ratio, $\beta_{Ft}=w_{Ft}/y_{pt}$ the foreign wealth-domestic income ratio, and $\beta_{Kt}=k_t/y_{pt}$ the domestic capital-output ratio. By definition $w_t=k_t+w_{Ft}$ and $y_t=y_{pt}+rw_{ft}$, so $\beta_{pt}=\beta_{Ft}+\beta_{Kt}$ and $\beta_t=\beta_{pt}/(1+r\beta_{Ft})$.

We also define $\beta_{Bt} = w_{Bt}/y_{pt}$ and $\beta_{Lt} = w_{Lt}/y_{Lt}$.

By integrating the age-wealth profiles $w_{Bt}(a)$ and $w_{Lt}(a)$ and by dividing by y_{pt}, we obtain the following formulas for steady-state $\beta_B{}^*$ and $\beta_L{}^*$:

$$\beta_B{}^* = b_y{}^* \left[\frac{e^{(r-g)H}-1}{r-g} - \frac{1-s_B}{1-e^{-(r-g_c)H}} \left(\frac{e^{(r-g)H}-1}{(r-g)} - \frac{1-e^{-(g-g_c)H}}{(g-g_c)} \right) \right] \qquad \textbf{(E.14)}$$

$$\beta_L{}^* = \frac{1}{D-A} \left[\frac{e^{(r-g)(D-A)}-1-(r-g)(D-A)}{(r-g)^2} - \frac{1-s_L}{r-g_c} \left(\frac{e^{(r-g)(D-A)}-1}{r-g} - \frac{1-e^{-(g-g_c)(D-A)}}{g-g_c} \right) \right] \qquad \textbf{(E.15)}$$

We can then compute $\beta_p{}^* = \beta_B{}^*+\beta_B{}^*$ and $\mu^*=b_y{}^*/m^*\beta_p{}^*=(D-A)b_y{}^*/\beta_p{}^*$.

Finally, the assumption of a Cobb-Douglas production function implies $\beta_K{}^*=\alpha/r$, from which one can compute the foreign wealth ratio $\beta_F{}^*=\beta_p{}^*-\beta_K{}^*$, the wealth-national income ratio $\beta^*=\beta_p{}^*/(1+r\beta_F{}^*)$, and the inheritance flow-national income ratio $\widehat{b}_y{}^* = b_y{}^*/(1+r\beta_F{}^*)$.

Equations (E11) to (E15) solve the open-economy model for the non-explosive case $r<\bar{r}(g)$. These are closed form solutions, but there are many effects going on. In particular the full formula for μ^* is relatively complicated, and in general there is no reason that μ^* is equal to the class saving level $\bar{\mu} = \frac{D-A}{H}$, or even that $\mu^*=\mu(g)\rightarrow\bar{\mu}$ as $g\rightarrow0$. In the case g=0%, the formula for μ^* still involves all other parameters, and not only D-A and H.

However by doing numerical calibrations using equations (E11)-(E15), one can see that higher growth and/or lower rates of return tend to reduce inheritance ($\mu'(g)<0$, $\mu'(r)>0$), and that for realistic parameter values, and for low growth and/or high rates of return, then μ^* and $b_y{}^*$ are relatively close to class saving levels $\bar{\mu}$ and β^*/H.

We report on Tables E6 and E7 two series of calibrations (parameters can be changed in the excel file). On Table E6 we assume r=5%, θ=2%, σ=5, s_B=10%, and we make the growth rate vary from g=0% to g=5%, and the demographic parameters vary from 19th century values (D=60, I=30) to 21st century values (D=80, I=50). As g rises, r-g declines, so the inheritance-income ratio b_y* declines: as was already noted above, b_y* is a steeply rising function of r-g. Note that the economy accumulates a lot of foreign assets when r-g is large (i.e. g small), and conversely is almost entirely owned by the rest of the world when r-g is small (i.e. g high). Consequently, as g rises, the inheritance-income ratio $\hat{b}_y$* declines in a less extreme and more realistic way than the ratio b_y*. E.g. $\hat{b}_y$* goes from 31% for g=1% to 25% for g=2% (rather than from 44% to 26%). We also find that the relative wealth of decedents μ* rises sharply as life expectancy increases (almost as sharply as in the class saving case; see Table E1). μ* is also an increasing function of r. Somewhat counter-intuitively, μ* also appears to be on Table E6 an increasing function of g. However this is entirely due to the g_c effect: i.e. as g rises from 0% to 5%, the desired consumption growth rate g_c=(r-θ)/σ remains constant at 1%. So with high growth young age agents borrow enormously against future growth, thereby raising the relative wealth of the old. We are not sure that such massive borrowing patterns are realistic.

In order to shut down this effect, on Table E7 we assume that the values of θ and σ adjust to changes in g so that g_c remains permanently equal to g as g rises from 0% to 5%.[280] We then find that μ* declines as g rises. I.e. high labor income growth raises the relative wealth of the young, in the same way as in the exogenous saving and dynastic models.

In the case $r>\bar{r}(g)=\bar{r}+g$ (with $\bar{r}$= - log(s_B)/H), then we have an explosive path: as t→+∞, b_{yt}→+∞ and β_{Ft}→+∞. I.e. in the same way as in the explosive case of the exogenous saving model, domestic output y_{pt} becomes negligible as compared to foreign asset income rw_{Ft}, and national income $y_t \approx rw_t$ grows at rate $g_r=r-\bar{r}$ (>g). The wealth-income ratio β_t→β*=1/r as t→+∞. One can also show that $\hat{b}_{yt}$ and μ_t converge towards some finite values $\hat{b}_y$* and μ*. All income derives from wealth, so nobody has wealth before age I. However there is no reason in general that the age-wealth profile $w_t(a)$ is flat above age I, so there is no reason that μ*=$\bar{\mu}$. This will occur iff g_c=(r-θ)/σ=g_r. So for instance if g=0%,

[280] There are several reasons why g_c is usually relatively close to g in the real world, i.e. why consumption tends to track income much more closely that what optimising models tend to predict. First, agents might not know in advance that g is going to be equal to 5% in the next 30 years (e.g. it was pretty hard to predict in the 1930s-1940s that g was going to be 5%-6% in the 1950s-1960s), so they might adjust consumption growth to current growth. Next, even if they know in advance that g=5% and their preference parameters are such that they want a lot of consumption smoothing (say g_c=1%) they might face borrowing constraints.

θ=0% σ=+∞, then $\mu^*\to\bar{\mu}$ as $r\to\bar{r}$ (either from above or from below). But in general μ^* will be different from $\bar{\mu}$: $\mu^*>\bar{\mu}$ if $g_c<g_r$ and $\mu^*<\bar{\mu}$ if $g_c>g_r$.

<u>(iii) closed economy, ρ=1, no borrowing</u>. We now consider the closed economy case. All equations are exactly the same as in the open economy case, except that now the rate of return r is no longer a free parameter. The long run steady-state r* is determined by the equality between the supply and the demand of capital:

$$\beta_B^*(r) + \beta_B^*(r) = \beta_K^* = \alpha/r \quad \textbf{(E.16)}$$

Where $\beta_B^*(r)$ and $\beta_B^*(r)$ are given by equation (E.14) and (E.15) above. These wealth accumulation ratios are increasing functions of r, so the supply equals demand equation has a unique solution. Unfortunately there exists no closed form solution for r*. The steady-state r* and $\beta^*=\alpha/r^*$ of the wealth-in-the-utility-function model can be larger or smaller than the dynastic model steady-state values $\hat{r}=\theta+\sigma g$ and $\hat{\beta}=\alpha/\hat{r}$, depending on the various parameters. The aggregate wealth-income ratio β* is naturally an increasing function of s_B and a decreasing function of g (and conversely for r*). In case s_B=0 and ρ=1, then $r^*>\hat{r}$ (with $r=\hat{r}$ there would be no saving at all), with r* declining and $\to\hat{r}$ as life expectancy D→+∞ (in effect the model converges toward the dynastic model). In case s_B is sufficiently large, then $r^*<\hat{r}$ (as $s_B\to1$, then $\beta^*\to+\infty$ and $r^*\to0$). But if one wants to go beyond these qualitative statements, one needs to use numerical solutions in order to study closed economy steady-states.

We report on Tables E8 to E11 four series of calibrations (parameters can be changed in the excel file). On Tables E8 and E9, we assume that s_B adjusts so that when g rises from 0% to 5% the steady-state r* and β* remain fixed at 5% and 600%. On Tables E10 and E11, we assume that s_B is fixed at 10%, and we compute the equilibrium values of r* and β*, either with fixed θ and σ (Table E10), or by assuming that θ and σ adjust so as to keep g_c=g (Table E11), in the same way as in the open economy calibrations. The most striking finding is that in all variants the steady-state b_y^* almost does not depend on life expectancy D: i.e. the decline in m* is almost entirely compensated by the rise in μ*. For realistic low-growth parameter values (g=1%-2%, r*=4%-5%, s_B around 10%), we find that μ* and b_y^* are extremely close to the class saving levels $\bar{\mu}$ and β*/H (or if anything slightly above class saving levels).

(iv) $\rho \leq 1$. All equations above can be extended to the case with less than 100% replacement rates, in the same way as in the dynastic model (see above). There are major differences with the dynastic model, however.

First, one can easily show that the same formula for steady-state b_y^* (equation (E13)) applies for any $\rho \leq 1$. This is because $\rho<1$ adds an extra lifecycle wealth term $w_L^x(a)$ in the wealth equations (with $w_L^x(a)$ hump shaped, i.e. maximal at age a=R and going to zero for a=D), but without affecting the fact that wealth at death $w^x(D)$ is equal to a fixed fraction s_B of lifetime resources. So the dynamic equations for b^{x+H} as a function of b^x and b_{yt+H} as a function of b_{yt} are wholly unaffected, and so is the steady-state formula for b_y^*. The only change in the formula is the value of λ. With $\rho \leq 1$, we have $y_L^x(a)=y_L^x(A)e^{g(a-A)}$ for $a \in [A,R[$ and $y_L^x(a)=\rho y_L^x(A)e^{g(a-A)}$ for $a \in [R,D]$, so $\tilde{y}_L$ is now given by:

$$\tilde{y}_L = \int_{A\leq a\leq D} e^{r(D-a)} y_L^x(a)\, da \ = y_L^x(A)\, e^{r(D-A)} \left[\frac{1-e^{-(r-g)(R-A)}}{r-g} + \rho \frac{e^{-(r-g)(R-A)} - e^{-(r-g)(D-A)}}{r-g}\right]$$

At time t, the cohort receiving bequest b_t is the cohort born at x=t-I. This cohort started working with labor income $y_L^x(A)=\frac{D-A}{R-A+\rho(D-R)} y_{Lt}e^{-g(I-A)}$. So $\tilde{y}_L=\lambda(D-A)e^{rH}y_{Lt}$, with:

$$\lambda = \frac{D-A}{R-A+\rho(D-R)} \left[\frac{e^{(r-g)(I-A)} - e^{-(r-g)(R-I)}}{(r-g)(D-A)} + \rho \frac{e^{-(r-g)(R-I)} - e^{-(r-g)H}}{(r-g)(D-A)} \right] \quad \textbf{(E.17)}$$

If $\rho=1$, then we are back to the simpler λ formula given by equation (E12). If r-g=0, then by construction $\lambda=1$ ($\forall\, \rho \leq 1$). With r-g>0, note that $\lambda'(\rho)<0$, i.e. more generous pay-as-you-pension systems lead to lower λ factors. This simply reflects the fact that with r-g>0 pay-as-you-go pension systems have a lower rate of return than private wealth. This also implies that for given s_B and r-g, less generous pensions (lower ρ) will actually lead to higher steady-state inheritance ratios b_y^* (see Table E5).

In the open economy case, both g and r are given, so ρ has no further impact on b_y^*. Of course lower ρ leads to higher β* and lower μ* (because of additional hump-shaped wealth accumulation), but in the open economy this has no impact on r. In effect the additional pension wealth is entirely invested in foreign assets, so there is no crowding out at all with other forms of wealth. Note however that the rise in β* also implies a rise in national income, so the rise in $\widehat{b}_y{}^*$ will be less strong than the rise in b_y*. Calibration results (not reported here) show that the two effects almost exactly cancel out, so that a lower ρ has virtually no impact on $\widehat{b}_y{}^*$.

In the closed economy case, the rise in β* due to lower ρ and the rise of pension wealth will lead to lower r*, which in turn leads to lower b_y*. I.e. there will be partial crowding out between pension wealth and other forms of wealth. Calibration results (not reported here) show that this r* effect is somewhat larger than the λ effect, so the overall effect of lower ρ on steady-state b_y* is slightly negative (but much smaller than in the dynastic model, where there was full crowding out).[281]

E.6. Extension of the formulas to the case with population growth

So far, all theoretical results and formulas on inheritance flows were derived within the context of the simple stationary demographic structure introduced in section 5: everybody becomes adult at age A, has exactly one kid at age H, and dies at age D, so each cohort size is fixed (and normalized to 1), and that total (adult) population N_t is also fixed (and is equal to adult life length: N_t=D-A). Note that all propositions also make the assumption that inheritance age I=D-H was higher that adulthood age: I=D-H>A. This assumption is satisfied in modern societies (with A=20 and H=30, then I=D-H>A as long as D>50), and allowed us to ignore children altogether (they never own any wealth, nor do they receive any income) and concentrate on the analysis of the age-wealth profile $w_t(a)$ within the adult population ($a \in [A;D]$). This assumption might however not hold in some ancient societies (e.g. if A=20, H=30 and D=40, then I=D-H=10). It can easily be relaxed, and all results and formulas can be extended to the case with children inheritors, with minor changes.[282]

Next, and most importantly, all propositions can also be generalized to a model with self-sustained (positive or negative) population growth. Generally speaking, the impact of population growth on steady-state inheritance flows is similar to the impact of productivity growth, and for the most part one simply needs to replace g by g+n (where g is

[281] It is not really meaningful to push further the pension analysis without modelling explicitly the reason why pay-as-you-go systems were introduced in the first place (i.e. uninsurable uncertainty on r).

[282] E.g. in the class saving case (Proposition 2), then if I=D-H<A the steady-state age-wealth profile (incl. children) would now be : $w_t(a)=0$ if $a \in [0;I]$ and $w_t(a)=b_t$ if $a \in [I;D]$, so that $\mu^*=b_t/w_t=D/(D-I)=D/H$. Since the mortality rate (incl. children) is now given by m*=1/D, we again obtain $b_w^*=\mu^* m^*=1/H$ and $b_y^*=\beta^*/H$. I.e. the basic result is unchanged. In order to fully solve the models with endogenous saving, one would need however to make assumptions as to whether children inheritors are allowed to borrow against future labor resources or are under the control of other family members until adulthood.

productivity growth and n is population growth) in the steady-state formulas. This is illustrated by Propositions 12-13 below.

Consider the following demographic structure. Everybody becomes adult at age a=A, has 1+η children at age a=H>A, and dies at age D>H. Everybody again inherits at age I=D-H>A. The only difference with the demographic structure used so far is that we allow the (average) number of children to differ from 1, i.e. η can now be positive or negative. Noting f the fertily rate (average number of children per woman), we simply have: 1+η = f/2. Each cohort size N^x now grows at rate n, and so does total adult population N_t :[283]

$$N^x = e^{nx}$$

$$N_t(a) = e^{n(t-a)}$$

$$N_t = \int_{A\leq a\leq D} N_t(a)\, da = e^{nt}\,\frac{e^{-nA} - e^{-nD}}{n}$$

$$\text{With: } e^{nH} = 1+\eta = f/2, \text{ i.e. } \mathbf{n} = \frac{\log(f/2)}{H} \qquad \textbf{(E.18)}$$

<u>Example</u>: With a fertily rate f=2.0 children per woman, then n=0: we are back to the case with zero population growth. A fertily rate f=2.2 means that everybody has 1.1 children, i.e. the population rises by 10% every generation, so for generation length H=30 this corresponds a population growth rate n=0.3% per year. A fertily rate f=3.0 corresponds to n=1.4%. Conversely, a fertility rate f=1.5 corresponds to n=-1.0%.

Because we assume steady-state population growth, the mortality rate m_t is stationary:

$$m_t = \frac{N_t(D)}{N_t} = m^* = m(n) = \frac{n}{e^{n(D-A)} - 1} \qquad \textbf{(E.19)}$$

Note that m'(n)<0: in growing populations, dying cohorts are smaller in size than living cohorts, so the mortality rate is lower. If n=0, we are back to the case with zero population growth: m*=1/(D-A). If n>0, m(n)<1/(D-A). If n<0, m(n)>1/(D-A).

The rest of the model is unchanged. We still assume a Cobb-Douglas production function $Y_t = F(K_t,H_t) = F(K_t,e^{gt}L_t)$ with exogenous productivity growth g≥0. With an exogenous

[283] We set initial cohort size N^0 equal to 1.

saving rate $s=\alpha s_K+(1-\alpha)s_L$, one simply needs to replace g by g+n in the Harrod-Domar-Solow closed-economy formula for steady-state β* and r*:

$$\beta^* = \frac{s}{g+n}$$

$$r^* = \frac{\alpha}{\beta^*} = \frac{\alpha(g+n)}{s}$$

In steady-state national income Y_t and aggregate wealth W_t grow at rate g+n. Per adult income $y_t=Y_t/N_t$ and per adult wealth $w_t=W_t/N_t$ grow at rate g. We are looking for a steady-state where the aggregate inheritance flow B_t also grows at rate g+n, while per decedent inheritance $b_t=w_t(D)$ grows at rate g. We again need to solve for the steady-state age-wealth profile $w_t(a)$. Note that because of population growth, average bequest left and average bequest received do not longer coincinde: at time t, decedents leave average bequest $b_t=w_t(D)=B_t/N_t(D)$, while successors receive average bequest $b_t/e^{nH}=B_t/N_t(I)$.

One can easily show that in the class saving case, the results obtained for b_w* and b_y* are wholly unaffected by the introduction of population growth:

<u>Proposition 12</u> (class saving model with population growth)
Assume pure class savings ($s_L=0$ & $s_K>0$) and population growth (n>0 or n<0). As $t\to+\infty$, $\mu_t\to\mu^*$, $b_{wt}\to b_w^*$ and $b_{yt}\to b_y^*$. Steady-state ratios μ*, b_w* and b_y* are given by:
(1) The ratio μ* between average wealth of decedents and average adult wealth depends solely on demographic parameters: $\mu^* = \mu(n) = \frac{e^{n(D-A)}-1}{nH} = \frac{1}{Hm^*}$
(2) The inheritance flow-private wealth ratio $b_w^*=\mu^*m^*$ and the estate multiplier $e^*=1/b_w^*$ depend solely on generation length H: $\mathbf{b_w^* = \overline{b}_w = 1/H}$ and $\mathbf{e^* = \overline{e} = H}$
(3) The inheritance flow-national income ratio $b_y^*=\mu^*m^*\beta^*$ depends solely on the aggregate wealth-income ratio β* and on generation length H: $\mathbf{b_y^* = \overline{b}_y = \beta^*/H}$

<u>Proof of Proposition 12.</u> The steady-state cross-sectional age-profile $w_t(a)$ looks as follows. Since $s_L=0$, young individuals have zero wealth until the time they inherit. Now take the group of individuals with age a>I at time t. They inherited a-I years ago, at time s=t-a+I. They received average bequests $b_s/e^{nH}=e^{-g(a-I)}b_t/e^{nH}$. But although they received smaller bequests, they saved a fraction $s_K=(g+n)/r^*$ of the corresponding return, so at time t their inherited wealth is now equal to: $w_t(a) = e^{(g+n)(a-I)}e^{-g(a-I)}b_t/e^{nH} = e^{n(a-D)}\,b_t$. So we have the following steady-state profile:

If $a \in [A,I[$, then $w_t(a) = 0$
If $a \in [I,D]$, then $w_t(a) = e^{n(a-D)}\,b_t$

So with positive population growth n>0, the cross-sectional age-average wealth profile is now upward sloping after inheritance age: on average younger successors are poorer than older successors. However the cross-sectional age-aggregate wealth profile is still flat: younger successors are poorer, but they are more numerous, and both effects exactly compensate each other. That is, if we define $W_t(a)=N_t(a)w_t(a)$, we have:

If $a \in [A,I[$, then $W_t(a) = 0$
If $a \in [I,D]$, then $W_t(a) = e^{n(t-D)}\,b_t = B_t$

It follows that aggregate wealth $W_t=(D-I)B_t=H\,B_t$, i.e. $b_w{}^*=1/H$ and $b_y{}^*= \beta^*/H$.
Alternatively, we get the following formula for average wealth:

$$w_t = [\int_{A\leq a\leq D} N_t(a)\, w_t(a)\, da\,]/N_t = \frac{nHe^{-nD}}{e^{-nA}-e^{-nD}}\ b_t$$

So we have:

$$\mu^* = \mu(n) = \frac{e^{n(D-A)}-1}{nH} = \frac{1}{Hm^*} \qquad \text{(E.20)}$$

Note that $\mu^*>\overline{\mu} = (D-A)/H$ if $n>0$, and $\mu^*<\overline{\mu}$ if $n<0$. When population grows faster, the mortality rate m* is lower, but the relative wealth of decedents μ* is higher, so that the product $b_w{}^*=\mu^*m^*=1/H$ is unchanged.

End of proof of Proposition 12.

Now consider the wealth-in-utility model. One can show that the formula for steady-state inheritance flows obtained under population stationarity is almost the same in the model with zero population growth (see Propositions 8-9). That is, one simply needs to replace g by g+n in the steady-state formula for $b_y{}^*$, and to add an additional term to the λ factor:

<u>Proposition 13</u> (wealth-in-the-utility model with population growth).

As $t \to +\infty$, $\mu_t \to \mu^* = \mu(g,r)$, $b_{wt} \to b_w^* = \mu^* m^*$, and $b_{yt} \to b_y^* = \mu^* m^* \beta^* = \frac{s_B \lambda'(1-\alpha)e^{(r-g-n)H}}{1-s_B e^{(r-g-n)H}}$

With: $\lambda' = \lambda \frac{(D-A)N_t(I)}{N_t} = \lambda \frac{n(D-A)e^{-nI}}{e^{-nA}-e^{-nD}}$

And: $\lambda = \frac{e^{(r-g)(I-A)} - e^{-(r-g)(D-I)}}{(r-g)(D-A)}$

<u>Proof of Proposition 13</u>. Consider the inheriting cohort at time t, i.e. the cohort born at time x=t-I. We again note $\tilde{y}_t = \tilde{b}_t + \tilde{y}_{Lt}$ the average lifetime resources received by this cohort, where $\tilde{b}_t$ is the average end-of-life capitalized value of their inheritance resources, and $\tilde{y}_{Lt}$ is the average end-of-life capitalized value of their labor income resources.

We have:

$\tilde{b}_t = e^{rH} B_t/N_t(I)$.

$\tilde{y}_{Lt} = e^{rH} \lambda(D-A)(1-\alpha)Y_t/N_t$

In the same way as in the zero population growth case, utility maximization implies that the average bequest b_{t+H} left by cohort x is equal to a a fraction s_B of their end-of-life capitalized lifetime resources $\tilde{y}_t$. So in aggregate terms we have:

$$B_{t+H} = s_B N_t(I) [e^{rH} B_t/N_t(I) + e^{rH} \lambda(D-A)(1-\alpha)Y_t/N_t]$$

I.e. $$\mathbf{B_{t+H} = s_B e^{rH} [B_t + \lambda'(1-\alpha)Y_t]} \qquad \textbf{(E.21)}$$

With: $\lambda' = \lambda \frac{(D-A)N_t(I)}{N_t}$

Note that the additional term $\frac{(D-A)N_t(I)}{N_t}$ is simply the ratio between the size of the currently inheriting cohort $N_t(I)$ and average cohort size $N_t/(D-A)$. With zero population growth this ratio is equal to 100% and this additional term disappears. More generally, if n is small, and if inheritance happens around mid-life, one can see that it will be close to 100% (the first-order term disappears, in the same way as in the λ formula).

Dividing both sides of equation (E21) by $Y_{t+H} = Y_t e^{(g+n)H}$, we get the following transition equation for the inheritance flow-national income ratio $b_{yt}=B_t/Y_t$:

$$\mathbf{b_{yt+H} = s_B\, e^{(r-g-n)H}\; [\, b_{yt} + \lambda'(1-\alpha)\,]} \qquad \textbf{(E.22)}$$

Assuming $s_B\, e^{(r-g-n)H} < 1$, we have a unique steady-state $b_y^* = \frac{s_B \lambda'(1-\alpha) e^{(r-g-n)H}}{1 - s_B e^{(r-g-n)H}}$.

Higher population growth reduces the relative importance of inheritance, in the same way as higher productivity growth. Conversely, negative population growth raises the relative importance of inheritance. If n is sufficientely negative, then $s_B\, e^{(r-g-n)H} > 1$, i.e. we have an explositive path. Intuitively, in a society where individuals almost stop having children, the size of dying cohort becomes very large as compared to the size of the inheriting cohorts, and so does the inheritance flow as compared to national income.

End of proof of Proposition 13.

List of files

The folder www.jourdan.ens.fr/piketty/inheritance contains the following files:

1. Piketty2010WP.pdf = pdf file for the working paper "On the Long Run Evolution of Inheritance – France 1820-2050", PSE, 2010

2. Piketty2010DataAppendixPart1.pdf & Piketty2010DataAppendixPart2.pdf = pdf files for the present data appendix

3. Piketty2010DataAppendix.zip = zip file containing detailed tables, figures, data files and computer codes in excel and stata formats:

- MainTablesFigues.xls = excel file containing all tables and figures included in the working paper, with linked formulas to other excel files & sheets

- AppendixTables(NationalAccountsData).xls = excel file containing all tables from appendix A, with linked formulas to other excel files & sheets

- AppendixTables(EstateTaxData).xls = excel file containing all tables from appendix B, with linked formulas to other excel files & sheets

- AppendixTables(DemoData).xls = excel file containing all tables from appendix C, with linked formulas to other excel files & sheets

- AppendixTables(Simulations).xls = excel file containing all tables from appendix D, with linked formulas to other excel files & sheets

- AppendixTables(SSFormulas).xls = excel file containing all tables from appendix E, with linked formulas to other excel files & sheets

- AppendixFigures.xls = excel file containing supplementary figures drawn from appendix tables, with linked formulas to other excel files & sheets

- AppendixDataFiles.zip: zip file containing a number of stata format data sets and do files used in the simulations (the exact list and description of these files is given in Appendix C3 and Appendix E6).

On the Long-Run Evolution of Inheritance: France 1820-2050

Data Appendix

Part 2 (Figures and Tables)

Thomas Piketty

Paris School of Economics *

First version: November 13th, 2009

This version: September 3rd, 2010

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This data appendix supplements the working paper by the same author "On the Long Run Evolution of Inheritance – France 1820-2050", PSE, 2010. The working paper and the data files are available on-line at www.jourdan.ens.fr/piketty/inheritance/ .

Figure A1: Annual inheritance flow as a fraction of national income, France 1896-2008 (annual series)

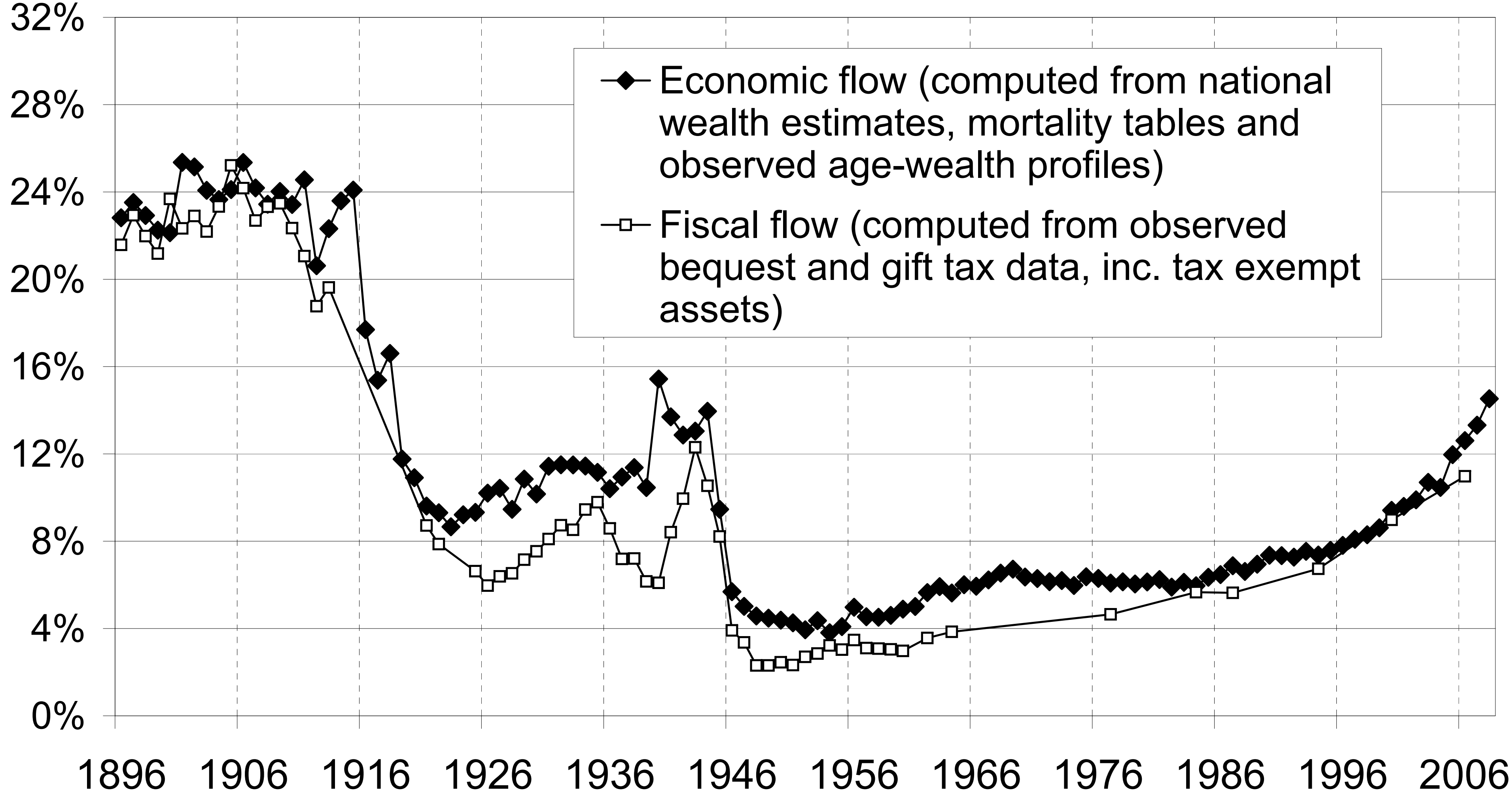


Figure A2: Wealth-income ratio in France 1896-2010 (annual series)

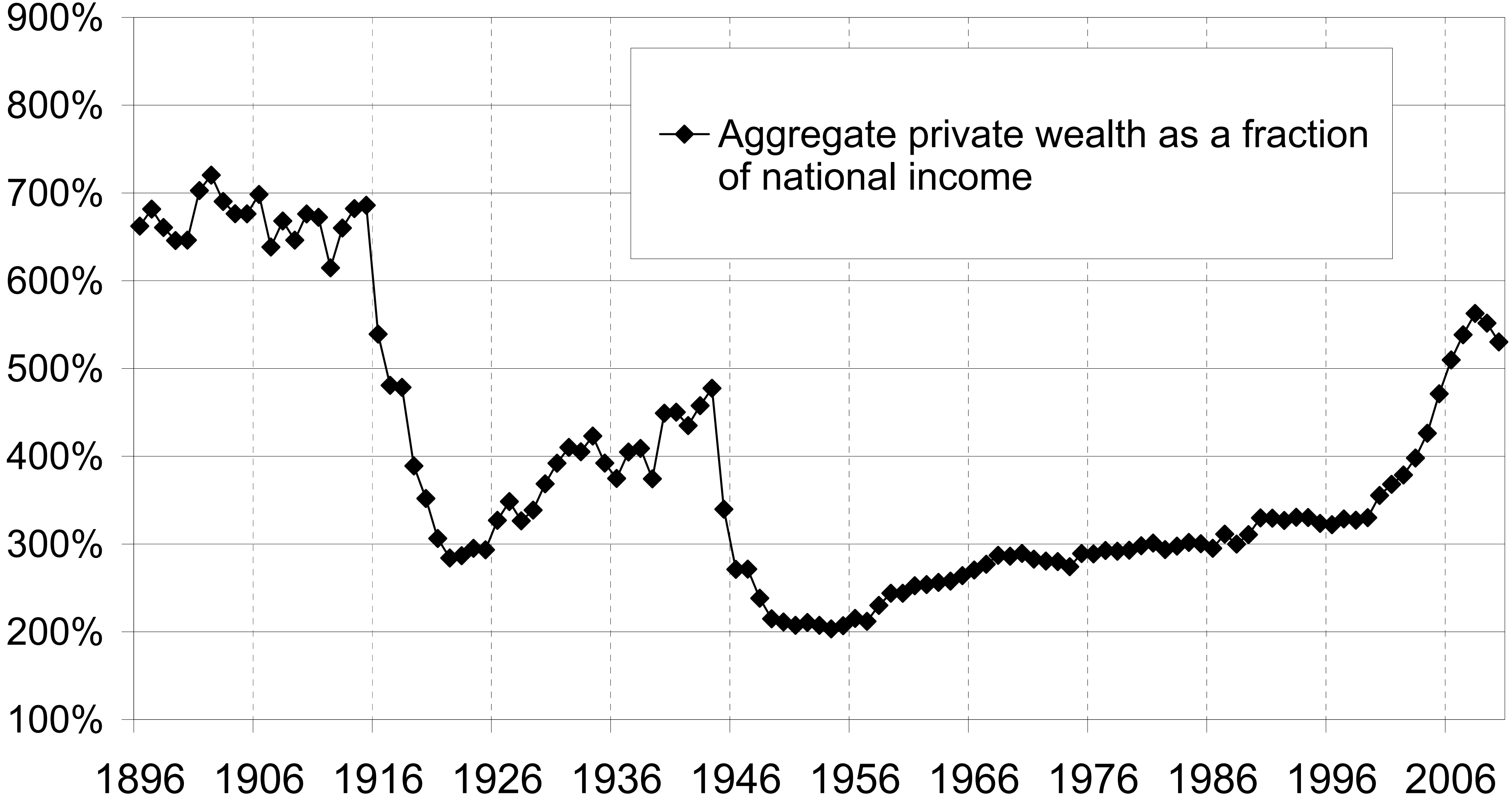


Figure A3: Wealth-disposable income ratio in France 1896-2010 (annual series)

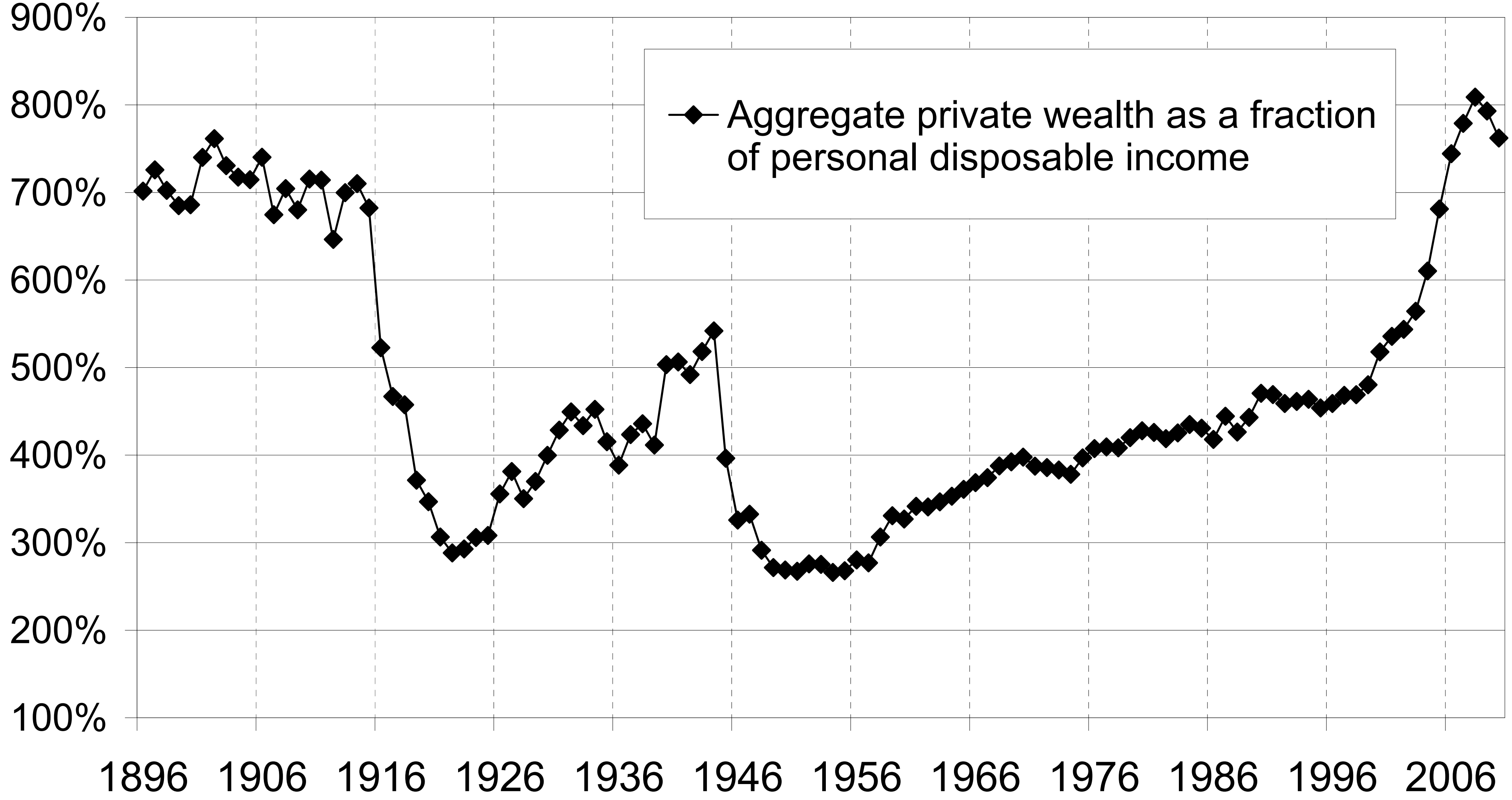


Figure A4: Gross capital share in the French corporate sector, 1896-2008 (annual series)

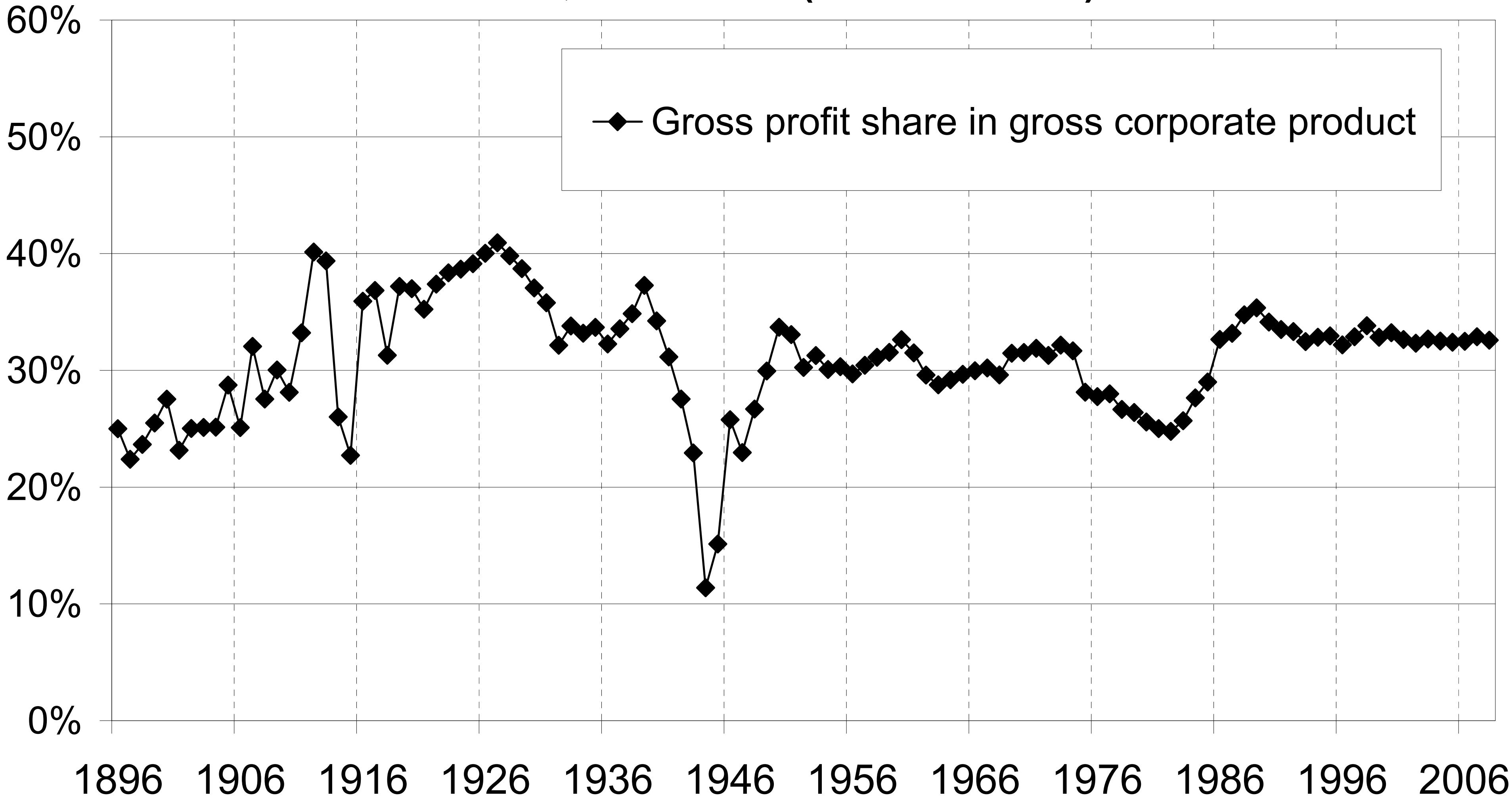


Figure A5: Net capital share in the French corporate sector, 1896-2008 (annual series)

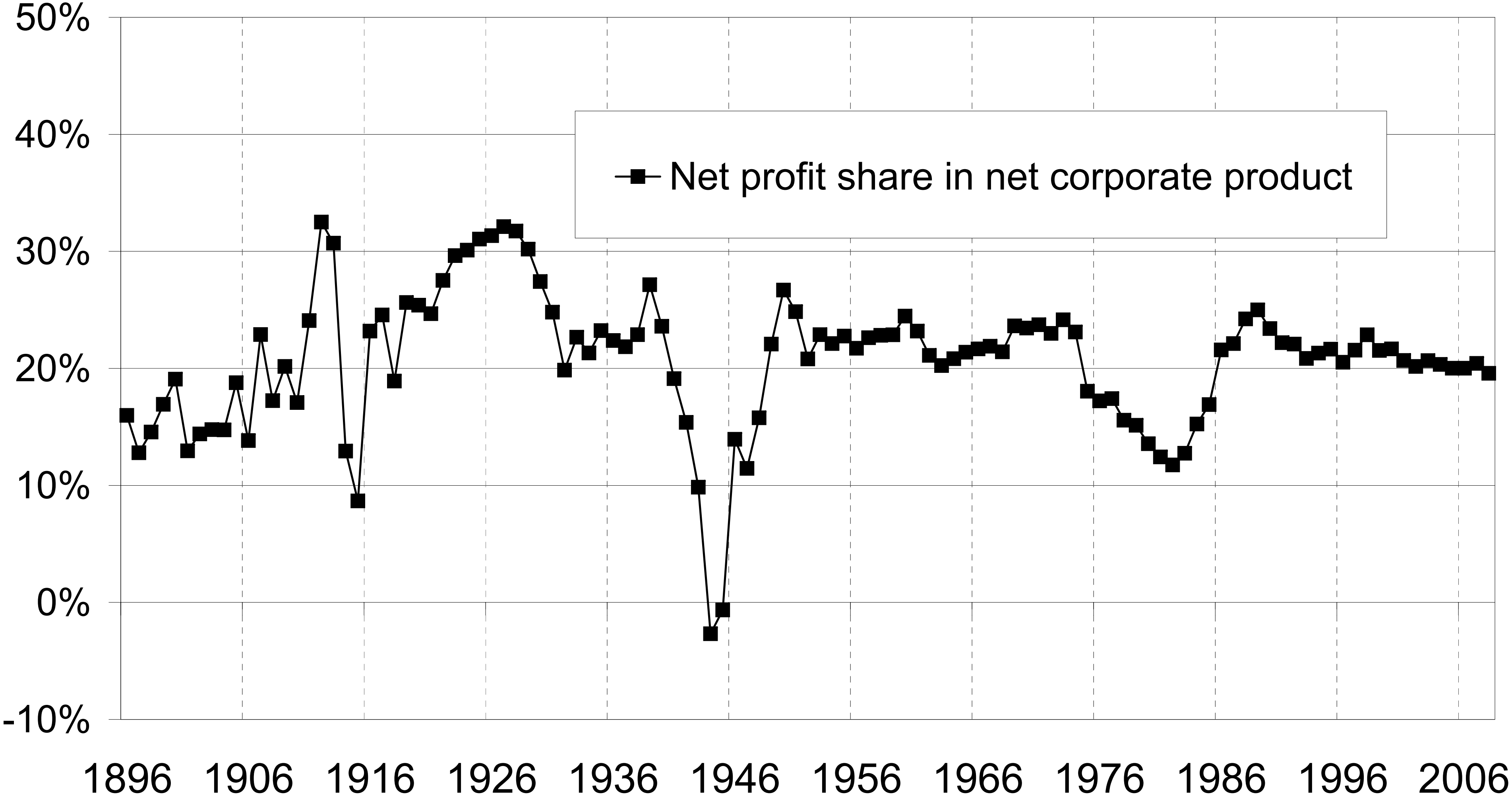


Figure A6: Rental income share in national income, France 1896-2008 (annual series)

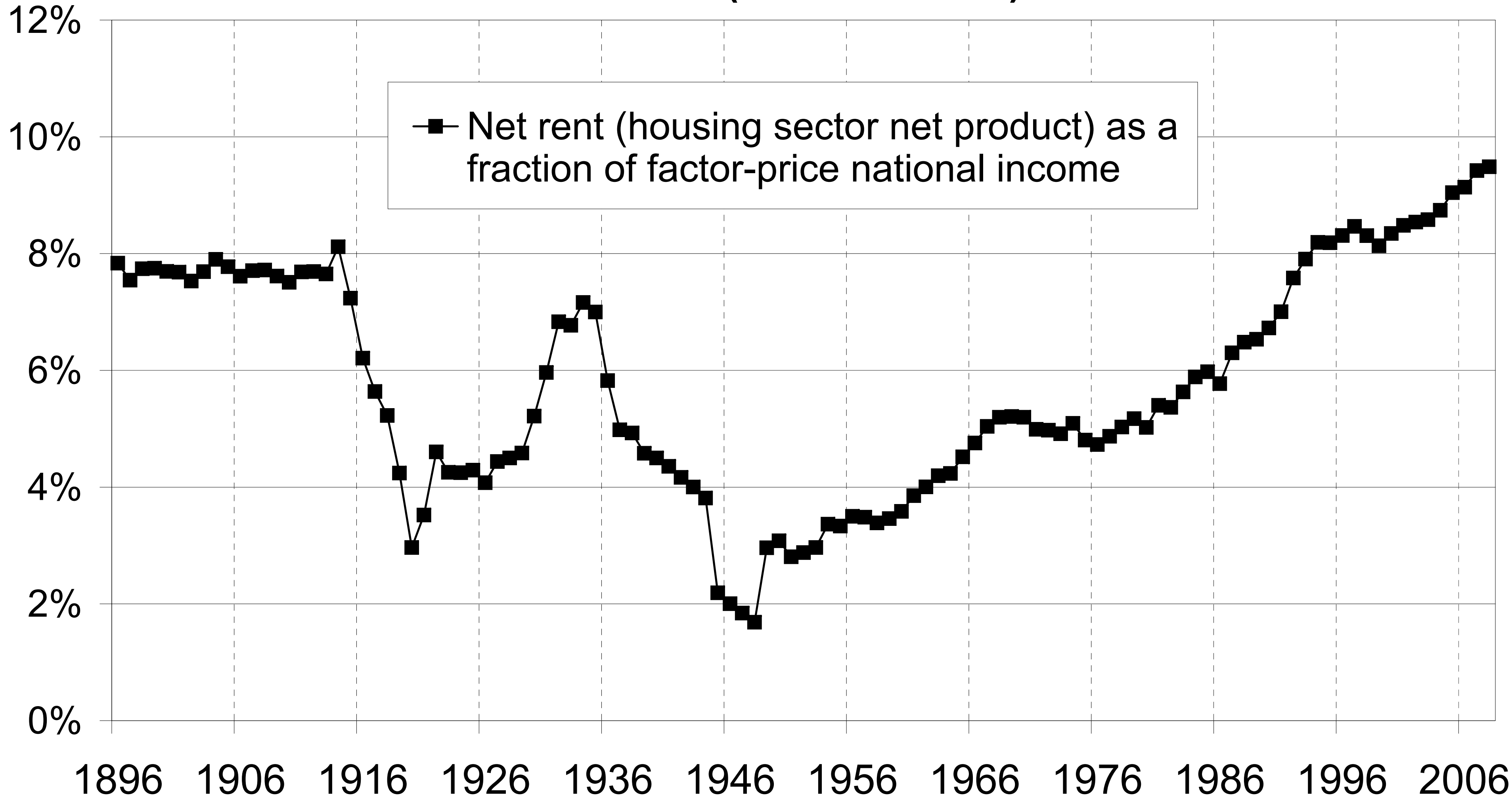


Figure A7: Capital share in national income, France 1896-2008 (annual series)

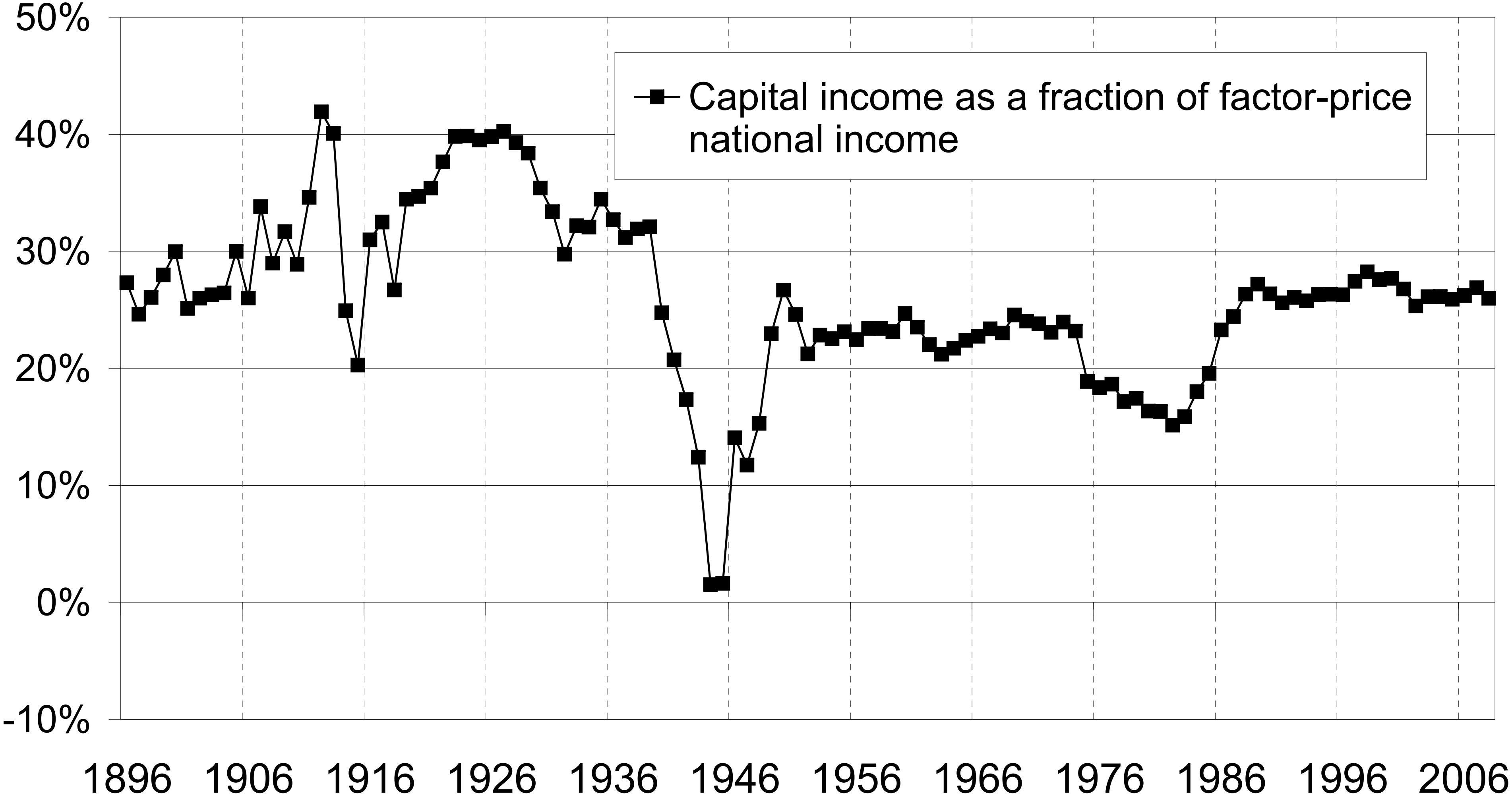


Figure A8: Capital share in national income, France 1896-2008 (annual series)

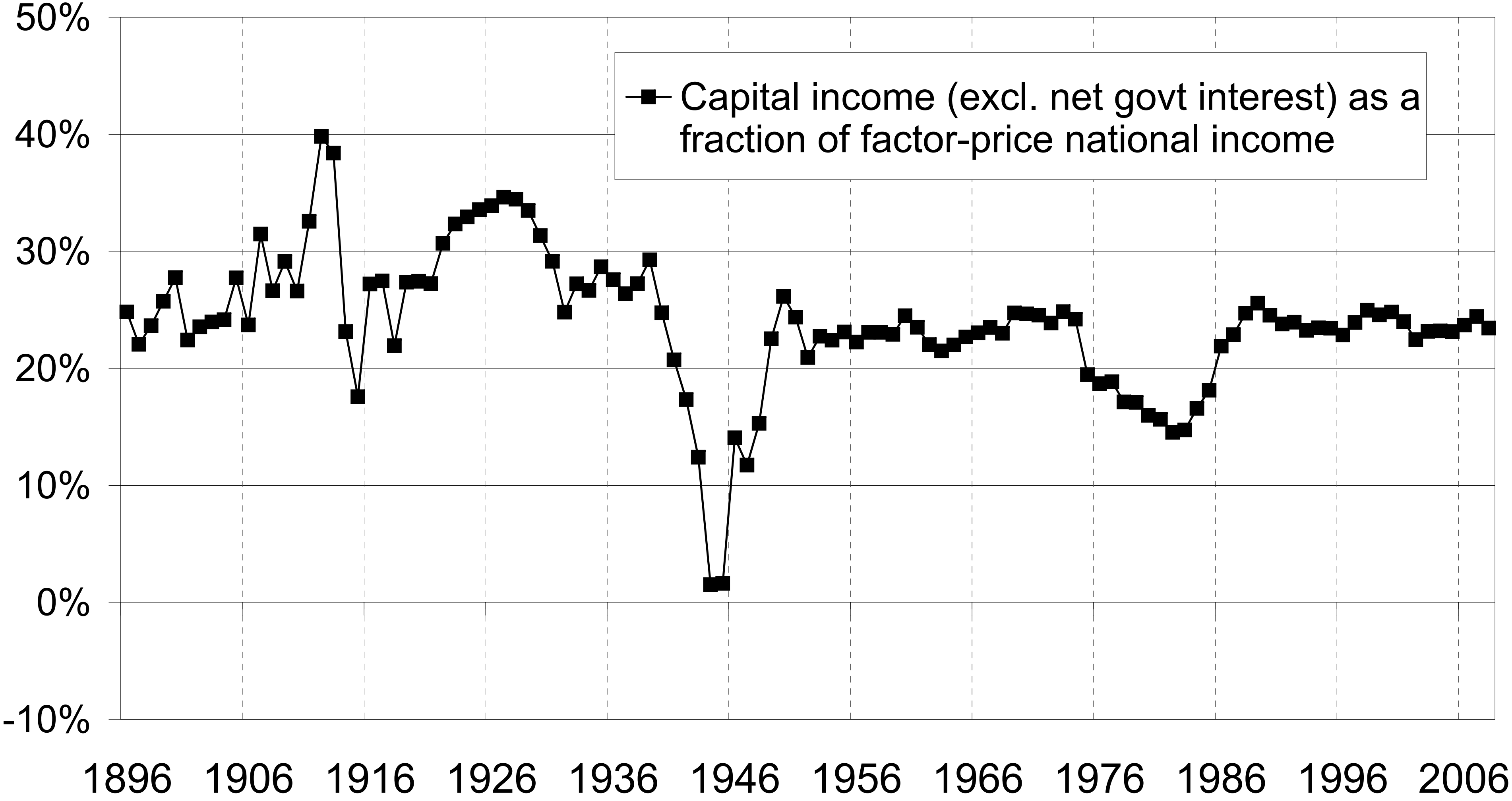


Figure A9: Capital share in disposable income, France 1896-2008 (annual series)

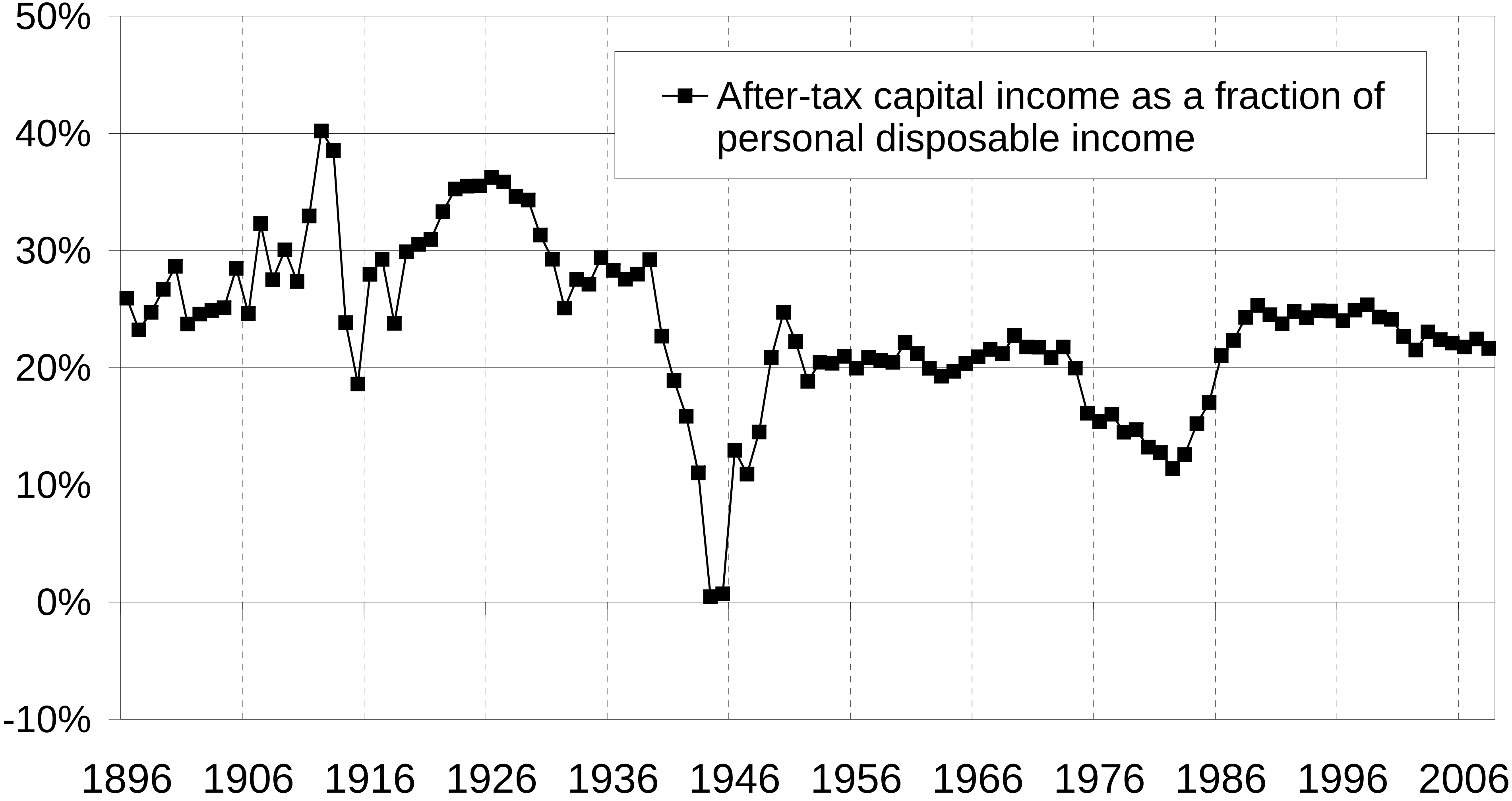
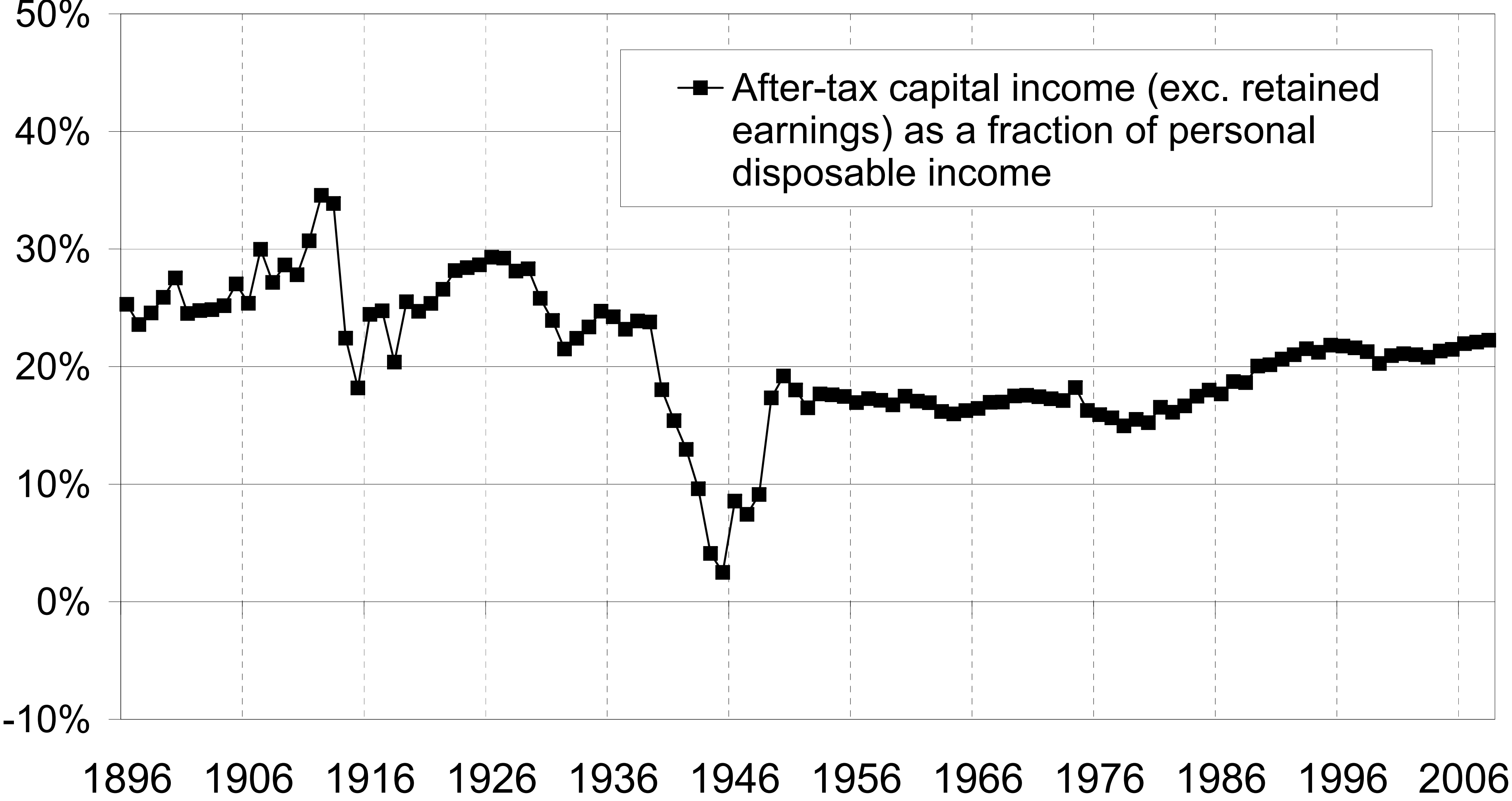


Figure A10: Capital share in disposable income, France 1896-2008 (annual series)



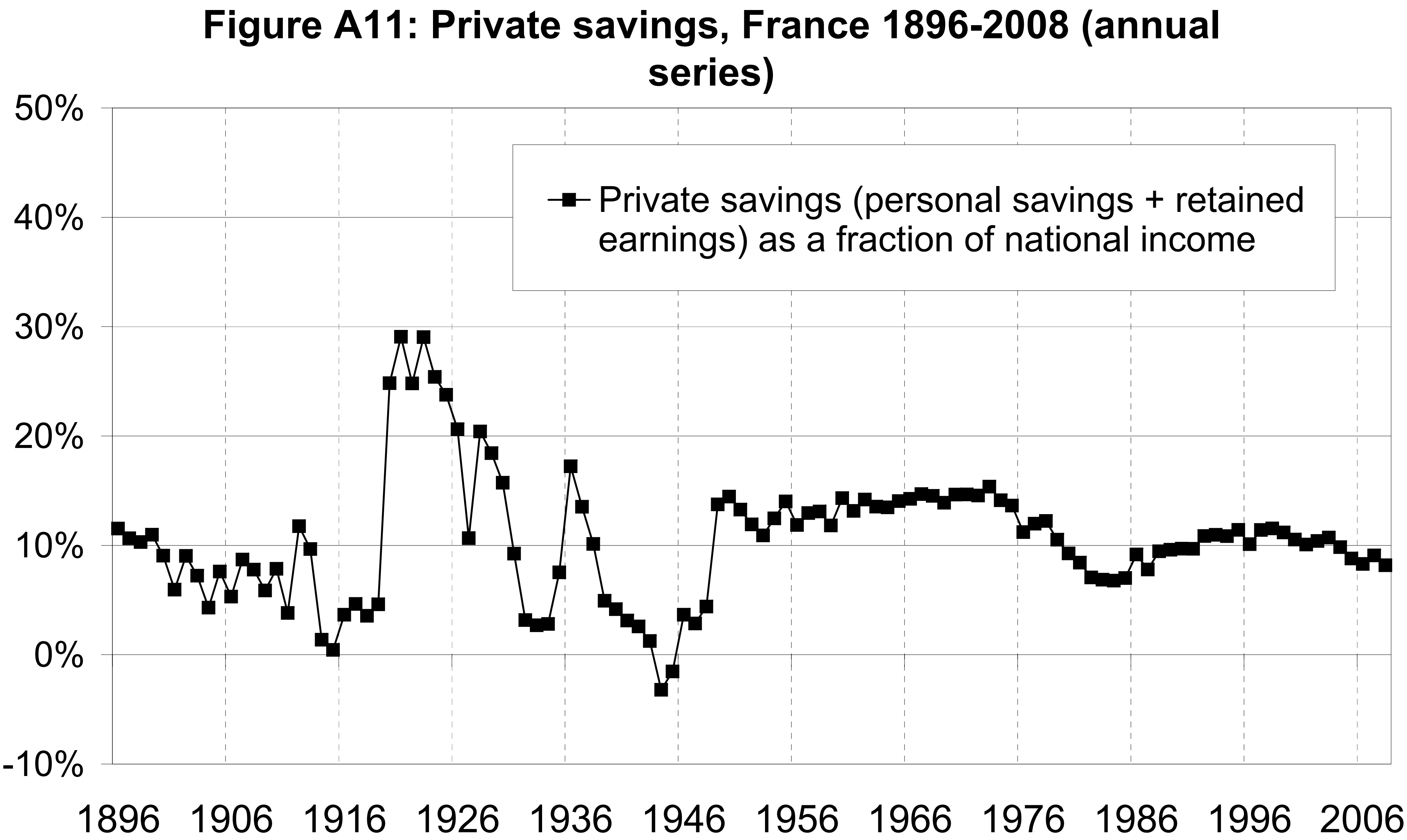


Figure A11: Private savings, France 1896-2008 (annual series)
Private savings (personal savings + retained earnings) as a fraction of national income
50%
40%
30%
20%
10%
0%
-10%
1896
1906
1916
1926
1936
1946
1956
1966
1976
1986
1996
2006

Figure A12: Rates of return on private wealth, France 1896-2008 (annual series)

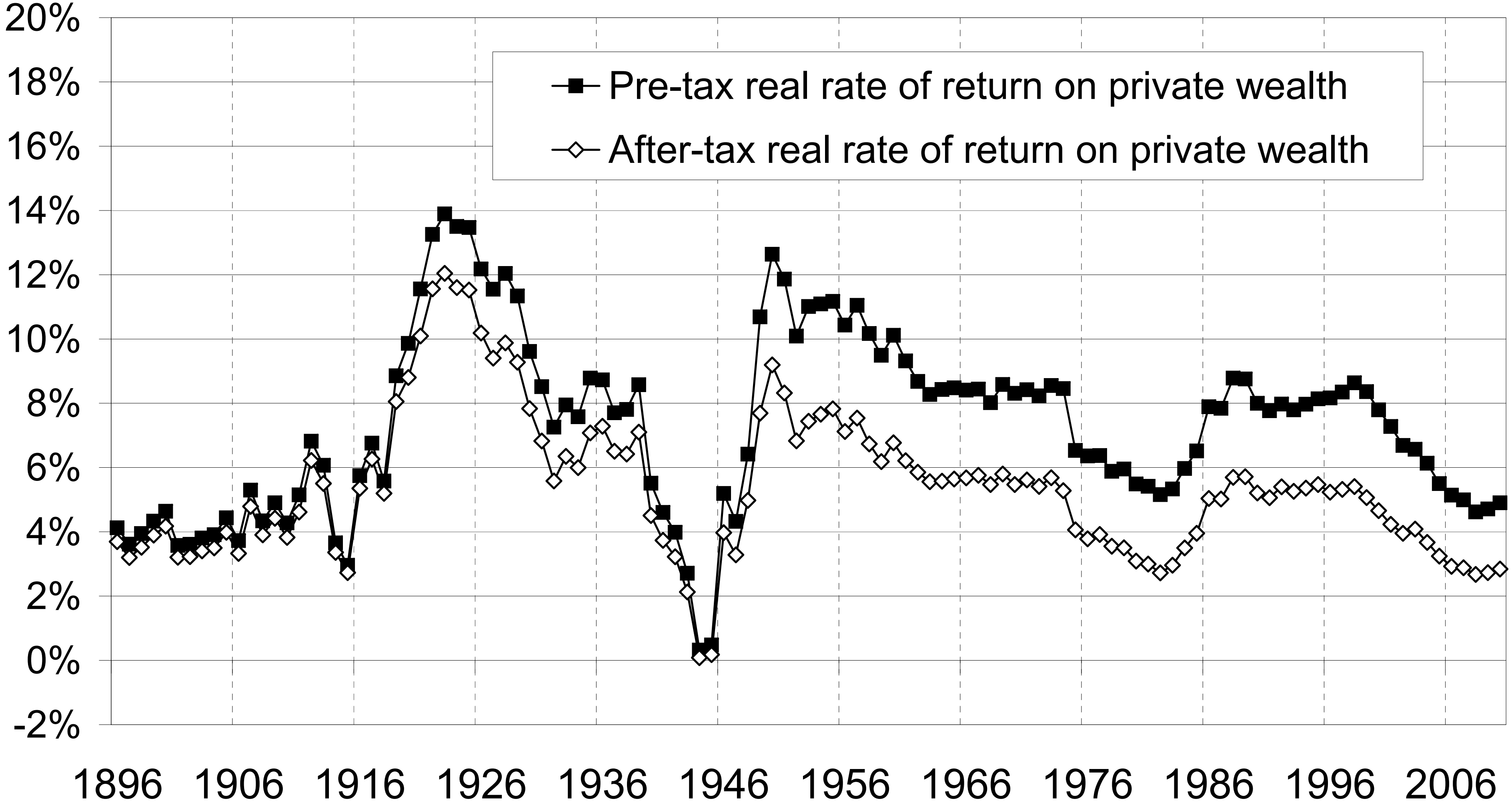


Figure A13: Capital shares vs savings rate, France 1896-2008 (annual series)

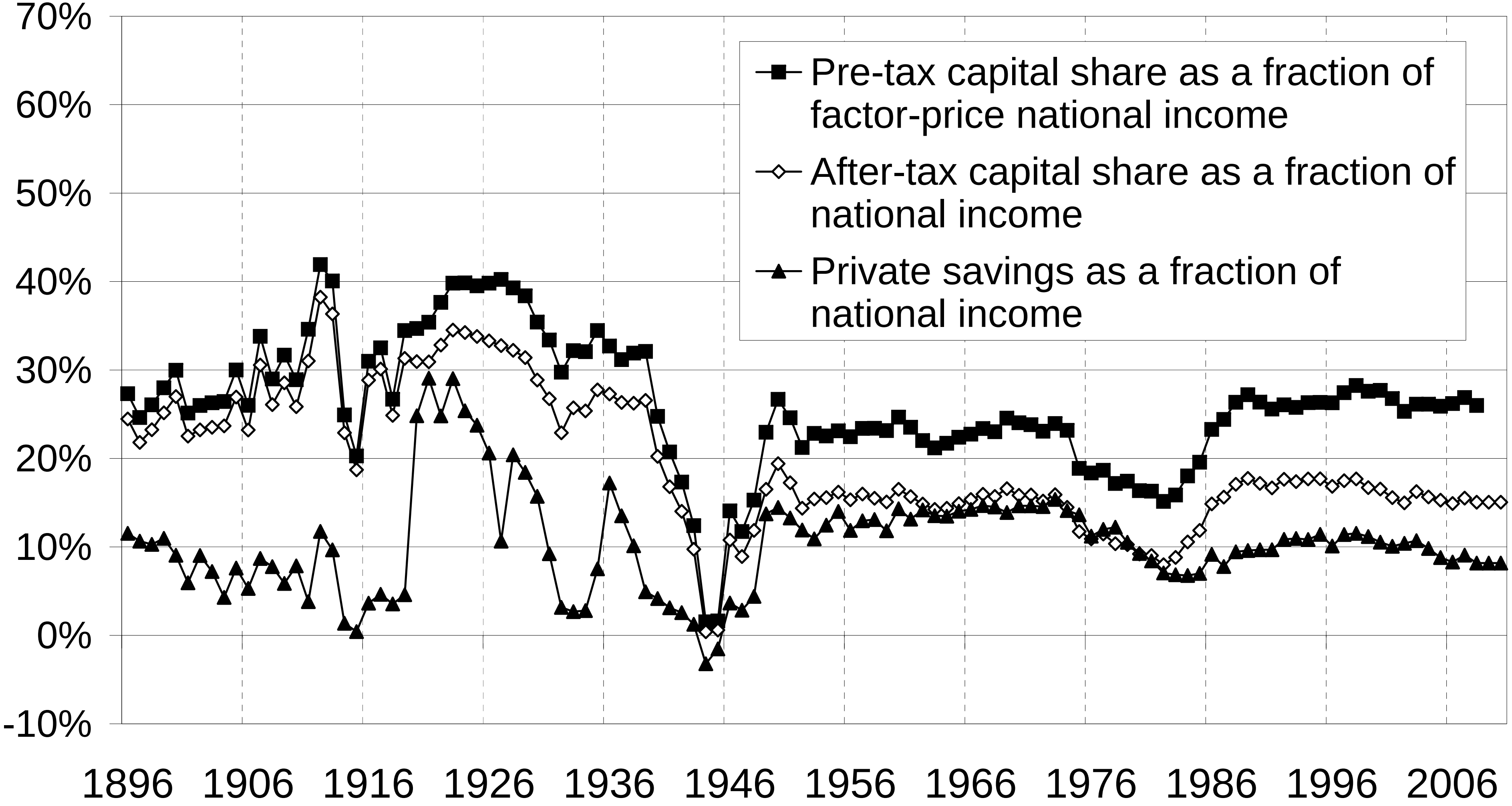


Figure A14: Rate of return vs growth rate, France 1820-2008 (decennial averages)

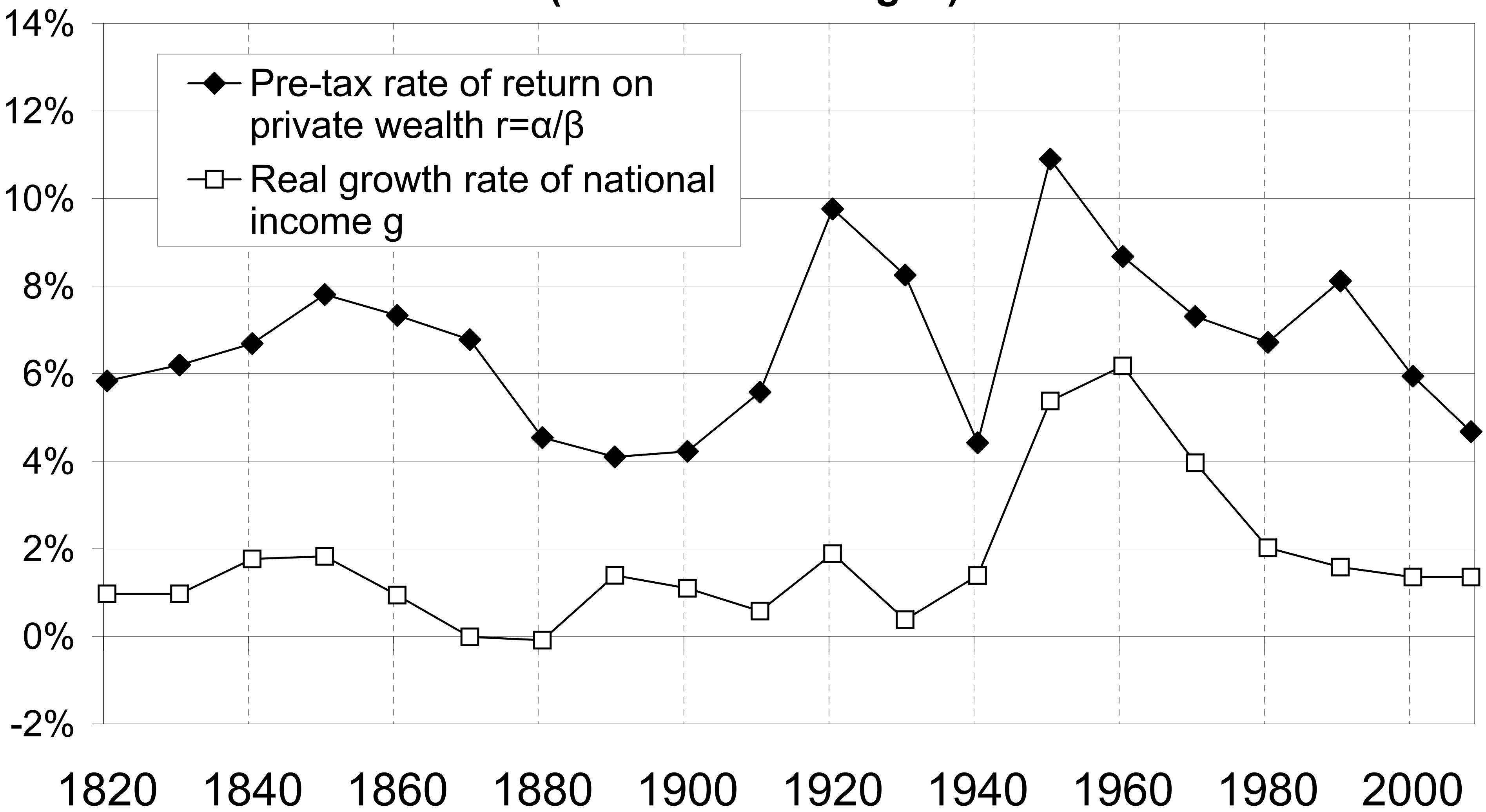


Figure A15: Rate of return vs growth rate, France 1820-2008 (decennial averages)

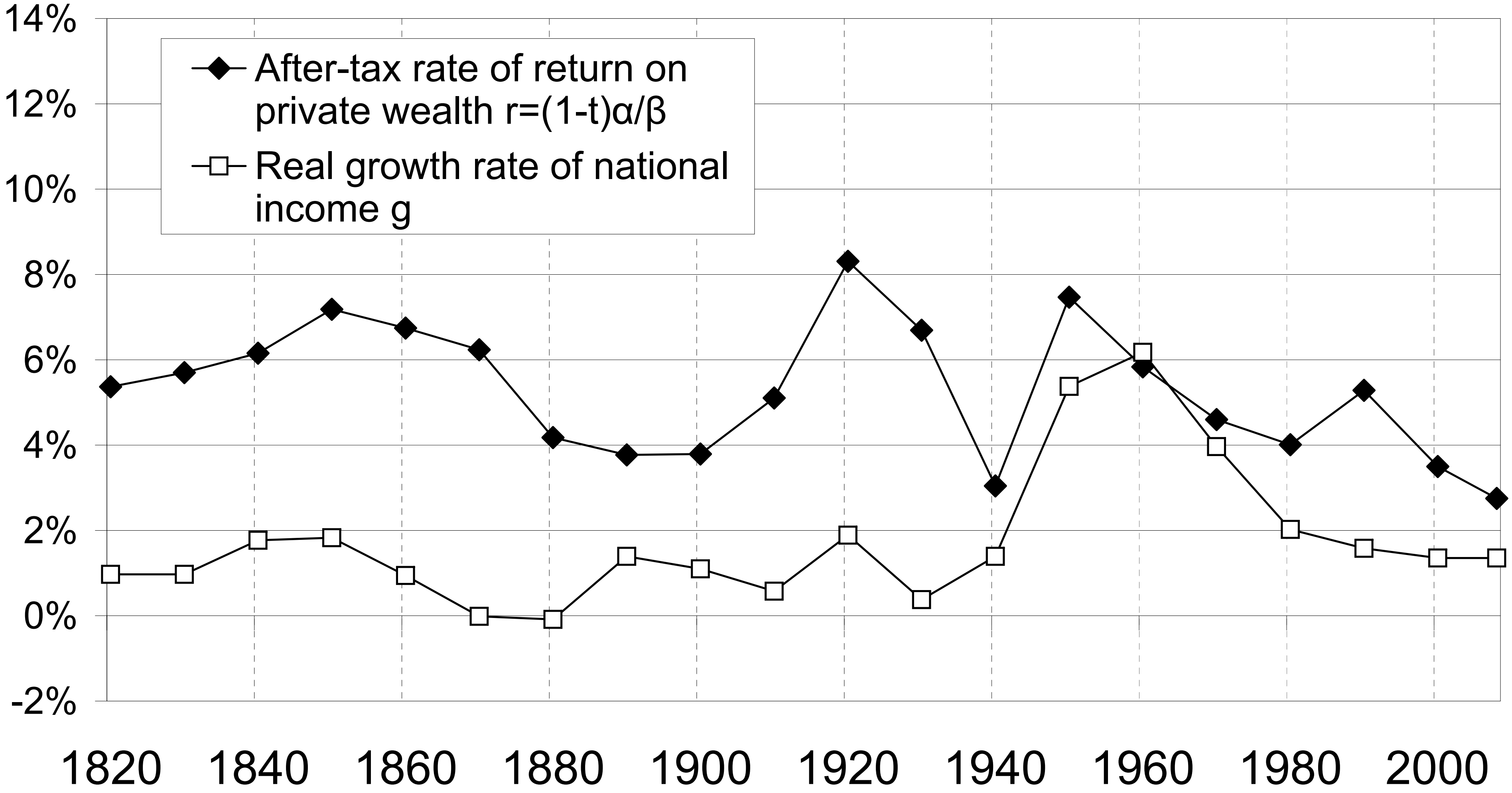


Figure C1: Population growth in France, 1820-2100

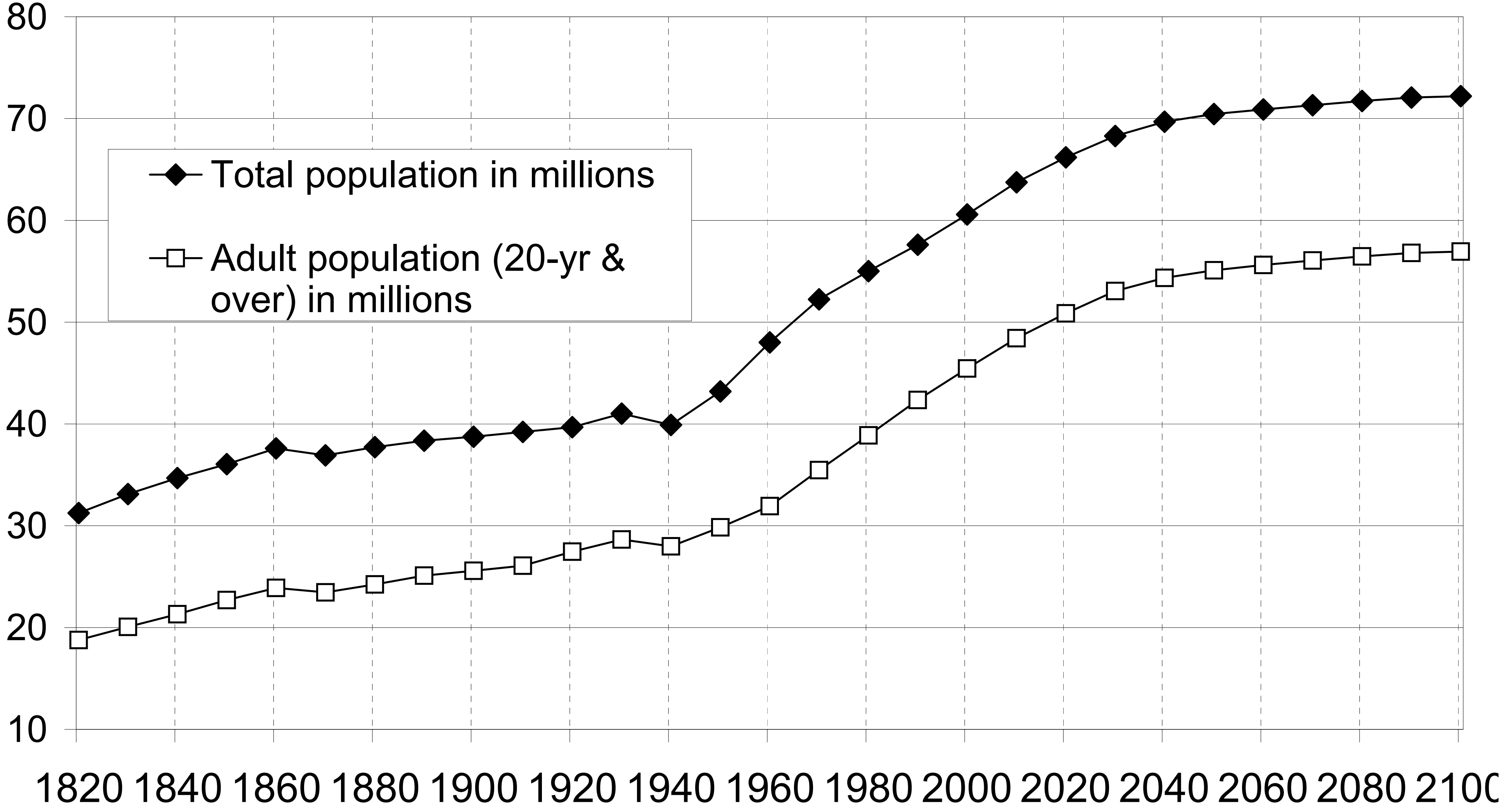


Figure E1: Steady-state cross-sectional age-wealth profile in the exogenous savings model (general case) (g=2%)

Figure E2: Steady-state cross-sectional age-wealth profile in the exogenous savings model (general case) (g=5%)

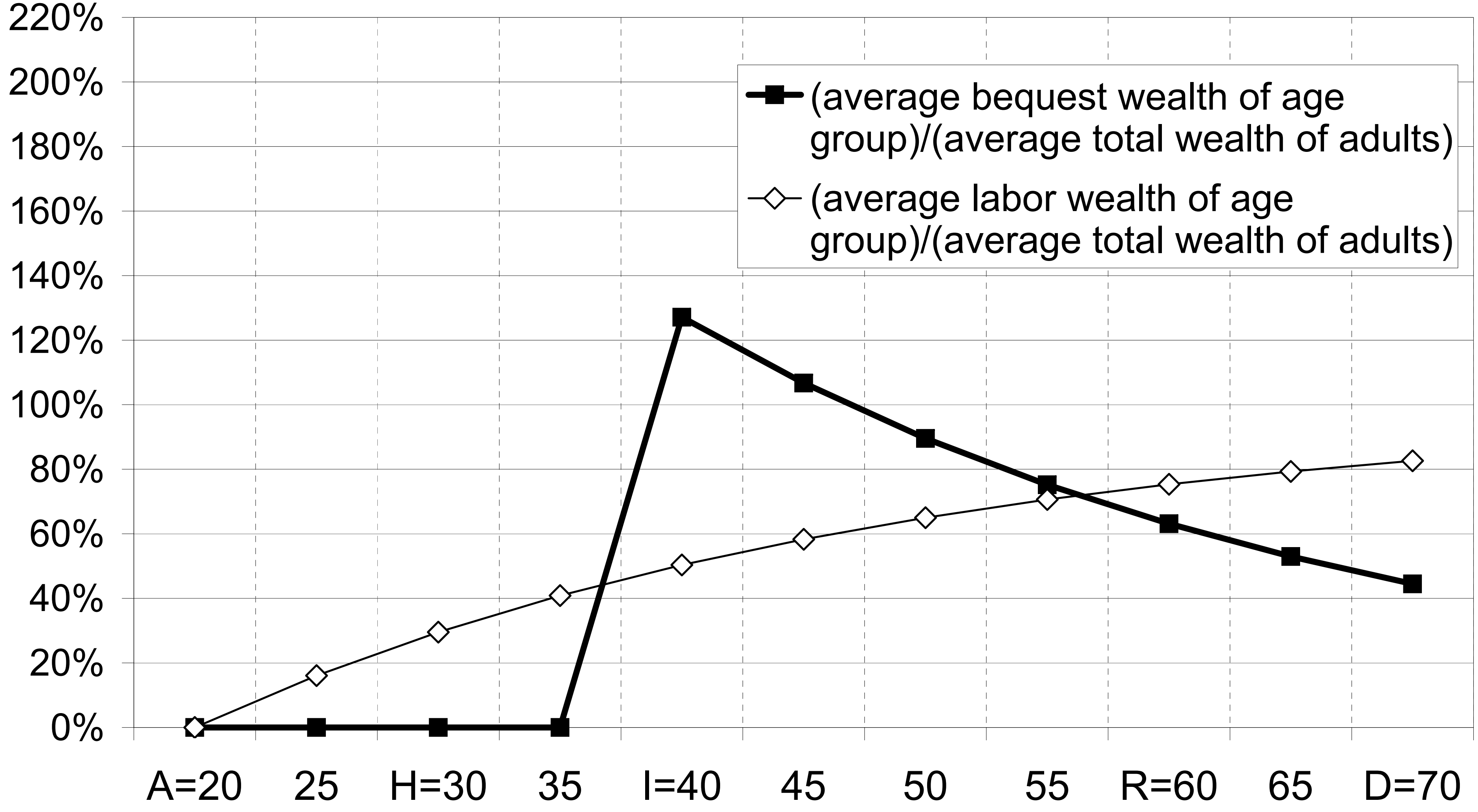


Figure E3: Steady-state cross-sectional age-wealth profile in the exogenous savings model: g=5% vs g=2%

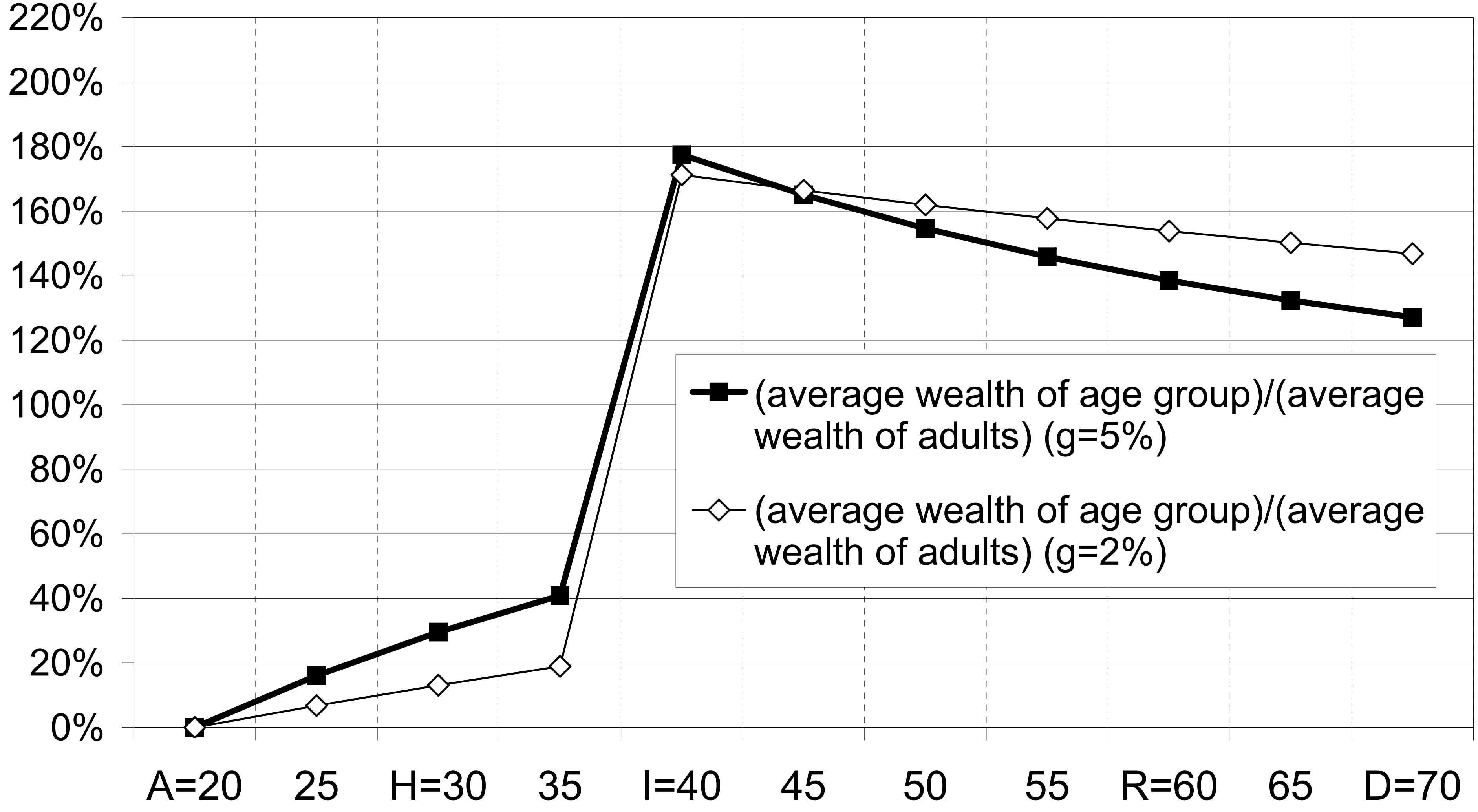


Figure E4: Steady-state cross-sectional age-wealth profile in the dynastic model: no borrowing vs borrowing

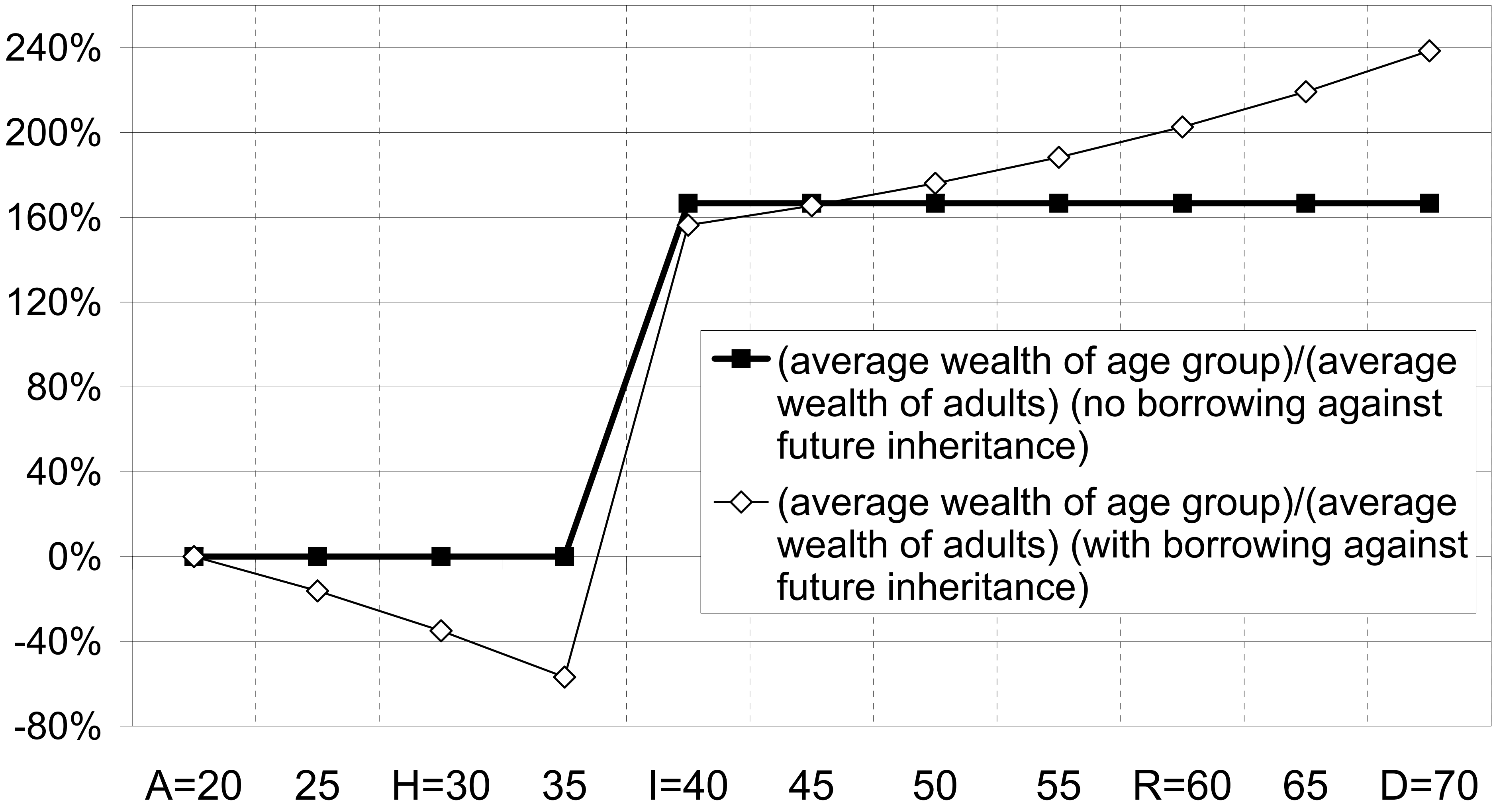


Figure E5: Steady-state cross-sectional age-wealth profile in the dynastic model with lifecycle wealth (g=2%, ρ=80%)

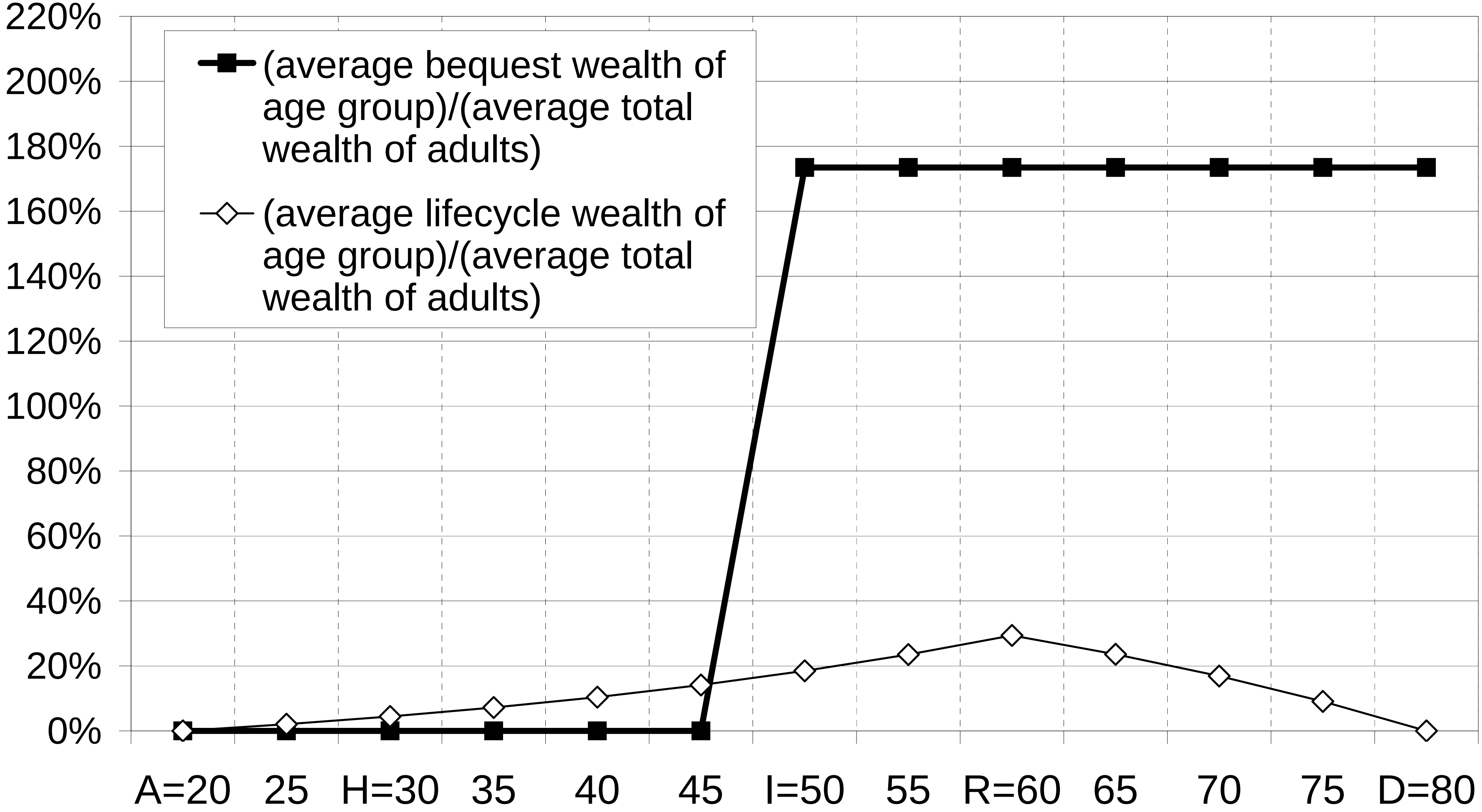


Figure E6: Steady-state cross-sectional age-wealth profile in the dynastic model with lifecycle wealth (g=2%, ρ=50%)

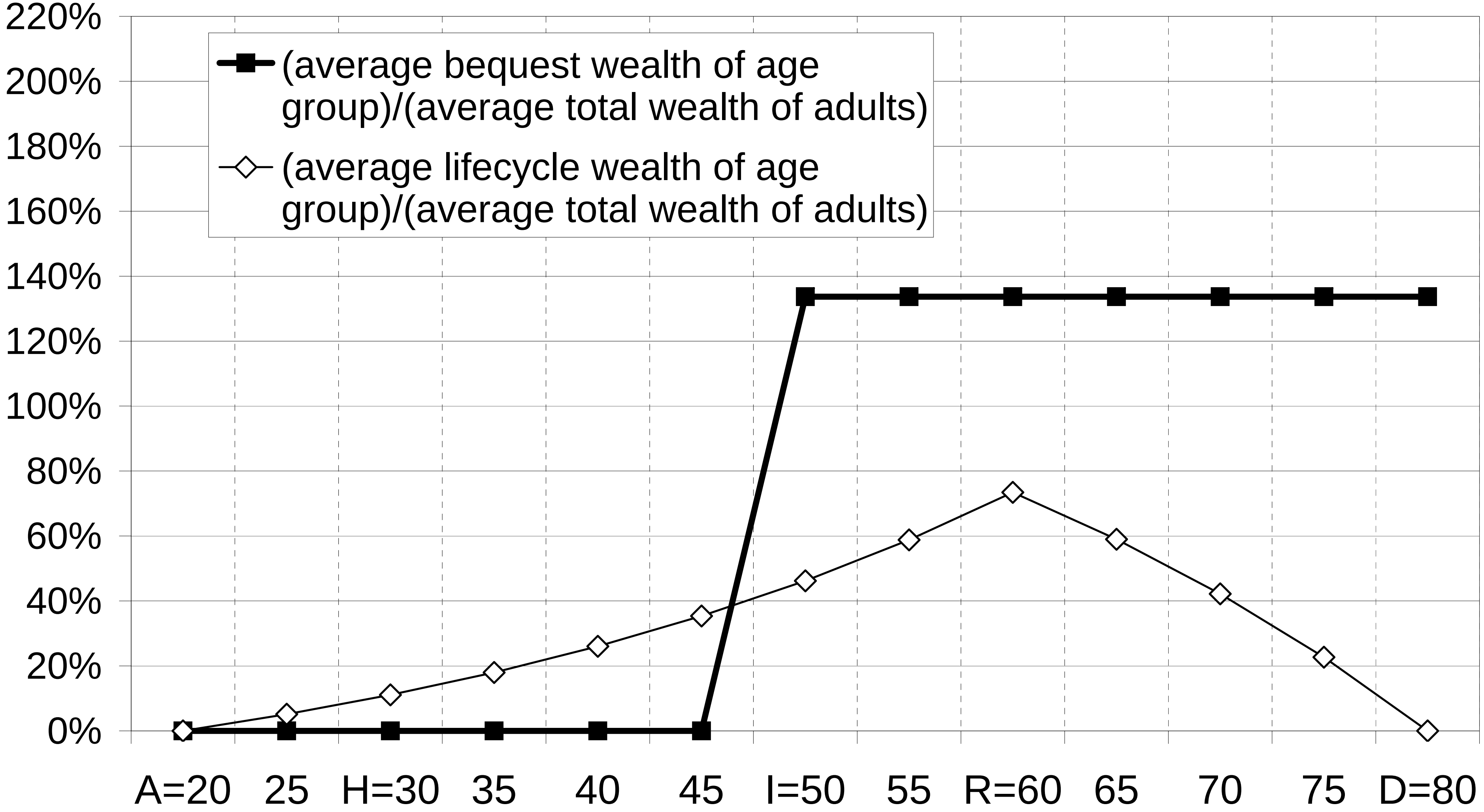
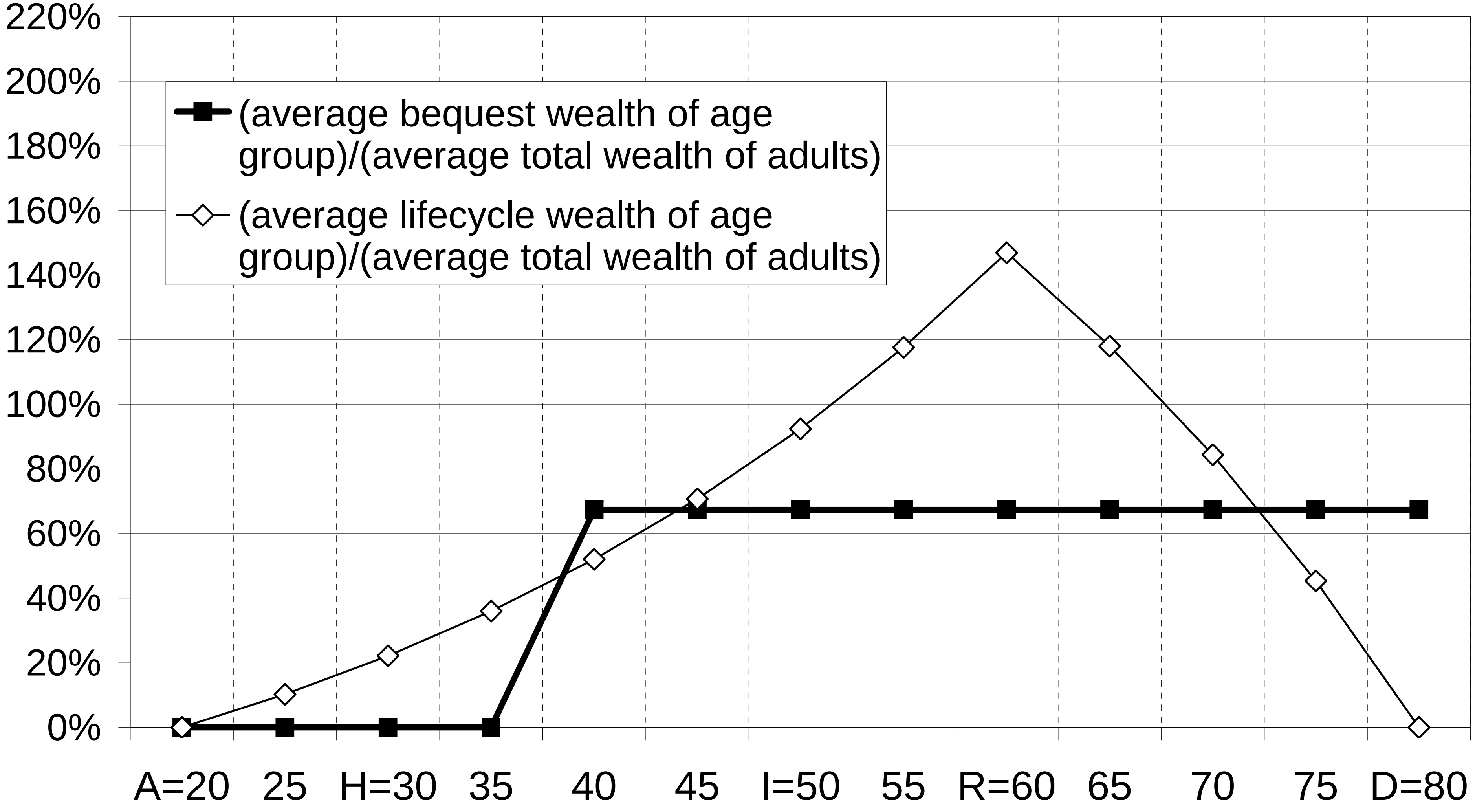


Figure E7: Steady-state cross-sectional age-wealth profile in the dynastic model with lifecycle wealth (g=2%, ρ=0%)



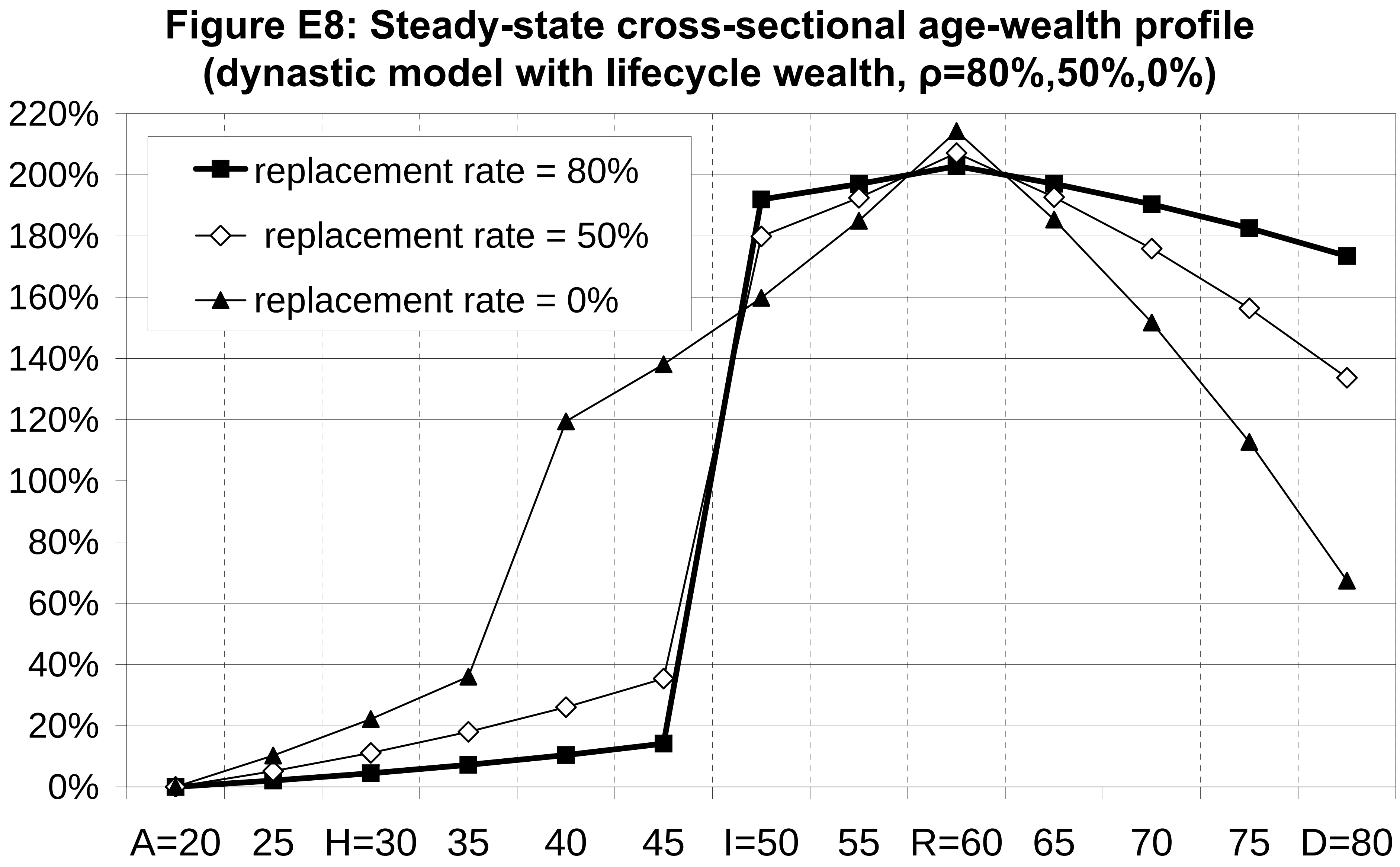


Figure E8: Steady-state cross-sectional age-wealth profile
(dynastic model with lifecycle wealth, ρ=80%,50%,0%)
220%
200%
180%
160%
140%
120%
100%
80%
60%
40%
20%
0%
replacement rate = 80%
replacement rate = 50%
replacement rate = 0%
A=20
25
H=30
35
40
45
I=50
55
R=60
65
70
75
D=80

Table A1: National income and private wealth in France, 1896-2009 (annual series)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
	(current billions euros 1949-2009; current billions old francs 1896-1948)		(2009 billions euros) (CPI)		(current euros 1949-2009; current old francs 1896-1948)				(2009 euros)				**Ratio (private wealth)/ (national income) $\beta_t = W_t/Y_t$**	*memo: Ratio (dispos. income)/ (national income) Y_{dt}/Y_t*	*memo: Per adult dispos. income y_{dt} (2009 €)*	***memo: Ratio (private wealth)/ (dispos. income) W_t/Y_{dt}***
	National income Y_t	Private wealth W_t	National income Y_t	Private wealth W_t	Per capita national income	Per capita private wealth	**Per adult national income y_t**	**Per adult private wealth w_t**	Per capita national income	Per capita private wealth	**Per adult national income y_t**	**Per adult private wealth w_t**				
1896	31.0	205.0	113.6	752.3	806	5 336	1 228	8 135	2 957	19 583	4 508	29 853	662%	94%	1 160	702%
1897	29.8	202.9	112.3	765.2	774	5 274	1 177	8 024	2 918	19 890	4 440	30 262	682%	94%	4 169	726%
1898	31.6	208.9	117.6	777.0	821	5 423	1 247	8 238	3 053	20 171	4 638	30 640	661%	94%	4 362	702%
1899	33.3	215.1	122.1	788.9	864	5 579	1 310	8 459	3 169	20 465	4 804	31 028	646%	94%	4 530	685%
1900	33.8	218.7	124.1	802.1	879	5 678	1 337	8 643	3 223	20 828	4 906	31 704	646%	94%	4 622	686%
1901	31.7	222.8	115.7	813.2	824	5 789	1 253	8 806	3 007	21 129	4 574	32 140	703%	95%	4 343	740%
1902	30.8	222.2	113.8	819.8	800	5 761	1 216	8 756	2 952	21 259	4 487	32 315	720%	95%	4 244	761%
1903	32.4	223.8	120.2	829.9	838	5 788	1 273	8 791	3 110	21 469	4 723	32 607	690%	94%	4 463	731%
1904	33.0	222.9	124.0	838.4	851	5 754	1 290	8 726	3 200	21 643	4 853	32 825	676%	94%	4 575	717%
1905	33.1	224.0	124.8	843.5	854	5 774	1 293	8 742	3 215	21 741	4 868	32 916	676%	95%	4 606	715%
1906	32.9	229.4	122.1	852.8	846	5 908	1 279	8 931	3 145	21 960	4 754	33 197	698%	94%	4 484	740%
1907	36.7	234.4	134.6	859.1	944	6 026	1 425	9 096	3 460	22 089	5 223	33 343	638%	95%	4 943	675%
1908	36.4	243.0	130.3	870.6	934	6 242	1 409	9 413	3 348	22 366	5 048	33 729	668%	95%	4 788	704%
1909	38.0	245.2	136.3	880.5	972	6 284	1 466	9 471	3 492	22 563	5 262	34 004	646%	95%	4 999	680%
1910	37.7	255.1	131.4	888.3	965	6 525	1 453	9 824	3 362	22 725	5 061	34 214	676%	94%	4 783	715%
1911	42.2	283.5	133.6	898.4	1 075	7 227	1 619	10 888	3 406	22 902	5 132	34 503	672%	94%	4 831	714%
1912	45.9	281.9	146.9	903.3	1 169	7 186	1 756	10 797	3 746	23 026	5 628	34 595	615%	95%	5 352	646%
1913	45.0	297.0	139.4	920.3	1 144	7 550	1 717	11 334	3 544	23 396	5 321	35 122	660%	94%	5 019	700%
1914	41.7	284.5	129.3	881.7	1 058	7 216	1 585	10 809	3 278	22 360	4 910	33 493	682%	96%	4 716	710%
1915	46.6	319.5	121.6	834.1	1 187	8 145	1 777	12 187	3 099	21 262	4 638	31 816	686%	101%	4 663	682%
1916	58.6	316.0	136.6	736.5	1 513	8 157	2 253	12 149	3 527	19 013	5 252	28 318	539%	103%	5 417	523%
1917	69.3	333.1	134.8	648.2	1 810	8 701	2 672	12 848	3 522	16 929	5 200	24 997	481%	103%	5 353	467%
1918	78.8	377.2	118.3	565.8	2 078	9 940	3 039	14 538	3 117	14 912	4 558	21 808	478%	105%	4 767	458%
1919	104.2	405.2	125.0	486.3	2 781	10 817	4 040	15 715	3 337	12 982	4 848	18 860	389%	105%	5 079	371%
1920	151.2	531.9	132.0	464.6	3 939	13 857	5 730	20 159	3 440	12 103	5 005	17 607	352%	101%	5 077	347%
1921	153.7	471.0	153.3	469.6	3 965	12 147	5 773	17 687	3 953	12 111	5 756	17 635	306%	100%	5 754	306%
1922	164.7	467.9	170.9	485.5	4 226	12 004	6 145	17 453	4 385	12 455	6 375	18 107	284%	99%	6 281	288%
1923	186.0	533.2	173.9	498.4	4 740	13 586	6 876	19 710	4 430	12 699	6 427	18 423	287%	98%	6 293	293%
1924	214.0	631.5	175.6	518.3	5 402	15 943	7 814	23 063	4 433	13 084	6 412	18 926	295%	96%	6 187	306%
1925	236.9	694.9	181.2	531.4	5 925	17 380	8 550	25 080	4 532	13 292	6 539	19 181	293%	95%	6 224	308%
1926	295.2	965.4	173.6	567.5	7 341	24 005	10 589	34 624	4 316	14 111	6 225	20 354	327%	92%	5 723	356%
1927	303.7	1 058.4	171.0	596.0	7 518	26 195	10 814	37 683	4 233	14 750	6 089	21 219	348%	91%	5 566	381%
1928	329.5	1 075.3	185.9	606.7	8 125	26 515	11 671	38 086	4 584	14 960	6 585	21 489	326%	93%	6 134	350%
1929	354.0	1 198.7	188.1	636.8	8 690	29 422	12 459	42 183	4 617	15 631	6 619	22 410	339%	92%	6 059	370%
1930	341.5	1 258.6	180.0	663.3	8 347	30 763	11 950	44 042	4 399	16 214	6 298	23 212	369%	92%	5 806	400%
1931	317.8	1 245.8	174.3	683.2	7 702	30 195	11 011	43 167	4 224	16 560	6 039	23 675	392%	91%	5 524	429%
1932	279.9	1 147.5	168.5	690.8	6 783	27 812	9 690	39 734	4 083	16 743	5 834	23 921	410%	91%	5 324	449%
1933	273.0	1 105.8	169.8	687.7	6 613	26 790	9 428	38 195	4 113	16 661	5 864	23 754	405%	93%	5 477	434%
1934	249.0	1 053.4	161.6	683.9	6 036	25 537	8 586	36 322	3 919	16 579	5 574	23 580	423%	94%	5 215	452%
1935	244.9	960.5	173.4	680.0	5 937	23 287	8 428	33 056	4 203	16 486	5 967	23 402	392%	94%	5 635	415%
1936	276.9	1 037.7	182.7	684.6	6 722	25 190	9 596	35 958	4 435	16 620	6 331	23 724	375%	96%	6 105	389%
1937	333.2	1 348.8	174.7	707.4	8 087	32 740	11 626	47 068	4 241	17 171	6 098	24 686	405%	96%	5 830	423%
1938	382.6	1 564.2	176.6	722.2	9 282	37 951	13 427	54 895	4 286	17 521	6 199	25 344	409%	94%	5 815	436%
1939	451.0	1 687.9	195.3	731.0	11 452	42 858	16 608	62 155	4 960	18 562	7 193	26 919	374%	91%	6 541	412%
1940	361.3	1 622.6	132.0	592.5	9 147	41 077	13 330	59 862	3 340	15 000	4 868	21 860	449%	89%	4 343	503%
1941	398.3	1 792.9	124.0	558.2	10 652	47 955	15 739	70 854	3 316	14 929	4 900	22 058	450%	89%	4 355	506%
1942	463.6	2 016.4	120.2	522.7	12 404	53 947	18 149	78 934	3 215	13 984	4 704	20 461	435%	88%	4 159	492%
1943	509.8	2 332.9	106.4	486.9	13 731	62 837	19 985	91 457	2 866	13 115	4 171	19 088	458%	88%	3 683	518%
1944	552.2	2 636.4	94.2	449.9	15 068	71 933	21 812	104 130	2 571	12 276	3 722	17 770	477%	88%	3 279	542%
1945	1 046.8	3 555.1	120.5	409.4	28 481	96 729	41 155	139 771	3 280	11 138	4 739	16 095	340%	86%	4 060	396%
1946	2 342.4	6 350.7	176.8	479.2	58 377	158 271	82 809	224 511	4 405	11 943	6 249	16 941	271%	83%	5 200	326%
1947	3 499.5	9 498.9	176.8	479.8	86 517	234 840	122 832	333 412	4 370	11 861	6 204	16 840	271%	82%	5 065	332%
1948	6 306.9	15 029.0	201.0	478.9	154 164	367 363	219 507	523 072	4 913	11 707	6 995	16 668	238%	82%	5 720	291%
1949	12.1	26.1	224.3	481.8	294	632	420	901	5 428	11 663	7 747	16 646	215%	79%	6 128	272%
1950	14.3	30.2	239.8	506.4	343	724	491	1 037	5 757	12 160	8 242	17 408	211%	79%	6 475	269%
1951	17.9	37.0	257.7	534.5	425	881	609	1 264	6 134	12 723	8 794	18 243	207%	78%	6 825	267%
1952	20.7	43.6	266.9	561.8	489	1 030	703	1 479	6 308	13 281	9 062	19 078	211%	76%	6 917	276%
1953	21.5	44.7	282.8	586.4	506	1 048	728	1 509	6 635	13 758	9 547	19 797	207%	75%	7 193	275%
1954	22.9	46.6	299.9	609.7	535	1 088	772	1 570	6 993	14 217	10 091	20 515	203%	76%	7 711	266%
1955	24.7	51.2	320.3	663.0	572	1 184	827	1 713	7 409	15 337	10 718	22 185	207%	77%	8 282	268%
1956	27.1	58.3	337.0	725.3	621	1 337	902	1 941	7 725	16 625	11 213	24 131	215%	77%	8 610	280%
1957	30.7	65.0	370.1	784.1	696	1 475	1 014	2 149	8 400	17 796	12 241	25 935	212%	77%	9 367	277%
1958	35.3	81.3	370.4	852.5	793	1 824	1 160	2 671	8 312	19 130	12 168	28 004	230%	75%	9 139	306%
1959	38.3	93.4	378.6	923.1	851	2 075	1 251	3 050	8 410	20 508	12 360	30 141	244%	74%	9 111	331%
1960	42.7	104.1	406.5	991.7	938	2 289	1 385	3 378	8 941	21 812	13 198	32 198	244%	75%	9 845	327%
1961	46.2	116.6	426.0	1 075.7	1 006	2 540	1 494	3 772	9 281	23 433	13 782	34 797	252%	74%	10 186	342%
1962	51.8	131.6	456.8	1 159.5	1 117	2 835	1 670	4 239	9 840	24 978	14 716	37 355	254%	74%	10 962	341%
1963	58.2	149.2	489.6	1 254.4	1 224	3 136	1 839	4 711	10 291	26 368	15 460	39 610	256%	74%	11 426	347%
1964	64.6	166.4	525.0	1 353.2	1 344	3 463	2 027	5 225	10 925	28 157	16 486	42 489	258%	73%	12 033	353%
1965	69.7	183.9	552.6	1 458.9	1 434	3 787	2 173	5 738	11 379	30 043	17 241	45 519	264%	73%	12 614	361%
1966	75.4	203.8	582.3	1 574.3	1 540	4 163	2 341	6 330	11 894	32 159	18 085	48 899	270%	73%	13 266	369%
1967	81.4	225.5	613.1	1 698.0	1 649	4 568	2 501	6 927	12 418	34 391	18 830	52 151	277%	74%	13 931	374%
1968	88.6	254.5	638.0	1 832.0	1 783	5 119	2 692	7 728	12 832	36 844	19 373	55 626	287%	74%	14 348	388%
1969	102.0	291.8	689.2	1 972.0	2 035	5 823	3 057	8 749	13 754	39 355	20 664	59 129	286%	73%	15 074	392%

1970	114.0	329.8	732.4	2 118.6	2 256	6 526	**3 375**	**9 762**	14 494	41 929	**21 680**	**62 718**	**289%**	73%	15 772	**398%**
1971	126.8	358.7	772.4	2 184.1	2 486	7 030	**3 704**	**10 474**	15 140	42 812	**22 555**	**63 781**	**283%**	73%	16 463	**387%**
1972	141.5	397.1	811.6	2 277.3	2 749	7 714	**4 087**	**11 466**	15 764	44 231	**23 434**	**65 749**	**281%**	73%	17 043	**386%**
1973	162.8	456.0	870.2	2 436.7	3 137	8 783	**4 651**	**13 023**	16 762	46 936	**24 853**	**69 593**	**280%**	73%	18 172	**383%**
1974	188.4	516.4	885.3	2 427.3	3 600	9 871	**5 324**	**14 597**	16 921	46 392	**25 024**	**68 608**	**274%**	73%	18 146	**378%**
1975	210.0	607.1	882.8	2 552.4	3 992	11 542	**5 880**	**17 001**	16 784	48 524	**24 721**	**71 471**	**289%**	73%	18 008	**397%**
1976	242.2	699.2	929.0	2 681.9	4 587	13 243	**6 730**	**19 428**	17 596	50 796	**25 814**	**74 521**	**289%**	71%	18 288	**407%**
1977	272.1	796.6	954.2	2 792.8	5 133	15 024	**7 494**	**21 934**	17 997	52 676	**26 275**	**76 905**	**293%**	72%	18 786	**409%**
1978	307.2	896.3	987.2	2 880.3	5 766	16 824	**8 379**	**24 449**	18 531	54 069	**26 928**	**78 571**	**292%**	71%	19 241	**408%**
1979	350.5	1 026.6	1 016.6	2 977.5	6 554	19 195	**9 481**	**27 767**	19 009	55 674	**27 498**	**80 537**	**293%**	70%	19 179	**420%**
1980	394.6	1 175.9	1 007.5	3 002.3	7 344	21 885	**10 576**	**31 515**	18 751	55 877	**27 002**	**80 464**	**298%**	70%	18 809	**428%**
1981	443.2	1 334.7	997.9	3 005.1	8 203	24 704	**11 772**	**35 452**	18 469	55 621	**26 505**	**79 820**	**301%**	71%	18 739	**426%**
1982	505.0	1 483.0	1 017.0	2 986.6	9 294	27 294	**13 287**	**39 018**	18 718	54 966	**26 758**	**78 578**	**294%**	70%	18 763	**419%**
1983	555.1	1 652.1	1 020.1	3 035.7	10 158	30 230	**14 477**	**43 082**	18 665	55 547	**26 601**	**79 163**	**298%**	70%	18 613	**425%**
1984	603.1	1 820.8	1 031.9	3 115.2	10 987	33 169	**15 587**	**47 055**	18 798	56 748	**26 667**	**80 505**	**302%**	69%	18 507	**435%**
1985	649.6	1 951.1	1 050.5	3 155.0	11 778	35 373	**16 630**	**49 943**	19 046	57 200	**26 892**	**80 762**	**300%**	70%	18 750	**431%**
1986	704.8	2 079.8	1 109.8	3 274.8	12 720	37 534	**17 883**	**52 771**	20 028	59 100	**28 158**	**83 092**	**295%**	71%	19 882	**418%**
1987	742.2	2 310.7	1 133.6	3 528.9	13 330	41 498	**18 667**	**58 113**	20 358	63 377	**28 509**	**88 751**	**311%**	70%	19 970	**444%**
1988	803.0	2 408.5	1 194.1	3 581.7	14 347	43 036	**20 018**	**60 043**	21 336	63 997	**29 768**	**89 289**	**300%**	70%	20 938	**426%**
1989	866.1	2 690.8	1 242.0	3 858.6	15 391	47 819	**21 397**	**66 477**	22 072	68 574	**30 683**	**95 330**	**311%**	70%	21 517	**443%**
1990	911.3	3 005.0	1 263.9	4 167.5	16 107	53 113	**22 305**	**73 548**	22 339	73 661	**30 934**	**102 002**	**330%**	70%	21 671	**471%**
1991	941.3	3 101.2	1 265.0	4 167.6	16 560	54 560	**22 828**	**75 208**	22 255	73 321	**30 677**	**101 069**	**329%**	70%	21 541	**469%**
1992	973.6	3 181.8	1 277.7	4 175.7	17 048	55 713	**23 384**	**76 418**	22 373	73 116	**30 688**	**100 288**	**327%**	71%	21 854	**459%**
1993	980.2	3 240.1	1 261.1	4 168.8	17 086	56 478	**23 316**	**77 074**	21 983	72 666	**30 000**	**99 166**	**331%**	72%	21 498	**461%**
1994	1 014.4	3 348.9	1 283.3	4 236.8	17 621	58 176	**23 932**	**79 011**	22 293	73 600	**30 277**	**99 958**	**330%**	71%	21 553	**464%**
1995	1 050.4	3 398.4	1 306.7	4 227.5	18 188	58 843	**24 617**	**79 646**	22 625	73 200	**30 624**	**99 078**	**324%**	71%	21 830	**454%**
1996	1 081.1	3 482.2	1 318.5	4 246.8	18 660	60 104	**25 214**	**81 212**	22 758	73 302	**30 750**	**99 045**	**322%**	70%	21 582	**459%**
1997	1 119.7	3 680.1	1 349.4	4 435.0	19 267	63 324	**26 004**	**85 465**	23 219	76 313	**31 338**	**102 996**	**329%**	70%	21 997	**468%**
1998	1 171.8	3 832.9	1 402.4	4 587.0	20 100	65 746	**27 080**	**88 577**	24 055	78 681	**32 408**	**106 005**	**327%**	70%	22 600	**469%**
1999	1 220.2	4 027.2	1 453.0	4 795.7	20 859	68 846	**28 064**	**92 626**	24 839	81 982	**33 419**	**110 299**	**330%**	69%	22 960	**480%**
2000	1 281.8	4 554.7	1 501.0	5 333.6	21 781	77 395	**29 261**	**103 974**	25 506	90 631	**34 265**	**121 756**	**355%**	69%	23 508	**518%**
2001	1 325.4	4 878.5	1 526.7	5 619.4	22 371	82 338	**29 990**	**110 383**	25 768	94 843	**34 545**	**127 148**	**368%**	69%	23 740	**536%**
2002	1 353.6	5 126.1	1 529.7	5 793.0	22 688	85 923	**30 349**	**114 936**	25 640	97 101	**34 298**	**129 888**	**379%**	70%	23 889	**544%**
2003	1 396.1	5 555.7	1 545.6	6 150.7	23 242	92 492	**31 025**	**123 465**	25 731	102 397	**34 347**	**136 687**	**398%**	71%	24 225	**564%**
2004	1 452.9	6 193.0	1 575.0	6 713.4	24 031	102 428	**32 047**	**136 597**	26 050	111 035	**34 740**	**148 075**	**426%**	70%	24 263	**610%**
2005	1 506.5	7 098.9	1 604.1	7 558.5	24 768	116 710	**32 984**	**155 425**	26 372	124 266	**35 120**	**165 488**	**471%**	69%	24 293	**681%**
2006	1 579.2	8 049.8	1 654.3	8 432.8	25 818	131 603	**34 336**	**175 026**	27 046	137 866	**35 970**	**183 356**	**510%**	68%	24 636	**744%**
2007	1 657.6	8 923.8	1 711.0	9 211.4	26 936	145 012	**35 774**	**192 594**	27 804	149 685	**36 927**	**198 802**	**538%**	69%	25 521	**779%**
2008	1 689.0	9 504.7	1 695.8	9 542.7	27 305	153 655	**36 197**	**203 696**	27 414	154 270	**36 342**	**204 511**	**563%**	70%	25 281	**809%**
2009	1 661.8	9 168.7	1 661.8	9 168.7	26 731	147 477	**35 380**	**195 200**	26 731	147 477	**35 380**	**195 200**	**552%**	70%	24 612	**793%**
2010	1 661.8	8 811.8	1 661.8	8 811.8	26 599	141 041	**35 154**	**186 399**	26 599	141 041	**35 154**	**186 399**	**530%**	70%	24 454	**762%**

Table A2: National income and private wealth in France, 1820-2009 (decennial averages)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
	(current billions euros 1949-2009; current billions old francs 1820-1948)		(2009 billions euros) (CPI)		(current euros 1949-2009; current old francs 1820-1948)				(2009 euros)							
	National income Y_t	Private wealth W_t	National income Y_t	Private wealth W_t	Per capita national income	Per capita private wealth	**Per adult national income y_t**	**Per adult private wealth w_t**	Per capita national income	Per capita private wealth	**Per adult national income y_t**	**Per adult private wealth w_t**	**Ratio (private wealth)/(national income) $\beta_t = W_t/Y_t$**	*memo: Ratio (dispos. income)/(national income) Y_{dt}/Y_t*	*memo: Per adult dispos. income y_{dt} (2009 €)*	***memo: Ratio (private wealth)/(dispos. income) W_t/Y_{dt}***
1820	11.3	62.0	56.2	308.2	362	1 984	**602**	**3 302**	1 797	9 861	**2 991**	**16 413**	**549%**	95%	2 842	**578%**
1830	13.5	80.0	61.9	365.7	409	2 416	**674**	**3 986**	1 868	11 045	**3 083**	**18 224**	**591%**	95%	2 928	**622%**
1840	16.5	95.0	73.7	425.4	475	2 739	**772**	**4 458**	2 125	12 265	**3 459**	**19 963**	**577%**	95%	3 286	**607%**
1850	21.9	130.0	88.4	523.6	608	3 605	**966**	**5 728**	2 451	14 523	**3 893**	**23 071**	**593%**	95%	3 698	**624%**
1860	26.1	165.0	97.0	613.8	694	4 388	**1 092**	**6 904**	2 581	16 325	**4 061**	**25 684**	**633%**	95%	3 858	**666%**
1870	28.7	185.0	96.9	623.9	778	5 011	**1 225**	**7 885**	2 625	16 898	**4 131**	**26 592**	**644%**	95%	3 924	**678%**
1880	27.8	195.0	96.1	674.9	736	5 170	**1 145**	**8 046**	2 547	17 893	**3 964**	**27 846**	**702%**	95%	3 766	**739%**
1890	30.4	205.0	110.3	743.8	793	5 345	**1 212**	**8 167**	2 877	19 391	**4 396**	**29 632**	**674%**	95%	4 176	**710%**
1900	33.9	228.6	133.3	899.8	874	5 901	**1 325**	**8 939**	3 441	23 226	**5 213**	**35 184**	**675%**	95%	4 932	**713%**
1910	42.7	279.4	138.0	903.0	1 088	7 123	**1 637**	**10 713**	3 518	23 024	**5 291**	**34 626**	**654%**	95%	5 005	**692%**
1920	238.9	762.8	170.5	537.5	5 987	19 105	**8 642**	**27 573**	4 292	13 520	**6 203**	**19 535**	**316%**	96%	5 930	**331%**
1930	315.0	1 241.0	175.7	693.4	7 696	30 312	**11 035**	**43 459**	4 286	16 912	**6 140**	**24 222**	**395%**	93%	5 727	**424%**
1940	1 548.1	4 483.5	147.6	493.9	38 854	113 495	**55 532**	**162 600**	3 770	12 762	**5 430**	**18 443**	**360%**	85%	4 599	**418%**
1950	25.3	55.1	312.3	674.7	583	1 267	**846**	**1 838**	7 208	15 553	**10 444**	**22 544**	**215%**	76%	7 963	**282%**
1960	68.1	182.7	537.9	1 437.0	1 407	3 772	**2 118**	**5 680**	11 155	29 754	**16 784**	**44 777**	**265%**	74%	12 369	**359%**
1970	211.6	608.4	884.2	2 532.9	4 026	11 575	**5 910**	**16 990**	16 900	48 404	**24 878**	**71 246**	**286%**	72%	17 910	**397%**
1980	626.7	1 890.7	1 080.4	3 254.4	11 355	34 254	**16 029**	**48 347**	19 624	59 101	**27 754**	**83 575**	**301%**	70%	19 449	**430%**
1990	1 046.4	3 429.8	1 318.1	4 320.8	18 150	59 490	**24 674**	**80 878**	22 874	74 984	**31 111**	**101 991**	**328%**	70%	21 909	**465%**
2000	1 490.4	6 905.4	1 600.5	7 352.4	24 567	113 503	**32 735**	**151 130**	26 406	120 957	**35 193**	**161 091**	**456%**	69%	24 397	**658%**
2008	1 689.0	9 504.7	1 695.8	9 542.7	27 305	153 655	**36 197**	**203 696**	27 414	154 270	**36 342**	**204 511**	**563%**	70%	25 281	**809%**

Table A3: Computation of the economic inheritance flow in France, 1896-2008 (annual series)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
	Private wealth-National income Ratio	Mortality Rate	Gift-corrected μ_t ratio	Economic inheritance flow / National income & private wealth Ratios b_{yt} & b_{wt}		*memo: Estate multiplier e_t*	(current billions euros 1949-2009; current billions old francs 1896-1948) Private wealth	Economic inheritance flow		(current euros 1949-2009; current old francs 1896-1948) Per adult national income	Per decedent bequest	**Ratio**	*memo: Fiscal inheritance flow computations (Appendix B)* Ratio fiscal flow - national income	*Ratio fiscal flow - private wealth*	*Fiscal estate multiplier*	*Fiscal ratio*
	$\beta_t = W_t/Y_t$	m_t	μ_t*	$b_{yt} = B_t/Y_t = \mu_t^* m_t \beta_t$	$b_{wt} = B_t/W_t = \mu_t^* m_t$	$e_t = W_t/B_t = 1/\mu_t^* m_t$	W_t	B_t	B_t/B_t^f	y_t	$b_t = \mu_t^* \beta_t y_t$	$b_t/y_t = \mu_t^* \beta_t$	B_t^f/Y_t	B_t^f/W_t	W_t/B_t^f	b_t^f/y_t
1896	662%	2.2%	156%	**22.8%**	**3.4%**	*29.0*	205.0	7.1	106%	1 228	12 716	**10.4**	*21.6%*	*3.3%*	*30.7*	*9.8*
1897	682%	2.2%	156%	**23.5%**	**3.5%**	*29.0*	202.9	7.0	103%	1 177	12 555	**10.7**	*22.9%*	*3.4%*	*29.7*	*10.4*
1898	661%	2.2%	157%	**22.9%**	**3.5%**	*28.8*	208.9	7.2	104%	1 247	12 948	**10.4**	*22.0%*	*3.3%*	*30.1*	*10.0*
1899	646%	2.2%	156%	**22.2%**	**3.4%**	*29.0*	215.1	7.4	105%	1 310	13 190	**10.1**	*21.2%*	*3.3%*	*30.5*	*9.6*
1900	646%	2.2%	155%	**22.1%**	**3.4%**	*29.2*	218.7	7.5	93%	1 337	13 383	**10.0**	*23.7%*	*3.7%*	*27.3*	*10.7*
1901	703%	2.3%	160%	**25.4%**	**3.6%**	*27.7*	222.8	8.0	114%	1 253	14 062	**11.2**	*22.3%*	*3.2%*	*31.5*	*9.9*
1902	720%	2.2%	159%	**25.2%**	**3.5%**	*28.6*	222.2	7.8	110%	1 216	13 907	**11.4**	*22.9%*	*3.2%*	*31.5*	*10.4*
1903	690%	2.2%	160%	**24.1%**	**3.5%**	*28.7*	223.8	7.8	109%	1 273	14 091	**11.1**	*22.2%*	*3.2%*	*31.1*	*10.2*
1904	676%	2.2%	160%	**23.7%**	**3.5%**	*28.6*	222.9	7.8	101%	1 290	13 962	**10.8**	*23.3%*	*3.4%*	*29.0*	*10.7*
1905	676%	2.3%	158%	**24.1%**	**3.6%**	*28.0*	224.0	8.0	96%	1 293	13 809	**10.7**	*25.2%*	*3.7%*	*26.8*	*11.2*
1906	698%	2.3%	161%	**25.4%**	**3.6%**	*27.5*	229.4	8.3	105%	1 279	14 368	**11.2**	*24.2%*	*3.5%*	*28.9*	*10.7*
1907	638%	2.4%	160%	**24.2%**	**3.8%**	*26.4*	234.4	8.9	107%	1 425	14 549	**10.2**	*22.7%*	*3.6%*	*28.1*	*9.6*
1908	668%	2.2%	159%	**23.4%**	**3.5%**	*28.5*	243.0	8.5	100%	1 409	14 998	**10.6**	*23.3%*	*3.5%*	*28.6*	*10.6*
1909	646%	2.3%	163%	**24.0%**	**3.7%**	*26.9*	245.2	9.1	102%	1 466	15 392	**10.5**	*23.5%*	*3.6%*	*27.5*	*10.3*
1910	676%	2.1%	164%	**23.4%**	**3.5%**	*28.9*	255.1	8.8	105%	1 453	16 137	**11.1**	*22.3%*	*3.3%*	*30.3*	*10.6*
1911	672%	2.2%	164%	**24.6%**	**3.7%**	*27.4*	283.5	10.4	117%	1 619	17 816	**11.0**	*21.1%*	*3.1%*	*31.9*	*9.4*
1912	615%	2.1%	161%	**20.6%**	**3.4%**	*29.8*	281.9	9.5	110%	1 756	17 350	**9.9**	*18.8%*	*3.1%*	*32.8*	*9.0*
1913	660%	2.1%	161%	**22.3%**	**3.4%**	*29.6*	297.0	10.0	114%	1 717	18 287	**10.6**	*19.6%*	*3.0%*	*33.6*	*9.4*
1914	682%	2.8%	124%	**23.6%**	**3.5%**	*28.9*	284.5	9.8		1 585	13 446	**8.5**				
1915	686%	3.0%	117%	**24.1%**	**3.5%**	*28.5*	319.5	11.2		1 777	14 248	**8.0**				
1916	539%	2.6%	124%	**17.7%**	**3.3%**	*30.5*	316.0	10.4		2 253	15 093	**6.7**				
1917	481%	2.4%	135%	**15.4%**	**3.2%**	*31.3*	333.1	10.7		2 672	17 290	**6.5**				
1918	478%	3.0%	117%	**16.6%**	**3.5%**	*28.8*	377.2	13.1		3 039	16 939	**5.6**				
1919	389%	2.0%	148%	**11.8%**	**3.0%**	*33.1*	405.2	12.2		4 040	23 323	**5.8**				
1920	352%	2.0%	154%	**10.9%**	**3.1%**	*32.2*	531.9	16.5		5 730	30 978	**5.4**				
1921	306%	2.0%	154%	**9.6%**	**3.1%**	*31.9*	471.0	14.8	110%	5 773	27 183	**4.7**	*8.7%*	*2.8%*	*35.1*	*4.3*
1922	284%	2.1%	153%	**9.3%**	**3.3%**	*30.5*	467.9	15.3	118%	6 145	26 777	**4.4**	*7.9%*	*2.8%*	*36.1*	*3.7*
1923	287%	2.0%	152%	**8.7%**	**3.0%**	*33.1*	533.2	16.1		6 876	29 915	**4.4**				
1924	295%	2.1%	151%	**9.2%**	**3.1%**	*32.1*	631.5	19.7		7 814	34 900	**4.5**				
1925	293%	2.1%	151%	**9.3%**	**3.2%**	*31.5*	694.9	22.1	141%	8 550	37 852	**4.4**	*6.6%*	*2.3%*	*44.3*	*3.1*
1926	327%	2.1%	150%	**10.2%**	**3.1%**	*32.1*	965.4	30.1	171%	10 589	51 828	**4.9**	*6.0%*	*1.8%*	*54.8*	*2.9*
1927	348%	2.0%	150%	**10.4%**	**3.0%**	*33.4*	1 058.4	31.7	163%	10 814	56 439	**5.2**	*6.4%*	*1.8%*	*54.6*	*3.2*
1928	326%	2.0%	148%	**9.5%**	**2.9%**	*34.5*	1 075.3	31.2	145%	11 671	56 417	**4.8**	*6.5%*	*2.0%*	*50.0*	*3.3*
1929	339%	2.2%	148%	**10.8%**	**3.2%**	*31.2*	1 198.7	38.4	152%	12 459	62 413	**5.0**	*7.2%*	*2.1%*	*47.3*	*3.3*
1930	369%	1.9%	145%	**10.2%**	**2.8%**	*36.3*	1 258.6	34.7	135%	11 950	63 715	**5.3**	*7.5%*	*2.0%*	*48.9*	*4.0*
1931	392%	2.0%	145%	**11.4%**	**2.9%**	*34.3*	1 245.8	36.3	141%	11 011	62 761	**5.7**	*8.1%*	*2.1%*	*48.4*	*4.0*
1932	410%	1.9%	144%	**11.5%**	**2.8%**	*35.7*	1 147.5	32.2	132%	9 690	57 334	**5.9**	*8.7%*	*2.1%*	*47.0*	*4.5*
1933	405%	2.0%	144%	**11.5%**	**2.8%**	*35.2*	1 105.8	31.4	135%	9 428	55 015	**5.8**	*8.5%*	*2.1%*	*47.5*	*4.3*
1934	423%	1.9%	143%	**11.4%**	**2.7%**	*37.0*	1 053.4	28.5	121%	8 586	51 836	**6.0**	*9.4%*	*2.2%*	*44.8*	*5.0*
1935	392%	2.0%	142%	**11.2%**	**2.8%**	*35.2*	960.5	27.3	114%	8 428	47 049	**5.6**	*9.8%*	*2.5%*	*40.1*	*4.9*
1936	375%	2.0%	141%	**10.4%**	**2.8%**	*36.0*	1 037.7	28.8	121%	9 596	50 812	**5.3**	*8.6%*	*2.3%*	*43.6*	*4.4*
1937	405%	1.9%	139%	**10.9%**	**2.7%**	*37.0*	1 348.8	36.5	152%	11 626	65 533	**5.6**	*7.2%*	*1.8%*	*56.3*	*3.7*
1938	409%	2.0%	138%	**11.4%**	**2.8%**	*36.0*	1 564.2	43.5	158%	13 427	75 655	**5.6**	*7.2%*	*1.8%*	*56.8*	*3.6*
1939	374%	2.0%	137%	**10.5%**	**2.8%**	*35.8*	1 687.9	47.2	170%	16 608	85 163	**5.1**	*6.2%*	*1.6%*	*60.8*	*3.0*
1940	449%	2.8%	123%	**15.4%**	**3.4%**	*29.1*	1 622.6	55.8	253%	13 330	73 682	**5.5**	*6.1%*	*1.4%*	*73.7*	*2.2*
1941	450%	2.3%	130%	**13.7%**	**3.0%**	*32.9*	1 792.9	54.5	163%	15 739	92 006	**5.8**	*8.4%*	*1.9%*	*53.5*	*3.6*
1942	435%	2.3%	129%	**12.9%**	**3.0%**	*33.8*	2 016.4	59.6	129%	18 149	101 896	**5.6**	*9.9%*	*2.3%*	*43.7*	*4.3*
1943	458%	2.4%	120%	**13.0%**	**2.9%**	*35.1*	2 332.9	66.5	106%	19 985	109 840	**5.5**	*12.3%*	*2.7%*	*37.2*	*5.2*
1944	477%	2.9%	99%	**14.0%**	**2.9%**	*34.2*	2 636.4	77.1	132%	21 812	103 283	**4.7**	*10.5%*	*2.2%*	*45.3*	*3.6*
1945	340%	2.1%	130%	**9.5%**	**2.8%**	*35.9*	3 555.1	99.0	115%	41 155	181 163	**4.4**	*8.2%*	*2.4%*	*41.3*	*3.8*
1946	271%	1.6%	129%	**5.7%**	**2.1%**	*47.7*	6 350.7	133.2	145%	82 809	288 968	**3.5**	*3.9%*	*1.4%*	*69.3*	*2.4*
1947	271%	1.6%	115%	**5.0%**	**1.8%**	*54.1*	9 498.9	175.5	149%	122 832	384 299	**3.1**	*3.4%*	*1.2%*	*80.8*	*2.1*
1948	238%	1.6%	123%	**4.6%**	**1.9%**	*52.1*	15 029.0	288.6	198%	219 507	644 281	**2.9**	*2.3%*	*1.0%*	*103.2*	*1.5*
1949	215%	1.7%	120%	**4.5%**	**2.1%**	*48.0*	26.1	0.5	194%	420	1 081	**2.6**	*2.3%*	*1.1%*	*93.1*	*1.3*
1950	211%	1.6%	127%	**4.4%**	**2.1%**	*48.2*	30.2	0.6	179%	491	1 319	**2.7**	*2.5%*	*1.2%*	*86.2*	*1.5*
1951	207%	1.7%	118%	**4.3%**	**2.1%**	*48.7*	37.0	0.8	183%	609	1 494	**2.5**	*2.3%*	*1.1%*	*89.2*	*1.3*
1952	211%	1.6%	116%	**3.9%**	**1.9%**	*53.4*	43.6	0.8	146%	703	1 721	**2.5**	*2.7%*	*1.3%*	*77.9*	*1.7*
1953	207%	1.7%	122%	**4.4%**	**2.1%**	*47.6*	44.7	0.9	153%	728	1 839	**2.5**	*2.9%*	*1.4%*	*72.7*	*1.7*
1954	203%	1.6%	117%	**3.8%**	**1.9%**	*53.4*	46.6	0.9	118%	772	1 842	**2.4**	*3.2%*	*1.6%*	*63.1*	*2.0*
1955	207%	1.6%	122%	**4.1%**	**2.0%**	*50.6*	51.2	1.0	135%	827	2 089	**2.5**	*3.0%*	*1.5%*	*68.3*	*1.9*
1956	215%	1.7%	137%	**5.0%**	**2.3%**	*43.3*	58.3	1.3	143%	902	2 664	**3.0**	*3.5%*	*1.6%*	*62.0*	*2.1*
1957	212%	1.6%	131%	**4.5%**	**2.1%**	*46.7*	65.0	1.4	146%	1 014	2 819	**2.8**	*3.1%*	*1.5%*	*68.3*	*1.9*
1958	230%	1.5%	128%	**4.5%**	**2.0%**	*50.9*	81.3	1.6	147%	1 160	3 430	**3.0**	*3.1%*	*1.3%*	*74.7*	*2.0*
1959	244%	1.5%	122%	**4.6%**	**1.9%**	*52.9*	93.4	1.8	151%	1 251	3 718	**3.0**	*3.0%*	*1.2%*	*80.1*	*2.0*
1960	244%	1.6%	126%	**4.9%**	**2.0%**	*49.9*	104.1	2.1	164%	1 385	4 259	**3.1**	*3.0%*	*1.2%*	*82.0*	*1.9*
1961	252%	1.5%	131%	**5.0%**	**2.0%**	*50.4*	116.6	2.3		1 494	4 926	**3.3**				
1962	254%	1.6%	135%	**5.6%**	**2.2%**	*44.9*	131.6	2.9	158%	1 670	5 741	**3.4**	*3.6%*	*1.4%*	*71.2*	*2.2*
1963	256%	1.7%	139%	**5.9%**	**2.3%**	*43.3*	149.2	3.4		1 839	6 549	**3.6**				
1964	258%	1.5%	142%	**5.6%**	**2.2%**	*45.8*	166.4	3.6	146%	2 027	7 414	**3.7**	*3.8%*	*1.5%*	*67.0*	*2.5*
1965	264%	1.6%	142%	**6.0%**	**2.3%**	*43.9*	183.9	4.2		2 173	8 125	**3.7**				
1966	270%	1.6%	141%	**5.9%**	**2.2%**	*45.5*	203.8	4.5		2 341	8 947	**3.8**				

1967	277%	1.6%	142%	6.2%	2.2%	44.5	225.5	5.1		2 501	9 829	3.9				
1968	287%	1.6%	143%	6.5%	2.3%	43.9	254.5	5.8		2 692	11 020	4.1				
1969	286%	1.6%	143%	6.7%	2.3%	42.6	291.8	6.9		3 057	12 541	4.1				
1970	289%	1.5%	144%	6.4%	2.2%	45.5	329.8	7.2		3 375	14 030	4.2				
1971	283%	1.5%	144%	6.3%	2.2%	45.0	358.7	8.0		3 704	15 092	4.1				
1972	281%	1.5%	144%	6.1%	2.2%	45.7	397.1	8.7		4 087	16 553	4.1				
1973	280%	1.5%	145%	6.2%	2.2%	45.2	456.0	10.1		4 651	18 866	4.1				
1974	274%	1.5%	145%	6.0%	2.2%	45.9	516.4	11.3		5 324	21 207	4.0				
1975	289%	1.5%	146%	6.4%	2.2%	45.4	607.1	13.4		5 880	24 761	4.2				
1976	289%	1.5%	146%	6.3%	2.2%	45.8	699.2	15.3		6 730	28 311	4.2				
1977	293%	1.4%	146%	6.1%	2.1%	48.1	796.6	16.5	131%	7 494	31 918	4.3	4.6%	1.6%	63.0	3.3
1978	292%	1.4%	146%	6.1%	2.1%	47.5	896.3	18.9		8 379	35 579	4.2				
1979	293%	1.4%	145%	6.0%	2.1%	48.5	1 026.6	21.2		9 481	40 293	4.3				
1980	298%	1.4%	145%	6.1%	2.1%	48.6	1 175.9	24.2		10 576	45 651	4.3				
1981	301%	1.4%	145%	6.2%	2.1%	48.3	1 334.7	27.7		11 772	51 359	4.4				
1982	294%	1.4%	145%	5.9%	2.0%	49.8	1 483.0	29.8		13 287	56 456	4.2				
1983	298%	1.4%	145%	6.1%	2.1%	48.7	1 652.1	33.9		14 477	62 288	4.3				
1984	302%	1.4%	144%	6.0%	2.0%	50.6	1 820.8	36.0	105%	15 587	67 966	4.4	5.7%	1.9%	53.3	4.1
1985	300%	1.4%	153%	6.3%	2.1%	47.3	1 951.1	41.2		16 630	76 469	4.6				
1986	295%	1.4%	162%	6.5%	2.2%	45.6	2 079.8	45.6		17 883	85 391	4.8				
1987	311%	1.3%	170%	6.9%	2.2%	45.3	2 310.7	51.0	122%	18 667	99 044	5.3	5.6%	1.8%	55.2	4.3
1988	300%	1.3%	173%	6.6%	2.2%	45.3	2 408.5	53.1		20 018	103 644	5.2				
1989	311%	1.3%	175%	6.9%	2.2%	44.7	2 690.8	60.1		21 397	116 224	5.4				
1990	330%	1.3%	177%	7.4%	2.2%	44.8	3 005.0	67.0		22 305	130 156	5.8				
1991	329%	1.2%	179%	7.3%	2.2%	44.9	3 101.2	69.1		22 828	134 578	5.9				
1992	327%	1.2%	181%	7.3%	2.2%	45.0	3 181.8	70.8		23 384	138 383	5.9				
1993	331%	1.2%	183%	7.5%	2.3%	43.9	3 240.1	73.9		23 316	141 322	6.1				
1994	330%	1.2%	185%	7.4%	2.2%	44.8	3 348.9	74.8	109%	23 932	146 265	6.1	6.7%	2.0%	49.0	5.6
1995	324%	1.2%	191%	7.6%	2.3%	42.7	3 398.4	79.6		24 617	152 065	6.2				
1996	322%	1.2%	197%	7.8%	2.4%	41.2	3 482.2	84.4		25 214	159 903	6.3				
1997	329%	1.2%	203%	8.1%	2.5%	40.6	3 680.1	90.5		26 004	173 263	6.7				
1998	327%	1.2%	208%	8.3%	2.5%	39.4	3 832.9	97.2		27 080	184 630	6.8				
1999	330%	1.2%	214%	8.6%	2.6%	38.3	4 027.2	105.1		28 064	198 194	7.1				
2000	355%	1.2%	220%	9.4%	2.6%	37.7	4 554.7	120.7	105%	29 261	228 776	7.8	9.0%	2.5%	39.6	7.5
2001	368%	1.2%	220%	9.6%	2.6%	38.4	4 878.5	127.2		29 990	242 896	8.1				
2002	379%	1.2%	221%	9.9%	2.6%	38.3	5 126.1	133.9		30 349	253 463	8.4				
2003	398%	1.2%	222%	10.7%	2.7%	37.2	5 555.7	149.3		31 025	273 516	8.8				
2004	426%	1.1%	221%	10.5%	2.5%	40.7	6 193.0	152.1		32 047	302 166	9.4				
2005	471%	1.1%	222%	12.0%	2.5%	39.4	7 098.9	180.3		32 984	345 554	10.5				
2006	510%	1.1%	223%	12.6%	2.5%	40.4	8 049.8	199.1	115%	34 336	390 031	11.4	11.0%	2.2%	46.5	9.9
2007	538%	1.1%	222%	13.3%	2.5%	40.4	8 923.8	220.7		35 774	428 271	12.0				
2008	563%	1.2%	223%	14.5%	2.6%	38.7	9 504.7	245.3		36 197	453 344	12.5				

Table A4: Computation of the economic inheritance flow in France, 1820-2008 (decennial averages)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
	Private wealth-National income Ratio	Mortality Rate	Gift-corrected μ_t ratio	Economic inheritance flow - national income & private wealth ratios b_{yt} & b_{wt}		*memo: Estate multiplier e_t*	(current billions euros 1949-2009; current billions old francs 1820-1948)			(current euros 1949-2009; current old francs 1820-1948)			*memo: Fiscal inheritance flow computations (Appendix B)*			
							Private wealth	Economic inheritance flow		Per adult national income	Per decedent bequest	**Ratio**	*Ratio fiscal flow - national income*	*Ratio fiscal flow - private wealth*	*Fiscal estate multiplier*	*Fiscal ratio*
	$\beta_t = W_t/Y_t$	m_t	μ_t^*	**$b_{yt} = B_t/Y_t = \mu_t^* m_t \beta_t$**	**$b_{wt} = B_t/W_t = \mu_t^* m_t$**	$e_t = W_t/B_t = 1/\mu_t^* m_t$	W_t	B_t	B_t/B_t^f	y_t	$b_t = \mu_t^* \beta_t y_t$	**$b_t/y_t = \mu_t^* \beta_t$**	*B_t^f/Y_t*	*B_t^f/W_t*	*W_t/B_t^f*	*b_t^f/y_t*
1820	549%	2.2%	166%	**20.3%**	**3.7%**	*27.0*	62.0	2.3	108%	602	5 497	**9.1**	*18.9%*	*3.4%*	*29.1*	*8.5*
1830	591%	2.2%	159%	**20.8%**	**3.5%**	*28.4*	80.0	2.8	115%	674	6 353	**9.4**	*18.1%*	*3.1%*	*32.6*	*8.2*
1840	577%	2.2%	165%	**21.1%**	**3.6%**	*27.4*	95.0	3.5	114%	772	7 348	**9.5**	*18.4%*	*3.2%*	*31.3*	*8.3*
1850	593%	2.1%	161%	**20.0%**	**3.4%**	*29.6*	130.0	4.4	125%	966	9 200	**9.5**	*16.0%*	*2.7%*	*37.1*	*7.6*
1860	633%	2.2%	148%	**20.2%**	**3.2%**	*31.3*	165.0	5.3	118%	1 092	10 234	**9.4**	*17.2%*	*2.7%*	*36.8*	*8.0*
1870	644%	2.2%	159%	**22.3%**	**3.5%**	*28.9*	185.0	6.4	113%	1 225	12 548	**10.2**	*19.8%*	*3.1%*	*32.6*	*9.1*
1880	702%	2.2%	159%	**24.4%**	**3.5%**	*28.7*	195.0	6.8	105%	1 145	12 785	**11.2**	*23.3%*	*3.3%*	*30.2*	*10.6*
1890	674%	2.2%	161%	**23.9%**	**3.5%**	*28.3*	205.0	7.3	103%	1 212	13 139	**10.8**	*23.1%*	*3.4%*	*29.2*	*10.5*
1900	675%	2.2%	159%	**24.1%**	**3.6%**	*28.0*	228.6	8.2	103%	1 325	14 252	**10.8**	*23.3%*	*3.5%*	*28.9*	*10.4*
1910	654%	2.1%	162%	**22.7%**	**3.5%**	*28.9*	279.4	9.7	111%	1 637	17 406	**10.6**	*20.3%*	*3.1%*	*32.2*	*9.5*
1920	316%	2.1%	151%	**9.8%**	**3.1%**	*32.2*	762.8	23.6	143%	8 642	41 470	**4.8**	*7.0%*	*2.2%*	*46.0*	*3.4*
1930	395%	2.0%	142%	**11.0%**	**2.8%**	*35.8*	1 241.0	34.6	138%	11 035	61 487	**5.6**	*8.1%*	*2.1%*	*49.4*	*4.1*
1940	360%	1.7%	122%	**9.8%**	**2.6%**	*40.3*	6 195.2	136.7	159%	83 053	268 833	**4.4**	*6.7%*	*1.8%*	*64.1*	*3.0*
1950	215%	1.6%	124%	**4.3%**	**2.0%**	*49.6*	55.1	1.1	150%	846	2 293	**2.7**	*2.9%*	*1.4%*	*74.2*	*1.8*
1960	265%	1.6%	138%	**5.9%**	**2.2%**	*45.5*	182.7	4.1	156%	2 118	7 935	**3.7**	*3.5%*	*1.4%*	*73.4*	*2.2*
1970	286%	1.5%	145%	**6.2%**	**2.2%**	*46.3*	608.4	13.0	131%	5 910	24 661	**4.1**	*4.6%*	*1.6%*	*63.0*	*3.3*
1980	301%	1.4%	156%	**6.4%**	**2.1%**	*47.4*	1 890.7	40.3	114%	16 029	76 449	**4.7**	*5.7%*	*1.8%*	*54.3*	*4.2*
1990	328%	1.2%	192%	**7.7%**	**2.4%**	*42.6*	3 429.8	81.2	109%	24 674	155 876	**6.3**	*6.7%*	*2.0%*	*49.0*	*5.6*
2000	445%	1.2%	221%	**11.4%**	**2.6%**	*39.0*	6 653.9	169.8	110%	32 441	324 224	**9.9**	*10.0%*	*2.3%*	*43.0*	*8.7*
2008	563%	1.2%	223%	**14.5%**	**2.6%**	*38.7*	9 504.7	245.3	115%	36 197	453 344	**12.5**	*12.6%*	*2.5%*	*40.3*	*10.9*

Table A5: Structure of national income in France, 1896-2008: national income vs gross domestic product

(current billions euros 1949-2009; current billions old francs 1896-1948)	**[1]** **National income** **Y_t**	[2] Net domestic product Y_{pt}	[3] Net foreign factor income FY_t	**[4]** **% FY_t/Y_t**	[5] including net foreign capital income FY_{Kt} (% Y_t)	[6] *including gross capital income inflow (% Y_t)*	[7] *including gross capital income outflow (% Y_t)*	[8] including net foreign labor income FY_{Lt} (% Y_t)	[9] *memo: net foreign taxes & transfers FT_t (% Y_t)*	[10] Gross domestic product GDP_t	[11] Capital depreciat. (CFC) KD_t	[12] **% KD_t/GDP_t**	[13] **% Y_t/GDP_t**
1896	**31.0**	30.0	0.9	**3%**	3%			0%	*0%*	32.7	2.7	**8%**	**95%**
1897	**29.8**	28.8	1.0	**3%**	3%			0%	*0%*	31.5	2.6	**8%**	**95%**
1898	**31.6**	30.6	1.0	**3%**	3%			0%	*0%*	33.4	2.7	**8%**	**95%**
1899	**33.3**	32.3	1.0	**3%**	3%			0%	*0%*	35.1	2.8	**8%**	**95%**
1900	**33.8**	32.7	1.1	**3%**	3%			0%	*0%*	35.6	2.9	**8%**	**95%**
1901	**31.7**	30.7	1.0	**3%**	3%			0%	*0%*	33.6	3.0	**9%**	**94%**
1902	**30.8**	29.8	1.0	**3%**	3%			0%	*0%*	32.9	3.1	**9%**	**94%**
1903	**32.4**	31.4	1.1	**3%**	3%			0%	*0%*	34.5	3.2	**9%**	**94%**
1904	**33.0**	31.9	1.1	**3%**	3%			0%	*0%*	35.1	3.2	**9%**	**94%**
1905	**33.1**	32.0	1.2	**4%**	4%			0%	*0%*	35.3	3.3	**9%**	**94%**
1906	**32.9**	31.5	1.3	**4%**	4%			0%	*0%*	35.0	3.4	**10%**	**94%**
1907	**36.7**	35.3	1.4	**4%**	4%			0%	*0%*	38.9	3.6	**9%**	**94%**
1908	**36.4**	35.0	1.4	**4%**	4%			0%	*0%*	38.6	3.7	**10%**	**94%**
1909	**38.0**	36.4	1.5	**4%**	4%			0%	*0%*	40.3	3.9	**10%**	**94%**
1910	**37.7**	36.2	1.6	**4%**	4%			0%	*0%*	40.2	4.1	**10%**	**94%**
1911	**42.2**	40.5	1.7	**4%**	4%			0%	*1%*	44.7	4.2	**9%**	**94%**
1912	**45.9**	44.0	1.8	**4%**	4%			0%	*0%*	48.4	4.4	**9%**	**95%**
1913	**45.0**	43.1	1.9	**4%**	4%			0%	*1%*	47.8	4.7	**10%**	**94%**
1914	**41.7**	39.9	1.8	**4%**	4%			0%	*0%*	45.0	5.1	**11%**	**93%**
1915	**46.6**	44.8	1.8	**4%**	4%			0%	*0%*	50.5	5.7	**11%**	**92%**
1916	**58.6**	57.1	1.5	**3%**	3%			0%	*0%*	64.8	7.7	**12%**	**90%**
1917	**69.3**	68.1	1.2	**2%**	2%			0%	*0%*	77.3	9.2	**12%**	**90%**
1918	**78.8**	77.8	1.0	**1%**	1%			0%	*0%*	87.8	10.0	**11%**	**90%**
1919	**104.2**	102.7	1.4	**1%**	1%			0%	*0%*	116.2	13.5	**12%**	**90%**
1920	**151.2**	149.6	1.6	**1%**	1%			0%	*0%*	168.9	19.3	**11%**	**90%**
1921	**153.7**	151.8	1.9	**1%**	1%			0%	*2%*	169.6	17.7	**10%**	**91%**
1922	**164.7**	162.8	2.0	**1%**	1%			0%	*2%*	181.2	18.4	**10%**	**91%**
1923	**186.0**	184.0	2.0	**1%**	1%			0%	*4%*	202.8	18.8	**9%**	**92%**
1924	**214.0**	211.7	2.3	**1%**	1%			0%	*3%*	233.2	21.5	**9%**	**92%**
1925	**236.9**	235.3	1.6	**1%**	1%			0%	*3%*	258.0	22.8	**9%**	**92%**
1926	**295.2**	292.4	2.8	**1%**	1%			0%	*2%*	321.5	29.1	**9%**	**92%**
1927	**303.7**	301.4	2.3	**1%**	1%			0%	*2%*	332.4	31.0	**9%**	**91%**
1928	**329.5**	326.5	3.0	**1%**	1%			0%	*3%*	357.2	30.7	**9%**	**92%**
1929	**354.0**	348.9	5.2	**1%**	1%			0%	*4%*	383.1	34.2	**9%**	**92%**
1930	**341.5**	336.6	4.9	**1%**	1%			0%	*6%*	374.4	37.8	**10%**	**91%**
1931	**317.8**	314.0	3.8	**1%**	1%			0%	*3%*	353.2	39.2	**11%**	**90%**
1932	**279.9**	278.3	1.6	**1%**	1%			0%	*1%*	314.5	36.2	**12%**	**89%**
1933	**273.0**	271.6	1.4	**0%**	0%			0%	*0%*	305.0	33.4	**11%**	**90%**
1934	**249.0**	246.5	2.5	**1%**	1%			0%	*0%*	278.3	31.8	**11%**	**89%**
1935	**244.9**	241.2	3.7	**2%**	2%			0%	*0%*	269.3	28.1	**10%**	**91%**
1936	**276.9**	271.1	5.8	**2%**	2%			0%	*-1%*	300.1	29.0	**10%**	**92%**
1937	**333.2**	326.1	7.0	**2%**	2%			0%	*-1%*	366.8	40.7	**11%**	**91%**
1938	**382.6**	373.6	9.0	**2%**	2%			0%	*-1%*	421.4	47.8	**11%**	**91%**
1939	**451.0**	443.8	7.2	**2%**	2%			0%	*-2%*	493.5	49.6	**10%**	**91%**
1940	**361.3**	361.3	0.0	**0%**	0%			0%	*0%*	402.8	41.5	**10%**	**90%**
1941	**398.3**	398.3	0.0	**0%**	0%			0%	*0%*	447.0	48.8	**11%**	**89%**
1942	**463.6**	463.6	0.0	**0%**	0%			0%	*0%*	518.9	55.2	**11%**	**89%**
1943	**509.8**	509.8	0.0	**0%**	0%			0%	*0%*	571.7	61.9	**11%**	**89%**
1944	**552.2**	552.2	0.0	**0%**	0%			0%	*0%*	617.1	64.8	**11%**	**89%**
1945	**1 046.8**	1 046.8	0.0	**0%**	0%			0%	*0%*	1178.5	131.7	**11%**	**89%**
1946	**2 342.4**	2 342.4	0.0	**0%**	0%			0%	*0%*	2597.6	255.2	**10%**	**90%**
1947	**3 499.5**	3 499.5	0.0	**0%**	0%			0%	*0%*	3861.8	362.3	**9%**	**91%**
1948	**6 306.9**	6 306.9	0.0	**0%**	0%			0%	*0%*	6941.7	634.8	**9%**	**91%**
1949	**12.1**	12.0	0.1	**1%**	1%	*1%*	*0%*	0%	*1%*	13.0	1.0	**8%**	**93%**
1950	**14.3**	14.2	0.1	**1%**	1%	*1%*	*0%*	0%	*0%*	15.3	1.1	**7%**	**93%**
1951	**17.9**	17.7	0.1	**1%**	1%	*1%*	*0%*	0%	*0%*	19.3	1.6	**8%**	**93%**
1952	**20.7**	20.5	0.1	**1%**	1%	*1%*	*0%*	0%	*0%*	22.5	1.9	**9%**	**92%**
1953	**21.5**	21.4	0.2	**1%**	1%	*1%*	*0%*	0%	*0%*	23.3	1.9	**8%**	**92%**
1954	**22.9**	22.8	0.2	**1%**	1%	*1%*	*0%*	0%	*0%*	24.7	2.0	**8%**	**93%**
1955	**24.7**	24.5	0.2	**1%**	1%	*1%*	*0%*	0%	*0%*	26.6	2.1	**8%**	**93%**
1956	**27.1**	26.9	0.2	**1%**	1%	*1%*	*0%*	0%	*-1%*	29.3	2.4	**8%**	**93%**
1957	**30.7**	30.4	0.3	**1%**	1%	*1%*	*0%*	0%	*-1%*	33.1	2.7	**8%**	**93%**
1958	**35.3**	35.0	0.3	**1%**	1%	*1%*	*0%*	0%	*-1%*	38.3	3.3	**9%**	**92%**
1959	**38.3**	38.0	0.3	**1%**	1%	*1%*	*0%*	0%	*-1%*	41.7	3.7	**9%**	**92%**
1960	**42.7**	42.3	0.3	**1%**	1%	*1%*	*0%*	0%	*-1%*	46.3	4.0	**9%**	**92%**
1961	**46.2**	45.8	0.3	**1%**	1%	*1%*	*0%*	0%	*-1%*	50.2	4.4	**9%**	**92%**
1962	**51.8**	51.4	0.5	**1%**	1%	*1%*	*0%*	0%	*-1%*	56.3	4.9	**9%**	**92%**
1963	**58.2**	57.6	0.6	**1%**	1%	*1%*	*0%*	0%	*-1%*	63.2	5.5	**9%**	**92%**
1964	**64.6**	63.9	0.6	**1%**	1%	*1%*	*0%*	0%	*-1%*	70.0	6.1	**9%**	**92%**
1965	**69.7**	69.0	0.7	**1%**	1%	*1%*	*0%*	0%	*-1%*	75.7	6.7	**9%**	**92%**
1966	**75.4**	74.7	0.7	**1%**	1%	*1%*	*0%*	0%	*-1%*	82.0	7.3	**9%**	**92%**
1967	**81.4**	80.7	0.7	**1%**	1%	*1%*	*0%*	0%	*-1%*	88.8	8.0	**9%**	**92%**
1968	**88.6**	88.0	0.7	**1%**	1%	*1%*	*0%*	0%	*-1%*	96.7	8.8	**9%**	**92%**
1969	**102.0**	101.3	0.7	**1%**	1%	*1%*	*1%*	0%	*-1%*	111.3	10.0	**9%**	**92%**

1970	**114.0**	113.1	0.9	**1%**	1%	*1%*	*1%*	0%	*-1%*	124.5	11.4	**9%**	**92%**
1971	**126.8**	125.9	0.9	**1%**	1%	*1%*	*1%*	0%	*-1%*	138.8	12.9	**9%**	**91%**
1972	**141.5**	140.7	0.9	**1%**	0%	*1%*	*1%*	0%	*-1%*	155.2	14.5	**9%**	**91%**
1973	**162.8**	161.8	1.1	**1%**	0%	*1%*	*1%*	0%	*-2%*	178.2	16.5	**9%**	**91%**
1974	**188.4**	186.7	1.6	**1%**	1%	*2%*	*1%*	0%	*-1%*	207.4	20.6	**10%**	**91%**
1975	**210.0**	208.7	1.3	**1%**	0%	*1%*	*1%*	0%	*-1%*	233.4	24.7	**11%**	**90%**
1976	**242.2**	240.5	1.7	**1%**	0%	*1%*	*1%*	0%	*-1%*	270.0	29.5	**11%**	**90%**
1977	**272.1**	270.3	1.8	**1%**	0%	*1%*	*1%*	0%	*-1%*	304.2	33.9	**11%**	**89%**
1978	**307.2**	306.2	0.9	**0%**	0%	*1%*	*1%*	0%	*-1%*	345.2	39.0	**11%**	**89%**
1979	**350.5**	348.6	1.8	**1%**	0%	*2%*	*2%*	0%	*-2%*	393.6	44.9	**11%**	**89%**
1980	**394.6**	391.7	2.9	**1%**	1%	*3%*	*2%*	0%	*-1%*	445.2	53.6	**12%**	**89%**
1981	**443.2**	438.5	4.7	**1%**	1%	*5%*	*4%*	0%	*-1%*	500.8	62.3	**12%**	**89%**
1982	**505.0**	501.7	3.3	**1%**	0%	*5%*	*4%*	0%	*-1%*	574.4	72.7	**13%**	**88%**
1983	**555.1**	555.8	-0.6	**0%**	0%	*3%*	*4%*	0%	*-1%*	636.6	80.8	**13%**	**87%**
1984	**603.1**	605.5	-2.4	**0%**	-1%	*3%*	*4%*	0%	*-1%*	693.1	87.6	**13%**	**87%**
1985	**649.6**	650.3	-0.6	**0%**	0%	*4%*	*4%*	0%	*-1%*	743.9	93.6	**13%**	**87%**
1986	**704.8**	702.5	2.3	**0%**	0%	*3%*	*3%*	0%	*-1%*	802.4	99.8	**12%**	**88%**
1987	**742.2**	739.3	3.0	**0%**	0%	*3%*	*3%*	0%	*-1%*	845.2	105.9	**13%**	**88%**
1988	**803.0**	798.6	4.3	**1%**	0%	*3%*	*3%*	1%	*-1%*	911.2	112.6	**12%**	**88%**
1989	**866.1**	860.7	5.4	**1%**	0%	*3%*	*3%*	0%	*-1%*	980.5	119.9	**12%**	**88%**
1990	**911.3**	905.7	5.6	**1%**	0%	*3%*	*3%*	0%	*-1%*	1033.0	127.3	**12%**	**88%**
1991	**941.3**	934.1	7.2	**1%**	0%	*4%*	*3%*	1%	*-1%*	1070.0	135.9	**13%**	**88%**
1992	**973.6**	968.4	5.2	**1%**	0%	*4%*	*4%*	0%	*-1%*	1107.8	139.4	**13%**	**88%**
1993	**980.2**	972.8	7.4	**1%**	0%	*4%*	*4%*	1%	*-1%*	1114.7	141.9	**13%**	**88%**
1994	**1 014.4**	1 009.2	5.2	**1%**	0%	*3%*	*3%*	1%	*-1%*	1154.7	145.6	**13%**	**88%**
1995	**1 050.4**	1 047.5	2.9	**0%**	0%	*3%*	*4%*	1%	*-1%*	1194.6	147.1	**12%**	**88%**
1996	**1 081.1**	1 075.6	5.5	**1%**	0%	*4%*	*4%*	1%	*-1%*	1227.3	151.7	**12%**	**88%**
1997	**1 119.7**	1 112.1	7.6	**1%**	0%	*4%*	*4%*	1%	*-1%*	1267.4	155.3	**12%**	**88%**
1998	**1 171.8**	1 163.5	8.3	**1%**	0%	*5%*	*5%*	0%	*-1%*	1323.7	160.1	**12%**	**89%**
1999	**1 220.2**	1 201.3	18.9	**2%**	1%	*5%*	*4%*	1%	*-1%*	1368.0	166.7	**12%**	**89%**
2000	**1 281.8**	1 263.0	18.8	**1%**	1%	*6%*	*5%*	1%	*-1%*	1441.4	178.4	**12%**	**89%**
2001	**1 325.4**	1 308.4	17.1	**1%**	1%	*6%*	*5%*	1%	*-1%*	1497.2	188.8	**13%**	**89%**
2002	**1 353.6**	1 351.7	1.9	**0%**	0%	*4%*	*5%*	1%	*-1%*	1548.6	196.9	**13%**	**87%**
2003	**1 396.1**	1 390.6	5.4	**0%**	0%	*5%*	*5%*	1%	*-1%*	1594.8	204.2	**13%**	**88%**
2004	**1 452.9**	1 445.6	7.4	**1%**	0%	*6%*	*6%*	1%	*-1%*	1660.2	214.6	**13%**	**88%**
2005	**1 506.5**	1 500.4	6.1	**0%**	0%	*7%*	*7%*	1%	*-1%*	1726.1	225.6	**13%**	**87%**
2006	**1 579.2**	1 566.4	12.8	**1%**	0%	*9%*	*9%*	1%	*-1%*	1806.4	240.0	**13%**	**87%**
2007	**1 657.6**	1 641.8	15.7	**1%**	0%	*10%*	*10%*	0%	*-1%*	1894.6	252.8	**13%**	**87%**
2008	**1 689.0**	1 680.1	8.9	**1%**	0%	*10%*	*10%*	1%	*-1%*	1950.1	270.0	**14%**	**87%**

Table A6: Structure of national income in France, 1896-2008: decomposition by production sectors

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
	% national income Y_t						% factor-price national income $Y_t - T_{pt}$					
	Housing sector	Self-employment sector	Corporate sector	Govt sector	Foreign sector	Production taxes	Housing sector	Self-employment sector	Corporate sector	Govt sector	Foreign sector	Production tax rate
	Y_{ht}	Y_{set}	Y_{ct}	Y_{gt}	FY_t	T_{pt}	Y_{ht}	Y_{set}	Y_{ct}	Y_{gt}	FY_t	T_{pt}
1896	7%	52%	28%	2%	3%	7%	8%	56%	31%	3%	3%	7%
1897	7%	51%	29%	2%	3%	7%	8%	55%	31%	3%	3%	8%
1898	7%	51%	29%	2%	3%	7%	8%	55%	31%	2%	3%	8%
1899	7%	51%	30%	2%	3%	7%	8%	55%	32%	2%	3%	7%
1900	7%	50%	30%	2%	3%	7%	8%	54%	33%	2%	4%	7%
1901	7%	50%	30%	2%	3%	7%	8%	54%	32%	2%	4%	7%
1902	7%	49%	31%	2%	3%	7%	8%	53%	33%	2%	4%	7%
1903	7%	50%	31%	2%	3%	7%	8%	53%	33%	2%	4%	7%
1904	7%	50%	30%	2%	3%	7%	8%	54%	32%	2%	4%	7%
1905	7%	49%	31%	2%	4%	7%	8%	53%	34%	2%	4%	7%
1906	7%	48%	31%	2%	4%	7%	8%	52%	34%	3%	4%	7%
1907	7%	48%	32%	2%	4%	7%	8%	51%	35%	2%	4%	7%
1908	7%	48%	32%	2%	4%	7%	8%	52%	34%	2%	4%	7%
1909	7%	47%	33%	2%	4%	7%	8%	51%	35%	3%	4%	7%
1910	7%	46%	33%	2%	4%	7%	8%	50%	35%	3%	5%	8%
1911	7%	46%	33%	2%	4%	7%	8%	50%	36%	3%	4%	8%
1912	7%	46%	34%	2%	4%	6%	8%	49%	37%	2%	4%	7%
1913	7%	45%	35%	2%	4%	7%	8%	48%	37%	2%	5%	7%
1914	8%	46%	30%	6%	4%	5%	8%	49%	32%	7%	5%	5%
1915	7%	42%	28%	15%	4%	5%	7%	44%	29%	16%	4%	5%
1916	6%	45%	30%	11%	3%	5%	6%	48%	31%	12%	3%	5%
1917	5%	44%	33%	11%	2%	5%	6%	46%	35%	11%	2%	6%
1918	5%	44%	34%	12%	1%	4%	5%	45%	36%	12%	1%	4%
1919	4%	43%	37%	9%	1%	5%	4%	46%	39%	10%	1%	5%
1920	3%	46%	40%	4%	1%	6%	3%	49%	42%	4%	1%	7%
1921	3%	45%	40%	4%	1%	7%	4%	48%	42%	4%	1%	7%
1922	4%	46%	38%	4%	1%	7%	5%	49%	41%	4%	1%	8%
1923	4%	47%	37%	3%	1%	7%	4%	50%	40%	4%	1%	8%
1924	4%	46%	39%	3%	1%	7%	4%	50%	42%	3%	1%	8%
1925	4%	47%	38%	3%	1%	8%	4%	51%	41%	3%	1%	8%
1926	4%	47%	36%	3%	1%	10%	4%	52%	40%	3%	1%	11%
1927	4%	45%	36%	3%	1%	11%	4%	51%	40%	3%	1%	12%
1928	4%	45%	36%	3%	1%	11%	4%	51%	40%	3%	1%	12%
1929	4%	44%	37%	3%	1%	11%	5%	49%	41%	3%	2%	13%
1930	5%	41%	40%	3%	1%	10%	5%	45%	44%	4%	2%	11%
1931	5%	38%	40%	4%	1%	11%	6%	43%	45%	5%	1%	13%
1932	6%	38%	39%	5%	1%	12%	7%	43%	44%	5%	1%	14%
1933	6%	38%	40%	4%	0%	12%	7%	43%	45%	5%	1%	14%
1934	6%	36%	39%	5%	1%	12%	7%	41%	45%	6%	1%	14%
1935	6%	37%	38%	5%	2%	12%	7%	42%	44%	5%	2%	14%
1936	5%	40%	37%	5%	2%	11%	6%	45%	41%	5%	2%	12%
1937	5%	41%	38%	5%	2%	9%	5%	46%	42%	5%	2%	10%
1938	4%	39%	37%	6%	2%	11%	5%	44%	42%	6%	3%	12%
1939	4%	41%	35%	8%	2%	10%	5%	46%	39%	9%	2%	12%
1940	4%	39%	38%	9%	0%	11%	4%	44%	42%	10%	0%	12%
1941	4%	39%	38%	9%	0%	11%	4%	43%	42%	10%	0%	12%
1942	4%	38%	39%	9%	0%	10%	4%	42%	43%	10%	0%	12%
1943	4%	37%	40%	9%	0%	10%	4%	41%	44%	11%	0%	12%
1944	3%	34%	42%	10%	0%	10%	4%	38%	47%	11%	0%	12%
1945	2%	37%	39%	10%	0%	11%	2%	42%	44%	11%	0%	13%
1946	2%	38%	39%	10%	0%	12%	2%	43%	44%	11%	0%	14%
1947	2%	36%	40%	10%	0%	13%	2%	41%	45%	12%	0%	15%
1948	1%	37%	38%	10%	0%	13%	2%	42%	44%	12%	0%	16%
1949	3%	35%	37%	10%	1%	14%	3%	41%	43%	12%	1%	16%
1950	3%	34%	37%	11%	1%	14%	3%	40%	44%	12%	1%	17%
1951	2%	33%	39%	11%	1%	15%	3%	38%	45%	13%	1%	18%
1952	2%	32%	38%	11%	1%	16%	3%	38%	45%	13%	1%	19%
1953	2%	31%	39%	11%	1%	16%	3%	37%	46%	13%	1%	19%
1954	3%	31%	39%	11%	1%	15%	3%	36%	46%	13%	1%	18%
1955	3%	30%	41%	11%	1%	15%	3%	35%	48%	13%	1%	17%
1956	3%	29%	42%	11%	1%	14%	3%	34%	49%	13%	1%	17%
1957	3%	28%	42%	11%	1%	15%	3%	33%	49%	13%	1%	17%
1958	3%	28%	42%	11%	1%	15%	3%	33%	49%	13%	1%	18%
1959	3%	27%	42%	11%	1%	16%	3%	32%	50%	14%	1%	19%
1960	3%	27%	43%	11%	1%	16%	4%	32%	50%	13%	1%	19%
1961	3%	26%	44%	11%	1%	16%	4%	30%	52%	13%	1%	18%
1962	3%	26%	43%	11%	1%	16%	4%	31%	51%	14%	1%	18%
1963	4%	25%	43%	12%	1%	16%	4%	29%	51%	14%	1%	19%

1964	4%	24%	44%	12%	1%	16%	4%	28%	52%	14%	1%	19%
1965	4%	23%	45%	11%	1%	16%	5%	28%	53%	14%	1%	19%
1966	4%	23%	45%	11%	1%	16%	5%	28%	53%	13%	1%	19%
1967	4%	23%	45%	11%	1%	16%	5%	28%	53%	13%	1%	18%
1968	4%	23%	45%	12%	1%	14%	5%	27%	53%	14%	1%	17%
1969	4%	21%	47%	12%	1%	15%	5%	25%	55%	14%	1%	17%
1970	4%	21%	48%	12%	1%	14%	5%	24%	56%	14%	1%	16%
1971	4%	20%	49%	12%	1%	14%	5%	23%	57%	14%	1%	16%
1972	4%	20%	49%	12%	1%	14%	5%	23%	57%	14%	1%	16%
1973	4%	19%	50%	12%	1%	14%	5%	22%	58%	14%	1%	16%
1974	4%	18%	51%	13%	1%	13%	5%	20%	59%	15%	1%	15%
1975	4%	17%	51%	14%	1%	14%	5%	20%	59%	16%	1%	16%
1976	4%	16%	51%	14%	1%	14%	5%	19%	59%	17%	1%	17%
1977	4%	16%	51%	15%	1%	13%	5%	18%	59%	17%	1%	15%
1978	4%	16%	50%	15%	0%	14%	5%	19%	58%	18%	0%	17%
1979	4%	16%	49%	15%	1%	15%	5%	18%	58%	18%	1%	18%
1980	4%	15%	50%	15%	1%	15%	5%	18%	58%	18%	1%	17%
1981	5%	15%	49%	16%	1%	14%	5%	17%	58%	18%	1%	17%
1982	5%	15%	49%	16%	1%	15%	5%	17%	58%	19%	1%	17%
1983	5%	15%	50%	16%	0%	15%	6%	17%	58%	19%	0%	17%
1984	5%	14%	50%	17%	0%	15%	6%	16%	59%	19%	0%	17%
1985	5%	14%	50%	16%	0%	15%	6%	16%	59%	19%	0%	17%
1986	5%	13%	51%	16%	0%	14%	6%	15%	60%	19%	0%	17%
1987	5%	12%	52%	16%	0%	15%	6%	14%	60%	18%	0%	17%
1988	6%	12%	52%	15%	1%	15%	6%	14%	61%	18%	1%	17%
1989	6%	12%	52%	15%	1%	15%	7%	14%	61%	17%	1%	17%
1990	6%	12%	52%	15%	1%	15%	7%	14%	61%	17%	1%	17%
1991	6%	12%	52%	15%	1%	15%	7%	14%	61%	18%	1%	17%
1992	6%	11%	52%	15%	1%	14%	8%	13%	61%	18%	1%	17%
1993	7%	11%	51%	16%	1%	15%	8%	13%	60%	19%	1%	17%
1994	7%	11%	50%	16%	1%	15%	8%	13%	59%	19%	1%	18%
1995	7%	10%	50%	16%	0%	16%	8%	12%	60%	19%	0%	18%
1996	7%	10%	49%	17%	1%	16%	8%	12%	59%	20%	1%	19%
1997	7%	10%	50%	16%	1%	16%	8%	12%	59%	20%	1%	20%
1998	7%	10%	50%	16%	1%	16%	8%	12%	60%	19%	1%	19%
1999	7%	10%	50%	16%	2%	16%	8%	12%	59%	19%	2%	19%
2000	7%	10%	50%	16%	1%	15%	8%	11%	59%	19%	2%	18%
2001	7%	10%	50%	16%	1%	15%	8%	12%	59%	19%	2%	18%
2002	7%	10%	51%	17%	0%	15%	9%	12%	60%	20%	0%	18%
2003	7%	10%	51%	17%	0%	15%	9%	11%	60%	19%	0%	18%
2004	7%	9%	51%	16%	1%	15%	9%	11%	60%	19%	1%	18%
2005	8%	9%	51%	16%	0%	16%	9%	11%	60%	19%	0%	19%
2006	8%	9%	51%	16%	1%	16%	9%	11%	60%	19%	1%	18%
2007	8%	9%	51%	16%	1%	15%	9%	11%	60%	19%	1%	18%
2008	8%	9%	51%	16%	1%	15%	9%	11%	60%	19%	1%	18%

Table A7: Structure of national income in France, 1896-2008: profits & wages in the corporate sector

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
	% net corporate product Y_{ct}								% national income Y_t					
	Wage share (wages & social contributions) Y_{Lct}	**Profit share** (net profits) Y_{Kct}	including corporate income taxes	including distributed profits (interest & dividend payments)	including retained earnings	including other corporate transfers	*memo: Wage share in gross corporate product*	*memo: Gross profit share in gross corporate product*	Corporate wages & social contribut. Y_{Lct}	Net corporate profits Y_{Kct}	including corporate income taxes	including distributed profits (net interest & dividend)	including retained earnings	including other corporate transfers
1896	**84%**	**16%**	0%	14%	2%	0%	*75%*	*25%*	**24%**	**5%**	0%	4%	1%	0%
1897	**87%**	**13%**	0%	14%	-1%	0%	*78%*	*22%*	**25%**	**4%**	0%	4%	0%	0%
1898	**85%**	**15%**	0%	14%	1%	0%	*76%*	*24%*	**25%**	**4%**	0%	4%	0%	0%
1899	**83%**	**17%**	0%	14%	3%	0%	*75%*	*25%*	**25%**	**5%**	0%	4%	1%	0%
1900	**81%**	**19%**	0%	16%	3%	0%	*72%*	*28%*	**25%**	**6%**	0%	5%	1%	0%
1901	**87%**	**13%**	0%	15%	-2%	0%	*77%*	*23%*	**26%**	**4%**	0%	5%	-1%	0%
1902	**86%**	**14%**	0%	15%	-1%	0%	*75%*	*25%*	**27%**	**4%**	0%	5%	0%	0%
1903	**85%**	**15%**	0%	15%	0%	0%	*75%*	*25%*	**26%**	**5%**	0%	5%	0%	0%
1904	**85%**	**15%**	0%	15%	0%	0%	*75%*	*25%*	**26%**	**4%**	0%	5%	0%	0%
1905	**81%**	**19%**	0%	14%	4%	0%	*71%*	*29%*	**26%**	**6%**	0%	5%	1%	0%
1906	**86%**	**14%**	0%	16%	-2%	0%	*75%*	*25%*	**27%**	**4%**	0%	5%	-1%	0%
1907	**77%**	**23%**	0%	16%	7%	0%	*68%*	*32%*	**25%**	**7%**	0%	5%	2%	0%
1908	**83%**	**17%**	0%	16%	1%	0%	*72%*	*28%*	**26%**	**5%**	0%	5%	0%	0%
1909	**80%**	**20%**	0%	16%	4%	0%	*70%*	*30%*	**26%**	**7%**	0%	5%	1%	0%
1910	**83%**	**17%**	0%	18%	-1%	0%	*72%*	*28%*	**27%**	**6%**	0%	6%	0%	0%
1911	**76%**	**24%**	0%	18%	6%	0%	*67%*	*33%*	**25%**	**8%**	0%	6%	2%	0%
1912	**67%**	**33%**	0%	17%	16%	0%	*60%*	*40%*	**23%**	**11%**	0%	6%	5%	0%
1913	**69%**	**31%**	0%	18%	13%	0%	*61%*	*39%*	**24%**	**11%**	0%	6%	4%	0%
1914	**87%**	**13%**	0%	8%	5%	0%	*74%*	*26%*	**26%**	**4%**	0%	3%	1%	0%
1915	**91%**	**9%**	0%	7%	2%	0%	*77%*	*23%*	**25%**	**2%**	0%	2%	0%	0%
1916	**77%**	**23%**	0%	11%	12%	0%	*64%*	*36%*	**23%**	**7%**	0%	3%	4%	0%
1917	**75%**	**25%**	0%	11%	14%	0%	*63%*	*37%*	**25%**	**8%**	0%	4%	5%	0%
1918	**81%**	**19%**	0%	8%	10%	0%	*69%*	*31%*	**28%**	**6%**	0%	3%	4%	0%
1919	**74%**	**26%**	1%	12%	13%	0%	*63%*	*37%*	**27%**	**9%**	0%	5%	5%	0%
1920	**75%**	**25%**	2%	9%	15%	0%	*63%*	*37%*	**30%**	**10%**	1%	4%	6%	0%
1921	**75%**	**25%**	2%	8%	14%	0%	*65%*	*35%*	**30%**	**10%**	1%	3%	6%	0%
1922	**72%**	**28%**	2%	8%	18%	0%	*63%*	*37%*	**27%**	**10%**	1%	3%	7%	0%
1923	**70%**	**30%**	3%	8%	19%	0%	*62%*	*38%*	**26%**	**11%**	1%	3%	7%	0%
1924	**70%**	**30%**	3%	9%	18%	0%	*61%*	*39%*	**27%**	**12%**	1%	4%	7%	0%
1925	**69%**	**31%**	3%	11%	17%	0%	*61%*	*39%*	**26%**	**12%**	1%	4%	7%	0%
1926	**69%**	**31%**	3%	11%	18%	0%	*60%*	*40%*	**25%**	**11%**	1%	4%	6%	0%
1927	**68%**	**32%**	5%	11%	17%	0%	*59%*	*41%*	**24%**	**12%**	2%	4%	6%	0%
1928	**68%**	**32%**	4%	11%	17%	0%	*60%*	*40%*	**24%**	**11%**	1%	4%	6%	0%
1929	**70%**	**30%**	4%	11%	15%	0%	*61%*	*39%*	**26%**	**11%**	1%	4%	5%	0%
1930	**73%**	**27%**	4%	10%	13%	0%	*63%*	*37%*	**29%**	**11%**	2%	4%	5%	0%
1931	**75%**	**25%**	4%	8%	12%	0%	*64%*	*36%*	**30%**	**10%**	2%	3%	5%	0%
1932	**80%**	**20%**	5%	6%	8%	0%	*68%*	*32%*	**31%**	**8%**	2%	3%	3%	0%
1933	**77%**	**23%**	3%	7%	12%	0%	*66%*	*34%*	**31%**	**9%**	1%	3%	5%	0%
1934	**79%**	**21%**	4%	9%	9%	0%	*67%*	*33%*	**31%**	**8%**	1%	3%	4%	0%
1935	**77%**	**23%**	3%	9%	11%	0%	*66%*	*34%*	**30%**	**9%**	1%	3%	4%	0%
1936	**78%**	**22%**	2%	10%	11%	0%	*68%*	*32%*	**29%**	**8%**	1%	4%	4%	0%
1937	**78%**	**22%**	2%	9%	11%	0%	*66%*	*34%*	**30%**	**8%**	1%	3%	4%	0%
1938	**77%**	**23%**	3%	10%	10%	0%	*65%*	*35%*	**29%**	**9%**	1%	4%	4%	0%
1939	**73%**	**27%**	3%	10%	14%	0%	*63%*	*37%*	**25%**	**9%**	1%	3%	5%	0%
1940	**76%**	**24%**	2%	10%	11%	0%	*66%*	*34%*	**29%**	**9%**	1%	4%	4%	0%
1941	**81%**	**19%**	2%	9%	8%	0%	*69%*	*31%*	**31%**	**7%**	1%	3%	3%	0%
1942	**85%**	**15%**	2%	7%	7%	0%	*72%*	*28%*	**33%**	**6%**	1%	3%	3%	0%
1943	**90%**	**10%**	2%	5%	3%	0%	*77%*	*23%*	**36%**	**4%**	1%	2%	1%	0%
1944	**103%**	**-3%**	1%	4%	-8%	0%	*89%*	*11%*	**43%**	**-1%**	1%	2%	-3%	0%
1945	**101%**	**-1%**	1%	2%	-4%	0%	*85%*	*15%*	**40%**	**0%**	0%	1%	-2%	0%
1946	**86%**	**14%**	3%	2%	9%	0%	*74%*	*26%*	**33%**	**5%**	1%	1%	4%	0%
1947	**89%**	**11%**	2%	2%	7%	0%	*77%*	*23%*	**35%**	**5%**	1%	1%	3%	0%
1948	**84%**	**16%**	2%	2%	12%	0%	*73%*	*27%*	**32%**	**6%**	1%	1%	4%	0%
1949	**78%**	**22%**	4%	7%	8%	3%	*70%*	*30%*	**29%**	**8%**	2%	3%	3%	1%
1950	**73%**	**27%**	4%	8%	12%	3%	*66%*	*34%*	**27%**	**10%**	2%	3%	4%	1%
1951	**75%**	**25%**	5%	8%	9%	3%	*67%*	*33%*	**29%**	**10%**	2%	3%	3%	1%
1952	**79%**	**21%**	5%	8%	5%	3%	*70%*	*30%*	**30%**	**8%**	2%	3%	2%	1%
1953	**77%**	**23%**	5%	9%	5%	3%	*69%*	*31%*	**30%**	**9%**	2%	4%	2%	1%
1954	**78%**	**22%**	5%	9%	5%	3%	*70%*	*30%*	**31%**	**9%**	2%	4%	2%	1%
1955	**77%**	**23%**	5%	9%	7%	3%	*70%*	*30%*	**31%**	**9%**	2%	3%	3%	1%
1956	**78%**	**22%**	5%	8%	6%	3%	*70%*	*30%*	**33%**	**9%**	2%	3%	2%	1%
1957	**77%**	**23%**	5%	8%	7%	3%	*70%*	*30%*	**32%**	**9%**	2%	3%	3%	1%
1958	**77%**	**23%**	6%	8%	6%	3%	*69%*	*31%*	**32%**	**10%**	2%	3%	3%	1%
1959	**77%**	**23%**	6%	8%	7%	3%	*68%*	*32%*	**32%**	**10%**	2%	3%	3%	1%
1960	**76%**	**24%**	6%	8%	8%	3%	*67%*	*33%*	**32%**	**10%**	2%	3%	3%	1%
1961	**77%**	**23%**	5%	8%	7%	3%	*68%*	*32%*	**33%**	**10%**	2%	4%	3%	1%
1962	**79%**	**21%**	5%	8%	5%	3%	*70%*	*30%*	**34%**	**9%**	2%	4%	2%	1%
1963	**80%**	**20%**	4%	8%	5%	3%	*71%*	*29%*	**34%**	**9%**	2%	3%	2%	1%
1964	**79%**	**21%**	4%	8%	6%	3%	*71%*	*29%*	**35%**	**9%**	2%	3%	3%	1%
1965	**79%**	**21%**	4%	7%	7%	3%	*70%*	*30%*	**35%**	**10%**	2%	3%	3%	1%
1966	**78%**	**22%**	4%	8%	7%	3%	*70%*	*30%*	**35%**	**10%**	2%	3%	3%	1%
1967	**78%**	**22%**	4%	8%	8%	3%	*70%*	*30%*	**35%**	**10%**	2%	3%	3%	1%
1968	**79%**	**21%**	4%	8%	7%	3%	*70%*	*30%*	**36%**	**10%**	2%	3%	3%	1%

1969	**76%**	**24%**	4%	8%	8%	3%	*69%*	*31%*	**36%**	**11%**	2%	4%	4%	2%
1970	**77%**	**23%**	5%	9%	6%	3%	*68%*	*32%*	**37%**	**11%**	2%	4%	3%	2%
1971	**76%**	**24%**	5%	10%	6%	3%	*68%*	*32%*	**37%**	**12%**	2%	5%	3%	2%
1972	**77%**	**23%**	5%	10%	5%	3%	*69%*	*31%*	**38%**	**11%**	2%	5%	3%	2%
1973	**76%**	**24%**	5%	10%	7%	3%	*68%*	*32%*	**38%**	**12%**	2%	5%	3%	2%
1974	**77%**	**23%**	6%	11%	2%	3%	*68%*	*32%*	**40%**	**12%**	3%	6%	1%	2%
1975	**82%**	**18%**	4%	11%	0%	3%	*72%*	*28%*	**42%**	**9%**	2%	5%	0%	2%
1976	**83%**	**17%**	5%	10%	-1%	3%	*72%*	*28%*	**42%**	**9%**	3%	5%	0%	2%
1977	**83%**	**17%**	5%	9%	1%	3%	*72%*	*28%*	**42%**	**9%**	2%	5%	0%	1%
1978	**84%**	**16%**	4%	9%	-1%	3%	*73%*	*27%*	**42%**	**8%**	2%	4%	0%	2%
1979	**85%**	**15%**	4%	9%	-1%	3%	*74%*	*26%*	**42%**	**7%**	2%	4%	-1%	2%
1980	**86%**	**14%**	5%	8%	-3%	3%	*74%*	*26%*	**43%**	**7%**	2%	4%	-1%	2%
1981	**88%**	**12%**	5%	10%	-5%	3%	*75%*	*25%*	**43%**	**6%**	2%	5%	-3%	2%
1982	**88%**	**12%**	5%	10%	-7%	3%	*75%*	*25%*	**43%**	**6%**	3%	5%	-3%	2%
1983	**87%**	**13%**	5%	11%	-6%	3%	*74%*	*26%*	**43%**	**6%**	2%	5%	-3%	2%
1984	**85%**	**15%**	4%	11%	-3%	3%	*72%*	*28%*	**42%**	**8%**	2%	5%	-2%	2%
1985	**83%**	**17%**	4%	11%	-1%	3%	*71%*	*29%*	**42%**	**8%**	2%	5%	-1%	1%
1986	**78%**	**22%**	5%	10%	5%	3%	*67%*	*33%*	**40%**	**11%**	2%	5%	2%	1%
1987	**78%**	**22%**	5%	10%	5%	3%	*67%*	*33%*	**40%**	**11%**	3%	5%	3%	1%
1988	**76%**	**24%**	5%	9%	8%	3%	*65%*	*35%*	**40%**	**13%**	3%	5%	4%	1%
1989	**75%**	**25%**	5%	10%	7%	3%	*65%*	*35%*	**39%**	**13%**	3%	5%	4%	1%
1990	**77%**	**23%**	5%	10%	6%	2%	*66%*	*34%*	**40%**	**12%**	3%	5%	3%	1%
1991	**78%**	**22%**	4%	11%	4%	3%	*67%*	*33%*	**40%**	**12%**	2%	6%	2%	1%
1992	**78%**	**22%**	3%	11%	5%	3%	*67%*	*33%*	**40%**	**11%**	2%	6%	3%	1%
1993	**79%**	**21%**	4%	11%	4%	3%	*68%*	*32%*	**40%**	**11%**	2%	6%	2%	1%
1994	**79%**	**21%**	4%	10%	5%	2%	*67%*	*33%*	**40%**	**11%**	2%	5%	3%	1%
1995	**78%**	**22%**	4%	11%	4%	2%	*67%*	*33%*	**39%**	**11%**	2%	6%	2%	1%
1996	**79%**	**21%**	5%	10%	3%	3%	*68%*	*32%*	**39%**	**10%**	2%	5%	2%	1%
1997	**78%**	**22%**	5%	9%	5%	2%	*67%*	*33%*	**39%**	**11%**	2%	5%	2%	1%
1998	**77%**	**23%**	5%	9%	6%	3%	*66%*	*34%*	**39%**	**11%**	3%	5%	3%	1%
1999	**78%**	**22%**	6%	7%	6%	3%	*67%*	*33%*	**39%**	**11%**	3%	4%	3%	1%
2000	**78%**	**22%**	6%	8%	4%	3%	*67%*	*33%*	**39%**	**11%**	3%	4%	2%	2%
2001	**79%**	**21%**	7%	9%	2%	3%	*67%*	*33%*	**40%**	**10%**	3%	4%	1%	2%
2002	**80%**	**20%**	5%	11%	1%	3%	*68%*	*32%*	**41%**	**10%**	3%	5%	0%	2%
2003	**79%**	**21%**	5%	10%	3%	3%	*67%*	*33%*	**41%**	**11%**	2%	5%	2%	2%
2004	**80%**	**20%**	5%	10%	1%	3%	*67%*	*33%*	**41%**	**10%**	3%	5%	1%	2%
2005	**80%**	**20%**	5%	10%	1%	4%	*68%*	*32%*	**41%**	**10%**	3%	5%	0%	2%
2006	**80%**	**20%**	6%	10%	0%	4%	*68%*	*32%*	**41%**	**10%**	3%	5%	0%	2%
2007	**80%**	**20%**	6%	10%	1%	4%	*67%*	*33%*	**41%**	**10%**	3%	5%	0%	2%
2008	**80%**	**20%**	6%	11%	-1%	4%	*67%*	*33%*	**41%**	**10%**	3%	5%	0%	2%

Table A8: Structure of national income in France, 1896-2008: capital & labor shares in national income

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
	% national income Y_t												% factor-price national income $Y_t - T_{pt}$			
	Total capital income	including corporate capital income (net corporate profits)	including housing capital income (net rents)	including capital share of self-employmt net income	including net foreign capital income	plus: net govt interest payments	*memo: personal interest payments*	**Total labour income**	including labor income paid by corporati.	including labor income paid by govt	including labor share of self-employmt net income	including net foreign labor income	**Capital share**	**Labour share**	**Capital share** (excl. govt interest)	**Labour share**
	Y_{Kt}*	Y_{Kct}	Y_{ht}	Y_{Kset}	FY_{Kt}	Y_{Kgt}		Y_{Lt}	Y_{Lct}	Y_{gt}	Y_{Lset}	FY_{Lt}	Y_{Kt}^*	Y_{Lt}	Y_{Kt}	Y_{Lt}
1896	25%	5%	7%	8%	3%	2%	0%	70%	24%	2%	44%	0%	27%	75%	25%	75%
1897	23%	4%	7%	7%	3%	2%	0%	72%	25%	2%	44%	0%	25%	78%	22%	78%
1898	24%	4%	7%	7%	3%	2%	0%	71%	25%	2%	44%	0%	26%	76%	24%	76%
1899	26%	5%	7%	9%	3%	2%	0%	69%	25%	2%	42%	0%	28%	74%	26%	74%
1900	28%	6%	7%	10%	3%	2%	0%	67%	25%	2%	41%	0%	30%	72%	28%	72%
1901	23%	4%	7%	7%	3%	3%	0%	72%	26%	2%	44%	0%	25%	78%	22%	78%
1902	24%	4%	7%	7%	3%	2%	0%	71%	27%	2%	42%	0%	26%	76%	24%	76%
1903	25%	5%	7%	7%	3%	2%	0%	71%	26%	2%	42%	0%	26%	76%	24%	76%
1904	25%	4%	7%	7%	3%	2%	0%	71%	26%	2%	43%	0%	26%	76%	24%	76%
1905	28%	6%	7%	9%	4%	2%	0%	68%	26%	2%	40%	0%	30%	72%	28%	72%
1906	24%	4%	7%	7%	4%	2%	0%	71%	27%	2%	42%	0%	26%	76%	24%	76%
1907	32%	7%	7%	11%	4%	2%	0%	64%	25%	2%	37%	0%	34%	69%	31%	69%
1908	27%	5%	7%	8%	4%	2%	0%	68%	26%	2%	40%	0%	29%	73%	27%	73%
1909	30%	7%	7%	10%	4%	2%	0%	66%	26%	2%	38%	0%	32%	71%	29%	71%
1910	27%	6%	7%	8%	4%	2%	0%	68%	27%	2%	38%	0%	29%	73%	27%	73%
1911	32%	8%	7%	11%	4%	2%	0%	63%	25%	2%	35%	0%	35%	67%	33%	67%
1912	39%	11%	7%	15%	4%	2%	0%	56%	23%	2%	31%	0%	42%	60%	40%	60%
1913	37%	11%	7%	14%	4%	2%	0%	57%	24%	2%	31%	0%	40%	62%	38%	62%
1914	24%	4%	8%	6%	4%	2%	0%	73%	26%	6%	40%	0%	25%	77%	23%	77%
1915	19%	2%	7%	4%	4%	3%	0%	79%	25%	15%	38%	0%	20%	82%	18%	82%
1916	29%	7%	6%	11%	3%	4%	0%	69%	23%	11%	35%	0%	31%	73%	27%	73%
1917	31%	8%	5%	11%	2%	5%	0%	69%	25%	11%	33%	0%	33%	73%	27%	73%
1918	26%	6%	5%	8%	1%	5%	0%	75%	28%	12%	35%	0%	27%	78%	22%	78%
1919	33%	9%	4%	11%	1%	7%	0%	69%	27%	9%	32%	0%	34%	73%	27%	73%
1920	33%	10%	3%	12%	1%	7%	0%	68%	30%	4%	35%	0%	35%	73%	27%	73%
1921	33%	10%	3%	11%	1%	8%	0%	68%	30%	4%	34%	0%	35%	73%	27%	73%
1922	35%	10%	4%	13%	1%	6%	0%	64%	27%	4%	33%	0%	38%	69%	31%	69%
1923	37%	11%	4%	14%	1%	7%	0%	63%	26%	3%	33%	0%	40%	68%	32%	68%
1924	37%	12%	4%	14%	1%	6%	0%	62%	27%	3%	32%	0%	40%	67%	33%	67%
1925	36%	12%	4%	15%	1%	5%	0%	61%	26%	3%	32%	0%	40%	66%	34%	66%
1926	36%	11%	4%	15%	1%	5%	0%	59%	25%	3%	32%	0%	40%	66%	34%	66%
1927	36%	12%	4%	15%	1%	5%	0%	58%	24%	3%	31%	0%	40%	65%	35%	65%
1928	35%	11%	4%	14%	1%	4%	0%	58%	24%	3%	31%	0%	39%	66%	34%	66%
1929	34%	11%	4%	13%	1%	4%	0%	59%	26%	3%	30%	0%	38%	67%	33%	67%
1930	32%	11%	5%	11%	1%	4%	0%	62%	29%	3%	29%	0%	35%	69%	31%	69%
1931	30%	10%	5%	9%	1%	4%	0%	63%	30%	4%	28%	0%	33%	71%	29%	71%
1932	26%	8%	6%	7%	1%	4%	0%	66%	31%	5%	30%	0%	30%	75%	25%	75%
1933	28%	9%	6%	9%	0%	4%	0%	64%	31%	4%	29%	0%	32%	73%	27%	73%
1934	28%	8%	6%	8%	1%	5%	0%	64%	31%	5%	28%	0%	32%	73%	27%	73%
1935	30%	9%	6%	9%	2%	5%	0%	63%	30%	5%	28%	0%	34%	71%	29%	71%
1936	29%	8%	5%	9%	2%	5%	0%	65%	29%	5%	31%	0%	33%	72%	28%	72%
1937	28%	8%	5%	9%	2%	4%	0%	67%	30%	5%	32%	0%	31%	74%	26%	74%
1938	28%	9%	4%	9%	2%	4%	0%	65%	29%	6%	30%	0%	32%	73%	27%	73%
1939	29%	9%	4%	11%	2%	3%	0%	63%	25%	8%	30%	0%	32%	71%	29%	71%
1940	22%	9%	4%	9%	0%	0%	0%	67%	29%	9%	30%	0%	25%	75%	25%	75%
1941	19%	7%	4%	7%	0%	0%	0%	71%	31%	9%	31%	0%	21%	79%	21%	79%
1942	16%	6%	4%	6%	0%	0%	0%	74%	33%	9%	32%	0%	17%	83%	17%	83%
1943	11%	4%	4%	4%	0%	0%	0%	78%	36%	9%	33%	0%	12%	88%	12%	88%
1944	1%	-1%	3%	-1%	0%	0%	0%	88%	43%	10%	35%	0%	2%	98%	2%	98%
1945	1%	0%	2%	0%	0%	0%	0%	87%	40%	10%	38%	0%	2%	98%	2%	98%
1946	12%	5%	2%	5%	0%	0%	0%	76%	33%	10%	32%	0%	14%	86%	14%	86%
1947	10%	5%	2%	4%	0%	0%	0%	77%	35%	10%	32%	0%	12%	88%	12%	88%
1948	13%	6%	1%	6%	0%	0%	0%	73%	32%	10%	31%	0%	15%	85%	15%	85%
1949	20%	8%	3%	8%	1%	0%	1%	67%	29%	10%	27%	0%	23%	77%	23%	77%
1950	23%	10%	3%	9%	1%	0%	1%	63%	27%	11%	25%	0%	27%	74%	26%	74%
1951	21%	10%	2%	8%	1%	0%	1%	64%	29%	11%	25%	0%	25%	76%	24%	76%
1952	18%	8%	2%	7%	1%	0%	1%	67%	30%	11%	25%	0%	21%	79%	21%	79%
1953	19%	9%	2%	7%	1%	0%	1%	65%	30%	11%	24%	0%	23%	77%	23%	77%
1954	19%	9%	3%	7%	1%	0%	1%	66%	31%	11%	24%	0%	23%	78%	22%	78%
1955	20%	9%	3%	7%	1%	0%	1%	66%	31%	11%	23%	0%	23%	77%	23%	77%
1956	19%	9%	3%	6%	1%	0%	1%	67%	33%	11%	23%	0%	22%	78%	22%	78%
1957	20%	9%	3%	6%	1%	0%	1%	66%	32%	11%	22%	0%	23%	77%	23%	77%
1958	20%	10%	3%	6%	1%	0%	1%	65%	32%	11%	22%	0%	23%	77%	23%	77%
1959	19%	10%	3%	6%	1%	0%	1%	65%	32%	11%	21%	0%	23%	77%	23%	77%
1960	21%	10%	3%	7%	1%	0%	1%	64%	32%	11%	20%	0%	25%	76%	24%	76%
1961	20%	10%	3%	6%	1%	0%	1%	65%	33%	11%	20%	0%	24%	76%	24%	76%
1962	19%	9%	3%	5%	1%	0%	1%	66%	34%	11%	21%	0%	22%	78%	22%	78%
1963	18%	9%	4%	5%	1%	0%	1%	66%	34%	12%	20%	0%	21%	79%	21%	79%
1964	18%	9%	4%	5%	1%	0%	1%	65%	35%	12%	19%	0%	22%	78%	22%	78%

1965	19%	10%	4%	5%	1%	0%	1%	65%	35%	11%	18%	0%	22%	77%	23%	77%
1966	19%	10%	4%	5%	1%	0%	1%	65%	35%	11%	18%	0%	23%	77%	23%	77%
1967	20%	10%	4%	5%	1%	0%	1%	65%	35%	11%	18%	0%	23%	77%	23%	77%
1968	20%	10%	4%	5%	1%	0%	1%	66%	36%	12%	18%	0%	23%	77%	23%	77%
1969	21%	11%	4%	5%	1%	0%	1%	64%	36%	12%	16%	0%	25%	75%	25%	75%
1970	21%	11%	4%	5%	1%	-1%	1%	65%	37%	12%	16%	0%	24%	75%	25%	75%
1971	21%	12%	4%	5%	1%	-1%	1%	65%	37%	12%	15%	0%	24%	75%	25%	75%
1972	20%	11%	4%	5%	0%	-1%	1%	66%	38%	12%	15%	0%	23%	76%	24%	76%
1973	21%	12%	4%	5%	0%	-1%	2%	65%	38%	12%	14%	0%	24%	75%	25%	75%
1974	20%	12%	4%	4%	1%	-1%	3%	66%	40%	13%	14%	0%	23%	76%	24%	76%
1975	16%	9%	4%	3%	0%	0%	2%	70%	42%	14%	14%	0%	19%	81%	19%	81%
1976	16%	9%	4%	3%	0%	0%	2%	70%	42%	14%	13%	0%	18%	81%	19%	81%
1977	16%	9%	4%	3%	0%	0%	2%	70%	42%	15%	13%	0%	19%	81%	19%	81%
1978	15%	8%	4%	3%	0%	0%	2%	71%	42%	15%	14%	0%	17%	83%	17%	83%
1979	15%	7%	4%	2%	0%	0%	2%	70%	42%	15%	13%	0%	17%	83%	17%	83%
1980	14%	7%	4%	2%	1%	0%	3%	72%	43%	15%	13%	0%	16%	84%	16%	84%
1981	14%	6%	5%	2%	1%	1%	3%	72%	43%	16%	13%	0%	16%	84%	16%	84%
1982	13%	6%	5%	2%	0%	1%	3%	73%	43%	16%	13%	0%	15%	85%	15%	85%
1983	14%	6%	5%	2%	0%	1%	3%	73%	43%	16%	13%	0%	16%	85%	15%	85%
1984	15%	8%	5%	2%	-1%	1%	3%	71%	42%	17%	12%	0%	18%	83%	17%	83%
1985	17%	8%	5%	2%	0%	1%	3%	70%	42%	16%	11%	0%	20%	82%	18%	82%
1986	20%	11%	5%	3%	0%	1%	3%	67%	40%	16%	10%	0%	23%	78%	22%	78%
1987	21%	11%	5%	3%	0%	1%	3%	66%	40%	16%	10%	0%	24%	77%	23%	77%
1988	22%	13%	6%	3%	0%	1%	3%	64%	40%	15%	9%	1%	26%	75%	25%	75%
1989	23%	13%	6%	3%	0%	1%	3%	64%	39%	15%	9%	0%	27%	74%	26%	74%
1990	23%	12%	6%	3%	0%	2%	3%	64%	40%	15%	9%	0%	26%	75%	25%	75%
1991	22%	12%	6%	3%	0%	2%	3%	65%	40%	15%	9%	1%	26%	76%	24%	76%
1992	22%	11%	6%	2%	0%	2%	3%	65%	40%	15%	9%	0%	26%	76%	24%	76%
1993	22%	11%	7%	2%	0%	2%	3%	66%	40%	16%	9%	1%	26%	77%	23%	77%
1994	22%	11%	7%	2%	0%	2%	3%	65%	40%	16%	8%	1%	26%	77%	23%	77%
1995	22%	11%	7%	2%	0%	2%	3%	65%	39%	16%	8%	1%	26%	77%	23%	77%
1996	22%	10%	7%	2%	0%	3%	2%	65%	39%	17%	8%	1%	26%	77%	23%	77%
1997	23%	11%	7%	2%	0%	3%	2%	64%	39%	16%	8%	1%	27%	76%	24%	76%
1998	24%	11%	7%	2%	0%	3%	2%	63%	39%	16%	8%	0%	28%	75%	25%	75%
1999	23%	11%	7%	2%	1%	3%	2%	63%	39%	16%	8%	1%	28%	75%	25%	75%
2000	23%	11%	7%	2%	1%	2%	2%	64%	39%	16%	8%	1%	28%	75%	25%	75%
2001	23%	10%	7%	2%	1%	2%	2%	65%	40%	16%	8%	1%	27%	76%	24%	76%
2002	21%	10%	7%	2%	0%	2%	2%	66%	41%	17%	8%	1%	25%	78%	22%	78%
2003	22%	11%	7%	2%	0%	3%	2%	65%	41%	17%	8%	1%	26%	77%	23%	77%
2004	22%	10%	7%	2%	0%	2%	1%	65%	41%	16%	7%	1%	26%	77%	23%	77%
2005	22%	10%	8%	2%	0%	2%	1%	65%	41%	16%	7%	1%	26%	77%	23%	77%
2006	22%	10%	8%	2%	0%	2%	2%	64%	41%	16%	7%	1%	26%	76%	24%	76%
2007	23%	10%	8%	2%	0%	2%	2%	64%	41%	16%	7%	0%	27%	76%	24%	76%
2008	22%	10%	8%	2%	0%	2%	3%	65%	41%	16%	7%	1%	26%	77%	23%	77%

Table A9: Structure of national income in France, 1896-2008: taxes & transfers

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
	Tax revenues (% national income Y_t)								Tax rates (% factor income Y_{Kt} & Y_{Lt})							Transfers (% national income Y_t)			
	Total taxes	Production taxes	Corporate taxes	Personal taxes	Social contributions	Total taxes on capital	*inc. beq. & gift tax*	Total taxes on labor	Tax rate on capital	Tax rate on labor	*Tax rate on labor (exc. replac. taxes)*	Tax rate on capital	Tax rate on labor	*Tax rate on labor (exc. replac. taxes)*	*memo: tax rate on beq. & gifts (% B_t)*	**Total cash transfers**	inc. replac. income (pensions & UI)	inc. pure transfers	*memo: in-kind govt transfers: health, educ.*
									(excluding production taxes)			(including production taxes)							
	T_t	T_{pt}	T_{ct}	T_{it}	SC_t	T_{Kt}	T_{Bt}	T_{Lt}								TR_t	Y_{Rt}	TR_{0t}	
1896	9%	7%	0%	2%	0%	1%	1%	1%	4%	2%	2%	10%	8%	8%	4%	1%	1%	0%	
1897	9%	7%	0%	2%	0%	1%	1%	1%	4%	2%	2%	11%	9%	9%	4%	1%	1%	0%	
1898	9%	7%	0%	2%	0%	1%	1%	1%	4%	2%	2%	11%	9%	9%	3%	1%	1%	0%	
1899	9%	7%	0%	2%	0%	1%	1%	1%	4%	1%	1%	10%	8%	8%	3%	1%	1%	0%	
1900	9%	7%	0%	2%	0%	1%	1%	1%	3%	1%	1%	10%	8%	8%	3%	1%	1%	0%	
1901	9%	7%	0%	2%	0%	1%	1%	1%	4%	2%	2%	10%	8%	8%	3%	1%	1%	0%	
1902	9%	7%	0%	2%	0%	1%	1%	1%	4%	2%	2%	11%	8%	8%	3%	1%	1%	0%	
1903	9%	7%	0%	2%	0%	1%	1%	1%	4%	2%	2%	11%	8%	8%	3%	1%	1%	0%	
1904	9%	7%	0%	2%	0%	1%	1%	1%	4%	2%	2%	10%	8%	8%	3%	1%	1%	0%	
1905	9%	7%	0%	2%	0%	1%	1%	1%	4%	2%	2%	10%	8%	8%	4%	1%	1%	0%	
1906	9%	7%	0%	2%	0%	1%	1%	1%	4%	2%	2%	11%	8%	8%	3%	1%	1%	0%	
1907	9%	7%	0%	2%	0%	1%	1%	1%	3%	2%	2%	10%	8%	8%	3%	1%	1%	0%	
1908	9%	7%	0%	2%	0%	1%	1%	1%	4%	2%	2%	10%	8%	8%	3%	1%	1%	0%	
1909	9%	7%	0%	2%	0%	1%	1%	1%	3%	2%	2%	10%	8%	8%	3%	1%	1%	0%	
1910	9%	7%	0%	2%	0%	1%	1%	1%	3%	2%	2%	10%	9%	9%	3%	2%	2%	0%	
1911	9%	7%	0%	2%	0%	1%	1%	1%	3%	1%	1%	10%	9%	9%	4%	1%	1%	0%	
1912	8%	6%	0%	2%	0%	1%	1%	1%	3%	1%	1%	9%	8%	8%	4%	1%	1%	0%	
1913	9%	7%	0%	2%	0%	1%	1%	1%	3%	1%	1%	9%	8%	8%	4%	1%	1%	0%	
1914	7%	5%	0%	2%	0%	1%	1%	1%	3%	2%	1%	8%	7%	6%	3%	1%	1%	0%	
1915	6%	5%	0%	1%	0%	1%	1%	1%	3%	1%	1%	8%	6%	6%	2%	4%	4%	0%	
1916	6%	5%	0%	1%	0%	1%	0%	1%	2%	1%	1%	7%	6%	6%	3%	6%	6%	0%	
1917	7%	5%	0%	1%	0%	1%	1%	1%	2%	1%	1%	7%	6%	6%	3%	5%	5%	0%	
1918	6%	4%	0%	2%	0%	1%	0%	1%	3%	2%	2%	7%	6%	6%	3%	6%	6%	0%	
1919	8%	5%	0%	2%	0%	1%	1%	2%	4%	2%	2%	9%	7%	7%	6%	11%	6%	5%	
1920	9%	6%	1%	2%	0%	2%	1%	2%	5%	2%	2%	11%	8%	8%	6%	8%	4%	5%	
1921	12%	7%	1%	4%	0%	2%	1%	3%	6%	4%	4%	13%	11%	11%	6%	6%	4%	1%	
1922	12%	7%	1%	4%	0%	2%	1%	3%	6%	4%	4%	13%	11%	11%	7%	10%	4%	6%	
1923	12%	7%	1%	4%	0%	2%	1%	3%	6%	4%	4%	13%	11%	11%	7%	5%	3%	2%	
1924	13%	7%	1%	5%	0%	3%	1%	3%	7%	5%	5%	14%	12%	12%	8%	6%	3%	3%	
1925	14%	8%	1%	4%	0%	3%	1%	3%	7%	5%	5%	14%	12%	12%	7%	5%	3%	1%	
1926	16%	10%	1%	4%	0%	2%	1%	3%	7%	5%	5%	16%	15%	15%	6%	3%	2%	0%	
1927	17%	11%	2%	4%	0%	3%	1%	3%	9%	5%	5%	19%	16%	15%	6%	4%	3%	1%	
1928	17%	11%	1%	4%	0%	3%	1%	3%	8%	5%	5%	18%	16%	15%	6%	6%	6%	0%	
1929	17%	11%	1%	4%	0%	3%	1%	3%	8%	5%	5%	18%	16%	15%	5%	5%	4%	0%	
1930	17%	10%	2%	4%	1%	3%	1%	4%	9%	6%	5%	18%	16%	14%	5%	6%	5%	0%	
1931	19%	11%	2%	4%	2%	3%	1%	5%	10%	8%	5%	20%	18%	15%	5%	7%	7%	0%	
1932	21%	12%	2%	5%	2%	3%	1%	6%	13%	9%	6%	23%	20%	17%	6%	8%	8%	0%	
1933	20%	12%	1%	5%	2%	3%	1%	5%	9%	8%	5%	20%	19%	17%	5%	9%	9%	1%	
1934	21%	12%	1%	5%	2%	3%	1%	6%	10%	9%	6%	21%	20%	17%	5%	10%	10%	0%	
1935	20%	12%	1%	5%	2%	2%	1%	6%	8%	9%	6%	19%	20%	17%	5%	10%	10%	0%	
1936	17%	11%	1%	4%	2%	2%	0%	5%	7%	7%	5%	17%	17%	15%	5%	9%	9%	0%	
1937	16%	9%	1%	4%	2%	2%	0%	5%	7%	8%	5%	16%	16%	14%	4%	8%	8%	0%	
1938	18%	11%	1%	5%	2%	2%	1%	5%	8%	8%	5%	18%	18%	15%	4%	8%	8%	0%	
1939	18%	10%	1%	5%	2%	2%	0%	5%	8%	8%	5%	17%	18%	15%	5%	6%	6%	0%	
1940	18%	11%	1%	5%	2%	2%	0%	5%	9%	8%	5%	18%	17%	15%	3%	9%	7%	2%	
1941	18%	11%	1%	5%	2%	2%	0%	6%	9%	8%	5%	19%	18%	15%	3%	9%	7%	2%	
1942	18%	10%	1%	4%	3%	1%	0%	6%	10%	9%	5%	19%	18%	15%	3%	9%	7%	2%	
1943	18%	10%	1%	4%	3%	1%	0%	7%	12%	8%	5%	22%	18%	15%	3%	9%	7%	2%	
1944	18%	10%	1%	4%	3%	1%	0%	7%	70%	8%	4%	73%	17%	14%	3%	8%	6%	2%	
1945	21%	11%	0%	4%	5%	1%	0%	9%	58%	10%	4%	63%	20%	15%	4%	9%	6%	2%	
1946	24%	12%	1%	4%	7%	2%	0%	10%	13%	13%	5%	23%	24%	16%	6%	9%	7%	2%	
1947	25%	13%	1%	4%	8%	1%	0%	11%	13%	15%	6%	24%	26%	18%	6%	9%	7%	2%	
1948	25%	13%	1%	3%	8%	1%	0%	10%	10%	14%	5%	22%	26%	17%	6%	9%	7%	2%	
1949	27%	14%	2%	3%	9%	2%	0%	11%	11%	17%	6%	23%	29%	19%	5%	9%	7%	2%	10%
1950	29%	14%	2%	3%	9%	2%	0%	12%	10%	19%	6%	23%	30%	20%	5%	10%	8%	2%	10%
1951	29%	15%	2%	3%	9%	2%	0%	12%	12%	18%	6%	25%	30%	20%	4%	10%	8%	2%	10%
1952	31%	16%	2%	3%	10%	2%	0%	13%	13%	19%	7%	27%	32%	22%	3%	10%	8%	2%	11%
1953	32%	16%	2%	4%	10%	3%	0%	14%	14%	21%	8%	27%	33%	22%	3%	10%	8%	2%	11%
1954	31%	15%	2%	3%	11%	2%	0%	13%	12%	20%	7%	26%	33%	22%	3%	11%	8%	2%	11%
1955	30%	15%	2%	3%	11%	2%	0%	13%	12%	20%	7%	25%	32%	21%	3%	11%	9%	2%	10%
1956	31%	14%	2%	3%	11%	3%	0%	14%	14%	21%	8%	26%	32%	21%	3%	11%	9%	2%	11%
1957	31%	15%	2%	3%	11%	3%	0%	14%	14%	21%	8%	27%	33%	21%	3%	11%	9%	2%	11%
1958	33%	15%	2%	4%	11%	3%	0%	14%	16%	22%	9%	29%	34%	23%	4%	11%	9%	2%	10%
1959	34%	16%	2%	4%	11%	3%	0%	15%	16%	23%	9%	30%	35%	24%	4%	11%	9%	2%	11%
1960	33%	16%	2%	4%	11%	3%	0%	14%	15%	22%	9%	28%	34%	23%	3%	11%	9%	2%	10%
1961	34%	16%	2%	4%	12%	3%	0%	15%	15%	24%	10%	28%	36%	24%	3%	11%	9%	2%	11%
1962	34%	16%	2%	4%	13%	3%	0%	16%	14%	24%	9%	27%	36%	24%	3%	12%	9%	2%	11%
1963	35%	16%	2%	4%	13%	2%	0%	16%	14%	25%	10%	27%	37%	24%	3%	13%	10%	3%	11%
1964	36%	16%	2%	4%	14%	3%	0%	17%	14%	26%	10%	28%	38%	25%	3%	13%	10%	2%	11%
1965	36%	16%	2%	4%	14%	3%	0%	18%	14%	27%	10%	28%	39%	25%	3%	13%	11%	2%	11%
1966	36%	16%	2%	5%	14%	2%	0%	18%	13%	27%	10%	27%	39%	25%	3%	13%	11%	2%	11%
1967	36%	16%	2%	4%	14%	3%	0%	18%	13%	28%	10%	27%	39%	24%	3%	13%	11%	2%	12%
1968	36%	14%	2%	5%	15%	3%	0%	19%	13%	29%	11%	25%	39%	24%	3%	14%	12%	2%	12%
1969	37%	15%	2%	5%	15%	3%	0%	19%	14%	30%	12%	26%	40%	25%	3%	14%	12%	2%	12%
1970	37%	14%	2%	5%	15%	3%	0%	19%	16%	30%	12%	28%	40%	24%	4%	13%	11%	2%	12%
1971	36%	14%	2%	4%	16%	3%	0%	19%	15%	30%	12%	27%	40%	24%	4%	13%	11%	2%	12%

1972	**37%**	14%	2%	5%	16%	3%	*0%*	20%	**16%**	**30%**	*12%*	**27%**	**40%**	*24%*	4%	**13%**	12%	2%	*13%*
1973	**36%**	14%	2%	4%	16%	3%	*0%*	19%	**15%**	**30%**	*12%*	**27%**	**40%**	*24%*	4%	**13%**	12%	2%	*13%*
1974	**37%**	13%	3%	5%	16%	4%	*0%*	20%	**20%**	**30%**	*12%*	**30%**	**39%**	*23%*	4%	**14%**	12%	2%	*13%*
1975	**39%**	14%	2%	5%	18%	3%	*0%*	22%	**18%**	**32%**	*12%*	**29%**	**41%**	*24%*	5%	**16%**	14%	2%	*14%*
1976	**41%**	14%	3%	5%	19%	3%	*0%*	24%	**21%**	**34%**	*14%*	**32%**	**43%**	*26%*	3%	**16%**	14%	2%	*14%*
1977	**41%**	13%	2%	6%	20%	3%	*0%*	24%	**20%**	**35%**	*15%*	**31%**	**43%**	*26%*	3%	**16%**	14%	2%	*15%*
1978	**42%**	14%	2%	6%	20%	3%	*0%*	25%	**19%**	**35%**	*14%*	**31%**	**44%**	*26%*	4%	**17%**	15%	2%	*15%*
1979	**44%**	15%	2%	6%	21%	3%	*0%*	26%	**20%**	**37%**	*16%*	**32%**	**46%**	*28%*	4%	**17%**	15%	2%	*15%*
1980	**45%**	15%	2%	6%	21%	3%	*0%*	27%	**23%**	**37%**	*16%*	**34%**	**47%**	*28%*	4%	**17%**	16%	2%	*16%*
1981	**45%**	14%	2%	6%	22%	3%	*0%*	27%	**24%**	**38%**	*15%*	**35%**	**47%**	*27%*	5%	**18%**	17%	2%	*16%*
1982	**46%**	15%	3%	7%	22%	3%	*0%*	28%	**26%**	**39%**	*15%*	**37%**	**48%**	*27%*	4%	**19%**	17%	2%	*17%*
1983	**47%**	15%	2%	7%	23%	3%	*0%*	29%	**23%**	**40%**	*16%*	**35%**	**49%**	*28%*	5%	**19%**	18%	2%	*17%*
1984	**48%**	15%	2%	7%	23%	3%	*0%*	30%	**21%**	**42%**	*17%*	**33%**	**50%**	*29%*	5%	**20%**	17%	2%	*17%*
1985	**47%**	15%	2%	7%	23%	3%	*0%*	29%	**20%**	**42%**	*17%*	**32%**	**51%**	*29%*	4%	**20%**	17%	2%	*17%*
1986	**46%**	14%	2%	7%	23%	4%	*0%*	28%	**19%**	**42%**	*17%*	**30%**	**50%**	*29%*	5%	**19%**	17%	3%	*16%*
1987	**47%**	15%	3%	7%	23%	4%	*0%*	28%	**18%**	**43%**	*17%*	**30%**	**51%**	*29%*	5%	**19%**	17%	2%	*16%*
1988	**46%**	15%	3%	6%	22%	4%	*0%*	27%	**18%**	**43%**	*17%*	**30%**	**51%**	*29%*	6%	**19%**	17%	2%	*16%*
1989	**46%**	15%	3%	6%	23%	4%	*0%*	27%	**18%**	**43%**	*18%*	**30%**	**51%**	*30%*	6%	**18%**	16%	2%	*16%*
1990	**47%**	15%	3%	7%	23%	4%	*0%*	28%	**18%**	**43%**	*18%*	**30%**	**52%**	*30%*	6%	**19%**	16%	2%	*16%*
1991	**47%**	15%	2%	7%	23%	4%	*0%*	28%	**17%**	**44%**	*18%*	**30%**	**52%**	*30%*	6%	**19%**	17%	2%	*16%*
1992	**47%**	14%	2%	7%	23%	3%	*0%*	29%	**15%**	**45%**	*18%*	**27%**	**53%**	*30%*	6%	**20%**	17%	2%	*17%*
1993	**47%**	15%	2%	8%	23%	3%	*0%*	30%	**15%**	**45%**	*17%*	**28%**	**53%**	*29%*	6%	**21%**	18%	2%	*18%*
1994	**48%**	15%	2%	8%	23%	3%	*0%*	29%	**16%**	**45%**	*17%*	**29%**	**54%**	*30%*	6%	**21%**	18%	2%	*18%*
1995	**48%**	16%	2%	8%	23%	3%	*0%*	29%	**16%**	**45%**	*17%*	**29%**	**54%**	*30%*	5%	**20%**	18%	2%	*18%*
1996	**50%**	16%	2%	8%	23%	4%	*0%*	30%	**18%**	**46%**	*17%*	**31%**	**54%**	*31%*	6%	**21%**	18%	2%	*18%*
1997	**50%**	16%	2%	8%	23%	4%	*1%*	29%	**19%**	**46%**	*17%*	**32%**	**55%**	*31%*	7%	**21%**	18%	2%	*18%*
1998	**50%**	16%	3%	11%	20%	5%	*0%*	29%	**20%**	**46%**	*17%*	**33%**	**54%**	*31%*	6%	**20%**	18%	2%	*18%*
1999	**50%**	16%	3%	11%	20%	5%	*1%*	29%	**22%**	**46%**	*18%*	**34%**	**55%**	*31%*	6%	**20%**	18%	2%	*18%*
2000	**50%**	15%	3%	11%	20%	5%	*1%*	29%	**22%**	**45%**	*18%*	**34%**	**54%**	*31%*	6%	**19%**	17%	2%	*18%*
2001	**49%**	15%	3%	11%	20%	5%	*1%*	29%	**24%**	**45%**	*18%*	**35%**	**53%**	*30%*	6%	**19%**	17%	2%	*18%*
2002	**49%**	15%	3%	11%	21%	5%	*1%*	29%	**22%**	**44%**	*17%*	**34%**	**53%**	*29%*	5%	**20%**	18%	2%	*19%*
2003	**49%**	15%	2%	11%	21%	4%	*1%*	29%	**20%**	**45%**	*17%*	**32%**	**53%**	*29%*	5%	**20%**	18%	2%	*19%*
2004	**49%**	15%	3%	11%	21%	5%	*1%*	29%	**21%**	**45%**	*17%*	**34%**	**53%**	*29%*	6%	**20%**	18%	2%	*19%*
2005	**50%**	16%	3%	11%	21%	5%	*1%*	29%	**22%**	**45%**	*17%*	**34%**	**54%**	*30%*	5%	**20%**	18%	2%	*19%*
2006	**50%**	16%	3%	11%	21%	5%	*1%*	29%	**24%**	**45%**	*17%*	**36%**	**54%**	*30%*	4%	**20%**	18%	2%	*19%*
2007	**49%**	15%	3%	10%	21%	5%	*1%*	29%	**23%**	**45%**	*16%*	**35%**	**53%**	*29%*	4%	**20%**	18%	2%	*19%*
2008	**49%**	15%	3%	10%	21%	5%	*0%*	29%	**23%**	**45%**	*16%*	**35%**	**53%**	*29%*	3%	**20%**	19%	2%	*19%*

Table A10: Structure of national income in France, 1896-2008: disposable income & savings

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]
	% national income Y_t									% disposable income Y_{dt}							
	Disposable income Y_{dt} = national income - taxes + transfers + net govt interest	incl. after-tax capital income	incl. after-tax labor income	incl. after-tax replac. income	memo: after-tax capital income excl. retained earnings	memo: retained earnings	Personal savings S_{0t}	**Private savings (personal savings + retained earnings) S_t**	memo: Private savings - war destructions $S_t + WD_t$	Disposable income = national income - taxes + transfers + net govt interest	incl. after-tax capital income	incl. after-tax labor income	incl. after-tax replac. income	memo: after-tax capital income excl. retained earnings	memo: retained earnings	Personal savings S_{0t}	**Private savings (personal savings + retained earnings) S_t**
1896	**94%**	24%	69%	1%	*24%*	*1%*	11%	**12%**	*12%*	100%	26%	73%	1%	*25%*	*1%*	12%	12%
1897	**94%**	22%	71%	1%	*22%*	*0%*	11%	**11%**	*11%*	100%	23%	76%	1%	*24%*	*0%*	12%	11%
1898	**94%**	23%	70%	1%	*23%*	*0%*	10%	**10%**	*10%*	100%	25%	74%	1%	*25%*	*0%*	11%	11%
1899	**94%**	25%	68%	1%	*24%*	*1%*	10%	**11%**	*11%*	100%	27%	72%	1%	*26%*	*1%*	11%	12%
1900	**94%**	27%	66%	1%	*26%*	*1%*	8%	**9%**	*9%*	100%	29%	70%	1%	*28%*	*1%*	8%	10%
1901	**95%**	23%	71%	1%	*23%*	*-1%*	7%	**6%**	*6%*	100%	24%	75%	1%	*25%*	*-1%*	7%	6%
1902	**95%**	23%	70%	1%	*23%*	*0%*	9%	**9%**	*9%*	100%	25%	74%	1%	*25%*	*0%*	10%	10%
1903	**94%**	24%	70%	1%	*23%*	*0%*	7%	**7%**	*7%*	100%	25%	74%	1%	*25%*	*0%*	8%	8%
1904	**94%**	24%	70%	1%	*24%*	*0%*	4%	**4%**	*4%*	100%	25%	74%	1%	*25%*	*0%*	5%	5%
1905	**95%**	27%	66%	1%	*26%*	*1%*	6%	**8%**	*8%*	100%	28%	70%	1%	*27%*	*1%*	7%	8%
1906	**94%**	23%	70%	1%	*24%*	*-1%*	6%	**5%**	*5%*	100%	25%	74%	1%	*25%*	*-1%*	6%	6%
1907	**95%**	31%	63%	1%	*28%*	*2%*	6%	**9%**	*9%*	100%	32%	67%	1%	*30%*	*2%*	7%	9%
1908	**95%**	26%	67%	1%	*26%*	*0%*	7%	**8%**	*8%*	100%	28%	71%	1%	*27%*	*0%*	8%	8%
1909	**95%**	29%	65%	1%	*27%*	*1%*	5%	**6%**	*6%*	100%	30%	69%	1%	*29%*	*1%*	5%	6%
1910	**94%**	26%	67%	2%	*26%*	*0%*	8%	**8%**	*8%*	100%	27%	71%	2%	*28%*	*0%*	9%	8%
1911	**94%**	31%	62%	1%	*29%*	*2%*	2%	**4%**	*4%*	100%	33%	66%	1%	*31%*	*2%*	2%	4%
1912	**95%**	38%	56%	1%	*33%*	*5%*	6%	**12%**	*12%*	100%	40%	58%	1%	*35%*	*6%*	7%	12%
1913	**94%**	36%	57%	1%	*32%*	*4%*	5%	**10%**	*10%*	100%	39%	60%	1%	*34%*	*5%*	6%	10%
1914	**96%**	23%	72%	1%	*22%*	*1%*	0%	**1%**	*1%*	100%	24%	75%	1%	*22%*	*1%*	0%	1%
1915	**101%**	19%	78%	4%	*18%*	*0%*	0%	**0%**	*-44%*	100%	19%	77%	4%	*18%*	*0%*	0%	0%
1916	**103%**	29%	69%	6%	*25%*	*4%*	0%	**4%**	*-36%*	100%	28%	66%	6%	*24%*	*4%*	0%	4%
1917	**103%**	30%	68%	5%	*25%*	*5%*	0%	**5%**	*-36%*	100%	29%	66%	5%	*25%*	*5%*	0%	5%
1918	**105%**	25%	74%	6%	*21%*	*4%*	0%	**4%**	*-43%*	100%	24%	70%	6%	*20%*	*3%*	0%	3%
1919	**105%**	31%	67%	6%	*27%*	*5%*	0%	**5%**	*5%*	100%	30%	64%	6%	*26%*	*4%*	0%	4%
1920	**101%**	31%	67%	4%	*25%*	*6%*	19%	**25%**	*25%*	100%	31%	66%	4%	*25%*	*6%*	19%	24%
1921	**100%**	31%	65%	4%	*25%*	*6%*	24%	**29%**	*29%*	100%	31%	65%	4%	*25%*	*6%*	24%	29%
1922	**99%**	33%	62%	4%	*26%*	*7%*	18%	**25%**	*25%*	100%	33%	63%	4%	*27%*	*7%*	18%	25%
1923	**98%**	35%	60%	3%	*28%*	*7%*	22%	**29%**	*29%*	100%	35%	61%	3%	*28%*	*7%*	23%	30%
1924	**96%**	34%	59%	3%	*27%*	*7%*	19%	**25%**	*25%*	100%	35%	61%	3%	*28%*	*7%*	19%	26%
1925	**95%**	34%	58%	3%	*27%*	*7%*	17%	**24%**	*24%*	100%	36%	61%	3%	*29%*	*7%*	18%	25%
1926	**92%**	33%	56%	2%	*27%*	*6%*	14%	**21%**	*21%*	100%	36%	61%	2%	*29%*	*7%*	16%	22%
1927	**91%**	33%	55%	3%	*27%*	*6%*	5%	**11%**	*11%*	100%	36%	61%	4%	*29%*	*7%*	5%	12%
1928	**93%**	32%	56%	5%	*26%*	*6%*	14%	**20%**	*20%*	100%	35%	60%	6%	*28%*	*6%*	15%	22%
1929	**92%**	31%	56%	4%	*26%*	*5%*	13%	**18%**	*18%*	100%	34%	61%	4%	*28%*	*6%*	14%	20%
1930	**92%**	29%	58%	5%	*24%*	*5%*	11%	**16%**	*16%*	100%	31%	63%	6%	*26%*	*6%*	12%	17%
1931	**91%**	27%	58%	6%	*22%*	*5%*	4%	**9%**	*9%*	100%	29%	64%	7%	*24%*	*5%*	5%	10%
1932	**91%**	23%	61%	7%	*20%*	*3%*	0%	**3%**	*3%*	100%	25%	67%	8%	*21%*	*4%*	0%	3%
1933	**93%**	26%	59%	8%	*21%*	*5%*	-2%	**3%**	*3%*	100%	28%	63%	9%	*22%*	*5%*	-2%	3%
1934	**94%**	25%	59%	9%	*22%*	*4%*	-1%	**3%**	*3%*	100%	27%	63%	10%	*23%*	*4%*	-1%	3%
1935	**94%**	28%	57%	9%	*23%*	*4%*	3%	**8%**	*8%*	100%	29%	61%	10%	*25%*	*5%*	3%	8%
1936	**96%**	27%	60%	9%	*23%*	*4%*	13%	**17%**	*17%*	100%	28%	63%	9%	*24%*	*4%*	14%	18%
1937	**96%**	26%	62%	7%	*22%*	*4%*	9%	**14%**	*14%*	100%	28%	65%	8%	*23%*	*4%*	10%	14%
1938	**94%**	26%	60%	8%	*22%*	*4%*	6%	**10%**	*10%*	100%	28%	64%	8%	*24%*	*4%*	7%	11%
1939	**91%**	27%	59%	6%	*22%*	*5%*	0%	**5%**	*5%*	100%	29%	64%	6%	*24%*	*5%*	0%	5%
1940	**89%**	20%	63%	6%	*16%*	*4%*	0%	**4%**	*-21%*	100%	23%	70%	7%	*18%*	*5%*	0%	5%
1941	**89%**	17%	66%	6%	*14%*	*3%*	0%	**3%**	*-23%*	100%	19%	74%	7%	*15%*	*4%*	0%	4%
1942	**88%**	14%	68%	6%	*11%*	*3%*	0%	**3%**	*-25%*	100%	16%	77%	7%	*13%*	*3%*	0%	3%
1943	**88%**	10%	72%	6%	*8%*	*1%*	0%	**1%**	*-29%*	100%	11%	82%	7%	*10%*	*1%*	0%	1%
1944	**88%**	0%	82%	6%	*4%*	*-3%*	0%	**-3%**	*-38%*	100%	0%	93%	7%	*4%*	*-4%*	0%	-4%
1945	**86%**	1%	79%	6%	*2%*	*-2%*	0%	**-2%**	*-29%*	100%	1%	92%	7%	*2%*	*-2%*	0%	-2%
1946	**83%**	11%	66%	7%	*7%*	*4%*	0%	**4%**	*4%*	100%	13%	79%	8%	*9%*	*4%*	0%	4%
1947	**82%**	9%	66%	7%	*6%*	*3%*	0%	**3%**	*3%*	100%	11%	81%	8%	*7%*	*3%*	0%	3%
1948	**82%**	12%	63%	7%	*7%*	*4%*	0%	**4%**	*4%*	100%	15%	77%	8%	*9%*	*5%*	0%	5%
1949	**79%**	17%	56%	7%	*14%*	*3%*	11%	**14%**	*14%*	100%	21%	70%	9%	*17%*	*4%*	14%	17%
1950	**79%**	19%	52%	7%	*15%*	*4%*	10%	**14%**	*14%*	100%	25%	66%	9%	*19%*	*6%*	13%	18%
1951	**78%**	17%	53%	8%	*14%*	*3%*	10%	**13%**	*13%*	100%	22%	68%	10%	*18%*	*4%*	13%	17%
1952	**76%**	14%	54%	8%	*13%*	*2%*	10%	**12%**	*12%*	100%	19%	71%	10%	*16%*	*2%*	13%	16%
1953	**75%**	15%	52%	8%	*13%*	*2%*	9%	**11%**	*11%*	100%	20%	69%	10%	*18%*	*3%*	12%	14%
1954	**76%**	16%	53%	8%	*13%*	*2%*	10%	**12%**	*12%*	100%	20%	69%	11%	*18%*	*3%*	14%	16%
1955	**77%**	16%	53%	8%	*13%*	*3%*	11%	**14%**	*14%*	100%	21%	68%	11%	*17%*	*4%*	15%	18%
1956	**77%**	15%	53%	8%	*13%*	*2%*	10%	**12%**	*12%*	100%	20%	69%	11%	*17%*	*3%*	12%	15%
1957	**77%**	16%	52%	8%	*13%*	*3%*	10%	**13%**	*13%*	100%	21%	68%	11%	*17%*	*4%*	13%	17%
1958	**75%**	15%	51%	8%	*13%*	*3%*	10%	**13%**	*13%*	100%	21%	68%	11%	*17%*	*4%*	14%	17%
1959	**74%**	15%	50%	8%	*12%*	*3%*	9%	**12%**	*12%*	100%	20%	68%	11%	*17%*	*4%*	12%	16%
1960	**75%**	17%	50%	8%	*13%*	*3%*	11%	**14%**	*14%*	100%	22%	67%	11%	*17%*	*5%*	15%	19%
1961	**74%**	16%	50%	9%	*13%*	*3%*	10%	**13%**	*13%*	100%	21%	67%	12%	*17%*	*4%*	14%	18%
1962	**74%**	15%	51%	9%	*13%*	*2%*	12%	**14%**	*14%*	100%	20%	68%	12%	*17%*	*3%*	16%	19%
1963	**74%**	14%	50%	9%	*12%*	*2%*	11%	**14%**	*14%*	100%	19%	68%	13%	*16%*	*3%*	15%	18%
1964	**73%**	14%	49%	10%	*12%*	*3%*	11%	**13%**	*13%*	100%	20%	67%	13%	*16%*	*4%*	15%	18%
1965	**73%**	15%	48%	10%	*12%*	*3%*	11%	**14%**	*14%*	100%	20%	66%	14%	*16%*	*4%*	15%	19%
1966	**73%**	15%	48%	10%	*12%*	*3%*	11%	**14%**	*14%*	100%	21%	65%	14%	*16%*	*5%*	15%	19%
1967	**74%**	16%	47%	11%	*13%*	*3%*	11%	**15%**	*15%*	100%	22%	64%	14%	*17%*	*5%*	15%	20%
1968	**74%**	16%	47%	11%	*13%*	*3%*	11%	**15%**	*15%*	100%	21%	64%	15%	*17%*	*4%*	15%	20%

1969	**73%**	17%	46%	11%	*13%*	*4%*	10%	**14%**	*14%*	100%	23%	62%	15%	*17%*	*5%*	14%	19%
1970	**73%**	16%	46%	11%	*13%*	*3%*	12%	**15%**	*15%*	100%	22%	64%	15%	*18%*	*4%*	16%	20%
1971	**73%**	16%	46%	11%	*13%*	*3%*	11%	**15%**	*15%*	100%	22%	63%	15%	*17%*	*4%*	16%	20%
1972	**73%**	15%	47%	11%	*13%*	*3%*	12%	**15%**	*15%*	100%	21%	64%	15%	*17%*	*4%*	16%	20%
1973	**73%**	16%	46%	11%	*13%*	*3%*	12%	**15%**	*15%*	100%	22%	63%	15%	*17%*	*5%*	16%	21%
1974	**73%**	14%	47%	11%	*13%*	*1%*	13%	**14%**	*14%*	100%	20%	64%	16%	*18%*	*2%*	18%	19%
1975	**73%**	12%	48%	13%	*12%*	*0%*	14%	**14%**	*14%*	100%	16%	66%	18%	*16%*	*0%*	19%	19%
1976	**71%**	11%	47%	13%	*11%*	*0%*	12%	**11%**	*11%*	100%	15%	67%	18%	*16%*	*0%*	16%	16%
1977	**72%**	11%	47%	13%	*11%*	*0%*	12%	**12%**	*12%*	100%	16%	66%	18%	*16%*	*0%*	16%	17%
1978	**71%**	10%	47%	14%	*11%*	*0%*	13%	**12%**	*12%*	100%	14%	66%	19%	*15%*	*0%*	18%	17%
1979	**70%**	10%	46%	14%	*11%*	*-1%*	11%	**11%**	*11%*	100%	15%	66%	20%	*16%*	*-1%*	16%	15%
1980	**70%**	9%	46%	14%	*11%*	*-1%*	11%	**9%**	*9%*	100%	13%	66%	21%	*15%*	*-2%*	15%	13%
1981	**71%**	9%	46%	15%	*12%*	*-3%*	11%	**8%**	*8%*	100%	13%	66%	21%	*17%*	*-4%*	16%	12%
1982	**70%**	8%	46%	16%	*11%*	*-3%*	10%	**7%**	*7%*	100%	11%	66%	23%	*16%*	*-5%*	15%	10%
1983	**70%**	9%	45%	16%	*12%*	*-3%*	10%	**7%**	*7%*	100%	13%	65%	23%	*17%*	*-4%*	14%	10%
1984	**69%**	11%	43%	16%	*12%*	*-2%*	8%	**7%**	*7%*	100%	15%	62%	23%	*17%*	*-2%*	12%	10%
1985	**70%**	12%	42%	16%	*13%*	*-1%*	8%	**7%**	*7%*	100%	17%	60%	23%	*18%*	*-1%*	11%	10%
1986	**71%**	15%	40%	15%	*12%*	*2%*	7%	**9%**	*9%*	100%	21%	57%	22%	*18%*	*3%*	10%	13%
1987	**70%**	16%	39%	15%	*13%*	*3%*	5%	**8%**	*8%*	100%	22%	56%	22%	*19%*	*4%*	8%	11%
1988	**70%**	17%	38%	15%	*13%*	*4%*	5%	**9%**	*9%*	100%	24%	54%	22%	*19%*	*6%*	8%	13%
1989	**70%**	18%	38%	15%	*14%*	*4%*	6%	**10%**	*10%*	100%	25%	53%	21%	*20%*	*5%*	8%	14%
1990	**70%**	17%	38%	15%	*14%*	*3%*	7%	**10%**	*10%*	100%	25%	54%	21%	*20%*	*4%*	9%	14%
1991	**70%**	17%	38%	15%	*14%*	*2%*	7%	**10%**	*10%*	100%	24%	54%	22%	*21%*	*3%*	11%	14%
1992	**71%**	18%	38%	16%	*15%*	*3%*	8%	**11%**	*11%*	100%	25%	53%	22%	*21%*	*4%*	11%	15%
1993	**72%**	17%	38%	16%	*15%*	*2%*	9%	**11%**	*11%*	100%	24%	53%	23%	*22%*	*3%*	13%	15%
1994	**71%**	18%	37%	16%	*15%*	*3%*	8%	**11%**	*11%*	100%	25%	52%	23%	*21%*	*4%*	12%	15%
1995	**71%**	18%	37%	16%	*16%*	*2%*	9%	**11%**	*11%*	100%	25%	52%	23%	*22%*	*3%*	13%	16%
1996	**70%**	17%	37%	16%	*15%*	*2%*	9%	**10%**	*10%*	100%	24%	53%	23%	*22%*	*2%*	12%	14%
1997	**70%**	17%	36%	16%	*15%*	*2%*	9%	**11%**	*11%*	100%	25%	52%	23%	*22%*	*3%*	13%	16%
1998	**70%**	18%	37%	15%	*15%*	*3%*	9%	**12%**	*12%*	100%	25%	53%	22%	*21%*	*4%*	12%	17%
1999	**69%**	17%	37%	15%	*14%*	*3%*	8%	**11%**	*11%*	100%	24%	54%	22%	*20%*	*4%*	12%	16%
2000	**69%**	17%	37%	15%	*14%*	*2%*	8%	**11%**	*11%*	100%	24%	54%	22%	*21%*	*3%*	12%	15%
2001	**69%**	16%	38%	15%	*14%*	*1%*	9%	**10%**	*10%*	100%	23%	56%	22%	*21%*	*2%*	13%	15%
2002	**70%**	15%	39%	16%	*15%*	*0%*	10%	**10%**	*10%*	100%	22%	56%	22%	*21%*	*1%*	14%	15%
2003	**71%**	16%	39%	16%	*15%*	*2%*	9%	**11%**	*11%*	100%	23%	55%	22%	*21%*	*2%*	13%	15%
2004	**70%**	16%	38%	16%	*15%*	*1%*	9%	**10%**	*10%*	100%	22%	55%	23%	*21%*	*1%*	13%	14%
2005	**69%**	15%	38%	16%	*15%*	*0%*	8%	**9%**	*9%*	100%	22%	55%	23%	*21%*	*1%*	12%	13%
2006	**68%**	15%	38%	16%	*15%*	*0%*	8%	**8%**	*8%*	100%	22%	55%	23%	*22%*	*0%*	12%	12%
2007	**69%**	16%	38%	16%	*15%*	*0%*	9%	**9%**	*9%*	100%	22%	55%	23%	*22%*	*0%*	13%	13%
2008	**70%**	15%	38%	16%	*15%*	*0%*	9%	**8%**	*8%*	100%	22%	55%	23%	*22%*	*-1%*	12%	12%

Table A11: Structure of national income in France, 1896-2008: summary macro variables (annual series)

	[1] Real growth rate of national income	[2] Ratio (Private wealth)/ (National income)	[3] Capital share (exc. govt interest)	[4] Labor share	[5] Capital share (inc. govt interest)	[6] Rate of return	[7] Tax rate	[8] Capital tax rate	[9] Labor tax rate	[10] Correct. tax rate	[11] Correct. capital tax rate (inc. other corp. transf.)	[12] Correct. labor tax rate (exc. replac. taxes)	[13] After-tax capital share	[14] After-tax rate of return	[15] Personal savings rate	[16] Private savings (person. savings + retained earnings)	[17] Private savings minus war destruct.
	g_t	$\beta_t = W_t/Y_t$	α_t	$1-\alpha_t$	α_t^*	$r_t = \alpha_t^*/\beta_t$	τ_t	τ_{Kt}	τ_{Lt}	τ_t^*	τ_{Kt}^*	τ_{Lt}^*	α_{dt}	$r_{dt} = \alpha_{dt}/\beta_t = (1-\tau_{Kt}^*)r_t$	s_{ot}	s_t	s_t+d_{yt}
1896		662%	25%	75%	27%	4.1%	9%	10%	8%	9%	10%	8%	24%	3.7%	11%	12%	12%
1897	-1.2%	682%	22%	78%	25%	3.6%	9%	11%	9%	10%	11%	9%	22%	3.2%	11%	11%	11%
1898	4.7%	661%	24%	76%	26%	3.9%	9%	11%	9%	9%	11%	9%	23%	3.5%	10%	10%	10%
1899	3.9%	646%	26%	74%	28%	4.3%	9%	10%	8%	9%	10%	8%	25%	3.9%	10%	11%	11%
1900	1.6%	646%	28%	72%	30%	4.6%	9%	10%	8%	9%	10%	8%	27%	4.2%	8%	9%	9%
1901	-6.8%	703%	22%	78%	25%	3.6%	9%	10%	8%	9%	10%	8%	23%	3.2%	7%	6%	6%
1902	-1.6%	720%	24%	76%	26%	3.6%	9%	11%	8%	9%	11%	8%	23%	3.2%	9%	9%	9%
1903	5.6%	690%	24%	76%	26%	3.8%	9%	11%	8%	9%	11%	8%	24%	3.4%	7%	7%	7%
1904	3.1%	676%	24%	76%	26%	3.9%	9%	10%	8%	9%	10%	8%	24%	3.5%	4%	4%	4%
1905	0.6%	676%	28%	72%	30%	4.4%	9%	10%	8%	9%	10%	8%	27%	4.0%	6%	8%	8%
1906	-2.1%	698%	24%	76%	26%	3.7%	9%	11%	8%	9%	11%	8%	23%	3.3%	6%	5%	5%
1907	10.2%	638%	31%	69%	34%	5.3%	9%	10%	8%	9%	10%	8%	31%	4.8%	6%	9%	9%
1908	-3.2%	668%	27%	73%	29%	4.3%	9%	10%	8%	9%	10%	8%	26%	3.9%	7%	8%	8%
1909	4.6%	646%	29%	71%	32%	4.9%	9%	10%	8%	9%	10%	8%	29%	4.4%	5%	6%	6%
1910	-3.6%	676%	27%	73%	29%	4.3%	9%	10%	9%	9%	10%	9%	26%	3.8%	8%	8%	8%
1911	1.7%	672%	33%	67%	35%	5.1%	9%	10%	9%	9%	10%	9%	31%	4.6%	2%	4%	4%
1912	10.0%	615%	40%	60%	42%	6.8%	8%	9%	8%	8%	9%	8%	38%	6.2%	6%	12%	12%
1913	-5.1%	660%	38%	62%	40%	6.1%	9%	9%	8%	9%	9%	8%	36%	5.5%	5%	10%	10%
1914	-7.3%	682%	23%	77%	25%	3.7%	7%	8%	7%	7%	8%	6%	23%	3.4%	0%	1%	1%
1915	-5.9%	686%	18%	82%	20%	3.0%	6%	8%	6%	6%	8%	6%	19%	2.7%	0%	0%	-44%
1916	12.3%	539%	27%	73%	31%	5.7%	6%	7%	6%	6%	7%	6%	29%	5.4%	0%	4%	-36%
1917	-1.3%	481%	27%	73%	33%	6.8%	7%	7%	6%	7%	7%	6%	30%	6.3%	0%	5%	-36%
1918	-12.3%	478%	22%	78%	27%	5.6%	6%	7%	6%	6%	7%	6%	25%	5.2%	0%	4%	-43%
1919	5.7%	389%	27%	73%	34%	8.9%	8%	9%	7%	8%	9%	7%	31%	8.1%	0%	5%	5%
1920	5.6%	352%	27%	73%	35%	9.9%	9%	11%	8%	9%	11%	8%	31%	8.8%	19%	25%	25%
1921	16.1%	306%	27%	73%	35%	11.6%	12%	13%	11%	12%	13%	11%	31%	10.1%	24%	29%	29%
1922	11.5%	284%	31%	69%	38%	13.3%	12%	13%	11%	12%	13%	11%	33%	11.6%	18%	25%	25%
1923	1.7%	287%	32%	68%	40%	13.9%	12%	13%	11%	13%	13%	11%	35%	12.0%	22%	29%	29%
1924	1.0%	295%	33%	67%	40%	13.5%	13%	14%	12%	14%	14%	12%	34%	11.6%	19%	25%	25%
1925	3.2%	293%	34%	66%	40%	13.5%	14%	14%	12%	14%	14%	12%	34%	11.5%	17%	24%	24%
1926	-4.2%	327%	34%	66%	40%	12.2%	16%	16%	15%	16%	16%	15%	33%	10.2%	14%	21%	21%
1927	-1.5%	348%	35%	65%	40%	11.5%	17%	19%	16%	17%	19%	15%	33%	9.4%	5%	11%	11%
1928	8.7%	326%	34%	66%	39%	12.0%	17%	18%	16%	17%	18%	15%	32%	9.9%	14%	20%	20%
1929	1.2%	339%	33%	67%	38%	11.3%	17%	18%	16%	17%	18%	15%	31%	9.3%	13%	18%	18%
1930	-4.3%	369%	31%	69%	35%	9.6%	17%	18%	16%	16%	18%	14%	29%	7.8%	11%	16%	16%
1931	-3.2%	392%	29%	71%	33%	8.5%	19%	20%	18%	18%	20%	15%	27%	6.8%	4%	9%	9%
1932	-3.3%	410%	25%	75%	30%	7.3%	21%	23%	20%	20%	23%	17%	23%	5.6%	0%	3%	3%
1933	0.8%	405%	27%	73%	32%	7.9%	20%	20%	19%	19%	20%	17%	26%	6.4%	-2%	3%	3%
1934	-4.8%	423%	27%	73%	32%	7.6%	21%	21%	20%	19%	21%	17%	25%	6.0%	-1%	3%	3%
1935	7.3%	392%	29%	71%	34%	8.8%	20%	19%	20%	19%	19%	17%	28%	7.1%	3%	8%	8%
1936	5.4%	375%	28%	72%	33%	8.7%	17%	17%	17%	16%	17%	15%	27%	7.3%	13%	17%	17%
1937	-4.4%	405%	26%	74%	31%	7.7%	16%	16%	16%	15%	16%	14%	26%	6.5%	9%	14%	14%
1938	1.1%	409%	27%	73%	32%	7.8%	18%	18%	18%	17%	18%	15%	26%	6.4%	6%	10%	10%
1939	10.6%	374%	29%	71%	32%	8.6%	18%	17%	18%	16%	17%	15%	27%	7.1%	0%	5%	5%
1940	-32.5%	449%	25%	75%	25%	5.5%	18%	18%	17%	16%	18%	15%	20%	4.5%	0%	4%	-21%
1941	-6.0%	450%	21%	79%	21%	4.6%	18%	19%	18%	16%	19%	15%	17%	3.7%	0%	3%	-23%
1942	-3.1%	435%	17%	83%	17%	4.0%	18%	19%	18%	16%	19%	15%	14%	3.2%	0%	3%	-25%
1943	-11.5%	458%	12%	88%	12%	2.7%	18%	22%	18%	16%	22%	15%	10%	2.1%	0%	1%	-29%
1944	-11.4%	477%	2%	98%	2%	0.3%	18%	73%	17%	15%	73%	14%	0%	0.1%	0%	-3%	-38%
1945	27.9%	340%	2%	98%	2%	0.5%	21%	63%	20%	16%	63%	15%	1%	0.2%	0%	-2%	-29%
1946	46.6%	271%	14%	86%	14%	5.2%	24%	23%	24%	17%	23%	16%	11%	4.0%	0%	4%	4%
1947	0.0%	271%	12%	88%	12%	4.3%	25%	24%	26%	18%	24%	18%	9%	3.3%	0%	3%	3%
1948	13.7%	238%	15%	85%	15%	6.4%	25%	22%	26%	18%	22%	17%	12%	5.0%	0%	4%	4%
1949	11.6%	215%	23%	77%	23%	10.7%	27%	23%	29%	21%	28%	19%	17%	7.7%	11%	14%	14%
1950	6.9%	211%	26%	74%	27%	12.6%	29%	23%	30%	22%	27%	20%	19%	9.2%	10%	14%	14%
1951	7.5%	207%	24%	76%	25%	11.9%	29%	25%	30%	23%	30%	20%	17%	8.3%	10%	13%	13%
1952	3.6%	211%	21%	79%	21%	10.1%	31%	27%	32%	24%	32%	22%	14%	6.8%	10%	12%	12%
1953	6.0%	207%	23%	77%	23%	11.0%	32%	27%	33%	25%	32%	22%	15%	7.4%	9%	11%	11%
1954	6.1%	203%	22%	78%	23%	11.1%	31%	26%	33%	24%	31%	22%	16%	7.7%	10%	12%	12%
1955	6.8%	207%	23%	77%	23%	11.2%	30%	25%	32%	23%	30%	21%	16%	7.8%	11%	14%	14%
1956	5.2%	215%	22%	78%	22%	10.4%	31%	26%	32%	23%	32%	21%	15%	7.1%	10%	12%	12%
1957	9.8%	212%	23%	77%	23%	11.0%	31%	27%	33%	24%	32%	21%	16%	7.5%	10%	13%	13%
1958	0.1%	230%	23%	77%	23%	10.2%	33%	29%	34%	25%	34%	23%	15%	6.7%	10%	13%	13%
1959	2.2%	244%	23%	77%	23%	9.5%	34%	30%	35%	27%	35%	24%	15%	6.2%	9%	12%	12%
1960	7.4%	244%	24%	76%	25%	10.1%	33%	28%	34%	26%	33%	23%	17%	6.8%	11%	14%	14%
1961	4.8%	252%	24%	76%	24%	9.3%	34%	28%	36%	26%	33%	24%	16%	6.2%	10%	13%	13%
1962	7.2%	254%	22%	78%	22%	8.7%	34%	27%	36%	26%	33%	24%	15%	5.9%	12%	14%	14%
1963	7.2%	256%	21%	79%	21%	8.3%	35%	27%	37%	26%	33%	24%	14%	5.6%	11%	14%	14%
1964	7.2%	258%	22%	78%	22%	8.4%	36%	28%	38%	27%	34%	25%	14%	5.6%	11%	13%	13%
1965	5.2%	264%	23%	77%	22%	8.5%	36%	28%	39%	27%	33%	25%	15%	5.6%	11%	14%	14%
1966	5.4%	270%	23%	77%	23%	8.4%	36%	27%	39%	26%	32%	25%	15%	5.7%	11%	14%	14%
1967	5.3%	277%	23%	77%	23%	8.4%	36%	27%	39%	26%	32%	24%	16%	5.8%	11%	15%	15%

1968	4.1%	**287%**	23%	77%	**23%**	**8.0%**	36%	25%	39%	26%	**32%**	24%	16%	**5.5%**	11%	15%	15%
1969	8.0%	**286%**	25%	75%	**25%**	**8.6%**	37%	26%	40%	27%	**32%**	25%	17%	**5.8%**	10%	14%	14%
1970	6.3%	**289%**	25%	75%	**24%**	**8.3%**	37%	28%	40%	27%	**34%**	24%	16%	**5.5%**	12%	15%	15%
1971	5.5%	**283%**	25%	75%	**24%**	**8.4%**	36%	27%	40%	26%	**33%**	24%	16%	**5.6%**	11%	15%	15%
1972	5.1%	**281%**	24%	76%	**23%**	**8.2%**	37%	27%	40%	26%	**34%**	24%	15%	**5.4%**	12%	15%	15%
1973	7.2%	**280%**	25%	75%	**24%**	**8.6%**	36%	27%	40%	26%	**34%**	24%	16%	**5.7%**	12%	15%	15%
1974	1.7%	**274%**	24%	76%	**23%**	**8.5%**	37%	30%	39%	26%	**38%**	23%	14%	**5.3%**	13%	14%	14%
1975	-0.3%	**289%**	19%	81%	**19%**	**6.5%**	39%	29%	41%	27%	**38%**	24%	12%	**4.1%**	14%	14%	14%
1976	5.2%	**289%**	19%	81%	**18%**	**6.4%**	41%	32%	43%	29%	**41%**	26%	11%	**3.8%**	12%	11%	11%
1977	2.7%	**293%**	19%	81%	**19%**	**6.4%**	41%	31%	43%	28%	**39%**	26%	11%	**3.9%**	12%	12%	12%
1978	3.5%	**292%**	17%	83%	**17%**	**5.9%**	42%	31%	44%	29%	**40%**	26%	10%	**3.6%**	13%	12%	12%
1979	3.0%	**293%**	17%	83%	**17%**	**6.0%**	44%	32%	46%	31%	**41%**	28%	10%	**3.5%**	11%	11%	11%
1980	-0.9%	**298%**	16%	84%	**16%**	**5.5%**	45%	34%	47%	31%	**44%**	28%	9%	**3.1%**	11%	9%	9%
1981	-1.0%	**301%**	16%	84%	**16%**	**5.4%**	45%	35%	47%	30%	**45%**	27%	9%	**3.0%**	11%	8%	8%
1982	1.9%	**294%**	15%	85%	**15%**	**5.2%**	46%	37%	48%	30%	**47%**	27%	8%	**2.7%**	10%	7%	7%
1983	0.3%	**298%**	15%	85%	**16%**	**5.3%**	47%	35%	49%	31%	**44%**	28%	9%	**3.0%**	10%	7%	7%
1984	1.2%	**302%**	17%	83%	**18%**	**6.0%**	48%	33%	50%	32%	**41%**	29%	11%	**3.5%**	8%	7%	7%
1985	1.8%	**300%**	18%	82%	**20%**	**6.5%**	47%	32%	51%	32%	**39%**	29%	12%	**4.0%**	8%	7%	7%
1986	5.6%	**295%**	22%	78%	**23%**	**7.9%**	46%	30%	50%	31%	**36%**	29%	15%	**5.0%**	7%	9%	9%
1987	2.1%	**311%**	23%	77%	**24%**	**7.8%**	47%	30%	51%	31%	**36%**	29%	16%	**5.0%**	5%	8%	8%
1988	5.3%	**300%**	25%	75%	**26%**	**8.8%**	46%	30%	51%	31%	**35%**	29%	17%	**5.7%**	5%	9%	9%
1989	4.0%	**311%**	26%	74%	**27%**	**8.8%**	46%	30%	51%	32%	**35%**	30%	18%	**5.7%**	6%	10%	10%
1990	1.8%	**330%**	25%	75%	**26%**	**8.0%**	47%	30%	52%	32%	**35%**	30%	17%	**5.2%**	7%	10%	10%
1991	0.1%	**329%**	24%	76%	**26%**	**7.8%**	47%	30%	52%	32%	**35%**	30%	17%	**5.1%**	7%	10%	10%
1992	1.0%	**327%**	24%	76%	**26%**	**8.0%**	47%	27%	53%	31%	**32%**	30%	18%	**5.4%**	8%	11%	11%
1993	-1.3%	**331%**	23%	77%	**26%**	**7.8%**	47%	28%	53%	31%	**33%**	29%	17%	**5.3%**	9%	11%	11%
1994	1.8%	**330%**	23%	77%	**26%**	**8.0%**	48%	29%	54%	32%	**33%**	30%	18%	**5.4%**	8%	11%	11%
1995	1.8%	**324%**	23%	77%	**26%**	**8.1%**	48%	29%	54%	32%	**33%**	30%	18%	**5.5%**	9%	11%	11%
1996	0.9%	**322%**	23%	77%	**26%**	**8.2%**	50%	31%	54%	33%	**36%**	31%	17%	**5.2%**	9%	10%	10%
1997	2.3%	**329%**	24%	76%	**27%**	**8.3%**	50%	32%	55%	33%	**36%**	31%	17%	**5.3%**	9%	11%	11%
1998	3.9%	**327%**	25%	75%	**28%**	**8.6%**	50%	33%	54%	34%	**37%**	31%	18%	**5.4%**	9%	12%	12%
1999	3.6%	**330%**	25%	75%	**28%**	**8.4%**	50%	34%	55%	34%	**39%**	31%	17%	**5.1%**	8%	11%	11%
2000	3.3%	**355%**	25%	75%	**28%**	**7.8%**	50%	34%	54%	34%	**40%**	31%	17%	**4.7%**	8%	11%	11%
2001	1.7%	**368%**	24%	76%	**27%**	**7.3%**	49%	35%	53%	34%	**42%**	30%	16%	**4.2%**	9%	10%	10%
2002	0.2%	**379%**	22%	78%	**25%**	**6.7%**	49%	34%	53%	33%	**41%**	29%	15%	**4.0%**	10%	10%	10%
2003	1.0%	**398%**	23%	77%	**26%**	**6.6%**	49%	32%	53%	32%	**38%**	29%	16%	**4.1%**	9%	11%	11%
2004	1.9%	**426%**	23%	77%	**26%**	**6.1%**	49%	34%	53%	33%	**40%**	29%	16%	**3.7%**	9%	10%	10%
2005	1.8%	**471%**	23%	77%	**26%**	**5.5%**	50%	34%	54%	34%	**41%**	30%	15%	**3.2%**	8%	9%	9%
2006	3.1%	**510%**	24%	76%	**26%**	**5.1%**	50%	36%	54%	34%	**43%**	30%	15%	**2.9%**	8%	8%	8%
2007	3.4%	**538%**	24%	76%	**27%**	**5.0%**	49%	35%	53%	33%	**42%**	29%	16%	**2.9%**	9%	9%	9%
2008	-0.9%	**563%**	23%	77%	**26%**	**4.6%**	49%	35%	53%	33%	**42%**	29%	15%	**2.7%**	9%	8%	8%
2009	-2.0%	**552%**	23%	77%	**26%**	**4.7%**	49%	35%	53%	33%	**42%**	29%	15%	**2.7%**	9%	8%	8%
2010	0.0%	**530%**	23%	77%	**26%**	**4.9%**	49%	35%	53%	33%	**42%**	29%	15%	**2.8%**	9%	8%	8%

Table A12: Structure of national income in France, 1820-2008: summary macro variables (decennial averages)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]
	Real growth rate of national income	Ratio (Private wealth)/(National income)	Capital share (exc. govt interest)	Labor share	Capital share (inc. govt interest)	**Rate of return**	Tax rate	Capital tax rate	Capital tax rate (inc. other corp. transf.)	After-tax capital share	**After-tax rate of return**	Personal savings rate	Private savings (person. savings + retained earnings)	Private savings minus war destruct.	Real rate of capital gains	Real rate of capital destruc. (wars)	**After-tax rate of return (incl. capital gains & losses)**
	$\mathbf{g_t}$	$\beta_t = W_t/Y_t$	α_t	$1-\alpha_t$	α_t^*	$\mathbf{r_t = \alpha_t^*/\beta_t}$	τ_t	τ_{Kt}	τ_{Kt}^*	α_{dt}	$r_{dt} = \alpha_{dt}/\beta_t = (1-\tau_{Kt}^*)r_t$	s_{ot}	s_t	s_t+d_{yt}	q_t	d_t	$r_{dt}^* = r_{dt}+q_t+d_t$
1820	**1.0%**	549%	30%	70%	32%	**5.8%**	8%	8%	8%	29%	**5.4%**	8%	8%	8%	0.3%	0.0%	**5.6%**
1830	**1.0%**	591%	35%	65%	37%	**6.2%**	8%	8%	8%	34%	**5.7%**	8%	8%	8%	0.3%	0.0%	**6.0%**
1840	**1.8%**	577%	37%	63%	39%	**6.7%**	8%	8%	8%	36%	**6.2%**	10%	10%	10%	0.1%	0.0%	**6.3%**
1850	**1.8%**	593%	44%	56%	46%	**7.8%**	8%	8%	8%	43%	**7.2%**	10%	10%	10%	0.4%	0.0%	**7.6%**
1860	**0.9%**	633%	44%	56%	46%	**7.3%**	8%	8%	8%	43%	**6.7%**	9%	9%	9%	-0.1%	0.0%	**6.6%**
1870	**0.0%**	644%	42%	58%	44%	**6.8%**	8%	8%	8%	40%	**6.2%**	8%	8%	8%	-1.3%	0.0%	**4.9%**
1880	**-0.1%**	702%	30%	70%	32%	**4.5%**	8%	8%	8%	29%	**4.2%**	9%	9%	9%	-0.4%	0.0%	**3.8%**
1890	**1.4%**	674%	26%	74%	28%	**4.1%**	8%	8%	8%	25%	**3.8%**	10%	10%	10%	-0.3%	0.0%	**3.5%**
1900	**1.1%**	675%	26%	74%	28%	**4.2%**	9%	10%	10%	26%	**3.8%**	7%	7%	7%	0.0%	0.0%	**3.8%**
1910	**0.6%**	654%	34%	66%	36%	**5.6%**	8%	8%	8%	33%	**5.1%**	5%	8%	8%	0.0%	0.0%	**5.1%**
1920	**1.9%**	316%	29%	71%	35%	**9.8%**	14%	15%	15%	30%	**8.3%**	10%	15%	5%	-4.5%	-2.1%	**1.7%**
1930	**0.4%**	395%	28%	72%	33%	**8.3%**	19%	19%	19%	26%	**6.7%**	4%	9%	9%	-1.2%	0.0%	**5.5%**
1940	**1.4%**	360%	14%	86%	14%	**4.4%**	21%	31%	31%	11%	**3.0%**	1%	3%	-14%	-0.8%	-4.0%	**-1.7%**
1950	**5.4%**	215%	23%	77%	23%	**10.9%**	31%	26%	31%	16%	**7.5%**	10%	13%	13%	0.6%	0.0%	**8.1%**
1960	**6.2%**	265%	23%	77%	23%	**8.7%**	35%	27%	33%	15%	**5.8%**	11%	14%	14%	2.5%	0.0%	**8.3%**
1970	**4.0%**	286%	21%	79%	21%	**7.3%**	39%	29%	37%	13%	**4.6%**	12%	13%	13%	-0.5%	0.0%	**4.1%**
1980	**2.0%**	301%	19%	81%	20%	**6.7%**	46%	33%	40%	12%	**4.0%**	8%	8%	8%	-0.1%	0.0%	**3.9%**
1990	**1.6%**	328%	24%	76%	27%	**8.1%**	48%	30%	35%	17%	**5.3%**	8%	11%	11%	-1.0%	0.0%	**4.3%**
2000	**1.4%**	456%	24%	76%	26%	**5.9%**	49%	34%	41%	15%	**3.5%**	9%	9%	9%	4.3%	0.0%	**7.7%**
2008	**1.4%**	563%	24%	76%	26%	**4.7%**	49%	34%	41%	15%	**2.8%**	9%	8%	8%	0.0%	0.0%	**2.8%**
1820-2009	**1.8%**	485%	29%	71%	31%	**6.8%**	20%	17%	19%	26%	**5.4%**	8%	10%	8%	-0.1%	-0.3%	**5.0%**
1820-1913	**1.0%**	638%	35%	65%	37%	**5.9%**	8%	8%	8%	34%	**5.4%**	8%	9%	9%	-0.1%	0.0%	**5.3%**
1913-2009	**2.6%**	325%	23%	77%	25%	**7.8%**	34%	27%	31%	17%	**5.4%**	8%	11%	8%	-0.1%	-0.7%	**4.6%**
1913-1949	**1.3%**	350%	25%	75%	28%	**7.9%**	17%	20%	21%	24%	**6.4%**	6%	10%	1%	-2.6%	-2.0%	**1.8%**
1949-1979	**5.2%**	255%	22%	78%	22%	**9.0%**	35%	28%	34%	15%	**6.0%**	11%	13%	13%	0.8%	0.0%	**6.8%**
1979-2009	**1.7%**	362%	22%	78%	24%	**6.9%**	48%	32%	39%	15%	**4.3%**	8%	9%	9%	1.0%	0.0%	**5.3%**

Table A13: Structure of national wealth in France, 1970-2009: private wealth vs government wealth

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
	Private wealth (individuals)				**Government wealth (all govt levels)**				**National wealth (private + government)**					
	(% national income Y_t)				(% national income Y_t)				(% national income Y_t)				% (Private wealth)/ (National wealth)	% (Govt wealth)/ (National wealth)
	Private wealth	Tangible assets	Financial assets	Financial liabilities	**Govt wealth**	Tangible assets	Financial assets	Financial liabilities	**National wealth**	Tangible assets	Financial assets	Financial liabilities		
	$\mathbf{W_t}$	K_{pt}	A_{pt}	L_{pt}	$\mathbf{W_{gt}}$	K_{gt}	A_{gt}	L_{gt}	$\mathbf{W_{nt}}$	K_{nt}	A_{nt}	L_{nt}		
1970	**289%**	207%	102%	20%	**38%**	46%	41%	49%	**328%**	253%	143%	68%	**88%**	**12%**
1971	**283%**	204%	98%	19%	**40%**	47%	38%	45%	**323%**	252%	136%	64%	**88%**	**12%**
1972	**281%**	203%	98%	20%	**42%**	48%	36%	42%	**323%**	251%	134%	62%	**87%**	**13%**
1973	**280%**	201%	99%	20%	**43%**	48%	34%	38%	**323%**	249%	133%	59%	**87%**	**13%**
1974	**274%**	197%	97%	20%	**43%**	48%	30%	35%	**317%**	245%	127%	55%	**86%**	**14%**
1975	**289%**	216%	93%	20%	**48%**	54%	29%	34%	**338%**	270%	122%	55%	**86%**	**14%**
1976	**289%**	214%	94%	20%	**51%**	54%	30%	34%	**340%**	268%	125%	53%	**85%**	**15%**
1977	**293%**	220%	93%	20%	**53%**	57%	29%	33%	**346%**	277%	122%	53%	**85%**	**15%**
1978	**292%**	219%	93%	20%	**52%**	57%	28%	32%	**344%**	275%	121%	53%	**85%**	**15%**
1979	**293%**	220%	94%	21%	**51%**	56%	28%	34%	**343%**	276%	122%	55%	**85%**	**15%**
1980	**298%**	225%	96%	23%	**55%**	59%	31%	35%	**353%**	284%	128%	58%	**84%**	**16%**
1981	**301%**	228%	98%	25%	**61%**	61%	34%	35%	**362%**	289%	132%	59%	**83%**	**17%**
1982	**294%**	225%	93%	25%	**58%**	62%	30%	34%	**352%**	287%	123%	59%	**83%**	**17%**
1983	**298%**	226%	98%	27%	**58%**	64%	34%	40%	**356%**	290%	133%	67%	**84%**	**16%**
1984	**302%**	228%	102%	28%	**57%**	64%	34%	41%	**359%**	292%	136%	69%	**84%**	**16%**
1985	**300%**	223%	108%	31%	**54%**	62%	35%	43%	**355%**	286%	143%	74%	**85%**	**15%**
1986	**295%**	216%	111%	32%	**50%**	60%	34%	45%	**345%**	276%	145%	77%	**86%**	**14%**
1987	**311%**	218%	126%	32%	**46%**	60%	34%	48%	**357%**	278%	160%	80%	**87%**	**13%**
1988	**300%**	216%	118%	34%	**45%**	58%	34%	48%	**345%**	274%	152%	82%	**87%**	**13%**
1989	**311%**	218%	130%	37%	**43%**	58%	32%	47%	**353%**	275%	162%	84%	**88%**	**12%**
1990	**330%**	228%	140%	38%	**44%**	60%	32%	48%	**373%**	288%	173%	87%	**88%**	**12%**
1991	**329%**	236%	135%	42%	**43%**	61%	31%	50%	**372%**	298%	166%	92%	**88%**	**12%**
1992	**327%**	232%	138%	43%	**41%**	61%	32%	52%	**368%**	292%	170%	95%	**89%**	**11%**
1993	**331%**	228%	147%	44%	**39%**	61%	36%	58%	**369%**	289%	182%	102%	**90%**	**10%**
1994	**330%**	221%	155%	46%	**30%**	60%	37%	67%	**360%**	282%	191%	113%	**92%**	**8%**
1995	**324%**	221%	148%	45%	**28%**	60%	36%	68%	**352%**	281%	184%	113%	**92%**	**8%**
1996	**322%**	216%	152%	46%	**19%**	59%	41%	81%	**342%**	275%	193%	127%	**94%**	**6%**
1997	**329%**	214%	160%	45%	**15%**	59%	38%	83%	**343%**	273%	199%	128%	**96%**	**4%**
1998	**327%**	207%	166%	45%	**13%**	57%	42%	86%	**340%**	263%	207%	131%	**96%**	**4%**
1999	**330%**	207%	171%	48%	**13%**	55%	43%	85%	**343%**	263%	214%	133%	**96%**	**4%**
2000	**355%**	218%	186%	49%	**23%**	57%	47%	80%	**379%**	275%	232%	129%	**94%**	**6%**
2001	**368%**	232%	187%	51%	**22%**	58%	44%	80%	**390%**	290%	231%	131%	**94%**	**6%**
2002	**379%**	251%	181%	53%	**23%**	61%	42%	81%	**402%**	312%	223%	134%	**94%**	**6%**
2003	**398%**	271%	179%	52%	**20%**	65%	41%	85%	**418%**	336%	220%	137%	**95%**	**5%**
2004	**426%**	297%	183%	54%	**22%**	68%	43%	89%	**448%**	366%	226%	143%	**95%**	**5%**
2005	**471%**	338%	191%	57%	**27%**	74%	44%	91%	**498%**	412%	235%	149%	**95%**	**5%**
2006	**510%**	374%	197%	61%	**35%**	80%	48%	93%	**544%**	454%	245%	155%	**94%**	**6%**
2007	**538%**	397%	207%	65%	**45%**	83%	50%	89%	**583%**	480%	257%	153%	**92%**	**8%**
2008	**563%**	416%	216%	69%	**51%**	87%	55%	90%	**614%**	502%	271%	160%	**92%**	**8%**
2009	**552%**	417%	208%	73%	**40%**	89%	53%	103%	**591%**	506%	261%	176%	**93%**	**7%**

Table A14: Structure of national wealth in France, 1970-2009: corporate wealth and net foreign asset position

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
	Corporate wealth (non-financial + financial corporations)								**Net foreign asset position** (France vis-a-vis rest of the world)					
	(% national income Y_t)								(% national income Y_t)					
	Net worth NW_{ct}	Tangible assets K_{ct}	Financial assets A_{ct}	Financial (non-equity) liabilities L_{ct}^d	**Equity value** L_{ct}^e	Net worth minus Equity value	***Tobin's Q*** *(L_{ct}^e/NW_{ct}) (Equity value/Net worth)*	***Net worth minus Equity value (% National wealth)***	**Net foreign wealth** W_{Ft}	Foreign assets owned by French residents FA_t	*inc. foreign equity owned by French residents* FA_t^e	French assets owned by foreign residents FL_t	*inc. French equity owned by foreign residents* FL_t^e	***Net foreign wealth (% National wealth)***
1970	**160%**	128%	286%	253%	**100%**	60%	***62%***	***18%***	**8%**	25%	*8%*	17%	*7%*	***2%***
1971	**149%**	128%	278%	258%	**84%**	65%	***57%***	***20%***	**9%**	28%	*8%*	18%	*6%*	***3%***
1972	**140%**	129%	276%	265%	**73%**	67%	***52%***	***21%***	**11%**	31%	*7%*	20%	*5%*	***3%***
1973	**145%**	125%	292%	272%	**82%**	63%	***57%***	***19%***	**12%**	34%	*7%*	22%	*6%*	***4%***
1974	**147%**	126%	293%	271%	**81%**	66%	***55%***	***21%***	**11%**	34%	*7%*	24%	*7%*	***3%***
1975	**146%**	145%	278%	277%	**58%**	88%	***39%***	***26%***	**9%**	32%	*5%*	22%	*5%*	***3%***
1976	**151%**	141%	282%	272%	**68%**	83%	***45%***	***24%***	**13%**	37%	*5%*	24%	*6%*	***4%***
1977	**144%**	144%	282%	283%	**57%**	87%	***39%***	***25%***	**12%**	39%	*4%*	28%	*5%*	***3%***
1978	**140%**	145%	286%	290%	**51%**	89%	***36%***	***26%***	**13%**	41%	*4%*	28%	*5%*	***4%***
1979	**140%**	141%	290%	292%	**55%**	85%	***39%***	***25%***	**12%**	41%	*4%*	30%	*5%*	***3%***
1980	**145%**	146%	293%	293%	**54%**	91%	***37%***	***26%***	**15%**	46%	*5%*	31%	*5%*	***4%***
1981	**151%**	151%	299%	299%	**54%**	97%	***36%***	***27%***	**19%**	55%	*6%*	36%	*5%*	***5%***
1982	**147%**	152%	291%	295%	**43%**	104%	***29%***	***30%***	**17%**	57%	*8%*	40%	*4%*	***5%***
1983	**149%**	155%	308%	314%	**43%**	106%	***29%***	***30%***	**17%**	61%	*11%*	44%	*3%*	***5%***
1984	**162%**	156%	329%	324%	**54%**	108%	***33%***	***30%***	**19%**	69%	*16%*	51%	*5%*	***5%***
1985	**164%**	155%	347%	337%	**67%**	97%	***41%***	***27%***	**12%**	69%	*13%*	58%	*6%*	***3%***
1986	**181%**	150%	352%	321%	**92%**	89%	***51%***	***26%***	**7%**	61%	*12%*	53%	*10%*	***2%***
1987	**209%**	150%	376%	317%	**133%**	76%	***64%***	***21%***	**5%**	62%	*15%*	57%	*17%*	***1%***
1988	**198%**	148%	371%	321%	**113%**	85%	***57%***	***25%***	**7%**	61%	*14%*	54%	*13%*	***2%***
1989	**222%**	148%	405%	331%	**151%**	72%	***68%***	***20%***	**2%**	66%	*17%*	64%	*19%*	***0%***
1990	**257%**	154%	448%	344%	**192%**	65%	***75%***	***17%***	**-3%**	74%	*21%*	77%	*26%*	***-1%***
1991	**237%**	159%	438%	360%	**155%**	83%	***65%***	***22%***	**-2%**	78%	*19%*	80%	*20%*	***0%***
1992	**242%**	160%	445%	362%	**161%**	81%	***67%***	***22%***	**-3%**	79%	*21%*	82%	*21%*	***-1%***
1993	**246%**	161%	473%	388%	**166%**	80%	***67%***	***22%***	**-1%**	89%	*23%*	90%	*22%*	***0%***
1994	**268%**	158%	505%	395%	**189%**	78%	***71%***	***22%***	**-1%**	97%	*28%*	98%	*27%*	***0%***
1995	**245%**	157%	479%	391%	**153%**	92%	***62%***	***26%***	**6%**	94%	*26%*	88%	*22%*	***2%***
1996	**244%**	156%	489%	401%	**147%**	97%	***60%***	***28%***	**8%**	95%	*28%*	88%	*22%*	***2%***
1997	**269%**	155%	520%	406%	**179%**	89%	***67%***	***26%***	**5%**	102%	*33%*	96%	*30%*	***2%***
1998	**291%**	151%	560%	420%	**204%**	87%	***70%***	***26%***	**13%**	124%	*43%*	111%	*37%*	***4%***
1999	**325%**	151%	595%	422%	**243%**	81%	***75%***	***24%***	**12%**	136%	*50%*	125%	*48%*	***3%***
2000	**404%**	155%	695%	447%	**348%**	56%	***86%***	***15%***	**4%**	171%	*71%*	167%	*77%*	***1%***
2001	**429%**	163%	729%	463%	**355%**	74%	***83%***	***19%***	**10%**	192%	*84%*	182%	*75%*	***3%***
2002	**394%**	172%	715%	493%	**296%**	99%	***75%***	***25%***	**17%**	202%	*80%*	185%	*62%*	***4%***
2003	**375%**	180%	678%	483%	**263%**	112%	***70%***	***27%***	**14%**	189%	*63%*	175%	*49%*	***3%***
2004	**403%**	189%	694%	479%	**288%**	115%	***71%***	***26%***	**9%**	200%	*71%*	191%	*56%*	***2%***
2005	**436%**	204%	734%	501%	**310%**	126%	***71%***	***25%***	**8%**	218%	*78%*	211%	*62%*	***2%***
2006	**474%**	215%	798%	539%	**340%**	133%	***72%***	***25%***	**9%**	263%	*96%*	254%	*79%*	***2%***
2007	**522%**	225%	872%	576%	**395%**	127%	***76%***	***22%***	**5%**	291%	*109%*	286%	*90%*	***1%***
2008	**540%**	237%	946%	642%	**398%**	142%	***74%***	***23%***	**16%**	323%	*115%*	307%	*89%*	***3%***
2009	**446%**	247%	916%	716%	**289%**	157%	***65%***	***26%***	**-5%**	296%	*78%*	301%	*61%*	***-1%***

Table A15a: Composition of private wealth in France, 1970-2009

(% national income Y_t)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
	Private wealth W_t	**Housing (net value) (K_t^h - L_t)**	inc. housing assets K_t^h	inc. financial liabilities L_t	**Non-housing tangible assets K_t^n** (unincorp. business assets, land,.)	**Financial assets A_t (A_t^e+A_t^d)**	inc. equity assets A_t^e	*inc. public equity & mutual funds*	*inc. private equity*	inc. debt (non-equity) assets A_t^d	*inc. life-insurance assets*	*inc. other debt assets (bonds, savings & checking accounts,..)*
1970	**289%**	**76%**	96%	20%	**111%**	**102%**	22%	0%	0%	80%	6%	74%
1971	**283%**	**79%**	99%	19%	**106%**	**98%**	18%	0%	0%	80%	7%	74%
1972	**281%**	**80%**	100%	20%	**103%**	**98%**	15%	0%	0%	83%	7%	76%
1973	**280%**	**79%**	100%	20%	**101%**	**99%**	16%	0%	0%	83%	7%	76%
1974	**274%**	**82%**	102%	20%	**95%**	**97%**	17%	0%	0%	81%	7%	74%
1975	**289%**	**97%**	118%	20%	**99%**	**93%**	11%	0%	0%	83%	7%	76%
1976	**289%**	**98%**	118%	20%	**96%**	**94%**	12%	0%	0%	83%	7%	76%
1977	**293%**	**105%**	125%	20%	**95%**	**93%**	9%	0%	0%	84%	7%	77%
1978	**292%**	**107%**	127%	20%	**92%**	**93%**	8%	3%	5%	85%	7%	78%
1979	**293%**	**109%**	130%	21%	**90%**	**94%**	10%	4%	6%	84%	7%	78%
1980	**298%**	**114%**	137%	23%	**88%**	**96%**	9%	4%	5%	87%	7%	80%
1981	**301%**	**119%**	144%	25%	**85%**	**98%**	9%	5%	4%	89%	7%	81%
1982	**294%**	**122%**	146%	25%	**79%**	**93%**	8%	5%	3%	86%	7%	79%
1983	**298%**	**122%**	149%	27%	**77%**	**98%**	8%	5%	3%	90%	8%	83%
1984	**302%**	**125%**	153%	28%	**75%**	**102%**	12%	8%	4%	90%	8%	82%
1985	**300%**	**122%**	153%	31%	**70%**	**108%**	16%	10%	6%	92%	9%	83%
1986	**295%**	**120%**	152%	32%	**64%**	**111%**	23%	14%	9%	88%	10%	78%
1987	**311%**	**124%**	156%	32%	**62%**	**126%**	36%	20%	15%	90%	11%	79%
1988	**300%**	**123%**	158%	34%	**58%**	**118%**	30%	19%	11%	88%	12%	75%
1989	**311%**	**125%**	162%	37%	**56%**	**130%**	41%	24%	17%	89%	14%	75%
1990	**330%**	**132%**	170%	38%	**58%**	**140%**	51%	29%	22%	89%	17%	73%
1991	**329%**	**137%**	179%	42%	**58%**	**135%**	43%	28%	15%	92%	19%	72%
1992	**327%**	**135%**	178%	43%	**53%**	**138%**	47%	31%	16%	92%	22%	70%
1993	**331%**	**135%**	179%	44%	**49%**	**147%**	49%	33%	15%	98%	25%	73%
1994	**330%**	**130%**	176%	46%	**46%**	**155%**	52%	35%	17%	103%	29%	74%
1995	**324%**	**131%**	177%	45%	**44%**	**148%**	41%	29%	11%	107%	33%	75%
1996	**322%**	**129%**	174%	46%	**41%**	**152%**	36%	25%	11%	116%	37%	79%
1997	**329%**	**129%**	174%	45%	**39%**	**160%**	39%	25%	14%	121%	42%	79%
1998	**327%**	**125%**	170%	45%	**37%**	**166%**	40%	24%	16%	126%	47%	79%
1999	**330%**	**123%**	171%	48%	**36%**	**171%**	44%	26%	18%	127%	50%	78%
2000	**355%**	**132%**	181%	49%	**37%**	**186%**	55%	29%	26%	130%	54%	77%
2001	**368%**	**143%**	194%	51%	**38%**	**187%**	54%	29%	25%	132%	57%	76%
2002	**379%**	**158%**	211%	53%	**40%**	**181%**	47%	27%	20%	135%	59%	75%
2003	**398%**	**177%**	229%	52%	**42%**	**179%**	43%	23%	20%	136%	60%	76%
2004	**426%**	**199%**	253%	54%	**44%**	**183%**	47%	24%	22%	137%	62%	74%
2005	**471%**	**232%**	290%	57%	**48%**	**191%**	49%	24%	25%	142%	68%	74%
2006	**510%**	**262%**	323%	61%	**51%**	**197%**	52%	26%	25%	145%	72%	74%
2007	**538%**	**280%**	345%	65%	**52%**	**207%**	58%	27%	31%	149%	76%	73%
2008	**563%**	**295%**	364%	69%	**51%**	**216%**	60%	29%	31%	156%	81%	75%
2009	**552%**	**293%**	366%	73%	**51%**	**208%**	46%	22%	24%	162%	83%	79%

Table A15b: Composition of private wealth in France, 1970-2009

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
	(% private wealth W_t)											
	Private wealth W_t	**Housing (net value) $(K_t^h - L_t)$**	inc. housing assets K_t^h	inc. financial liabilities L_t	**Non-housing tangible assets K_t^n** (unincorp. business assets, land,.)	**Financial assets A_t $(A_t^e+A_t^d)$**	inc. equity assets A_t^e	*inc. public equity & mutual funds*	*inc. private equity*	inc. debt (non-equity) assets A_t^d	*inc. life-insurance assets*	*inc. other debt assets (bonds, savings & checking accounts,..)*
1970	100%	26%	33%	7%	38%	35%	7%	3%	5%	28%	2%	26%
1971	100%	28%	35%	7%	37%	35%	6%	2%	4%	28%	2%	26%
1972	100%	28%	36%	7%	37%	35%	5%	2%	3%	30%	2%	27%
1973	100%	28%	36%	7%	36%	35%	6%	2%	4%	30%	2%	27%
1974	100%	30%	37%	7%	35%	35%	6%	2%	4%	29%	2%	27%
1975	100%	34%	41%	7%	34%	32%	4%	1%	2%	29%	2%	26%
1976	100%	34%	41%	7%	33%	33%	4%	2%	3%	29%	2%	26%
1977	100%	36%	43%	7%	32%	32%	3%	1%	2%	29%	2%	26%
1978	100%	37%	43%	7%	31%	32%	3%	1%	2%	29%	2%	27%
1979	100%	37%	44%	7%	31%	32%	3%	1%	2%	29%	2%	26%
1980	100%	38%	46%	8%	29%	32%	3%	1%	2%	29%	2%	27%
1981	100%	39%	48%	8%	28%	32%	3%	2%	1%	29%	2%	27%
1982	100%	41%	50%	8%	27%	32%	3%	2%	1%	29%	2%	27%
1983	100%	41%	50%	9%	26%	33%	3%	2%	1%	30%	3%	28%
1984	100%	41%	51%	9%	25%	34%	4%	3%	1%	30%	3%	27%
1985	100%	41%	51%	10%	23%	36%	5%	3%	2%	31%	3%	28%
1986	100%	41%	51%	11%	22%	38%	8%	5%	3%	30%	3%	26%
1987	100%	40%	50%	10%	20%	40%	11%	7%	5%	29%	4%	25%
1988	100%	41%	53%	11%	19%	39%	10%	6%	4%	29%	4%	25%
1989	100%	40%	52%	12%	18%	42%	13%	8%	5%	29%	5%	24%
1990	100%	40%	52%	12%	17%	43%	15%	9%	7%	27%	5%	22%
1991	100%	42%	54%	13%	18%	41%	13%	8%	5%	28%	6%	22%
1992	100%	41%	55%	13%	16%	42%	14%	10%	5%	28%	7%	21%
1993	100%	41%	54%	13%	15%	44%	15%	10%	5%	30%	8%	22%
1994	100%	39%	53%	14%	14%	47%	16%	11%	5%	31%	9%	22%
1995	100%	41%	55%	14%	14%	46%	13%	9%	3%	33%	10%	23%
1996	100%	40%	54%	14%	13%	47%	11%	8%	3%	36%	11%	24%
1997	100%	39%	53%	14%	12%	49%	12%	8%	4%	37%	13%	24%
1998	100%	38%	52%	14%	11%	51%	12%	7%	5%	39%	14%	24%
1999	100%	37%	52%	15%	11%	52%	13%	8%	5%	39%	15%	23%
2000	100%	37%	51%	14%	11%	52%	16%	8%	7%	37%	15%	22%
2001	100%	39%	53%	14%	10%	51%	15%	8%	7%	36%	15%	21%
2002	100%	42%	56%	14%	11%	48%	12%	7%	5%	36%	16%	20%
2003	100%	45%	58%	13%	11%	45%	11%	6%	5%	34%	15%	19%
2004	100%	47%	59%	13%	10%	43%	11%	6%	5%	32%	15%	17%
2005	100%	49%	61%	12%	10%	41%	10%	5%	5%	30%	14%	16%
2006	100%	51%	63%	12%	10%	39%	10%	5%	5%	29%	14%	14%
2007	100%	52%	64%	12%	10%	38%	11%	5%	6%	28%	14%	13%
2008	100%	52%	65%	12%	9%	38%	11%	5%	6%	28%	14%	13%
2009	100%	53%	66%	13%	9%	38%	8%	4%	4%	29%	15%	14%
estimated fraction of assets subject to estate tax			80%		70%			90%	50%		5%	90%
estimated fraction of assets exempt from estate tax			20%		30%			10%	50%		95%	10%

Table A16: Raw national wealth estimates in France, 1820-2008

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
	Private wealth W_t	*incl. net foreign financial assets* W_{Ft}	*Net foreign assets as % of private wealth*	**Govt wealth** W_{gt}	*Govt assets*	*Govt debt*	**National wealth** W_{nt}	% (Private wealth)/ (National wealth)	% (Govt wealth)/ (National wealth)	**% (Private wealth)/ (National income)**	% (Govt wealth)/ (National income)	% (Govt assets)/ (National income)	% (Govt debt)/ (National income)	% (National wealth)/ (National income)
1820	**62**	*1*	*2%*	**2**	*7*	*5*	**64**	98%	2%	**549%**	13%	58%	44%	562%
1830	**80**	*2*	*3%*	**3**	*8*	*5*	**83**	96%	4%	**591%**	22%	59%	37%	613%
1840	**95**	*3*	*3%*	**3**	*9*	*6*	**98**	97%	3%	**577%**	18%	55%	36%	595%
1850	**130**	*6*	*5%*	**7**	*14*	*7*	**137**	95%	5%	**593%**	32%	64%	32%	625%
1860	**165**	*15*	*9%*	**9**	*17*	*8*	**174**	95%	5%	**633%**	35%	65%	31%	667%
1870	**185**	*20*	*11%*	**3**	*23*	*20*	**188**	98%	2%	**644%**	10%	80%	70%	654%
1880	**195**	*25*	*13%*	**3**	*28*	*25*	**198**	98%	2%	**702%**	11%	101%	90%	713%
1896	**205**	*27*	*13%*	**5**	*34*	*29*	**210**	98%	2%	**662%**	16%	110%	94%	678%
1913	**297**	*41*	*14%*	**5**	*39*	*34*	**302**	98%	2%	**660%**	11%	87%	76%	671%
1925	**695**	*15*	*2%*	**-101**	*192*	*293*	**594**	117%	-17%	**293%**	-43%	81%	124%	251%
1954	**47**	*1*	*2%*	**22**	*28*	*7*	**68**	68%	32%	**203%**	94%	124%	30%	297%
1970	**330**	*9*	*3%*	**44**	*99*	*55*	**373**	88%	12%	**289%**	38%	87%	49%	328%
1980	**1 176**	*59*	*5%*	**219**	*355*	*136*	**1 395**	84%	16%	**298%**	55%	90%	35%	353%
1990	**3 005**	*-29*	*-1%*	**398**	*839*	*441*	**3 403**	88%	12%	**330%**	44%	92%	48%	373%
2000	**4 555**	*50*	*1%*	**298**	*1 325*	*1 027*	**4 852**	94%	6%	**355%**	23%	103%	80%	379%
2008	**9 505**	*272*	*3%*	**858**	*2 385*	*1 527*	**10 363**	92%	8%	**563%**	51%	141%	90%	614%

Table A17: Accumulation equation for private wealth in France, 1896-2009 (annual series)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
			Method n°1: savings = private savings (personal savings + corporate retained earnings)						**Method n°2: savings = personal savings**						
	National income Y_t	Real growth rate of national income g_t	Real growth rate or private wealth g_{wt}	Ratio (private wealth)/ (national income)	Private savings rate	Savings-induced wealth growth rate	Real rate of capital gains	Destruction rate	Real growth rate or private wealth g_{wt}	Ratio (private wealth)/ (national income)	Personal savings rate	Savings-induced wealth growth rate	Real rate of capital gains	Destruction rate	*memo: war destructions* $d_{yt} = WD_t / Y_t$
	(billions 2009 €)	$1+g_t = Y_t/Y_{t-1}$	$1+g_{wt} = W_t/W_{t-1}$	$\beta_t = W_t/Y_t$	$s_t = S_t/Y_t$	$g_{wst} = s_{t-1}/\beta_{t-1}$	q_t	d_t	$1+g_{wt} = W_t/W_{t-1}$	$\beta_t = W_t/Y_t$	$s_{0t} = S_{0t}/Y_t$	$g_{wst} = s_{0t-1}/\beta_{t-1}$	q_t	d_t	
1896	**113.6**			**662%**	**11.5%**			**0.0%**		**662%**	**10.9%**			**0.0%**	**0.0%**
1897	112.3	-1.2%	1.7%	682%	10.6%	1.7%	0.0%	0.0%	1.8%	682%	11.0%	1.7%	0.1%	0.0%	0.0%
1898	117.6	4.7%	1.5%	661%	10.3%	1.6%	0.0%	0.0%	1.7%	662%	10.1%	1.6%	0.1%	0.0%	0.0%
1899	122.1	3.9%	1.5%	646%	11.0%	1.6%	0.0%	0.0%	1.6%	648%	10.2%	1.5%	0.1%	0.0%	0.0%
1900	124.1	1.6%	1.7%	646%	9.1%	1.7%	0.0%	0.0%	1.7%	648%	8.0%	1.6%	0.1%	0.0%	0.0%
1901	115.7	-6.8%	1.4%	703%	5.9%	1.4%	0.0%	0.0%	1.3%	705%	6.7%	1.2%	0.1%	0.0%	0.0%
1902	113.8	-1.6%	0.8%	720%	9.0%	0.8%	0.0%	0.0%	1.1%	724%	9.2%	1.0%	0.1%	0.0%	0.0%
1903	120.2	5.6%	1.2%	690%	7.2%	1.3%	0.0%	0.0%	1.4%	695%	7.2%	1.3%	0.1%	0.0%	0.0%
1904	124.0	3.1%	1.0%	676%	4.3%	1.0%	0.0%	0.0%	1.1%	681%	4.3%	1.0%	0.1%	0.0%	0.0%
1905	124.8	0.6%	0.6%	676%	7.6%	0.6%	0.0%	0.0%	0.7%	682%	6.2%	0.6%	0.1%	0.0%	0.0%
1906	122.1	-2.1%	1.1%	698%	5.3%	1.1%	0.0%	0.0%	1.0%	704%	6.0%	0.9%	0.1%	0.0%	0.0%
1907	134.6	10.2%	0.7%	638%	8.7%	0.8%	0.0%	0.0%	1.0%	645%	6.5%	0.9%	0.1%	0.0%	0.0%
1908	130.3	-3.2%	1.3%	668%	7.8%	1.4%	0.0%	0.0%	1.1%	673%	7.4%	1.0%	0.1%	0.0%	0.0%
1909	136.3	4.6%	1.1%	646%	5.9%	1.2%	0.0%	0.0%	1.2%	652%	4.5%	1.1%	0.1%	0.0%	0.0%
1910	131.4	-3.6%	0.9%	676%	7.9%	0.9%	0.0%	0.0%	0.8%	681%	8.3%	0.7%	0.1%	0.0%	0.0%
1911	133.6	1.7%	1.1%	672%	3.8%	1.2%	0.0%	0.0%	1.3%	679%	1.7%	1.2%	0.1%	0.0%	0.0%
1912	146.9	10.0%	0.5%	615%	11.7%	0.6%	0.0%	0.0%	0.3%	619%	6.4%	0.2%	0.1%	0.0%	0.0%
1913	**139.4**	**-5.1%**	**1.9%**	**660%**	**9.7%**	**1.9%**	**0.0%**	**0.0%**	**1.1%**	**660%**	**5.3%**	**1.0%**	**0.1%**	**0.0%**	**0.0%**
1914	129.3	-7.3%	-4.2%	682%	1.4%	1.5%	-5.6%	0.0%	-3.7%	686%	0.0%	0.8%	-4.5%	0.0%	0.0%
1915	121.6	-5.9%	-5.4%	686%	0.4%	0.2%	-5.6%	-6.5%	-4.5%	696%	0.0%	0.0%	-4.5%	-6.4%	-44.9%
1916	136.6	12.3%	-11.7%	539%	3.6%	0.1%	-5.6%	-7.4%	-10.6%	554%	0.0%	0.0%	-4.5%	-7.2%	-40.0%
1917	134.8	-1.3%	-12.0%	481%	4.6%	0.7%	-5.6%	-8.4%	-11.4%	498%	0.0%	0.0%	-4.5%	-8.1%	-40.5%
1918	118.3	-12.3%	-12.7%	478%	3.6%	1.0%	-5.6%	-9.7%	-12.2%	498%	0.0%	0.0%	-4.5%	-9.3%	-46.2%
1919	125.0	5.7%	-14.1%	389%	4.6%	0.7%	-5.6%	0.0%	-13.3%	408%	0.0%	0.0%	-4.5%	0.0%	0.0%
1920	132.0	5.6%	-4.5%	352%	24.8%	1.2%	-5.6%	0.0%	-4.5%	369%	18.9%	0.0%	-4.5%	0.0%	0.0%
1921	153.3	16.1%	1.1%	306%	29.1%	7.1%	-5.6%	0.0%	0.4%	320%	23.5%	5.1%	-4.5%	0.0%	0.0%
1922	170.9	11.5%	3.4%	284%	24.8%	9.5%	-5.6%	0.0%	2.6%	294%	18.2%	7.4%	-4.5%	0.0%	0.0%
1923	173.9	1.7%	2.7%	287%	29.0%	8.7%	-5.6%	0.0%	1.4%	293%	22.1%	6.2%	-4.5%	0.0%	0.0%
1924	175.6	1.0%	4.0%	295%	25.4%	10.1%	-5.6%	0.0%	2.7%	298%	18.6%	7.5%	-4.5%	0.0%	0.0%
1925	**181.2**	**3.2%**	**2.5%**	**293%**	**23.8%**	**8.6%**	**-5.6%**	0.0%	**1.5%**	**293%**	**17.2%**	**6.2%**	**-4.5%**	**0.0%**	**0.0%**
1926	173.6	-4.2%	6.8%	327%	20.6%	8.1%	-1.2%	0.0%	5.7%	324%	14.3%	5.9%	-0.2%	0.0%	0.0%
1927	171.0	-1.5%	5.0%	348%	10.7%	6.3%	-1.2%	0.0%	4.2%	342%	4.6%	4.4%	-0.2%	0.0%	0.0%
1928	185.9	8.7%	1.8%	326%	20.4%	3.1%	-1.2%	0.0%	1.1%	318%	14.4%	1.3%	-0.2%	0.0%	0.0%
1929	188.1	1.2%	5.0%	339%	18.4%	6.3%	-1.2%	0.0%	4.3%	328%	12.9%	4.5%	-0.2%	0.0%	0.0%
1930	180.0	-4.3%	4.2%	369%	15.7%	5.4%	-1.2%	0.0%	3.7%	356%	10.6%	3.9%	-0.2%	0.0%	0.0%
1931	174.3	-3.2%	3.0%	392%	9.2%	4.3%	-1.2%	0.0%	2.8%	378%	4.4%	3.0%	-0.2%	0.0%	0.0%
1932	168.5	-3.3%	1.1%	410%	3.2%	2.4%	-1.2%	0.0%	1.0%	395%	-0.1%	1.2%	-0.2%	0.0%	0.0%
1933	169.8	0.8%	-0.5%	405%	2.7%	0.8%	-1.2%	0.0%	-0.2%	391%	-2.1%	0.0%	-0.2%	0.0%	0.0%
1934	161.6	-4.8%	-0.6%	423%	2.8%	0.7%	-1.2%	0.0%	-0.7%	407%	-0.7%	-0.5%	-0.2%	0.0%	0.0%
1935	173.4	7.3%	-0.6%	392%	7.5%	0.7%	-1.2%	0.0%	-0.4%	378%	3.1%	-0.2%	-0.2%	0.0%	0.0%
1936	182.7	5.4%	0.7%	375%	17.2%	1.9%	-1.2%	0.0%	0.6%	361%	13.3%	0.8%	-0.2%	0.0%	0.0%
1937	174.7	-4.4%	3.3%	405%	13.5%	4.6%	-1.2%	0.0%	3.5%	391%	9.3%	3.7%	-0.2%	0.0%	0.0%
1938	176.6	1.1%	2.1%	409%	10.1%	3.3%	-1.2%	0.0%	2.2%	395%	6.3%	2.4%	-0.2%	0.0%	0.0%
1939	195.3	10.6%	1.2%	374%	4.9%	2.5%	-1.2%	0.0%	1.4%	362%	0.0%	1.6%	-0.2%	0.0%	0.0%
1940	132.0	-32.5%	-18.9%	449%	4.2%	1.3%	-20.0%	-5.5%	-20.0%	429%	0.0%	0.0%	-20.0%	-5.8%	-24.8%
1941	124.0	-6.0%	-5.8%	450%	3.1%	0.9%	-1.2%	-5.9%	-6.0%	429%	0.0%	0.0%	-0.2%	-6.1%	-26.4%
1942	120.2	-3.1%	-6.4%	435%	2.6%	0.7%	-1.2%	-6.3%	-6.3%	415%	0.0%	0.0%	-0.2%	-6.6%	-27.2%
1943	106.4	-11.5%	-6.8%	458%	1.3%	0.6%	-1.2%	-6.7%	-6.7%	437%	0.0%	0.0%	-0.2%	-7.0%	-30.7%
1944	94.2	-11.4%	-7.6%	477%	-3.2%	0.3%	-1.2%	-7.3%	-7.2%	458%	0.0%	0.0%	-0.2%	-7.6%	-34.7%
1945	120.5	27.9%	-9.0%	340%	-1.5%	-0.7%	-1.2%	-8.0%	-7.8%	330%	0.0%	0.0%	-0.2%	-8.2%	-27.1%
1946	176.8	46.6%	17.1%	271%	3.7%	-0.5%	27.8%	0.0%	23.4%	278%	0.0%	0.0%	34.5%	0.0%	0.0%
1947	176.8	0.0%	0.1%	271%	2.9%	1.3%	-1.2%	0.0%	-0.2%	278%	0.0%	0.0%	-0.2%	0.0%	0.0%
1948	201.0	13.7%	-0.2%	238%	4.4%	1.1%	-1.2%	0.0%	-0.2%	244%	0.0%	0.0%	-0.2%	0.0%	0.0%
1949	224.3	11.6%	0.6%	215%	13.7%	1.8%	-1.2%	0.0%	-0.2%	218%	10.9%	0.0%	-0.2%	0.0%	0.0%
1950	239.8	6.9%	5.1%	211%	14.5%	6.4%	-1.2%	0.0%	4.8%	214%	10.1%	5.0%	-0.2%	0.0%	0.0%
1951	257.7	7.5%	5.5%	207%	13.3%	6.8%	-1.2%	0.0%	4.5%	208%	10.0%	4.7%	-0.2%	0.0%	0.0%
1952	266.9	3.6%	5.1%	211%	11.9%	6.4%	-1.2%	0.0%	4.6%	210%	10.1%	4.8%	-0.2%	0.0%	0.0%
1953	282.8	6.0%	4.4%	207%	10.9%	5.7%	-1.2%	0.0%	4.6%	207%	8.8%	4.8%	-0.2%	0.0%	0.0%
1954	**299.9**	**6.1%**	**4.0%**	**203%**	**12.5%**	**5.3%**	**-1.2%**	**0.0%**	**4.0%**	**203%**	**10.3%**	**4.2%**	**-0.2%**	**0.0%**	**0.0%**
1955	320.3	6.8%	8.7%	207%	14.0%	6.1%	2.5%	0.0%	8.9%	207%	11.3%	5.1%	3.6%	0.0%	0.0%
1956	337.0	5.2%	9.4%	215%	11.9%	6.8%	2.5%	0.0%	9.2%	215%	9.5%	5.5%	3.6%	0.0%	0.0%
1957	370.1	9.8%	8.1%	212%	13.0%	5.5%	2.5%	0.0%	8.2%	212%	10.2%	4.4%	3.6%	0.0%	0.0%
1958	370.4	0.1%	8.7%	230%	13.1%	6.1%	2.5%	0.0%	8.6%	230%	10.5%	4.8%	3.6%	0.0%	0.0%
1959	378.6	2.2%	8.3%	244%	11.8%	5.7%	2.5%	0.0%	8.3%	244%	9.1%	4.6%	3.6%	0.0%	0.0%
1960	406.5	7.4%	7.4%	244%	14.3%	4.8%	2.5%	0.0%	7.5%	244%	10.8%	3.7%	3.6%	0.0%	0.0%
1961	426.0	4.8%	8.5%	252%	13.1%	5.9%	2.5%	0.0%	8.2%	252%	10.1%	4.4%	3.6%	0.0%	0.0%
1962	456.8	7.2%	7.8%	254%	14.2%	5.2%	2.5%	0.0%	7.7%	253%	11.9%	4.0%	3.6%	0.0%	0.0%
1963	489.6	7.2%	8.2%	256%	13.5%	5.6%	2.5%	0.0%	8.5%	256%	11.3%	4.7%	3.6%	0.0%	0.0%
1964	525.0	7.2%	7.9%	258%	13.5%	5.3%	2.5%	0.0%	8.2%	258%	10.8%	4.4%	3.6%	0.0%	0.0%

1965	552.6	5.2%	7.8%	264%	14.0%	5.2%	2.5%	0.0%	7.9%	265%	11.0%	4.2%	3.6%	0.0%	0.0%
1966	582.3	5.4%	7.9%	270%	14.2%	5.3%	2.5%	0.0%	7.9%	271%	10.9%	4.2%	3.6%	0.0%	0.0%
1967	613.1	5.3%	7.9%	277%	14.7%	5.3%	2.5%	0.0%	7.8%	278%	11.3%	4.0%	3.6%	0.0%	0.0%
1968	638.0	4.1%	7.9%	287%	14.5%	5.3%	2.5%	0.0%	7.8%	288%	11.4%	4.1%	3.6%	0.0%	0.0%
1969	689.2	8.0%	7.6%	286%	13.9%	5.1%	2.5%	0.0%	7.7%	287%	10.1%	4.0%	3.6%	0.0%	0.0%
1970	**732.4**	**6.3%**	**7.4%**	**289%**	**14.6%**	**4.9%**	**2.5%**	**0.0%**	**7.2%**	**289%**	**11.6%**	**3.5%**	**3.6%**	**0.0%**	**0.0%**
1971	772.4	5.5%	3.1%	283%	14.7%	5.1%	-1.9%	0.0%	3.1%	283%	11.5%	4.0%	-0.9%	0.0%	0.0%
1972	811.6	5.1%	4.3%	281%	14.6%	5.2%	-0.9%	0.0%	4.3%	281%	11.9%	4.1%	0.2%	0.0%	0.0%
1973	870.2	7.2%	7.0%	280%	15.4%	5.2%	1.7%	0.0%	7.0%	280%	12.0%	4.3%	2.6%	0.0%	0.0%
1974	885.3	1.7%	-0.4%	274%	14.1%	5.5%	-5.6%	0.0%	-0.4%	274%	12.8%	4.3%	-4.5%	0.0%	0.0%
1975	882.8	-0.3%	5.2%	289%	13.6%	5.1%	0.0%	0.0%	5.2%	289%	13.7%	4.7%	0.4%	0.0%	0.0%
1976	929.0	5.2%	5.1%	289%	11.2%	4.7%	0.3%	0.0%	5.1%	289%	11.6%	4.8%	0.3%	0.0%	0.0%
1977	954.2	2.7%	4.1%	293%	12.0%	3.9%	0.2%	0.0%	4.1%	293%	11.7%	4.0%	0.1%	0.0%	0.0%
1978	987.2	3.5%	3.1%	292%	12.2%	4.1%	-0.9%	0.0%	3.1%	292%	12.6%	4.0%	-0.8%	0.0%	0.0%
1979	1 016.6	3.0%	3.4%	293%	10.5%	4.2%	-0.8%	0.0%	3.4%	293%	11.1%	4.3%	-0.9%	0.0%	0.0%
1980	1 007.5	-0.9%	0.8%	298%	9.3%	3.6%	-2.7%	0.0%	0.8%	298%	10.7%	3.8%	-2.8%	0.0%	0.0%
1981	997.9	-1.0%	0.1%	301%	8.4%	3.1%	-2.9%	0.0%	0.1%	301%	11.1%	3.6%	-3.4%	0.0%	0.0%
1982	1 017.0	1.9%	-0.6%	294%	7.1%	2.8%	-3.3%	0.0%	-0.6%	294%	10.4%	3.7%	-4.1%	0.0%	0.0%
1983	1 020.1	0.3%	1.6%	298%	6.9%	2.4%	-0.7%	0.0%	1.6%	298%	9.7%	3.5%	-1.8%	0.0%	0.0%
1984	1 031.9	1.2%	2.6%	302%	6.8%	2.3%	0.3%	0.0%	2.6%	302%	8.3%	3.3%	-0.6%	0.0%	0.0%
1985	1 050.5	1.8%	1.3%	300%	7.0%	2.2%	-0.9%	0.0%	1.3%	300%	7.7%	2.8%	-1.4%	0.0%	0.0%
1986	1 109.8	5.6%	3.8%	295%	9.2%	2.3%	1.4%	0.0%	3.8%	295%	6.8%	2.6%	1.2%	0.0%	0.0%
1987	1 133.6	2.1%	7.8%	311%	7.8%	3.1%	4.5%	0.0%	7.8%	311%	5.3%	2.3%	5.3%	0.0%	0.0%
1988	1 194.1	5.3%	1.5%	300%	9.5%	2.5%	-1.0%	0.0%	1.5%	300%	5.5%	1.7%	-0.2%	0.0%	0.0%
1989	1 242.0	4.0%	7.7%	311%	9.6%	3.2%	4.4%	0.0%	7.7%	311%	5.9%	1.8%	5.8%	0.0%	0.0%
1990	1 263.9	1.8%	8.0%	330%	9.7%	3.1%	4.8%	0.0%	8.0%	330%	6.6%	1.9%	6.0%	0.0%	0.0%
1991	1 265.0	0.1%	0.0%	329%	9.7%	2.9%	-2.9%	0.0%	0.0%	329%	7.5%	2.0%	-2.0%	0.0%	0.0%
1992	1 277.7	1.0%	0.2%	327%	10.9%	2.9%	-2.7%	0.0%	0.2%	327%	8.2%	2.3%	-2.0%	0.0%	0.0%
1993	1 261.1	-1.3%	-0.2%	331%	11.0%	3.3%	-3.4%	0.0%	-0.2%	331%	9.0%	2.5%	-2.6%	0.0%	0.0%
1994	1 283.3	1.8%	1.6%	330%	10.8%	3.3%	-1.6%	0.0%	1.6%	330%	8.3%	2.7%	-1.1%	0.0%	0.0%
1995	1 306.7	1.8%	-0.2%	324%	11.4%	3.3%	-3.4%	0.0%	-0.2%	324%	9.3%	2.5%	-2.7%	0.0%	0.0%
1996	1 318.5	0.9%	0.5%	322%	10.1%	3.5%	-3.0%	0.0%	0.5%	322%	8.5%	2.9%	-2.3%	0.0%	0.0%
1997	1 349.4	2.3%	4.4%	329%	11.4%	3.1%	1.3%	0.0%	4.4%	329%	9.1%	2.6%	1.7%	0.0%	0.0%
1998	1 402.4	3.9%	3.4%	327%	11.5%	3.5%	0.0%	0.0%	3.4%	327%	8.7%	2.8%	0.6%	0.0%	0.0%
1999	1 453.0	3.6%	4.5%	330%	11.2%	3.5%	1.0%	0.0%	4.5%	330%	8.4%	2.7%	1.8%	0.0%	0.0%
2000	1 501.0	3.3%	11.2%	355%	10.5%	3.4%	7.6%	0.0%	11.2%	355%	8.3%	2.5%	8.5%	0.0%	0.0%
2001	1 526.7	1.7%	5.4%	368%	10.1%	3.0%	2.3%	0.0%	5.4%	368%	9.0%	2.3%	2.9%	0.0%	0.0%
2002	1 529.7	0.2%	3.1%	379%	10.4%	2.7%	0.3%	0.0%	3.1%	379%	10.1%	2.4%	0.6%	0.0%	0.0%
2003	1 545.6	1.0%	6.2%	398%	10.7%	2.7%	3.3%	0.0%	6.2%	398%	9.1%	2.7%	3.4%	0.0%	0.0%
2004	1 575.0	1.9%	9.1%	426%	9.8%	2.7%	6.3%	0.0%	9.1%	426%	9.1%	2.3%	6.7%	0.0%	0.0%
2005	1 604.1	1.8%	12.6%	471%	8.8%	2.3%	10.0%	0.0%	12.6%	471%	8.4%	2.1%	10.2%	0.0%	0.0%
2006	1 654.3	3.1%	11.6%	510%	8.3%	1.9%	9.5%	0.0%	11.6%	510%	8.4%	1.8%	9.6%	0.0%	0.0%
2007	1 711.0	3.4%	9.2%	538%	9.1%	1.6%	7.5%	0.0%	9.2%	538%	8.8%	1.6%	7.5%	0.0%	0.0%
2008	1 695.8	-0.9%	3.6%	563%	8.2%	1.7%	1.9%	0.0%	3.6%	563%	8.6%	1.6%	1.9%	0.0%	0.0%
2009	1 661.8	-2.0%	-3.9%	552%	8.2%	1.5%	-5.3%	0.0%	-3.9%	552%	8.6%	1.5%	-5.4%	0.0%	0.0%
2010	1 661.8	0.0%	-3.9%	530%	9.4%	1.5%	-5.3%	0.0%	-3.9%	530%	8.4%	1.6%	-5.4%	0.0%	0.0%
	p_t	g_t	g_{wt}		s_t	g_{wst}	q_t	d_t	g_{wt}		s_t	g_{wst}	q_t	d_t	
1896-2009	*7.1%*	**2.4%**	**2.2%**		10.5%	**3.3%**	**-0.3%**	**-0.7%**	**2.2%**		8.2%	**2.5%**	**0.4%**	**-0.7%**	
						144%	*-15%*	*-29%*				*112%*	*16%*	*-29%*	
1970-2009	*4.9%*	**2.1%**	**3.8%**		10.5%	**3.2%**	**0.6%**		**3.8%**		9.4%	**2.9%**	**0.9%**		
						85%	*15%*					*76%*	*24%*		
1954-1970	*4.5%*	**5.7%**	**8.1%**		13.7%	**5.5%**	**2.5%**		**8.1%**		10.7%	**4.3%**	**3.6%**		
						69%	*31%*					*55%*	*45%*		
1925-1954	*13.4%*	**1.8%**	**0.5%**		9.0%	**3.0%**	**-1.1%**	**-1.4%**	**0.5%**		5.4%	**1.9%**	**0.1%**	**-1.5%**	
							43%	*57%*					*-5%*	*105%*	
1913-1925	*12.4%*	**2.2%**	**-4.5%**		13.4%	**4.0%**	**-5.6%**	**-2.7%**	**-4.5%**		8.9%	**2.7%**	**-4.5%**	**-2.7%**	
							67%	*33%*					*63%*	*37%*	
1896-1913	*1.0%*	**1.2%**	**1.2%**		8.1%	**1.2%**	**0.0%**		**1.2%**		7.3%	**1.1%**	**0.1%**		
						102%	*-2%*					*91%*	*8%*		

Table A18: Accumulation equation for private wealth in France, 1820-1913 (decennial averages)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
	National income Y_t (current billions francs)	**Real growth rate of national income g_t**	**Private wealth W_t** (current billions francs)	**Real growth rate of private wealth g_{wt}**	**Wealth-income ratio $\beta_t = W_t/Y_t$**	**Savings rate $s_t = S_t/Y_t$**	**Savings-induced wealth growth rate $g_{wst} = s_{t-1}/\beta_{t-1}$**	**Real rate of capital gains q_t**	*memo: consumer price inflation p_t*	*memo: consumer price index*	*memo: population growth rate n_t*	*memo: adult population*	*memo: nominal wage index*	*memo: nominal wage bill*
1820	11.3	1.0%	62.0	**1.7%**	549%	8%	**1.5%**	**0.3%**	*0.8%*	*74*	*0.7%*	*18.8*	*43*	*32*
1830	13.5	1.0%	80.0	**1.7%**	591%	8%	**1.5%**	**0.3%**	*0.8%*	*80*	*0.7%*	*20.1*	*45*	*35*
1840	16.5	1.8%	95.0	**1.5%**	577%	10%	**1.4%**	**0.1%**	*0.2%*	*82*	*0.6%*	*21.3*	*50*	*42*
1850	21.9	1.8%	130.0	**2.1%**	593%	10%	**1.7%**	**0.4%**	*1.1%*	*91*	*0.6%*	*22.7*	*55*	*49*
1860	26.1	0.9%	165.0	**1.6%**	633%	9%	**1.7%**	**-0.1%**	*0.8%*	*99*	*0.5%*	*23.9*	*62*	*58*
1870	28.7	0.0%	185.0	**0.2%**	644%	8%	**1.5%**	**-1.3%**	*1.0%*	*109*	*-0.2%*	*23.5*	*73*	*67*
1880	27.8	-0.1%	195.0	**0.8%**	702%	9%	**1.2%**	**-0.4%**	*-0.3%*	*106*	*0.3%*	*24.2*	*82*	*78*
1890	30.4	1.4%	205.0	**1.0%**	674%	10%	**1.3%**	**-0.3%**	*-0.5%*	*101*	*0.4%*	*25.1*	*92*	*90*
1900	33.9	1.2%	228.6	**1.2%**	675%	7%	**1.5%**	**-0.2%**	*-0.1%*	*100*	*0.2%*	*25.6*	*100*	*100*
1910	42.7	1.6%	279.4	**1.1%**	654%	8%	**1.0%**	**0.0%**	*2.0%*	*113*	*0.4%*	*26.2*	*112*	*115*
1820-1913		**1.0%**		**1.3%**	**629%**	**9%**	**1.4%**	**-0.1%**	***0.5%***		***0.4%***			

Table A19: Sources of private wealth accumulation in France, 1820-2009 - Summary statistics

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
			Method n°1: savings = private savings				**Method n°2: savings = personal savings**				
	Real growth rate of national income	Real growth rate of private wealth	Private savings rate (personal savings + net retained earnings)	Savings-induced wealth growth rate	Real rate of capital gains	Destruction rate	Personal savings rate	Savings-induced wealth growth rate	Real rate of capital gains	Destruction rate	*Memo: Consumer price inflation*
	g	g_w	$s = S/Y$	$g_{ws} = s/\beta$	q	d	$s = S/Y$	$g_{ws} = s/\beta$	q	d	p
1820-2009	**1.8%**	**1.8%**	**9.8%**	**2.5%** *135%*	**-0.3%** *-14%*	***-0.4%*** *-21%*	**8.5%**	**2.1%** *113%*	**0.1%** *8%*	***-0.4%*** *-21%*	**4.4%**
1820-1913	**1.0%**	**1.3%**	**8.7%**	**1.4%** *109%*	**-0.1%** *-9%*	***0.0%***	**8.7%**	**1.4%** *109%*	**-0.1%** *-9%*	***0.0%***	***0.5%***
1913-2009	**2.6%**	**2.4%**	**10.9%**	**3.6%** *148%*	**-0.4%** *-16%*	**-0.8%** *-31%*	**8.3%**	**2.8%** *115%*	**0.4%** *17%*	**-0.8%** *-32%*	**8.3%**
1896-2009	2.4%	2.2%	10.5%	3.3% *144%*	-0.3% *-15%*	-0.7% *-29%*	8.2%	2.5% *113%*	0.4% *16%*	-0.7% *-30%*	7.1%
1896-1913	1.2%	1.2%	8.1%	1.2% *102%*	0.0% *-2%*	0.0%	7.3%	1.1% *92%*	0.1% *8%*	0.0%	1.0%
1913-1949	**1.3%**	**-1.7%**	**10.0%**	**2.9%**	**-2.6%** *56%*	**-2.0%** *44%*	**5.9%**	**1.8%**	**-1.4%** *41%*	**-2.1%** *59%*	**13.9%**
1949-1979	**5.2%**	**6.2%**	**13.4%**	**5.4%** *87%*	**0.8%** *13%*	**0.0%**	**11.0%**	**4.4%** *71%*	**1.8%** *29%*	**0.0%**	**6.4%**
1979-2009	**1.7%**	**3.8%**	**9.5%**	**2.8%** *73%*	**1.0%** *27%*	**0.0%**	**8.5%**	**2.5%** *66%*	**1.3%** *34%*	**0.0%**	**3.6%**
1949-1959	5.4%	6.6%	12.9%	6.1% *91%*	0.6% *9%*	0.0%	10.2%	4.8% *74%*	1.7% *26%*	0.0%	6.5%
1959-1969	6.2%	7.9%	13.8%	5.3% *68%*	2.5% *32%*	0.0%	10.9%	4.2% *54%*	3.6% *46%*	0.0%	3.9%
1969-1979	4.0%	4.2%	13.6%	4.8% *113%*	-0.5% *-13%*	0.0%	11.9%	4.2% *100%*	0.0% *0%*	0.0%	8.8%
1979-1989	2.0%	2.6%	8.2%	2.8% *105%*	-0.1% *-5%*	0.0%	8.6%	2.9% *110%*	-0.3% *-10%*	0.0%	7.3%
1989-1999	1.6%	2.2%	10.6%	3.3% *146%*	-1.0% *-46%*	0.0%	8.1%	2.5% *113%*	-0.3% *-13%*	0.0%	1.9%
1999-2009	1.4%	6.7%	9.7%	2.3% *36%*	4.3% *64%*	0.0%	8.8%	2.1% *32%*	4.5% *68%*	0.0%	1.8%

Table A20: Price and return indexes in France, 1800-2009 (annual series)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
	Price and return indexes (1900 = 1.00)						Annual inflation rates and return rates					
	Consumer price index P_t	Real estate price index (Paris)	Real estate price index (France)	Equity price index	Equity total return index (dividend reinvested)	Bonds total return index (interest reinvested)	Consumer price inflation p_t	Real estate price inflation (Paris)	Real estate price inflation (France)	Equity price inflation	Equity total return (incl. dividend)	Bonds total return (incl. interest)
1800	0.84				0.00	0.00						
1801	0.86				0.00	0.00	3.1%				9.2%	16.0%
1802	0.92				0.00	0.00	7.3%				9.2%	16.0%
1803	0.92				0.00	0.00	-0.1%				9.2%	7.3%
1804	0.83				0.00	0.00	-10.2%				8.2%	16.3%
1805	0.82				0.00	0.01	-0.6%				20.6%	13.9%
1806	0.81				0.00	0.01	-1.5%				-1.7%	20.0%
1807	0.77				0.00	0.01	-4.8%				16.9%	30.7%
1808	0.78				0.00	0.01	1.4%				6.7%	11.1%
1809	0.72				0.00	0.01	-8.3%				2.8%	1.5%
1810	0.91				0.00	0.01	25.7%				9.0%	7.9%
1811	1.00				0.00	0.01	10.2%				3.4%	6.4%
1812	1.12				0.00	0.01	12.2%				5.0%	6.8%
1813	0.92				0.00	0.01	-17.8%				-8.8%	-8.2%
1814	0.76				0.00	0.01	-17.2%				-0.7%	1.5%
1815	1.06				0.00	0.01	39.0%				7.6%	3.6%
1816	1.06				0.00	0.01	-0.1%				14.5%	1.3%
1817	1.22				0.00	0.01	15.3%				30.3%	19.3%
1818	1.00				0.01	0.02	-17.8%				23.7%	18.2%
1819	0.84				0.01	0.02	-16.6%				-0.9%	4.8%
1820	0.74				0.01	0.02	-11.0%				2.6%	16.9%
1821	0.73				0.01	0.02	-1.7%				13.0%	20.8%
1822	0.69				0.01	0.03	-5.7%				8.9%	11.3%
1823	0.69				0.01	0.03	-0.3%				2.9%	2.7%
1824	0.68				0.01	0.03	-0.5%				30.2%	21.5%
1825	0.69				0.01	0.03	1.4%				14.9%	5.1%
1826	0.72				0.01	0.03	3.9%				-2.1%	1.3%
1827	0.75				0.01	0.04	4.1%				1.3%	8.6%
1828	0.82				0.01	0.04	9.6%				-3.7%	8.0%
1829	0.85				0.01	0.04	3.4%				2.7%	10.0%
1830	0.83				0.01	0.04	-2.3%				3.7%	-2.1%
1831	0.82				0.01	0.04	-0.8%				-8.5%	-8.8%
1832	0.82				0.01	0.05	-0.6%				9.6%	15.0%
1833	0.77				0.01	0.05	-6.5%				9.0%	12.4%
1834	0.76				0.01	0.06	-0.8%				7.5%	7.1%
1835	0.77				0.02	0.06	0.8%				16.4%	7.3%
1836	0.78				0.02	0.06	1.2%				18.0%	4.3%
1837	0.79				0.02	0.07	1.7%				14.5%	5.0%
1838	0.83				0.02	0.07	4.8%				10.7%	5.5%
1839	0.86				0.03	0.07	4.4%				6.6%	5.3%
1840	0.85	0.33			0.03	0.08	-1.7%				19.3%	5.3%
1841	0.79	0.33			0.03	0.08	-6.5%	1.9%			6.0%	5.3%
1842	0.82	0.34			0.04	0.09	2.8%	1.8%			6.7%	8.0%
1843	0.79	0.33			0.04	0.09	-3.6%	-1.8%			5.3%	6.2%
1844	0.81	0.35			0.04	0.10	3.6%	6.9%			6.2%	4.7%
1845	0.80	0.38			0.04	0.10	-1.3%	8.2%			9.3%	3.5%
1846	0.86	0.38			0.04	0.10	6.9%	-1.3%			3.6%	3.8%
1847	0.91	0.38			0.04	0.10	6.3%	1.3%			-4.5%	-0.2%
1848	0.79	0.40			0.03	0.07	-13.9%	3.2%			-40.9%	-32.0%
1849	0.77	0.34			0.03	0.08	-2.1%	-13.1%			34.4%	20.1%
1850	0.76	0.35			0.04	0.10	-1.1%	1.8%			5.6%	13.7%
1851	0.76	0.37			0.04	0.10	-0.1%	4.8%			4.5%	5.5%
1852	0.79	0.37			0.05	0.12	4.4%	0.0%			39.2%	20.7%
1853	0.89	0.37			0.06	0.13	11.6%	1.7%			9.1%	5.1%
1854	0.99	0.43			0.06	0.12	11.9%	15.6%			2.7%	-3.0%
1855	1.06	0.44			0.07	0.13	6.7%	2.5%			16.1%	0.7%
1856	1.08	0.48		1.03	0.09	0.13	1.7%	9.3%			28.9%	7.1%
1857	1.01	0.55		0.98	0.10	0.14	-6.5%	13.3%		-4.5%	17.2%	2.7%
1858	0.91	0.57		0.88	0.11	0.15	-9.2%	4.2%		-10.7%	10.8%	8.3%
1859	0.86	0.62		0.81	0.11	0.15	-5.3%	9.1%		-8.0%	-3.3%	2.4%
1860	0.96	0.62		0.81	0.12	0.16	11.4%	-0.8%		0.0%	6.2%	6.3%
1861	1.01	0.60		0.84	0.12	0.17	5.1%	-2.0%		3.6%	7.1%	4.2%
1862	0.98	0.61		0.91	0.14	0.18	-3.0%	1.0%		9.1%	16.0%	6.8%
1863	0.97	0.65		0.99	0.16	0.19	-1.3%	5.7%		9.0%	12.2%	2.9%
1864	0.94	0.62		0.92	0.17	0.19	-3.0%	-3.7%		-7.6%	3.2%	0.9%

1865	0.93	0.66		0.88	0.19	0.20	-0.8%	6.6%		-4.5%	11.0%	7.5%
1866	0.98	0.71		0.81	0.19	0.21	4.9%	7.8%		-8.0%	4.1%	4.8%
1867	1.04	0.71		0.77	0.19	0.22	6.0%	-0.7%		-4.3%	0.1%	6.1%
1868	1.06	0.79		0.76	0.19	0.24	2.0%	11.4%		-1.5%	-0.8%	5.8%
1869	0.99	0.83		0.84	0.19	0.25	-6.3%	4.4%		10.0%	-1.8%	6.5%
1870	1.01	0.77		0.82	0.18	0.24	2.3%	-6.3%		-2.1%	-3.8%	-3.5%
1871	1.18	0.71		0.71	0.21	0.22	16.4%	-8.3%		-13.6%	16.6%	-11.4%
1872	1.09	0.69		0.75	0.27	0.23	-7.3%	-2.6%		5.8%	27.9%	5.7%
1873	1.13	0.67		0.78	0.31	0.25	3.2%	-3.3%		4.7%	13.5%	9.5%
1874	1.15	0.59		0.78	0.31	0.28	1.7%	-11.4%		0.0%	-0.5%	13.3%
1875	1.02	0.61		0.87	0.34	0.32	-11.4%	3.1%		10.4%	9.7%	12.5%
1876	1.05	0.65		0.84	0.34	0.35	3.7%	5.7%		-2.7%	1.7%	9.1%
1877	1.08	0.69		0.88	0.32	0.37	2.5%	6.2%		4.2%	-6.3%	6.5%
1878	1.09	0.71		0.91	0.34	0.41	1.2%	4.2%		4.0%	6.6%	10.2%
1879	1.08	0.81		0.94	0.36	0.45	-1.5%	13.9%		2.6%	5.2%	10.1%
1880	1.12	0.88		1.04	0.41	0.49	4.1%	8.6%		11.3%	13.7%	8.0%
1881	1.12	0.94		1.15	0.62	0.51	-0.2%	5.9%		10.1%	51.9%	4.1%
1882	1.09	0.91		1.05	0.63	0.51	-2.2%	-3.1%		-8.7%	1.1%	1.0%
1883	1.10	0.93		0.94	0.65	0.51	1.1%	2.0%		-10.6%	3.9%	-0.3%
1884	1.08	0.87		0.88	0.65	0.52	-2.2%	-5.8%		-5.6%	0.1%	2.0%
1885	1.04	0.87		0.81	0.67	0.55	-3.5%	0.0%		-8.6%	3.1%	6.5%
1886	1.04	0.86		0.79	0.62	0.58	-0.3%	-1.2%		-2.2%	-8.1%	5.6%
1887	1.02	0.87		0.80	0.63	0.60	-1.4%	0.6%		0.7%	2.5%	2.4%
1888	0.98	0.86		0.84	0.61	0.62	-4.0%	-0.6%		5.9%	-3.8%	4.1%
1889	1.00	0.90		0.89	0.65	0.66	1.5%	4.6%		5.6%	7.7%	5.8%
1890	1.02	0.91		0.96	0.72	0.72	2.0%	1.3%		7.9%	10.8%	8.7%
1891	1.04	0.91		0.95	0.79	0.76	1.8%	0.0%		-1.2%	9.0%	5.9%
1892	1.03	0.91		0.90	0.77	0.80	-0.9%	0.0%		-4.9%	-1.9%	5.6%
1893	1.01	0.94		0.88	0.77	0.83	-1.5%	3.2%		-1.9%	-0.8%	3.5%
1894	1.04	0.92		0.87	0.78	0.88	3.1%	-2.4%		-2.0%	1.6%	6.0%
1895	1.02	0.88		0.84	0.76	0.91	-2.6%	-3.8%		-2.7%	-2.2%	3.8%
1896	1.00	0.89		0.85	0.79	0.93	-1.6%	0.7%		1.4%	2.9%	2.0%
1897	0.97	0.91		0.94	0.85	0.96	-2.7%	2.6%		9.6%	7.7%	3.5%
1898	0.99	0.91		1.01	0.88	0.98	1.4%	0.0%		7.5%	3.5%	1.8%
1899	1.00	0.95		1.04	0.97	0.98	1.4%	3.8%		2.9%	11.0%	0.2%
1900	1.00	1.00		1.00	1.00	1.00	0.0%	5.5%		-3.4%	2.8%	1.8%
1901	1.01	1.00		0.88	0.97	1.03	0.5%	0.0%		-11.7%	-3.2%	2.6%
1902	0.99	1.01		0.82	1.00	1.05	-1.1%	0.6%		-7.3%	3.2%	1.9%
1903	0.99	1.02		0.82	1.03	1.05	-0.5%	1.7%		0.0%	3.4%	0.5%
1904	0.98	1.02		0.83	1.07	1.08	-1.4%	-0.5%		1.4%	3.7%	2.6%
1905	0.97	1.01		0.92	1.13	1.13	-0.1%	-1.2%		11.3%	5.3%	5.0%
1906	0.99	1.02		0.96	1.19	1.15	1.3%	1.2%		4.4%	5.8%	1.2%
1907	1.00	1.03		0.96	1.25	1.15	1.4%	1.1%		0.0%	4.6%	0.2%
1908	1.02	1.04		0.94	1.34	1.20	2.3%	1.2%		-3.0%	7.1%	4.7%
1909	1.02	1.06		0.99	1.43	1.26	-0.2%	2.2%		6.3%	6.7%	4.8%
1910	1.05	1.12		1.06	1.50	1.30	3.1%	4.9%		7.1%	4.9%	3.3%
1911	1.16	1.15		1.11	1.51	1.31	9.9%	3.1%		4.4%	0.7%	0.6%
1912	1.14	1.16		1.19	1.64	1.31	-1.1%	1.1%		7.4%	8.8%	-0.1%
1913	1.18	1.17		1.17	1.82	1.27	3.4%	0.9%		-2.0%	11.3%	-2.7%
1914	1.18	1.21		1.09	1.75	1.26	0.0%	3.0%		-7.0%	-4.0%	-0.8%
1915	1.41	1.28		0.92	1.81	1.17	18.7%	5.5%		-15.1%	3.5%	-7.2%
1916	1.57	1.42		1.05	2.03	1.10	12.0%	11.4%		13.3%	12.3%	-5.9%
1917	1.89	1.35		1.22	2.22	1.13	19.8%	-5.1%		16.8%	9.0%	2.8%
1918	2.45	1.32		1.32	2.32	1.18	29.7%	-2.5%		8.1%	4.5%	4.5%
1919	3.06	1.33		1.44	2.69	1.24	25.0%	0.8%		8.8%	15.9%	4.4%
1920	4.20	1.32		1.77	3.39	1.24	37.4%	-0.8%		22.8%	26.1%	0.4%
1921	3.68	1.40		1.32	2.64	1.25	-12.4%	6.4%		-25.2%	-22.2%	0.6%
1922	3.54	1.54		1.39	2.87	1.36	-3.9%	10.4%		5.3%	8.8%	8.6%
1923	3.92	1.79		2.01	4.33	1.46	11.0%	15.9%		44.5%	51.1%	7.4%
1924	4.47	1.97		2.43	5.42	1.50	13.9%	10.0%		20.9%	25.2%	3.2%
1925	4.80	2.22		2.34	5.38	1.52	7.3%	12.7%		-3.7%	-0.8%	1.3%
1926	6.24	2.46		2.73	6.50	1.52	30.1%	11.1%		16.3%	20.9%	-0.5%
1927	6.51	2.59		3.36	8.32	1.80	4.4%	5.2%		23.2%	27.9%	18.8%
1928	6.50	2.63		4.85	12.50	2.10	-0.2%	1.5%		44.6%	50.3%	16.7%
1929	6.90	2.76		5.93	15.67	2.33	6.2%	4.9%		22.2%	25.4%	10.7%
1930	6.96	3.18		5.11	13.90	2.56	0.8%	15.4%		-13.8%	-11.3%	10.2%
1931	6.69	3.38		3.60	10.06	2.69	-3.9%	6.1%		-29.5%	-27.6%	4.8%
1932	6.09	3.53		2.87	8.32	2.71	-8.9%	4.5%		-20.5%	-17.3%	0.7%
1933	5.90	3.50		2.71	8.26	2.74	-3.2%	-0.6%		-5.3%	-0.8%	1.3%
1934	5.65	3.44		2.27	7.18	2.85	-4.2%	-1.9%		-16.4%	-13.0%	4.0%
1935	5.18	3.26		2.18	7.15	3.10	-8.3%	-5.2%		-4.1%	-0.5%	8.8%
1936	5.56	3.11	5.56	2.11	7.20	3.14	7.3%	-4.4%		-3.2%	0.6%	1.2%
1937	6.99	3.04	6.66	2.65	9.42	3.27	25.8%	-2.3%	19.8%	26.1%	30.9%	4.1%
1938	7.95	3.03	6.47	2.44	8.98	3.43	13.6%	-0.4%	-2.9%	-7.9%	-4.7%	5.0%

1939	8.47	3.13	6.22	2.68	10.24	3.96	6.6%	3.3%	-3.8%	9.6%	14.0%	15.3%
1940	10.04	3.53	6.52	3.29	14.97	4.13	18.6%	12.6%	4.8%	22.7%	46.1%	4.3%
1941	11.78	4.19	6.99	7.89	29.53	4.80	17.3%	18.8%	7.2%	140.2%	97.3%	16.2%
1942	14.15	5.11	9.37	12.97	49.70	5.29	20.1%	21.9%	34.0%	64.3%	68.3%	10.1%
1943	17.58	5.52	13.98	13.20	56.83	5.48	24.2%	8.0%	49.3%	1.8%	14.3%	3.7%
1944	21.49	5.57	16.52	13.47	59.53	5.68	22.3%	1.0%	18.1%	2.0%	4.7%	3.6%
1945	31.85	6.10	17.92	11.08	48.36	5.96	48.2%	9.4%	8.5%	-17.8%	-18.8%	4.9%
1946	48.61	6.67	22.36	13.74	61.62	5.86	52.6%	9.4%	24.8%	24.1%	27.4%	-1.7%
1947	72.62	7.29	27.47	18.04	81.34	5.85	49.4%	9.4%	22.9%	31.2%	32.0%	-0.1%
1948	115.11	7.98	34.15	19.72	89.45	5.79	58.5%	9.4%	24.3%	9.3%	10.0%	-1.0%
1949	130.30	8.73	42.53	17.73	81.30	5.76	13.2%	9.4%	24.5%	-10.1%	-9.1%	-0.6%
1950	143.33	9.55	45.21	15.96	76.76	6.09	10.0%	9.4%	6.3%	-10.0%	-5.6%	5.7%
1951	166.70	13.29	51.03	19.86	99.50	6.51	16.3%	39.2%	12.9%	24.4%	29.6%	6.9%
1952	186.53	16.82	60.77	25.36	136.41	7.13	11.9%	26.5%	19.1%	27.7%	37.1%	9.5%
1953	183.36	20.79	68.69	28.19	158.25	7.71	-1.7%	23.6%	13.0%	11.2%	16.0%	8.2%
1954	184.10	27.17	78.07	37.94	225.72	8.23	0.4%	30.7%	13.7%	34.6%	42.6%	6.7%
1955	185.75	36.12	94.98	53.55	331.88	8.97	0.9%	32.9%	21.7%	41.1%	47.0%	9.0%
1956	193.55	51.84	122.33	54.61	349.27	9.33	4.2%	43.5%	28.8%	2.0%	5.2%	4.0%
1957	199.36	77.69	153.09	69.15	456.08	9.82	3.0%	49.9%	25.1%	26.6%	30.6%	5.2%
1958	229.46	92.45	189.97	62.06	421.19	10.32	15.1%	19.0%	24.1%	-10.3%	-7.7%	5.1%
1959	243.46	99.38	233.46	82.63	540.97	11.53	6.1%	7.5%	22.9%	33.1%	28.4%	11.7%
1960	252.47	121.83	286.11	99.65	667.31	12.30	3.7%	22.6%	22.6%	20.6%	23.4%	6.8%
1961	260.80	150.99	328.91	116.85	799.80	13.15	3.3%	23.9%	15.0%	17.3%	19.9%	6.9%
1962	273.06	180.56	384.48	127.84	883.21	13.88	4.7%	19.6%	16.9%	9.4%	10.4%	5.5%
1963	286.17	234.98	473.62	116.67	820.45	14.97	4.8%	30.1%	23.2%	-8.7%	-7.1%	7.9%
1964	295.90	277.05	581.70	100.53	721.07	15.58	3.4%	17.9%	22.8%	-13.8%	-12.1%	4.1%
1965	303.29	336.03	704.17	93.09	679.29	15.71	2.5%	21.3%	21.1%	-7.4%	-5.8%	0.9%
1966	311.48	356.17	776.70	89.19	671.13	16.31	2.7%	6.0%	10.3%	-4.2%	-1.2%	3.8%
1967	319.58	342.68	821.38	81.03	630.22	17.15	2.6%	-3.8%	5.8%	-9.1%	-6.1%	5.2%
1968	334.28	397.61	883.34	87.41	701.77	17.92	4.6%	16.0%	7.5%	7.9%	11.4%	4.5%
1969	356.01	455.16	975.71	108.16	895.70	17.98	6.5%	14.5%	10.5%	23.7%	27.6%	0.4%
1970	374.52	472.64	1 015.62	112.06	955.01	18.85	5.2%	3.8%	4.1%	3.6%	6.6%	4.8%
1971	395.12	500.85	1 076.12	109.40	959.36	20.83	5.5%	6.0%	6.0%	-2.4%	0.5%	10.5%
1972	419.62	545.58	1 173.73	121.81	1 103.87	23.19	6.2%	8.9%	9.1%	11.3%	15.1%	11.3%
1973	450.25	601.02	1 298.08	131.21	1 230.88	24.01	7.3%	10.2%	10.6%	7.7%	11.5%	3.5%
1974	511.93	709.00	1 490.23	105.50	1 039.94	23.40	13.7%	18.0%	14.8%	-19.6%	-15.5%	-2.5%
1975	572.34	762.76	1 668.00	105.14	1 111.71	26.51	11.8%	7.6%	11.9%	-0.3%	6.9%	13.3%
1976	627.29	880.37	1 932.86	109.93	1 168.70	29.36	9.6%	15.4%	15.9%	4.6%	5.1%	10.7%
1977	686.25	984.99	2 227.21	91.85	1 026.74	31.53	9.4%	11.9%	15.2%	-16.5%	-12.1%	7.4%
1978	748.70	1 025.96	2 487.00	116.49	1 365.43	35.60	9.1%	4.2%	11.7%	26.8%	33.0%	12.9%
1979	829.56	1 176.85	2 813.51	147.52	1 783.19	39.44	10.8%	14.7%	13.1%	26.6%	30.6%	10.8%
1980	942.38	1 379.07	3 371.28	162.42	2 060.04	37.20	13.6%	17.2%	19.8%	10.1%	15.5%	-5.7%
1981	1 068.66	1 569.72	3 742.37	143.62	1 911.94	38.18	13.4%	13.8%	11.0%	-11.6%	-7.2%	2.6%
1982	1 194.76	1 604.75	3 952.32	143.09	2 020.26	44.08	11.8%	2.2%	5.6%	-0.4%	5.7%	15.4%
1983	1 309.46	1 670.30	4 154.28	188.13	2 800.21	55.67	9.6%	4.1%	5.1%	31.5%	38.6%	26.3%
1984	1 406.36	1 781.29	4 316.35	256.39	3 987.23	67.43	7.4%	6.6%	3.9%	36.3%	42.4%	21.1%
1985	1 487.93	1 971.21	4 458.75	328.73	5 247.72	82.24	5.8%	10.7%	3.3%	28.2%	31.6%	22.0%
1986	1 528.10	2 204.07	4 665.83	523.66	8 516.86	106.61	2.7%	11.8%	4.6%	59.3%	62.3%	29.6%
1987	1 575.48	2 578.27	4 997.50	585.65	9 780.52	110.98	3.1%	17.0%	7.1%	11.8%	14.8%	4.1%
1988	1 618.01	3 193.80	5 536.95	500.56	8 652.96	124.88	2.7%	23.9%	10.8%	-14.5%	-11.5%	12.5%
1989	1 677.88	3 913.38	6 204.72	683.15	12 068.9	138.42	3.7%	22.5%	12.1%	36.5%	39.5%	10.8%
1990	1 734.93	4 600.54	6 751.31	672.52	12 243.1	141.35	3.4%	17.6%	8.8%	-1.6%	1.4%	2.1%
1991	1 790.45	4 674.98	7 102.65	647.56	12 156.2	162.99	3.2%	1.6%	5.2%	-3.7%	-0.7%	15.3%
1992	1 833.42	4 204.74	6 934.45	668.43	12 519.7	182.20	2.4%	-10.1%	-2.4%	3.2%	3.0%	11.8%
1993	1 870.09	3 921.15	6 834.51	746.40	13 866.9	218.02	2.0%	-6.7%	-1.4%	11.7%	10.8%	19.7%
1994	1 901.88	3 877.25	6 821.86	789.54	15 028.1	226.86	1.7%	-1.1%	-0.2%	5.8%	8.4%	4.1%
1995	1 934.21	3 625.17	6 759.69	708.50	13 582.8	240.09	1.7%	-6.5%	-0.9%	-10.3%	-9.6%	5.8%
1996	1 972.89	3 329.19	6 819.02	806.47	16 054.6	277.66	2.0%	-8.2%	0.9%	13.8%	18.2%	15.7%
1997	1 996.57	3 210.10	6 939.57	1 043.07	21 128.7	309.95	1.2%	-3.6%	1.8%	29.3%	31.6%	11.6%
1998	2 010.54	3 255.95	7 017.47	1 360.88	28 073.0	347.67	0.7%	1.4%	1.1%	30.5%	32.9%	12.2%
1999	2 020.58	3 570.58	7 514.29	1 665.73	34 743.2	364.80	0.5%	9.7%	7.1%	22.4%	23.8%	4.9%
2000	2 054.72	4 059.38	8 173.92	2 282.73	48 209.2	362.50	1.7%	13.7%	8.8%	37.0%	38.8%	-0.6%
2001	2 088.87	4 440.48	8 816.17	1 844.12	39 470.0	392.68	1.7%	9.4%	7.9%	-19.2%	-18.1%	8.3%
2002	2 129.13	4 829.39	9 546.30	1 440.01	31 394.2	415.88	1.9%	8.8%	8.3%	-21.9%	-20.5%	5.9%
2003	2 173.36	5 438.63	10 667.7	1 208.39	26 850.0	459.16	2.1%	12.6%	11.7%	-16.1%	-14.5%	10.4%
2004	2 219.60	6 172.74	12 287.1	1 442.64	32 760.1	479.38	2.1%	13.5%	15.2%	19.4%	22.0%	4.4%
2005	2 259.81	7 053.91	14 165.3	1 699.33	39 541.8	524.53	1.8%	14.3%	15.3%	17.8%	20.7%	9.4%
2006	2 296.81	7 860.94	15 879.9	2 061.63	49 186.8	550.76	1.6%	11.4%	12.1%	21.3%	24.4%	5.0%
2007	2 330.99	8 583.18	16 924.0	2 334.82	57 171.8	578.29	1.5%	9.2%	6.6%	13.3%	16.2%	5.0%
2008	2 396.53	9 192.38	17 132.9	1 753.41	44 217.7	607.21	2.8%	7.1%	1.2%	-24.9%	-22.7%	5.0%
2009	2 406.11	8 351.93	15 510.2	1 264.84	33 084.5	637.57	0.4%	-9.1%	-9.5%	-27.9%	-25.2%	5.0%
2010	2 406.11	7 588.33	14 041.3	1 264.84	34 077.1	669.45	0.0%	-9.1%	-9.5%	0.0%	3.0%	5.0%

Table A21: Construction of a composite asset price index

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	Weights used to construct the index				Resulting composite asset price index (1900=1.00)	Composite asset price inflation	Composite asset price inflation relative to CPI
	Weight on real estate price index (Paris)	Weight on equity price index	Weight on consumer price index	Weight on nominal assets (fixed nominal asset prices)			
1896	30%	30%	20%	20%	0.92		
1897	30%	30%	20%	20%	0.95	3.1%	6.0%
1898	30%	30%	20%	20%	0.97	2.5%	1.1%
1899	30%	30%	20%	20%	0.99	2.3%	0.9%
1900	30%	30%	20%	20%	1.00	0.6%	0.6%
1901	30%	30%	20%	20%	0.97	-3.4%	-3.9%
1902	30%	30%	20%	20%	0.94	-2.2%	-1.1%
1903	30%	30%	20%	20%	0.95	0.4%	0.9%
1904	30%	30%	20%	20%	0.95	0.0%	1.4%
1905	30%	30%	20%	20%	0.98	3.0%	3.1%
1906	30%	30%	20%	20%	1.00	1.9%	0.6%
1907	30%	30%	20%	20%	1.00	0.6%	-0.8%
1908	30%	30%	20%	20%	1.00	-0.1%	-2.3%
1909	30%	30%	20%	20%	1.03	2.5%	2.7%
1910	30%	30%	20%	20%	1.07	4.2%	1.1%
1911	30%	30%	20%	20%	1.11	4.2%	-5.1%
1912	30%	30%	20%	20%	1.14	2.3%	3.4%
1913	30%	30%	20%	20%	1.14	0.4%	-2.9%
1914	30%	30%	20%	20%	1.13	-1.2%	-1.2%
1915	30%	30%	20%	20%	1.14	0.9%	-15.0%
1916	30%	30%	20%	20%	1.25	9.8%	-2.0%
1917	30%	30%	20%	20%	1.35	7.5%	-10.3%
1918	30%	30%	20%	20%	1.45	7.6%	-17.0%
1919	30%	30%	20%	20%	1.56	7.9%	-13.7%
1920	30%	30%	20%	20%	1.78	14.1%	-17.0%
1921	30%	30%	20%	20%	1.64	-8.1%	4.9%
1922	30%	30%	20%	20%	1.70	3.9%	8.1%
1923	30%	30%	20%	20%	2.05	20.3%	8.4%
1924	30%	30%	20%	20%	2.29	12.0%	-1.6%
1925	30%	30%	20%	20%	2.39	4.2%	-2.9%
1926	30%	30%	20%	20%	2.73	14.2%	-12.2%
1927	30%	30%	20%	20%	2.99	9.4%	4.8%
1928	30%	30%	20%	20%	3.40	13.8%	14.0%
1929	30%	30%	20%	20%	3.72	9.4%	3.0%
1930	30%	30%	20%	20%	3.74	0.6%	-0.2%
1931	30%	30%	20%	20%	3.45	-7.8%	-4.1%
1932	30%	30%	20%	20%	3.22	-6.6%	2.5%
1933	30%	30%	20%	20%	3.14	-2.4%	0.8%
1934	30%	30%	20%	20%	2.94	-6.3%	-2.2%
1935	30%	30%	20%	20%	2.81	-4.5%	4.2%
1936	30%	30%	20%	20%	2.79	-0.8%	-7.6%
1937	30%	30%	20%	20%	3.13	12.3%	-10.7%
1938	30%	30%	20%	20%	3.14	0.2%	-11.8%
1939	30%	30%	20%	20%	3.30	5.2%	-1.3%
1940	30%	30%	20%	20%	3.78	14.3%	-3.6%
1941	30%	30%	20%	20%	5.71	51.2%	28.9%
1942	30%	30%	20%	20%	7.41	29.9%	8.2%
1943	30%	30%	20%	20%	7.99	7.8%	-13.2%
1944	30%	30%	20%	20%	8.42	5.4%	-13.8%
1945	30%	30%	20%	20%	9.02	7.1%	-27.7%
1946	30%	30%	20%	20%	10.87	20.6%	-21.0%
1947	30%	30%	20%	20%	13.27	22.1%	-18.3%

1948	30%	30%	20%	20%	15.57	17.3%	-26.0%
1949	30%	30%	20%	20%	15.95	2.4%	-9.5%
1950	30%	30%	20%	20%	16.24	1.8%	-7.4%
1951	30%	30%	20%	20%	19.87	22.4%	5.2%
1952	30%	30%	20%	20%	23.58	18.6%	6.0%
1953	30%	30%	20%	20%	25.96	10.1%	12.0%
1954	30%	30%	20%	20%	31.06	19.7%	19.2%
1955	30%	30%	20%	20%	38.02	22.4%	21.3%
1956	30%	30%	20%	20%	43.53	14.5%	9.9%
1957	30%	30%	20%	20%	53.78	23.5%	19.9%
1958	30%	30%	20%	20%	56.81	5.6%	-8.2%
1959	30%	30%	20%	20%	64.43	13.4%	6.9%
1960	30%	30%	20%	20%	73.26	13.7%	9.6%
1961	30%	30%	20%	20%	82.80	13.0%	9.4%
1962	30%	30%	20%	20%	90.78	9.6%	4.7%
1963	30%	30%	20%	20%	97.47	7.4%	2.5%
1964	30%	30%	20%	20%	99.33	1.9%	-1.4%
1965	30%	30%	20%	20%	103.96	4.7%	2.1%
1966	30%	30%	20%	20%	105.09	1.1%	-1.6%
1967	30%	30%	20%	20%	101.56	-3.4%	-5.8%
1968	30%	30%	20%	20%	109.77	8.1%	3.3%
1969	30%	30%	20%	20%	123.78	12.8%	5.9%
1970	30%	30%	20%	20%	127.84	3.3%	-1.8%
1971	30%	30%	20%	20%	130.62	2.2%	-3.1%
1972	30%	30%	20%	20%	140.18	7.3%	1.1%
1973	30%	30%	20%	20%	149.75	6.8%	-0.4%
1974	30%	30%	20%	20%	153.12	2.3%	-10.1%
1975	30%	30%	20%	20%	160.06	4.5%	-6.5%
1976	30%	30%	20%	20%	172.73	7.9%	-1.5%
1977	30%	30%	20%	20%	173.61	0.5%	-8.1%
1978	30%	30%	20%	20%	192.91	11.1%	1.8%
1979	30%	30%	20%	20%	221.00	14.6%	3.4%
1980	30%	30%	20%	20%	245.10	10.9%	-2.4%
1981	30%	30%	20%	20%	253.33	3.4%	-8.9%
1982	30%	30%	20%	20%	260.72	2.9%	-7.9%
1983	30%	30%	20%	20%	293.54	12.6%	2.7%
1984	30%	30%	20%	20%	335.69	14.4%	6.5%
1985	30%	30%	20%	20%	378.73	12.8%	6.6%
1986	30%	30%	20%	20%	461.57	21.9%	18.7%
1987	30%	30%	20%	20%	504.34	9.3%	6.0%
1988	30%	30%	20%	20%	521.20	3.3%	0.6%
1989	30%	30%	20%	20%	617.32	18.4%	14.2%
1990	30%	30%	20%	20%	651.15	5.5%	2.0%
1991	30%	30%	20%	20%	651.23	0.0%	-3.1%
1992	30%	30%	20%	20%	641.01	-1.6%	-3.9%
1993	30%	30%	20%	20%	653.03	1.9%	-0.1%
1994	30%	30%	20%	20%	664.38	1.7%	0.0%
1995	30%	30%	20%	20%	633.22	-4.7%	-6.3%
1996	30%	30%	20%	20%	646.51	2.1%	0.1%
1997	30%	30%	20%	20%	698.03	8.0%	6.7%
1998	30%	30%	20%	20%	765.80	9.7%	8.9%
1999	30%	30%	20%	20%	840.23	9.7%	9.2%
2000	30%	30%	20%	20%	970.95	15.6%	13.6%
2001	30%	30%	20%	20%	945.55	-2.6%	-4.2%
2002	30%	30%	20%	20%	911.88	-3.6%	-5.4%
2003	30%	30%	20%	20%	906.18	-0.6%	-2.6%
2004	30%	30%	20%	20%	999.43	10.3%	8.0%
2005	30%	30%	20%	20%	1 099.20	10.0%	8.0%
2006	30%	30%	20%	20%	1 210.83	10.2%	8.4%
2007	30%	30%	20%	20%	1 295.94	7.0%	5.5%
2008	30%	30%	20%	20%	1 234.01	-4.8%	-7.4%
2009	30%	30%	20%	20%	1 098.00	-11.0%	-11.4%

Table A22: Price and return indexes in France, 1900-2009 (decennial averages)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
	Average annual nominal inflation rates and return rates							Real rates (in excess of CPI)						
	Consumer price inflation p_t	Real estate price inflation (Paris)	Real estate price inflation (France)	Equity price inflation	Composite asset price index	Equity total return (incl. dividend)	Bonds total return (incl. interest)	Real estate price inflation (Paris)	Real estate price inflation (France)	Equity price inflation	Composite asset price inflation	Equity total return (incl. dividend)	Bonds total return (incl. interest)	*Memo: real rate of capital gains q_t*
1820-1900	**0.4%**					6.6%	5.1%					6.2%	4.7%	***-0.1%***
1820-1855	**1.0%**					7.1%	5.5%					6.0%	4.4%	***0.3%***
1856-1900	**-0.2%**	1.7%		-0.1%		5.7%	4.7%	1.8%		0.1%		5.9%	4.8%	***-0.5%***
1896-2009	**7.1%**	8.4%		6.7%	6.5%	9.9%	5.9%	1.2%		-0.4%	**-0.6%**	2.6%	-1.1%	***-0.3%***
1896-1913	**1.0%**	1.6%		1.9%	**1.3%**	5.1%	1.9%	0.6%		0.9%	**0.3%**	4.0%	0.9%	***0.0%***
1913-1949	**13.9%**	5.7%		7.8%	**7.6%**	11.1%	4.3%	-7.2%		-5.4%	**-5.6%**	-2.5%	-8.5%	***-2.6%***
1949-2009	**4.9%**	12.2%	10.4%	7.7%	**7.4%**	10.8%	8.2%	6.9%	5.2%	2.7%	**2.4%**	5.7%	3.2%	***0.9%***
1949-1979	6.2%	18.1%	15.3%	8.0%	**9.4%**	11.5%	6.7%	11.1%	8.5%	1.6%	**3.0%**	4.9%	0.4%	***0.8%***
1979-2009	3.3%	6.4%	5.4%	7.3%	**5.3%**	10.0%	10.3%	3.0%	2.1%	3.9%	**2.0%**	6.5%	6.8%	***1.0%***
1896-1913	**1.0%**	1.6%		1.9%	**1.3%**	5.1%	1.9%	0.6%		0.9%	**0.3%**	4.0%	0.9%	***0.0%***
1913-1925	**12.4%**	5.4%		6.0%	**6.3%**	9.4%	1.5%	-6.2%		-5.7%	**-5.4%**	-2.6%	-9.7%	***-5.6%***
1925-1954	**13.4%**	9.0%		10.1%	**9.2%**	13.8%	6.0%	-3.9%		-2.9%	**-3.7%**	0.3%	-6.5%	***-1.1%***
1954-1970	**4.5%**	19.5%	17.4%	7.0%	**9.2%**	9.4%	5.3%	14.4%	12.3%	2.4%	**4.5%**	4.7%	0.7%	***2.5%***
1970-2009	**4.9%**	7.6%	7.2%	6.4%	**5.7%**	9.5%	9.4%	2.6%	2.2%	1.5%	**0.7%**	4.4%	4.4%	***0.6%***
1900-09	**0.2%**	0.7%		-0.1%	**0.3%**	4.0%	2.6%	0.5%		-0.3%	**0.0%**	3.8%	2.4%	***0.0%***
1910-19	**12.6%**	1.9%		3.4%	**4.3%**	6.7%	-0.6%	-9.4%		-8.1%	**-7.3%**	-5.2%	-11.7%	***-3.4%***
1920-29	**5.7%**	8.6%		14.4%	**8.5%**	18.6%	7.2%	2.7%		8.3%	**2.7%**	12.2%	1.5%	***-3.9%***
1930-39	**2.2%**	-0.2%		-6.9%	**-1.4%**	-3.3%	5.0%	-2.3%		-8.9%	**-3.5%**	-5.4%	2.7%	***-1.2%***
1940-49	**32.9%**	10.6%	23.2%	20.6%	**17.4%**	20.7%	3.8%	-16.8%	-7.4%	-9.3%	**-11.7%**	-9.2%	-22.0%	***-0.8%***
1950-59	**6.1%**	29.7%	20.0%	20.0%	**16.5%**	24.2%	7.3%	22.3%	13.1%	13.2%	**9.9%**	17.1%	1.2%	***0.6%***
1960-69	**3.9%**	15.8%	14.6%	0.9%	**6.0%**	3.3%	4.3%	11.4%	10.3%	-2.9%	**2.0%**	-0.5%	0.4%	***2.5%***
1970-79	**9.2%**	10.7%	12.0%	3.1%	**6.3%**	7.2%	8.5%	1.3%	2.5%	-5.6%	**-2.7%**	-1.9%	-0.6%	***-0.5%***
1980-89	**6.6%**	12.3%	7.0%	17.3%	**10.8%**	21.7%	15.7%	5.3%	0.4%	10.0%	**3.9%**	14.1%	8.5%	***-0.1%***
1990-99	**1.7%**	-2.8%	1.2%	10.6%	**2.9%**	12.3%	11.1%	-4.4%	-0.5%	8.7%	**1.1%**	10.4%	9.2%	***-1.0%***
2000-09	**1.8%**	8.3%	7.4%	-6.3%	**1.4%**	-4.1%	6.5%	6.5%	5.5%	-8.0%	**-0.4%**	-5.8%	4.6%	***4.3%***

Table B1: Computation of the fiscal inheritance flow in France, 1826-2008 (annual series)

(values in current billions euros 1949-2008; current billions old francs 1826-1948)	[1] Raw fiscal bequest flow B_t^{f0}	[2] Correction for non-filers: upgrade factor for non-filers	[3] Fiscal flow, incl. non-filers B_t^{f1}	[4] % non-filers bequest in total bequest	[5] Correction for tax-exempt assets: upgrade factor for tax-exempt assets	[6] Fiscal flow, incl. non-filers & tax-exempt assets B_t^{f2}	[7] % tax-exempt assets in total bequest	[8] Correction for inter-vivos gift: Raw fiscal inter-vivos gift flow V_t^{f0}	[9] Ratio (raw gift flow)/(raw bequest flow) $v_t = V_t^{f0}/B_t^{f0}$	[10] Fiscal flow, incl. non-filers, tax-exempt assets & gifts B_t^f	[11] upgrade factor for inter-vivos gifts $1+v_t$	[12] Fiscal inheritance flow / National income, private wealth & disposable income Ratios: B_t^f/Y_t	[13] B_t^f/W_t	[14] B_t^f/Y_{dt}	[15] memo: B_t/Y_{dt}	[16] memo: number of estate tax returns: N_{dt}^f (thous.)	[17] N_{dt}^f/N_{dt}^{20+} (% n. decedents 20-yr+)
1826	1.3	*103%*	1.3	*3%*	*118%*	1.5	*15%*	0.4	35%	**2.1**	135%						
1827	1.3	*103%*	1.3	*3%*	*118%*	1.6	*15%*	0.4	35%	**2.1**	135%						
1828	1.3	*103%*	1.3	*3%*	*119%*	1.6	*16%*	0.5	35%	**2.1**	135%						
1829	1.3	*103%*	1.4	*3%*	*119%*	1.6	*16%*	0.5	35%	**2.2**	135%						
1830	1.4	*103%*	1.4	*3%*	*120%*	1.7	*16%*	0.5	34%	**2.3**	134%						
1831	1.2	*103%*	1.3	*3%*	*120%*	1.5	*17%*	0.5	39%	**2.1**	139%						
1832	1.6	*103%*	1.6	*3%*	*121%*	1.9	*17%*	0.5	32%	**2.6**	132%						
1833	1.4	*103%*	1.4	*3%*	*121%*	1.7	*18%*	0.5	36%	**2.3**	136%						
1834	1.4	*103%*	1.4	*3%*	*122%*	1.7	*18%*	0.5	36%	**2.4**	136%						
1835	1.5	*103%*	1.5	*3%*	*122%*	1.8	*18%*	0.5	35%	**2.5**	135%						
1836	1.5	*103%*	1.5	*3%*	*123%*	1.8	*19%*	0.5	38%	**2.5**	138%						
1837	1.6	*103%*	1.6	*3%*	*123%*	2.0	*19%*	0.6	35%	**2.7**	135%						
1838	1.4	*103%*	1.5	*3%*	*124%*	1.8	*19%*	0.6	40%	**2.6**	140%						
1839	1.5	*103%*	1.5	*3%*	*124%*	1.9	*20%*	0.6	41%	**2.6**	141%						
1840	1.5	*103%*	1.6	*3%*	*125%*	2.0	*20%*	0.6	40%	**2.7**	140%						
1841	1.6	*103%*	1.6	*3%*	*125%*	2.0	*20%*	0.6	39%	**2.8**	139%						
1842	1.7	*103%*	1.7	*3%*	*125%*	2.2	*20%*	0.6	38%	**3.0**	138%						
1843	1.7	*103%*	1.7	*3%*	*125%*	2.1	*20%*	0.7	41%	**3.0**	141%						
1844	1.7	*103%*	1.7	*3%*	*125%*	2.2	*20%*	0.7	40%	**3.1**	140%						
1845	1.7	*103%*	1.7	*3%*	*125%*	2.1	*20%*	0.7	42%	**3.0**	142%						
1846	1.6	*103%*	1.7	*3%*	*125%*	2.1	*20%*	0.7	44%	**3.0**	144%						
1847	2.0	*103%*	2.0	*3%*	*125%*	2.5	*20%*	0.7	36%	**3.4**	136%						
1848	1.9	*103%*	1.9	*3%*	*125%*	2.4	*20%*	0.7	34%	**3.3**	134%						
1849	1.8	*103%*	1.8	*3%*	*125%*	2.3	*20%*	0.6	36%	**3.1**	136%						
1850	1.9	*103%*	2.0	*3%*	*125%*	2.5	*20%*	0.7	34%	**3.3**	134%						
1851	1.7	*103%*	1.8	*3%*	*125%*	2.2	*20%*	0.6	35%	**3.0**	135%						
1852	1.9	*103%*	2.0	*3%*	*125%*	2.5	*20%*	0.6	31%	**3.3**	131%						
1853	1.9	*103%*	2.0	*3%*	*125%*	2.5	*20%*	0.7	34%	**3.3**	134%						
1854	1.9	*103%*	2.0	*3%*	*125%*	2.4	*20%*	0.7	36%	**3.3**	136%						
1855	2.3	*103%*	2.3	*3%*	*125%*	2.9	*20%*	0.7	32%	**3.9**	132%						
1856	2.1	*103%*	2.1	*3%*	*124%*	2.7	*19%*	0.7	34%	**3.6**	134%						
1857	2.1	*103%*	2.2	*3%*	*123%*	2.7	*19%*	0.7	35%	**3.6**	135%						
1858	2.4	*103%*	2.4	*3%*	*122%*	3.0	*18%*	0.8	32%	**3.9**	132%						
1859	2.3	*103%*	2.4	*3%*	*121%*	2.9	*18%*	0.8	32%	**3.8**	132%						
1860	2.6	*103%*	2.7	*3%*	*120%*	3.2	*17%*	0.8	31%	**4.2**	131%						
1861	2.3	*103%*	2.4	*3%*	*120%*	2.9	*16%*	0.8	36%	**3.9**	136%						
1862	2.5	*103%*	2.6	*3%*	*119%*	3.1	*16%*	0.8	33%	**4.1**	133%						
1863	2.6	*103%*	2.7	*3%*	*118%*	3.1	*15%*	0.8	33%	**4.2**	133%						
1864	2.8	*103%*	2.9	*3%*	*117%*	3.4	*15%*	0.9	30%	**4.4**	130%						
1865	2.9	*103%*	2.9	*3%*	*116%*	3.4	*14%*	0.9	30%	**4.4**	130%						
1866	3.1	*103%*	3.2	*3%*	*115%*	3.7	*13%*	0.9	29%	**4.7**	129%						
1867	3.2	*103%*	3.2	*3%*	*115%*	3.7	*13%*	0.9	29%	**4.8**	129%						
1868	3.3	*103%*	3.4	*3%*	*114%*	3.8	*12%*	0.9	28%	**4.9**	128%						
1869	3.5	*103%*	3.5	*3%*	*113%*	4.0	*12%*	0.9	27%	**5.1**	127%						
1870	3.2	*103%*	3.3	*3%*	*112%*	3.7	*11%*	0.7	21%	**4.5**	121%						
1871	4.8	*103%*	4.9	*3%*	*112%*	5.5	*10%*	0.7	15%	**6.3**	115%						
1872	3.8	*103%*	3.9	*3%*	*111%*	4.3	*10%*	1.1	30%	**5.6**	130%						
1873	3.5	*103%*	3.6	*3%*	*110%*	4.0	*9%*	1.0	29%	**5.2**	129%						
1874	3.7	*103%*	3.8	*3%*	*109%*	4.2	*9%*	1.0	27%	**5.3**	127%						
1875	4.0	*103%*	4.1	*3%*	*109%*	4.5	*8%*	1.1	26%	**5.7**	126%						
1876	4.5	*103%*	4.6	*3%*	*108%*	5.0	*7%*	1.1	24%	**6.1**	124%						
1877	4.2	*103%*	4.3	*3%*	*107%*	4.6	*7%*	1.0	24%	**5.8**	124%						
1878	4.5	*103%*	4.6	*3%*	*107%*	4.9	*6%*	1.1	23%	**6.1**	123%						
1879	4.8	*103%*	4.9	*3%*	*106%*	5.2	*6%*	1.1	23%	**6.4**	123%						
1880	5.0	*103%*	5.1	*3%*	*105%*	5.4	*5%*	1.1	22%	**6.6**	122%						
1881	4.7	*103%*	4.8	*3%*	*105%*	5.0	*5%*	1.1	23%	**6.2**	123%						
1882	4.8	*103%*	4.9	*3%*	*105%*	5.2	*5%*	1.0	22%	**6.3**	122%						
1883	5.0	*103%*	5.1	*3%*	*105%*	5.4	*5%*	1.1	21%	**6.5**	121%						
1884	4.8	*103%*	5.0	*3%*	*105%*	5.2	*5%*	1.0	21%	**6.3**	121%						
1885	5.1	*103%*	5.3	*3%*	*105%*	5.5	*5%*	1.0	20%	**6.7**	120%						
1886	5.1	*103%*	5.2	*3%*	*105%*	5.5	*5%*	1.0	20%	**6.6**	120%						

1887	5.1	103%	5.3	3%	105%	5.6	5%	1.0	19%	6.6	119%						
1888	5.1	103%	5.2	3%	105%	5.5	5%	1.0	19%	6.5	119%						
1889	4.8	103%	4.9	3%	105%	5.2	5%	0.9	20%	6.2	120%						
1890	5.5	103%	5.7	3%	105%	6.0	5%	0.9	17%	7.0	117%						
1891	5.5	103%	5.6	3%	105%	5.9	5%	1.0	18%	7.0	118%						
1892	6.1	103%	6.2	3%	105%	6.6	5%	1.0	17%	7.7	117%						
1893	5.5	103%	5.6	3%	105%	5.9	5%	1.0	18%	6.9	118%						
1894	5.5	103%	5.6	3%	105%	5.9	5%	1.0	18%	7.0	118%						
1895	5.7	103%	5.8	3%	105%	6.1	5%	1.0	18%	7.2	118%						
1896	5.2	103%	5.4	3%	105%	5.6	5%	1.0	18%	6.7	118%	21.6%	3.3%	22.9%	24.2%		
1897	5.3	103%	5.5	3%	105%	5.8	5%	1.0	18%	6.8	118%	22.9%	3.4%	24.4%	25.0%		
1898	5.4	103%	5.6	3%	105%	5.9	5%	1.0	19%	6.9	119%	22.0%	3.3%	23.4%	24.4%		
1899	5.5	103%	5.7	3%	105%	6.0	5%	1.0	18%	7.1	118%	21.2%	3.3%	22.5%	23.6%		
1900	6.4	103%	6.6	3%	105%	6.9	5%	1.0	16%	8.0	116%	23.7%	3.7%	25.1%	23.5%		
1901	5.2	103%	5.3	3%	111%	5.9	10%	1.0	20%	7.1	120%	22.3%	3.2%	23.5%	26.7%		
1902	5.1	103%	5.2	3%	113%	5.9	11%	1.0	19%	7.1	119%	22.9%	3.2%	24.2%	26.6%	364	66%
1903	5.1	102%	5.3	2%	115%	6.0	13%	1.0	19%	7.2	119%	22.2%	3.2%	23.5%	25.5%	386	69%
1904	5.4	103%	5.6	3%	117%	6.5	14%	1.0	18%	7.7	118%	23.3%	3.4%	24.7%	25.1%	382	66%
1905	5.9	103%	6.0	2%	119%	7.1	16%	1.0	17%	8.4	117%	25.2%	3.7%	26.7%	25.5%	385	66%
1906	5.4	102%	5.5	2%	121%	6.7	17%	1.0	19%	7.9	119%	24.2%	3.5%	25.6%	26.9%		
1907	5.6	102%	5.7	2%	123%	7.0	19%	1.0	19%	8.3	119%	22.7%	3.6%	24.0%	25.6%	402	71%
1908	5.6	102%	5.7	2%	125%	7.2	20%	1.0	18%	8.5	118%	23.3%	3.5%	24.6%	24.7%		
1909	5.9	102%	6.0	2%	125%	7.5	20%	1.1	19%	8.9	119%	23.5%	3.6%	24.7%	25.3%	379	69%
1910	5.4	103%	5.6	3%	125%	7.0	20%	1.1	21%	8.4	121%	22.3%	3.3%	23.6%	24.8%	360	62%
1911	5.8	103%	6.0	3%	125%	7.5	20%	1.1	19%	8.9	119%	21.1%	3.1%	22.4%	26.1%	359	66%
1912	5.6	103%	5.8	3%	125%	7.2	20%	1.1	19%	8.6	119%	18.8%	3.1%	19.7%	21.7%	359	65%
1913	5.6	105%	5.9	5%	125%	7.4	20%	1.1	20%	8.8	120%	19.6%	3.0%	20.8%	23.7%	361	49%
1914					125%		20%		20%		120%				24.6%		
1915					125%		20%		20%		120%				24.0%		
1916					125%		20%		20%		120%				17.2%		
1917					125%		20%		20%		120%				14.9%		
1918					125%		20%		20%		120%				15.9%		
1919					125%		20%		25%		125%				11.2%		
1920					125%		20%		25%		125%				10.8%		
1921	8.3	104%	8.6	4%	125%	10.7	20%	2.1	25%	13.4	125%	8.7%	2.8%	8.7%	9.6%		
1922	8.0	104%	8.3	4%	125%	10.4	20%	2.0	25%	13.0	125%	7.9%	2.8%	8.0%	9.4%		
1923					125%		20%		25%		125%				8.8%		
1924					125%		20%		25%		125%				9.5%		
1925	9.8	103%	10.0	2%	125%	12.6	20%		25%	15.7	125%	6.6%	2.3%	7.0%	9.8%	386	66%
1926	11.1	102%	11.3	2%	125%	14.1	20%		25%	17.6	125%	6.0%	1.8%	6.5%	11.1%	404	72%
1927	12.1	102%	12.4	2%	125%	15.5	20%		25%	19.4	125%	6.4%	1.8%	7.0%	11.4%	381	69%
1928	13.5	102%	13.8	2%	125%	17.2	20%		25%	21.5	125%	6.5%	2.0%	7.0%	10.2%		
1929	15.9	102%	16.2	2%	125%	20.3	20%		25%	25.3	125%	7.2%	2.1%	7.8%	11.8%	389	71%
1930	16.0	103%	16.5	3%	125%	20.6	20%		25%	25.7	125%	7.5%	2.0%	8.2%	11.0%	357	62%
1931	16.1	103%	16.5	2%	125%	20.6	20%		25%	25.7	125%	8.1%	2.1%	8.9%	12.5%	372	66%
1932	15.2	103%	15.6	3%	125%	19.5	20%		25%	24.4	125%	8.7%	2.1%	9.6%	12.6%	371	65%
1933	14.5	103%	14.9	3%	125%	18.6	20%		25%	23.3	125%	8.5%	2.1%	9.1%	12.3%	354	64%
1934	14.7	103%	15.1	3%	125%	18.8	20%		25%	23.5	125%	9.4%	2.2%	10.1%	12.2%		
1935	14.9	103%	15.3	3%	125%	19.2	20%		25%	24.0	125%	9.8%	2.5%	10.4%	11.8%	370	65%
1936	14.8	103%	15.2	3%	125%	19.0	20%		25%	23.8	125%	8.6%	2.3%	8.9%	10.8%	363	65%
1937	14.9	103%	15.3	3%	125%	19.2	20%		25%	23.9	125%	7.2%	1.8%	7.5%	11.4%	361	63%
1938	17.2	102%	17.6	2%	125%	22.0	20%		25%	27.6	125%	7.2%	1.8%	7.7%	12.1%	379	68%
1939	16.7	106%	17.8	6%	125%	22.2	20%		25%	27.8	125%	6.2%	1.6%	6.8%	11.5%	331	44%
1940	13.4	105%	14.1	5%	125%	17.6	20%		25%	22.0	125%	6.1%	1.4%	6.8%	17.3%	297	50%
1941	20.7	103%	21.4	3%	125%	26.8	20%		25%	33.5	125%	8.4%	1.9%	9.5%	15.4%	346	59%
1942	28.5	104%	29.5	3%	125%	36.9	20%		25%	46.1	125%	9.9%	2.3%	11.3%	14.5%	355	59%
1943	37.8	106%	40.1	6%	125%	50.2	20%		25%	62.7	125%	12.3%	2.7%	13.9%	14.8%	332	45%
1944	39.4	104%	40.9	4%	125%	51.1	20%	5.5	14%	58.2	114%	10.5%	2.2%	12.0%	15.8%	313	57%
1945	47.7	102%	48.7	2%	125%	60.9	20%	19.6	41%	86.0	141%	8.2%	2.4%	9.6%	11.0%	319	69%
1946	51.2	103%	52.8	3%	125%	65.9	20%	19.9	39%	91.6	139%	3.9%	1.4%	4.7%	6.8%	285	62%
1947	70.4	102%	72.0	2%	125%	90.0	20%	21.6	31%	117.6	131%	3.4%	1.2%	4.1%	6.1%	309	69%
1948	81.9	104%	85.1	4%	125%	106.3	20%	30.3	37%	145.7	137%	2.3%	1.0%	2.8%	5.6%	284	56%
1949	0.2	103%	0.2	3%	125%	0.2	20%	0.1	32%	0.3	132%	2.3%	1.1%	2.9%	5.7%	288	61%
1950	0.2	104%	0.2	4%	125%	0.3	20%	0.1	38%	0.4	138%	2.5%	1.2%	3.1%	5.6%	276	54%
1951	0.3	103%	0.3	3%	126%	0.3	21%	0.1	27%	0.4	127%	2.3%	1.1%	3.0%	5.5%	283	60%
1952	0.3	104%	0.4	4%	126%	0.5	21%	0.1	23%	0.6	123%	2.7%	1.3%	3.5%	5.2%	286	56%
1953	0.4	104%	0.4	4%	127%	0.5	21%	0.1	28%	0.6	128%	2.9%	1.4%	3.8%	5.8%	259	55%
1954	0.5	103%	0.5	3%	127%	0.6	21%	0.1	22%	0.7	122%	3.2%	1.6%	4.2%	5.0%	286	59%
1955	0.4	105%	0.5	5%	127%	0.6	22%	0.1	26%	0.7	126%	3.0%	1.5%	3.9%	5.3%	249	49%
1956	0.4	133%	0.5	25%	128%	0.7	22%	0.2	40%	0.9	140%	3.5%	1.6%	4.5%	6.5%	65	13%
1957	0.4	129%	0.6	22%	128%	0.7	22%	0.1	32%	1.0	132%	3.1%	1.5%	4.1%	5.9%	69	15%
1958	0.5	123%	0.7	19%	129%	0.9	22%	0.1	27%	1.1	127%	3.1%	1.3%	4.1%	6.0%	84	18%
1959	0.6	123%	0.8	18%	129%	1.0	23%	0.1	20%	1.2	120%	3.0%	1.2%	4.1%	6.2%	89	18%
1960	0.7	121%	0.8	17%	130%	1.0	23%	0.2	23%	1.3	123%	3.0%	1.2%	4.0%	6.6%	90	19%

1961					130%		23%		25%		125%				6.8%		
1962	0.9	120%	1.1	17%	131%	1.5	23%	0.2	27%	1.8	127%	3.6%	1.4%	4.8%	7.6%	105	20%
1963					131%		24%		27%		127%				8.0%		
1964	1.3	116%	1.5	14%	131%	2.0	24%	0.3	27%	2.5	127%	3.8%	1.5%	5.3%	7.7%	124	24%
1965					132%		24%		27%		127%				8.2%		
1966					132%		24%		27%		127%				8.1%		
1967					133%		25%		27%		127%				8.4%		
1968					133%		25%		27%		127%				8.8%		
1969					134%		25%		28%		128%				9.2%		
1970					134%		25%		28%		128%				8.7%		
1971					134%		25%		28%		128%				8.6%		
1972					133%		25%		28%		128%				8.4%		
1973					133%		25%		28%		128%				8.5%		
1974					133%		25%		28%		128%				8.2%		
1975					133%		25%		28%		128%				8.7%		
1976					132%		24%		28%		128%				8.9%		
1977	6.3	118%	7.5	15%	132%	9.9	24%		28%	12.7	128%	4.6%	1.6%	6.5%	8.5%	242	46%
1978					132%		24%		28%		128%				8.6%		
1979					132%		24%		28%		128%				8.7%		
1980					132%		24%		28%		128%				8.8%		
1981					131%		24%		29%		129%				8.8%		
1982					131%		24%		29%		129%				8.4%		
1983					131%		24%		29%		129%				8.7%		
1984	17.5	115%	20.2	13%	131%	26.5	24%	5.0	29%	34.2	129%	5.7%	1.9%	8.2%	8.6%	266	49%
1985					132%		24%		34%		134%				9.1%		
1986					133%		25%		39%		139%				9.2%		
1987	19.1	114%	21.8	13%	133%	29.1	25%	8.3	44%	41.8	144%	5.6%	1.8%	8.0%	9.8%	262	51%
1988					134%		25%		46%		146%				9.4%		
1989					135%		26%		49%		149%				9.9%		
1990					137%		27%		52%		152%				10.5%		
1991					137%		27%		55%		155%				10.5%		
1992					138%		28%		58%		158%				10.2%		
1993					139%		28%		61%		161%				10.5%		
1994	26.8	111%	29.7	10%	141%	41.8	29%	17.1	64%	68.4	164%	6.7%	2.0%	9.5%	10.4%	306	58%
1995					142%		30%		66%		166%				10.6%		
1996					144%		31%		69%		169%				11.1%		
1997					146%		32%		72%		172%				11.5%		
1998					149%		33%		75%		175%				11.9%		
1999					151%		34%		78%		178%				12.5%		
2000	38.9	108%	41.9	7%	152%	63.7	34%	31.3	81%	115.1	181%	9.0%	2.5%	13.1%	13.7%	346	66%
2001					153%		35%		81%		181%				14.0%		
2002					153%		34%		81%		181%				14.2%		
2003					151%		34%		81%		181%				15.2%		
2004					151%		34%		81%		181%				15.0%		
2005					151%		34%		81%		181%				17.3%		
2006	58.9	108%	63.5	7%	150%	95.4	33%	48.0	82%	173.3	182%	11.0%	2.2%	16.0%	18.4%	338	66%
2007					151%		34%		82%		182%				19.3%		
2008					151%		34%		82%		182%				20.9%		

Table B2: Computation of the fiscal inheritance flow in France, 1826-2008 (decennial averages)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
(values in current billions euros 1949-2008; current billions old francs 1826-1948)	Raw fiscal bequest flow	Correction for non-filers			Correction for tax-exempt assets			Correction for inter-vivos gift				Fiscal inheritance flow / National income, private wealth & disposable income Ratios			
	B_t^{f0}	upgrade factor for non-filers	Fiscal flow, incl. non-filers B_t^{f1}	% non-filers bequest in total bequest	upgrade factor for tax-exempt assets	Fiscal flow, incl. non-filers & tax-exempt assets B_t^{f2}	% tax-exempt assets in total bequest	Raw fiscal inter-vivos gift flow V_t^{f0}	Ratio (raw gift flow)/(raw bequest flow) $v_t=V_t^{f0}/B_t^{f0}$	Fiscal flow, incl. non-filers, tax-exempt assets & gifts B_t^f	upgrade factor for inter-vivos gifts $1+v_t$	**B_t^f/Y_t**	B_t^f/W_t	B_t^f/Y_{dt}	memo: B_t/Y_{dt}
1820	1.3	*103%*	1.3	*3%*	*118%*	1.6	*16%*	0.5	35%	**2.1**	135%	**18.9%**	3.4%	19.8%	21.4%
1830	1.4	*103%*	1.5	*3%*	*122%*	1.8	*18%*	0.5	37%	**2.5**	137%	**18.1%**	3.1%	19.1%	21.9%
1840	1.7	*103%*	1.7	*3%*	*125%*	2.2	*20%*	0.7	39%	**3.0**	139%	**18.4%**	3.2%	19.4%	22.2%
1850	2.1	*103%*	2.1	*3%*	*124%*	2.6	*19%*	0.7	34%	**3.5**	134%	**16.0%**	2.7%	16.8%	21.1%
1860	2.9	*103%*	3.0	*3%*	*117%*	3.4	*14%*	0.9	30%	**4.5**	130%	**17.2%**	2.7%	18.1%	21.3%
1870	4.1	*103%*	4.2	*3%*	*109%*	4.6	*8%*	1.0	24%	**5.7**	124%	**19.8%**	3.1%	20.8%	23.4%
1880	5.0	*103%*	5.1	*3%*	*105%*	5.4	*5%*	1.0	21%	**6.5**	121%	**23.3%**	3.3%	24.5%	25.7%
1890	5.5	*103%*	5.7	*3%*	*105%*	6.0	*5%*	1.0	18%	**7.0**	118%	**23.1%**	3.4%	24.3%	25.1%
1900	5.6	*102%*	5.7	*2%*	*117%*	6.7	*15%*	1.0	19%	**7.9**	119%	**23.3%**	3.5%	24.7%	25.5%
1910	5.6	*103%*	5.8	*3%*	*125%*	7.3	*20%*	1.1	20%	**8.7**	120%	**20.3%**	3.1%	21.5%	24.0%
1920	11.2	*103%*	11.5	*3%*	*125%*	14.4	*20%*	2.0	25%	**18.0**	125%	**7.0%**	2.2%	7.3%	10.2%
1930	15.5	*103%*	16.0	*3%*	*125%*	20.0	*20%*		25%	**25.0**	125%	**8.1%**	2.1%	8.7%	11.8%
1940	39.1	*104%*	40.5	*4%*	*125%*	50.6	*20%*	16.2	29%	**66.4**	129%	**6.7%**	1.8%	7.9%	11.5%
1950	0.4	*113%*	0.5	*11%*	*127%*	0.6	*21%*	0.1	28%	**0.8**	128%	**2.9%**	1.4%	3.8%	5.7%
1960	1.0	*119%*	1.1	*16%*	*132%*	1.5	*24%*	0.3	27%	**1.9**	127%	**3.5%**	1.4%	4.7%	7.9%
1970	6.3	*118%*	7.5	*15%*	*133%*	9.9	*25%*		28%	**12.7**	128%	**4.6%**	1.6%	6.5%	8.6%
1980	18.3	*115%*	21.0	*13%*	*132%*	27.8	*24%*	6.7	35%	**38.0**	135%	**5.7%**	1.8%	8.1%	9.1%
1990	26.8	*111%*	29.7	*10%*	*142%*	41.8	*30%*	17.1	65%	**68.4**	165%	**6.7%**	2.0%	9.6%	11.0%
2000	48.9	*108%*	52.7	*7%*	*152%*	79.6	*34%*	39.6	81%	**144.2**	181%	**10.0%**	2.3%	14.4%	16.4%
2008	72.5	*108%*	78.2	*7%*	*150%*	117.6	*33%*	59.1	*82%*	**213.5**	*182%*	**12.6%**	2.2%	18.2%	20.9%

Table B3: Raw data on the age-wealth profile of decedents $w_{dt}(a)$ in France, 1820-2006

Average wealth at death as a fraction of average wealth of decedents aged 50-to-59 year-old (raw data)

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
1820	2%	8%	29%	37%	47%	100%	134%	148%	153%
1830	2%	8%	32%	39%	52%	100%	124%	142%	133%
1840	2%	8%	31%	35%	54%	100%	135%	139%	149%
1850	2%	8%	28%	37%	52%	100%	128%	144%	142%
1860	2%	8%	31%	36%	61%	100%	129%	125%	132%
1870	2%	8%	29%	38%	55%	100%	135%	159%	183%
1880	2%	8%	30%	39%	61%	100%	148%	166%	220%
1890	2%	8%	32%	43%	55%	100%	162%	182%	234%
1902	2%	8%	26%	57%	65%	100%	172%	176%	238%
1912	2%	8%	23%	54%	72%	100%	158%	178%	257%
1922	4%	10%	22%	56%	78%	100%	130%	165%	181%
1931	1%	7%	22%	59%	77%	100%	123%	137%	143%
1943	1%	5%	22%	40%	58%	100%	113%	98%	87%
1947	1%	6%	23%	52%	77%	100%	99%	76%	62%
1956	1%	4%	34%	48%	75%	100%	109%	95%	83%
1958	1%	3%	31%	46%	77%	100%	116%	99%	83%
1959	1%	3%	28%	58%	81%	100%	120%	105%	92%
1960	1%	3%	28%	52%	74%	100%	110%	101%	87%
1962	1%	2%	24%	49%	73%	100%	117%	104%	95%
1964	1%	2%	23%	48%	75%	100%	122%	114%	106%
1984	1%	2%	19%	55%	83%	100%	118%	113%	105%
1987	1%	2%	19%	55%	77%	100%	126%	113%	119%
1994	1%	2%	23%	47%	85%	100%	114%	109%	112%
2000	1%	2%	19%	46%	66%	100%	122%	121%	118%
2006	1%	2%	25%	42%	74%	100%	111%	106%	134%

Table B4: Corrected age-wealth profiles $w_t(a)$ in France, 1820-2006

Differential mortality parameters by age group

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
$diffmort_t(a)$	200%	200%	200%	200%	200%	180%	150%	130%	110%
$m_t^P(a)/m_t(a)$	133%	133%	133%	133%	133%	129%	120%	113%	105%
$m_t^R(a)/m_t(a)$	67%	67%	67%	67%	67%	71%	80%	87%	95%
$sharepoor_t(a)$	10%	10%	10%	10%	10%	10%	10%	10%	10%
$w_{dt}(a)/w_t(a)$	73%	73%	73%	73%	73%	77%	84%	90%	96%
$w_t(a)/w_{dt}(a)$	136%	136%	136%	136%	136%	130%	119%	112%	104%

Average wealth as a fraction of average wealth of individuals aged 50-to-59 year-old
(after differential mortality correction)

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
1820	2%	8%	31%	39%	49%	100%	123%	127%	123%
1830	2%	8%	34%	41%	55%	100%	114%	122%	107%
1840	2%	8%	33%	37%	57%	100%	124%	120%	119%
1850	2%	8%	29%	39%	55%	100%	118%	124%	114%
1860	2%	8%	33%	38%	64%	100%	118%	108%	106%
1870	2%	8%	31%	40%	58%	100%	124%	137%	147%
1880	2%	8%	32%	41%	64%	100%	136%	143%	176%
1890	2%	8%	34%	45%	58%	100%	149%	157%	188%
1902	2%	8%	27%	60%	68%	100%	158%	151%	191%
1912	2%	8%	24%	57%	76%	100%	145%	153%	206%
1922	4%	11%	23%	59%	82%	100%	119%	142%	145%
1931	1%	7%	23%	63%	81%	100%	113%	118%	115%
1943	1%	5%	23%	43%	61%	100%	104%	84%	69%
1956	1%	4%	36%	50%	79%	100%	100%	81%	67%
1958	1%	3%	33%	48%	81%	100%	106%	86%	66%
1959	1%	3%	29%	60%	85%	100%	110%	90%	74%
1960	1%	3%	30%	55%	77%	100%	101%	87%	70%
1962	1%	2%	25%	51%	77%	100%	108%	89%	76%
1964	1%	2%	24%	50%	79%	100%	112%	98%	85%
1984	1%	2%	20%	58%	87%	100%	108%	98%	84%
1987	1%	2%	20%	58%	80%	100%	116%	97%	96%
1994	1%	2%	24%	50%	89%	100%	105%	94%	90%
2000	1%	2%	20%	48%	69%	100%	112%	104%	95%
2006	1%	2%	27%	44%	78%	100%	102%	91%	108%

Table B5: Computation of μ_t and μ_t* ratios in France, 1820-2006

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	**[11]**	**[12]**	[13]	[14]
	Uniform mortality estimates					Differential mortality estimates					**Final series**		Ratio w_t^{50-59}/w_t^{20+}	Ratio w_t^{50-59}/w_t
	μ_t^{0+}	μ_t^{20+}	cf_t	B_t^{20+}/B_t	W_t^{20+}/W_t	μ_t^{0+}	μ_t^{20+}	cf_t	B_t^{20+}/B_t	W_t^{20+}/W_t	**$\mu_t = cf_t\ \mu_t^{20+}$**	**$\mu_t^* = (1+v_t)\ \mu_t$**		
1820	142%	162%	97%	98%	95%	111%	127%	97%	98%	95%	**123%**	**166%**	*163%*	*155%*
1830	136%	154%	97%	98%	95%	106%	120%	97%	98%	95%	**117%**	**159%**	*162%*	*154%*
1840	141%	156%	97%	98%	95%	110%	122%	97%	98%	95%	**119%**	**165%**	*159%*	*151%*
1850	141%	158%	97%	98%	96%	110%	124%	97%	98%	95%	**120%**	**161%**	*161%*	*153%*
1860	140%	149%	98%	98%	96%	109%	117%	97%	98%	96%	**114%**	**148%**	*155%*	*148%*
1870	163%	167%	97%	99%	96%	128%	132%	97%	99%	96%	**128%**	**159%**	*150%*	*143%*
1880	163%	171%	98%	99%	96%	129%	135%	97%	99%	96%	**132%**	**159%**	*140%*	*134%*
1890	177%	176%	98%	99%	97%	141%	140%	97%	99%	96%	**136%**	**161%**	*134%*	*129%*
1902	186%	172%	98%	99%	97%	147%	137%	97%	99%	97%	**133%**	**159%**	*127%*	*123%*
1912	201%	175%	98%	99%	97%	159%	139%	97%	99%	97%	**135%**	**161%**	*128%*	*124%*
1922	188%	161%	97%	99%	96%	148%	127%	96%	99%	96%	**123%**	**153%**	*131%*	*125%*
1931	180%	151%	98%	100%	98%	141%	119%	98%	100%	98%	**116%**	**145%**	*136%*	*133%*
1943	154%	124%	98%	100%	98%	122%	98%	98%	100%	98%	**96%**	**120%**	*154%*	*150%*
1947	137%	116%	98%	100%	98%	106%	90%	98%	100%	98%	**88%**	**115%**	*149%*	*146%*
1956	169%	127%	99%	100%	99%	132%	99%	99%	100%	99%	**98%**	**137%**	*141%*	*138%*
1958	175%	130%	99%	100%	99%	137%	102%	99%	100%	99%	**101%**	**128%**	*140%*	*139%*
1959	178%	131%	99%	100%	99%	140%	103%	99%	100%	99%	**102%**	**122%**	*133%*	*132%*
1960	180%	131%	99%	100%	99%	142%	103%	99%	100%	99%	**102%**	**126%**	*141%*	*139%*
1962	190%	136%	99%	100%	99%	150%	108%	99%	100%	99%	**107%**	**135%**	*140%*	*139%*
1964	200%	142%	99%	100%	99%	159%	113%	99%	100%	99%	**112%**	**142%**	*137%*	*135%*
1984	196%	143%	99%	100%	99%	155%	113%	99%	100%	99%	**112%**	**144%**	*140%*	*138%*
1987	204%	150%	99%	100%	99%	162%	120%	99%	100%	99%	**119%**	**170%**	*139%*	*137%*
1994	190%	144%	99%	100%	99%	151%	114%	99%	100%	99%	**113%**	**185%**	*139%*	*138%*
2000	201%	153%	99%	100%	99%	161%	123%	99%	100%	99%	**122%**	**220%**	*140%*	*139%*
2006	202%	154%	99%	100%	99%	161%	124%	99%	100%	99%	**123%**	**223%**	*137%*	*136%*

Table C1: Population growth and mortality rates in France, 1820-2100 (annual series)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
(thousands)	Population (thousands) N_t	Population growth rate $\mathbf{n_t}$	Births (thousands) N_{bt}	Decedents (thousands) N_{dt}	Migrations (thousands) N_{it}	**Mortality rate** $m_t^{0+}= N_{dt}/N_t$	Adult population (20-yr+) N_t^{20+}	Share 0-19-yr-old in living population	Adult decedents N_{dt}^{20+}	Share 0-19-yr-old in decedents	**Adult mortality rate** $m_t = N_{dt}^{20+}/N_t^{20+}$
1820	30 342		959	752	0	**2.5%**	18 125	40.3%	406	46.1%	**2.2%**
1821	30 549	**0.7%**	964	760	0	**2.5%**	18 276	40.2%	408	46.3%	**2.2%**
1822	30 752	**0.7%**	971	766	0	**2.5%**	18 425	40.1%	411	46.4%	**2.2%**
1823	30 957	**0.7%**	963	769	0	**2.5%**	18 571	40.0%	414	46.2%	**2.2%**
1824	31 150	**0.6%**	983	775	0	**2.5%**	18 716	39.9%	416	46.3%	**2.2%**
1825	31 358	**0.7%**	973	777	0	**2.5%**	18 858	39.9%	419	46.1%	**2.2%**
1826	31 554	**0.6%**	991	783	0	**2.5%**	18 997	39.8%	422	46.1%	**2.2%**
1827	31 762	**0.7%**	979	785	0	**2.5%**	19 133	39.8%	424	45.9%	**2.2%**
1828	31 956	**0.6%**	976	786	0	**2.5%**	19 265	39.7%	427	45.7%	**2.2%**
1829	32 146	**0.6%**	965	787	0	**2.4%**	19 395	39.7%	429	45.4%	**2.2%**
1830	32 324	**0.6%**	967	788	0	**2.4%**	19 522	39.6%	432	45.2%	**2.2%**
1831	32 503	**0.6%**	986	793	0	**2.4%**	19 646	39.6%	434	45.2%	**2.2%**
1832	32 696	**0.6%**	937	789	0	**2.4%**	19 770	39.5%	437	44.6%	**2.2%**
1833	32 843	**0.5%**	977	795	0	**2.4%**	19 894	39.4%	439	44.7%	**2.2%**
1834	33 026	**0.6%**	989	800	0	**2.4%**	20 017	39.4%	442	44.8%	**2.2%**
1835	33 215	**0.6%**	985	803	0	**2.4%**	20 138	39.4%	444	44.7%	**2.2%**
1836	33 396	**0.5%**	960	802	0	**2.4%**	20 254	39.4%	447	44.2%	**2.2%**
1837	33 555	**0.5%**	953	802	0	**2.4%**	20 370	39.3%	449	43.9%	**2.2%**
1838	33 706	**0.5%**	960	804	0	**2.4%**	20 482	39.2%	452	43.8%	**2.2%**
1839	33 862	**0.5%**	954	805	0	**2.4%**	20 586	39.2%	455	43.5%	**2.2%**
1840	34 011	**0.4%**	965	809	0	**2.4%**	20 676	39.2%	457	43.5%	**2.2%**
1841	34 167	**0.5%**	980	814	0	**2.4%**	20 817	39.1%	460	43.5%	**2.2%**
1842	34 333	**0.5%**	978	817	0	**2.4%**	20 959	39.0%	463	43.3%	**2.2%**
1843	34 493	**0.5%**	967	819	0	**2.4%**	21 103	38.8%	466	43.0%	**2.2%**
1844	34 642	**0.4%**	970	822	0	**2.4%**	21 240	38.7%	470	42.8%	**2.2%**
1845	34 790	**0.4%**	973	825	0	**2.4%**	21 386	38.5%	473	42.6%	**2.2%**
1846	34 938	**0.4%**	965	826	0	**2.4%**	21 523	38.4%	476	42.3%	**2.2%**
1847	35 077	**0.4%**	901	819	0	**2.3%**	21 669	38.2%	480	41.4%	**2.2%**
1848	35 158	**0.2%**	939	823	0	**2.3%**	21 804	38.0%	484	41.3%	**2.2%**
1849	35 274	**0.3%**	985	834	0	**2.4%**	21 935	37.8%	487	41.6%	**2.2%**
1850	35 425	**0.4%**	953	804	0	**2.3%**	22 055	37.7%	460	42.8%	**2.1%**
1851	35 574	**0.4%**	970	809	0	**2.3%**	22 205	37.6%	464	42.7%	**2.1%**
1852	35 734	**0.5%**	964	810	0	**2.3%**	22 363	37.4%	468	42.2%	**2.1%**
1853	35 888	**0.4%**	936	807	0	**2.2%**	22 487	37.3%	471	41.6%	**2.1%**
1854	36 017	**0.4%**	922	804	0	**2.2%**	22 633	37.2%	475	40.9%	**2.1%**
1855	36 136	**0.3%**	898	800	0	**2.2%**	22 783	37.0%	479	40.1%	**2.1%**
1856	36 234	**0.3%**	951	806	0	**2.2%**	22 928	36.7%	483	40.0%	**2.1%**
1857	36 379	**0.4%**	940	808	0	**2.2%**	23 053	36.6%	487	39.7%	**2.1%**
1858	36 511	**0.4%**	968	813	0	**2.2%**	23 171	36.5%	491	39.6%	**2.1%**
1859	36 666	**0.4%**	1 017	823	0	**2.2%**	23 290	36.5%	495	39.8%	**2.1%**
1860	36 860	**0.5%**	956	819	0	**2.2%**	23 402	36.5%	499	39.1%	**2.1%**
1861	36 997	**0.4%**	994	824	0	**2.2%**	23 518	36.4%	502	39.0%	**2.1%**
1862	37 167	**0.5%**	994	826	0	**2.2%**	23 641	36.4%	506	38.7%	**2.1%**
1863	37 335	**0.5%**	1 012	831	0	**2.2%**	23 759	36.4%	510	38.6%	**2.1%**
1864	37 516	**0.5%**	1 005	832	0	**2.2%**	23 868	36.4%	514	38.3%	**2.2%**
1865	37 688	**0.5%**	1 005	834	0	**2.2%**	23 976	36.4%	517	38.0%	**2.2%**
1866	37 859	**0.5%**	1 006	835	0	**2.2%**	24 083	36.4%	521	37.6%	**2.2%**
1867	38 030	**0.5%**	1 003	836	0	**2.2%**	24 183	36.4%	524	37.3%	**2.2%**
1868	38 197	**0.4%**	983	834	0	**2.2%**	24 240	36.5%	527	36.8%	**2.2%**
1869	38 346	**0.4%**	999	836	0	**2.2%**	24 319	36.6%	530	36.5%	**2.2%**
1870	38 509	**0.4%**	1 005	838	-2 331	**2.2%**	24 427	36.6%	533	36.3%	**2.2%**
1871	36 374	**-5.5%**	825	823	0	**2.3%**	23 034	36.7%	496	39.7%	**2.2%**
1872	36 376	**0.0%**	965	833	0	**2.3%**	23 132	36.4%	499	40.1%	**2.2%**
1873	36 508	**0.4%**	945	835	0	**2.3%**	23 225	36.4%	502	39.9%	**2.2%**
1874	36 618	**0.3%**	954	837	0	**2.3%**	23 299	36.4%	505	39.7%	**2.2%**
1875	36 735	**0.3%**	950	837	0	**2.3%**	23 364	36.4%	507	39.4%	**2.2%**
1876	36 848	**0.3%**	966	839	0	**2.3%**	23 413	36.5%	510	39.3%	**2.2%**
1877	36 974	**0.3%**	944	837	0	**2.3%**	23 494	36.5%	512	38.8%	**2.2%**
1878	37 081	**0.3%**	936	835	0	**2.3%**	23 567	36.4%	515	38.3%	**2.2%**
1879	37 182	**0.3%**	935	834	0	**2.2%**	23 657	36.4%	517	38.0%	**2.2%**
1880	37 283	**0.3%**	920	831	0	**2.2%**	23 778	36.2%	520	37.4%	**2.2%**
1881	37 371	**0.2%**	938	833	0	**2.2%**	23 859	36.2%	522	37.3%	**2.2%**

1882	37 477	**0.3%**	936	833	0	**2.2%**	23 964	36.1%	525	37.0%	**2.2%**
1883	37 580	**0.3%**	938	833	0	**2.2%**	24 068	36.0%	527	36.7%	**2.2%**
1884	37 684	**0.3%**	936	833	0	**2.2%**	24 183	35.8%	530	36.4%	**2.2%**
1885	37 788	**0.3%**	924	831	0	**2.2%**	24 292	35.7%	532	36.0%	**2.2%**
1886	37 881	**0.2%**	912	828	0	**2.2%**	24 401	35.6%	534	35.5%	**2.2%**
1887	37 965	**0.2%**	899	825	0	**2.2%**	24 508	35.4%	536	34.9%	**2.2%**
1888	38 039	**0.2%**	882	821	0	**2.2%**	24 612	35.3%	539	34.4%	**2.2%**
1889	38 101	**0.2%**	880	818	0	**2.1%**	24 701	35.2%	541	33.9%	**2.2%**
1890	38 162	**0.2%**	837	811	0	**2.1%**	24 794	35.0%	543	33.1%	**2.2%**
1891	38 188	**0.1%**	866	812	0	**2.1%**	24 900	34.8%	545	32.9%	**2.2%**
1892	38 241	**0.1%**	855	811	0	**2.1%**	24 892	34.9%	547	32.6%	**2.2%**
1893	38 285	**0.1%**	875	813	0	**2.1%**	24 976	34.8%	549	32.5%	**2.2%**
1894	38 347	**0.2%**	855	811	0	**2.1%**	25 047	34.7%	551	32.1%	**2.2%**
1895	38 390	**0.1%**	833	807	0	**2.1%**	25 125	34.6%	553	31.5%	**2.2%**
1896	38 416	**0.1%**	865	810	0	**2.1%**	25 200	34.4%	555	31.4%	**2.2%**
1897	38 471	**0.1%**	859	810	0	**2.1%**	25 286	34.3%	558	31.2%	**2.2%**
1898	38 520	**0.1%**	835	807	0	**2.1%**	25 358	34.2%	560	30.6%	**2.2%**
1899	38 548	**0.1%**	852	808	0	**2.1%**	25 425	34.0%	562	30.5%	**2.2%**
1900	38 512	**-0.1%**	833	802	28	**2.1%**	25 300	34.3%	560	30.2%	**2.2%**
1901	38 486	**-0.1%**	863	791	5	**2.1%**	25 301	34.3%	572	27.7%	**2.3%**
1902	38 564	**0.2%**	851	767	8	**2.0%**	25 370	34.2%	558	27.3%	**2.2%**
1903	38 657	**0.2%**	833	759	7	**2.0%**	25 452	34.2%	554	27.0%	**2.2%**
1904	38 737	**0.2%**	824	767	5	**2.0%**	25 542	34.1%	558	27.2%	**2.2%**
1905	38 800	**0.2%**	813	775	-2	**2.0%**	25 627	34.0%	578	25.4%	**2.3%**
1906	38 836	**0.1%**	812	785	31	**2.0%**	25 689	33.9%	580	26.2%	**2.3%**
1907	38 893	**0.1%**	778	797	51	**2.0%**	25 765	33.8%	610	23.4%	**2.4%**
1908	38 925	**0.1%**	798	749	51	**1.9%**	25 811	33.7%	568	24.2%	**2.2%**
1909	39 024	**0.3%**	775	760	50	**1.9%**	25 894	33.6%	592	22.1%	**2.3%**
1910	39 089	**0.2%**	780	708	67	**1.8%**	25 963	33.6%	548	22.6%	**2.1%**
1911	39 228	**0.4%**	748	780	34	**2.0%**	26 038	33.6%	581	25.5%	**2.2%**
1912	39 229	**0.0%**	756	697	50	**1.8%**	26 110	33.4%	545	21.8%	**2.1%**
1913	39 337	**0.3%**	751	707	50	**1.8%**	26 204	33.4%	549	22.3%	**2.1%**
1914	39 431	**0.2%**	715	915	0	**2.3%**	26 325	33.2%	732	20.0%	**2.8%**
1915	39 231	**-0.5%**	456	952	0	**2.4%**	26 218	33.2%	787	17.3%	**3.0%**
1916	38 735	**-1.3%**	363	812	0	**2.1%**	26 008	32.9%	687	15.4%	**2.6%**
1917	38 287	**-1.2%**	390	731	0	**1.9%**	25 930	32.3%	616	15.7%	**2.4%**
1918	37 946	**-0.9%**	446	934	0	**2.5%**	25 946	31.6%	773	17.3%	**3.0%**
1919	37 458	**-1.3%**	479	633	1 080	**1.7%**	25 783	31.2%	525	17.1%	**2.0%**
1920	38 383	**2.5%**	838	678	229	**1.8%**	26 384	31.3%	532	21.4%	**2.0%**
1921	38 773	**1.0%**	817	698	87	**1.8%**	26 629	31.3%	544	22.1%	**2.0%**
1922	38 978	**0.5%**	764	692	198	**1.8%**	26 810	31.2%	573	17.3%	**2.1%**
1923	39 249	**0.7%**	766	670	267	**1.7%**	27 053	31.1%	539	19.7%	**2.0%**
1924	39 611	**0.9%**	758	683	296	**1.7%**	27 383	30.9%	565	17.4%	**2.1%**
1925	39 981	**0.9%**	774	712	173	**1.8%**	27 706	30.7%	583	18.1%	**2.1%**
1926	40 217	**0.6%**	772	717	133	**1.8%**	27 882	30.7%	581	18.9%	**2.1%**
1927	40 404	**0.5%**	748	680	84	**1.7%**	28 087	30.5%	561	17.5%	**2.0%**
1928	40 556	**0.4%**	754	678	110	**1.7%**	28 235	30.4%	553	18.5%	**2.0%**
1929	40 741	**0.5%**	734	743	180	**1.8%**	28 417	30.3%	615	17.2%	**2.2%**
1930	40 912	**0.4%**	754	653	244	**1.6%**	28 577	30.1%	545	16.6%	**1.9%**
1931	41 257	**0.8%**	738	683	-52	**1.7%**	28 859	30.1%	579	15.2%	**2.0%**
1932	41 261	**0.0%**	726	664	-47	**1.6%**	28 880	30.0%	561	15.4%	**1.9%**
1933	41 276	**0.0%**	682	664	-45	**1.6%**	28 951	29.9%	570	14.1%	**2.0%**
1934	41 249	**-0.1%**	682	638	-44	**1.5%**	29 001	29.7%	550	13.8%	**1.9%**
1935	41 249	**0.0%**	644	662	-36	**1.6%**	29 058	29.6%	581	12.3%	**2.0%**
1936	41 194	**-0.1%**	634	646	15	**1.6%**	28 858	29.9%	567	12.2%	**2.0%**
1937	41 198	**0.0%**	621	633	29	**1.5%**	28 657	30.4%	556	12.1%	**1.9%**
1938	41 216	**0.0%**	616	651	-1 796	**1.6%**	28 494	30.9%	575	11.6%	**2.0%**
1939	39 385	**-4.4%**	587	623	154	**1.6%**	27 157	31.0%	554	11.0%	**2.0%**
1940	39 503	**0.3%**	539	850	-1 804	**2.2%**	27 106	31.4%	757	10.9%	**2.8%**
1941	37 388	**-5.4%**	497	665	158	**1.8%**	25 304	32.3%	593	10.8%	**2.3%**
1942	37 378	**0.0%**	548	658	-141	**1.8%**	25 546	31.7%	585	11.1%	**2.3%**
1943	37 127	**-0.7%**	586	697	-365	**1.9%**	25 509	31.3%	606	13.1%	**2.4%**
1944	36 651	**-1.3%**	604	857	356	**2.3%**	25 319	30.9%	746	13.0%	**2.9%**
1945	36 753	**0.3%**	626	665	3 411	**1.8%**	25 435	30.8%	547	17.8%	**2.1%**
1946	40 125	**9.2%**	844	547	26	**1.4%**	28 287	29.5%	461	15.7%	**1.6%**
1947	40 448	**0.8%**	870	538	130	**1.3%**	28 490	29.6%	457	15.2%	**1.6%**
1948	40 911	**1.1%**	871	513	45	**1.3%**	28 732	29.8%	448	12.7%	**1.6%**
1949	41 313	**1.0%**	873	574	35	**1.4%**	28 947	29.9%	503	12.3%	**1.7%**
1950	41 647	**0.8%**	862	535	35	**1.3%**	29 092	30.1%	475	11.2%	**1.6%**
1951	42 010	**0.9%**	827	566	30	**1.3%**	29 300	30.3%	509	10.0%	**1.7%**
1952	42 301	**0.7%**	822	525	20	**1.2%**	29 447	30.4%	474	9.7%	**1.6%**
1953	42 618	**0.8%**	805	557	19	**1.3%**	29 618	30.5%	511	8.3%	**1.7%**
1954	42 885	**0.6%**	811	519	51	**1.2%**	29 720	30.7%	474	8.6%	**1.6%**

1955	43 228	**0.8%**	806	526	120	**1.2%**	29 885	30.9%	484	8.1%	**1.6%**
1956	43 627	**0.9%**	807	546	170	**1.3%**	30 057	31.1%	506	7.3%	**1.7%**
1957	44 059	**1.0%**	816	532	220	**1.2%**	30 233	31.4%	494	7.2%	**1.6%**
1958	44 563	**1.1%**	812	501	140	**1.1%**	30 442	31.7%	465	7.0%	**1.5%**
1959	45 015	**1.0%**	829	509	130	**1.1%**	30 628	32.0%	475	6.8%	**1.5%**
1960	45 465	**1.0%**	820	521	140	**1.1%**	30 800	32.3%	489	6.0%	**1.6%**
1961	45 904	**1.0%**	839	500	180	**1.1%**	30 913	32.7%	470	6.1%	**1.5%**
1962	46 422	**1.1%**	832	541	860	**1.2%**	31 040	33.1%	510	5.8%	**1.6%**
1963	47 573	**2.5%**	869	558	175	**1.2%**	31 669	33.4%	526	5.7%	**1.7%**
1964	48 059	**1.0%**	878	520	145	**1.1%**	31 848	33.7%	490	5.8%	**1.5%**
1965	48 562	**1.0%**	866	544	70	**1.1%**	32 051	34.0%	515	5.3%	**1.6%**
1966	48 954	**0.8%**	864	529	85	**1.1%**	32 195	34.2%	500	5.4%	**1.6%**
1967	49 374	**0.9%**	841	543	52	**1.1%**	32 560	34.1%	516	5.0%	**1.6%**
1968	49 723	**0.7%**	836	553	102	**1.1%**	32 934	33.8%	526	4.9%	**1.6%**
1969	50 108	**0.8%**	842	573	152	**1.1%**	33 351	33.4%	546	4.7%	**1.6%**
1970	50 528	**0.8%**	850	542	180	**1.1%**	33 780	33.1%	517	4.7%	**1.5%**
1971	51 016	**1.0%**	881	554	143	**1.1%**	34 244	32.9%	529	4.6%	**1.5%**
1972	51 486	**0.9%**	878	550	102	**1.1%**	34 635	32.7%	525	4.5%	**1.5%**
1973	51 916	**0.8%**	857	559	106	**1.1%**	35 014	32.6%	535	4.3%	**1.5%**
1974	52 321	**0.8%**	801	553	31	**1.1%**	35 379	32.4%	531	4.0%	**1.5%**
1975	52 600	**0.5%**	745	560	14	**1.1%**	35 712	32.1%	540	3.6%	**1.5%**
1976	52 798	**0.4%**	720	557	57	**1.1%**	35 989	31.8%	539	3.3%	**1.5%**
1977	53 019	**0.4%**	745	536	44	**1.0%**	36 315	31.5%	518	3.3%	**1.4%**
1978	53 272	**0.5%**	737	547	19	**1.0%**	36 659	31.2%	530	3.1%	**1.4%**
1979	53 481	**0.4%**	757	542	35	**1.0%**	36 970	30.9%	525	3.0%	**1.4%**
1980	53 731	**0.5%**	800	547	44	**1.0%**	37 313	30.6%	530	3.1%	**1.4%**
1981	54 029	**0.6%**	805	555	56	**1.0%**	37 649	30.3%	539	2.9%	**1.4%**
1982	54 335	**0.6%**	797	543	61	**1.0%**	38 008	30.0%	528	2.9%	**1.4%**
1983	54 650	**0.6%**	749	560	56	**1.0%**	38 347	29.8%	545	2.6%	**1.4%**
1984	54 895	**0.4%**	760	542	45	**1.0%**	38 696	29.5%	529	2.5%	**1.4%**
1985	55 157	**0.5%**	768	552	38	**1.0%**	39 065	29.2%	539	2.4%	**1.4%**
1986	55 411	**0.5%**	778	547	39	**1.0%**	39 412	28.9%	534	2.4%	**1.4%**
1987	55 682	**0.5%**	768	527	44	**0.9%**	39 762	28.6%	515	2.3%	**1.3%**
1988	55 966	**0.5%**	771	525	57	**0.9%**	40 113	28.3%	512	2.3%	**1.3%**
1989	56 270	**0.5%**	765	529	71	**0.9%**	40 477	28.1%	517	2.2%	**1.3%**
1990	56 577	**0.5%**	762	526	27	**0.9%**	40 857	27.8%	515	2.1%	**1.3%**
1991	56 841	**0.5%**	759	525	36	**0.9%**	41 235	27.5%	514	2.1%	**1.2%**
1992	57 111	**0.5%**	744	522	37	**0.9%**	41 637	27.1%	511	2.0%	**1.2%**
1993	57 369	**0.5%**	712	532	17	**0.9%**	42 039	26.7%	523	1.8%	**1.2%**
1994	57 565	**0.3%**	711	520	-4	**0.9%**	42 385	26.4%	511	1.7%	**1.2%**
1995	57 753	**0.3%**	730	532	-15	**0.9%**	42 668	26.1%	524	1.5%	**1.2%**
1996	57 936	**0.3%**	734	536	-19	**0.9%**	42 878	26.0%	528	1.5%	**1.2%**
1997	58 116	**0.3%**	727	530	-14	**0.9%**	43 060	25.9%	523	1.5%	**1.2%**
1998	58 299	**0.3%**	738	534	-6	**0.9%**	43 272	25.8%	527	1.4%	**1.2%**
1999	58 497	**0.3%**	745	538	146	**0.9%**	43 479	25.7%	530	1.4%	**1.2%**
2000	58 850	**0.6%**	775	535	160	**0.9%**	43 806	25.6%	528	1.4%	**1.2%**
2001	59 249	**0.7%**	771	531	171	**0.9%**	44 196	25.4%	524	1.4%	**1.2%**
2002	59 660	**0.7%**	762	535	181	**0.9%**	44 600	25.2%	528	1.3%	**1.2%**
2003	60 067	**0.7%**	761	552	186	**0.9%**	44 998	25.1%	546	1.2%	**1.2%**
2004	60 462	**0.7%**	768	509	105	**0.8%**	45 338	25.0%	503	1.2%	**1.1%**
2005	60 825	**0.6%**	774	528	95	**0.9%**	45 674	24.9%	522	1.1%	**1.1%**
2006	61 167	**0.6%**	797	516	91	**0.8%**	45 992	24.8%	511	1.1%	**1.1%**
2007	61 538	**0.6%**	760	521	80	**0.8%**	46 334	24.7%	515	1.1%	**1.1%**
2008	61 857	**0.5%**	758	547	101	**0.9%**	46 661	24.6%	541	1.0%	**1.2%**
2009	62 170	**0.5%**	757	552	101	**0.9%**	46 971	24.4%	546	1.0%	**1.2%**
2010	62 477	**0.5%**	756	557	101	**0.9%**	47 274	24.3%	552	1.0%	**1.2%**
2011	62 777	**0.5%**	754	562	101	**0.9%**	47 567	24.2%	557	0.9%	**1.2%**
2012	63 071	**0.5%**	753	568	101	**0.9%**	47 849	24.1%	563	0.9%	**1.2%**
2013	63 357	**0.5%**	752	574	101	**0.9%**	48 111	24.1%	569	0.9%	**1.2%**
2014	63 636	**0.4%**	750	580	101	**0.9%**	48 335	24.0%	575	0.8%	**1.2%**
2015	63 907	**0.4%**	749	586	101	**0.9%**	48 557	24.0%	581	0.8%	**1.2%**
2016	64 171	**0.4%**	748	592	101	**0.9%**	48 790	24.0%	587	0.8%	**1.2%**
2017	64 429	**0.4%**	747	597	101	**0.9%**	49 025	23.9%	592	0.7%	**1.2%**
2018	64 680	**0.4%**	745	601	101	**0.9%**	49 245	23.9%	597	0.7%	**1.2%**
2019	64 926	**0.4%**	744	605	101	**0.9%**	49 475	23.8%	600	0.7%	**1.2%**
2020	65 166	**0.4%**	742	608	101	**0.9%**	49 720	23.7%	604	0.7%	**1.2%**
2021	65 402	**0.4%**	741	611	101	**0.9%**	49 991	23.6%	607	0.7%	**1.2%**
2022	65 634	**0.4%**	740	613	101	**0.9%**	50 255	23.4%	609	0.6%	**1.2%**
2023	65 862	**0.3%**	739	616	101	**0.9%**	50 508	23.3%	612	0.6%	**1.2%**
2024	66 086	**0.3%**	739	618	101	**0.9%**	50 758	23.2%	615	0.6%	**1.2%**
2025	66 308	**0.3%**	739	621	101	**0.9%**	51 007	23.1%	617	0.6%	**1.2%**
2026	66 528	**0.3%**	741	624	101	**0.9%**	51 261	22.9%	620	0.6%	**1.2%**
2027	66 746	**0.3%**	743	627	101	**0.9%**	51 500	22.8%	624	0.6%	**1.2%**

2028	66 963	**0.3%**	745	630	101	**0.9%**	51 734	22.7%	627	0.5%	**1.2%**
2029	67 179	**0.3%**	747	635	101	**0.9%**	51 961	22.7%	631	0.5%	**1.2%**
2030	67 393	**0.3%**	750	639	101	**0.9%**	52 184	22.6%	636	0.5%	**1.2%**
2031	67 605	**0.3%**	752	645	101	**1.0%**	52 400	22.5%	642	0.5%	**1.2%**
2032	67 813	**0.3%**	754	651	101	**1.0%**	52 610	22.4%	648	0.5%	**1.2%**
2033	68 017	**0.3%**	755	659	101	**1.0%**	52 812	22.4%	656	0.5%	**1.2%**
2034	68 215	**0.3%**	756	667	101	**1.0%**	53 005	22.3%	664	0.4%	**1.3%**
2035	68 405	**0.3%**	757	676	101	**1.0%**	53 188	22.2%	673	0.4%	**1.3%**
2036	68 587	**0.3%**	757	686	101	**1.0%**	53 361	22.2%	683	0.4%	**1.3%**
2037	68 760	**0.3%**	757	697	101	**1.0%**	53 523	22.2%	694	0.4%	**1.3%**
2038	68 922	**0.2%**	757	708	101	**1.0%**	53 673	22.1%	705	0.4%	**1.3%**
2039	69 073	**0.2%**	757	719	101	**1.0%**	53 811	22.1%	716	0.4%	**1.3%**
2040	69 213	**0.2%**	756	729	101	**1.1%**	53 937	22.1%	726	0.3%	**1.3%**
2041	69 341	**0.2%**	755	739	101	**1.1%**	54 050	22.1%	736	0.3%	**1.4%**
2042	69 458	**0.2%**	754	747	101	**1.1%**	54 153	22.0%	745	0.3%	**1.4%**
2043	69 566	**0.2%**	753	755	101	**1.1%**	54 246	22.0%	752	0.3%	**1.4%**
2044	69 666	**0.1%**	752	760	101	**1.1%**	54 331	22.0%	758	0.3%	**1.4%**
2045	69 759	**0.1%**	750	765	101	**1.1%**	54 410	22.0%	763	0.3%	**1.4%**
2046	69 846	**0.1%**	749	768	101	**1.1%**	54 485	22.0%	766	0.3%	**1.4%**
2047	69 928	**0.1%**	749	771	101	**1.1%**	54 558	22.0%	769	0.3%	**1.4%**
2048	70 007	**0.1%**	748	773	101	**1.1%**	54 630	22.0%	771	0.3%	**1.4%**
2049	70 083	**0.1%**	747	775	101	**1.1%**	54 703	21.9%	773	0.3%	**1.4%**
2050	70 157	**0.1%**	747	783	101	**1.1%**	54 776	21.9%	781	0.3%	**1.4%**
2051	70 222	**0.1%**	747	769	101	**1.1%**	54 842	21.9%	767	0.3%	**1.4%**
2052	70 301	**0.1%**	747	776	101	**1.1%**	54 926	21.9%	774	0.3%	**1.4%**
2053	70 372	**0.1%**	747	783	101	**1.1%**	55 003	21.8%	781	0.3%	**1.4%**
2054	70 437	**0.1%**	747	789	101	**1.1%**	55 076	21.8%	787	0.3%	**1.4%**
2055	70 496	**0.1%**	747	794	101	**1.1%**	55 144	21.8%	792	0.3%	**1.4%**
2056	70 550	**0.1%**	747	799	101	**1.1%**	55 207	21.7%	797	0.3%	**1.4%**
2057	70 599	**0.1%**	747	803	101	**1.1%**	55 266	21.7%	801	0.2%	**1.4%**
2058	70 644	**0.1%**	747	806	101	**1.1%**	55 321	21.7%	804	0.2%	**1.5%**
2059	70 686	**0.1%**	747	809	101	**1.1%**	55 373	21.7%	807	0.2%	**1.5%**
2060	70 725	**0.1%**	747	811	101	**1.1%**	55 422	21.6%	809	0.2%	**1.5%**
2061	70 762	**0.1%**	747	812	101	**1.1%**	55 468	21.6%	810	0.2%	**1.5%**
2062	70 799	**0.1%**	747	812	101	**1.1%**	55 513	21.6%	810	0.2%	**1.5%**
2063	70 836	**0.1%**	747	812	101	**1.1%**	55 556	21.6%	810	0.2%	**1.5%**
2064	70 872	**0.1%**	747	811	102	**1.1%**	55 598	21.6%	809	0.2%	**1.5%**
2065	70 909	**0.1%**	747	810	102	**1.1%**	55 640	21.5%	808	0.2%	**1.5%**
2066	70 948	**0.1%**	747	809	102	**1.1%**	55 682	21.5%	807	0.2%	**1.4%**
2067	70 988	**0.1%**	747	807	102	**1.1%**	55 724	21.5%	805	0.2%	**1.4%**
2068	71 029	**0.1%**	747	806	102	**1.1%**	55 767	21.5%	804	0.2%	**1.4%**
2069	71 071	**0.1%**	747	805	102	**1.1%**	55 810	21.5%	803	0.2%	**1.4%**
2070	71 115	**0.1%**	747	804	102	**1.1%**	55 853	21.5%	802	0.2%	**1.4%**
2071	71 159	**0.1%**	747	803	102	**1.1%**	55 898	21.4%	801	0.2%	**1.4%**
2072	71 205	**0.1%**	747	803	102	**1.1%**	55 943	21.4%	801	0.2%	**1.4%**
2073	71 250	**0.1%**	747	803	101	**1.1%**	55 989	21.4%	801	0.2%	**1.4%**
2074	71 295	**0.1%**	747	804	101	**1.1%**	56 034	21.4%	802	0.2%	**1.4%**
2075	71 339	**0.1%**	747	806	101	**1.1%**	56 078	21.4%	804	0.2%	**1.4%**
2076	71 382	**0.1%**	747	807	101	**1.1%**	56 121	21.4%	805	0.2%	**1.4%**
2077	71 423	**0.1%**	747	809	101	**1.1%**	56 162	21.4%	807	0.2%	**1.4%**
2078	71 463	**0.1%**	747	809	101	**1.1%**	56 201	21.4%	807	0.2%	**1.4%**
2079	71 501	**0.1%**	747	810	101	**1.1%**	56 240	21.3%	808	0.2%	**1.4%**
2080	71 540	**0.1%**	747	810	101	**1.1%**	56 278	21.3%	808	0.2%	**1.4%**
2081	71 578	**0.1%**	747	809	101	**1.1%**	56 317	21.3%	807	0.2%	**1.4%**
2082	71 617	**0.1%**	747	808	101	**1.1%**	56 356	21.3%	806	0.2%	**1.4%**
2083	71 657	**0.1%**	747	808	101	**1.1%**	56 395	21.3%	806	0.2%	**1.4%**
2084	71 697	**0.1%**	747	808	101	**1.1%**	56 435	21.3%	806	0.2%	**1.4%**
2085	71 736	**0.1%**	747	808	101	**1.1%**	56 475	21.3%	806	0.2%	**1.4%**
2086	71 776	**0.1%**	747	808	101	**1.1%**	56 515	21.3%	806	0.2%	**1.4%**
2087	71 816	**0.1%**	747	809	101	**1.1%**	56 554	21.3%	807	0.2%	**1.4%**
2088	71 855	**0.1%**	747	809	101	**1.1%**	56 594	21.2%	807	0.2%	**1.4%**
2089	71 894	**0.1%**	747	811	101	**1.1%**	56 632	21.2%	809	0.2%	**1.4%**
2090	71 931	**0.1%**	747	812	101	**1.1%**	56 669	21.2%	810	0.2%	**1.4%**
2091	71 966	**0.0%**	747	814	101	**1.1%**	56 705	21.2%	812	0.2%	**1.4%**
2092	72 000	**0.0%**	747	817	101	**1.1%**	56 739	21.2%	815	0.2%	**1.4%**
2093	72 031	**0.0%**	747	819	101	**1.1%**	56 770	21.2%	817	0.2%	**1.4%**
2094	72 060	**0.0%**	747	822	101	**1.1%**	56 799	21.2%	820	0.2%	**1.4%**
2095	72 087	**0.0%**	747	824	101	**1.1%**	56 825	21.2%	822	0.2%	**1.4%**
2096	72 111	**0.0%**	747	825	101	**1.1%**	56 850	21.2%	823	0.2%	**1.4%**
2097	72 134	**0.0%**	747	826	101	**1.1%**	56 873	21.2%	824	0.2%	**1.4%**
2098	72 157	**0.0%**	747	826	101	**1.1%**	56 895	21.2%	824	0.2%	**1.4%**
2099	72 179	**0.0%**	747	826	101	**1.1%**	56 917	21.1%	824	0.2%	**1.4%**
2100	72 200	**0.0%**	747	825	101	**1.1%**	56 939	21.1%	823	0.2%	**1.4%**

Table C2: Population growth and mortality rates in France, 1820-2100 (decennial averages)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
	Population (thousands) N_t	**Population growth rate** $\mathbf{n_t}$	Births (thousands) N_{bt}	Decedents (thousands) N_{dt}	Migrations (thousands) N_{it}	**Mortality rate** $m_t^{0+} = N_{dt}/N_t$	Adult population (20-yr+) N_t^{20+}	Share 0-19-yr-old in living population	Adult decedents N_{dt}^{20+}	Share 0-19-yr-old in decedents	**Adult mortality rate** $m_t = N_{dt}^{20+}/N_t^{20+}$	Average age of decedents	Average age of heirs
1820	31 253	**0.6%**	972	774	0	**2.5%**	18 776	39.9%	418	46.1%	**2.2%**	56.8	25.5
1830	33 113	**0.5%**	967	798	0	**2.4%**	20 068	39.4%	443	44.5%	**2.2%**	56.8	25.6
1840	34 688	**0.4%**	962	821	0	**2.4%**	21 311	38.6%	472	42.5%	**2.2%**	56.9	25.7
1850	36 056	**0.4%**	952	808	0	**2.2%**	22 697	37.1%	477	40.9%	**2.1%**	57.8	26.7
1860	37 600	**0.4%**	996	831	0	**2.2%**	23 899	36.4%	515	38.0%	**2.2%**	58.8	27.6
1870	36 920	**-0.3%**	943	835	-233	**2.3%**	23 461	36.5%	510	38.9%	**2.2%**	59.6	28.4
1880	37 717	**0.2%**	917	828	0	**2.2%**	24 237	35.7%	531	35.9%	**2.2%**	60.1	28.9
1890	38 357	**0.1%**	853	810	0	**2.1%**	25 100	34.6%	552	31.8%	**2.2%**	60.6	29.4
1900	38 743	**0.1%**	818	775	23	**2.0%**	25 575	34.0%	573	26.1%	**2.2%**	60.8	29.6
1910	39 221	**0.2%**	759	723	50	**1.8%**	26 079	33.5%	556	23.1%	**2.1%**	61.1	29.9
1920	39 689	**0.8%**	772	695	176	**1.8%**	27 459	30.8%	565	18.8%	**2.1%**	62.3	31.3
1930	41 020	**-0.3%**	668	652	-158	**1.6%**	28 649	30.2%	564	13.4%	**2.0%**	63.5	32.4
1940	39 910	**2.5%**	817	567	729	**1.4%**	27 978	29.9%	483	14.7%	**1.7%**	66.2	35.3
1950	43 195	**0.9%**	820	532	94	**1.2%**	29 842	30.9%	487	8.4%	**1.6%**	68.8	38.0
1960	48 014	**1.1%**	849	538	196	**1.1%**	31 936	33.5%	509	5.5%	**1.6%**	70.3	39.6
1970	52 244	**0.7%**	797	550	73	**1.1%**	35 470	32.1%	529	3.8%	**1.5%**	71.4	40.9
1980	55 013	**0.5%**	776	543	51	**1.0%**	38 884	29.3%	529	2.6%	**1.4%**	73.0	42.7
1990	57 606	**0.4%**	736	529	21	**0.9%**	42 351	26.5%	520	1.7%	**1.2%**	74.4	44.5
2000	60 584	**0.6%**	768	533	127	**0.9%**	45 457	25.0%	526	1.2%	**1.2%**	76.0	46.4
2010	63 743	**0.4%**	750	582	101	**0.9%**	48 423	24.0%	577	0.8%	**1.2%**	78.0	48.8
2020	66 188	**0.3%**	741	620	101	**0.9%**	50 870	23.1%	617	0.6%	**1.2%**	79.8	51.0
2030	68 279	**0.3%**	755	675	101	**1.0%**	53 057	22.3%	672	0.4%	**1.3%**	81.4	52.6
2040	69 687	**0.1%**	751	758	101	**1.1%**	54 350	22.0%	756	0.3%	**1.4%**	83.9	54.6
2050	70 446	**0.1%**	747	791	101	**1.1%**	55 093	21.8%	789	0.3%	**1.4%**	84.7	54.2
2060	70 894	**0.1%**	747	809	102	**1.1%**	55 618	21.5%	807	0.2%	**1.5%**	84.9	53.2
2070	71 313	**0.1%**	747	806	101	**1.1%**	56 052	21.4%	804	0.2%	**1.4%**	84.8	52.3
2080	71 716	**0.1%**	747	809	101	**1.1%**	56 455	21.3%	807	0.2%	**1.4%**	84.8	52.2
2090	72 066	**0.0%**	747	821	101	**1.1%**	56 804	21.2%	819	0.2%	**1.4%**	84.8	52.3
2100	72 200	**0.0%**	747	825	101	**1.1%**	56 939	21.1%	823	0.2%	**1.4%**	84.9	52.4

Table C3: Population by age group in France, 1820-2100 (male + female)

(thousands)	[1] Total	[2] 0-9	[3] 10-19	[4] 20-29	[5] 30-39	[6] 40-49	[7] 50-59	[8] 60-69	[9] 70-79	[10] 80+
1820	30 342	6 428	5 788	5 089	4 163	3 308	2 598	1 861	901	204
1821	30 549	6 486	5 787	5 136	4 206	3 348	2 602	1 868	912	204
1822	30 752	6 539	5 788	5 179	4 249	3 389	2 610	1 873	920	205
1823	30 957	6 594	5 791	5 217	4 291	3 430	2 622	1 878	927	207
1824	31 150	6 639	5 796	5 250	4 333	3 471	2 637	1 882	934	209
1825	31 358	6 701	5 800	5 280	4 374	3 512	2 656	1 886	940	210
1826	31 554	6 754	5 803	5 304	4 416	3 552	2 677	1 889	946	212
1827	31 762	6 822	5 807	5 323	4 459	3 592	2 702	1 892	951	214
1828	31 956	6 879	5 812	5 335	4 503	3 632	2 730	1 894	955	216
1829	32 146	6 939	5 812	5 342	4 548	3 671	2 761	1 896	959	218
1830	32 324	7 004	5 798	5 342	4 594	3 710	2 795	1 897	963	221
1831	32 503	7 013	5 844	5 341	4 637	3 748	2 829	1 900	966	224
1832	32 696	7 036	5 890	5 343	4 676	3 786	2 864	1 907	969	226
1833	32 843	7 010	5 939	5 346	4 711	3 824	2 898	1 916	972	227
1834	33 026	7 027	5 982	5 351	4 741	3 861	2 933	1 927	974	229
1835	33 215	7 040	6 037	5 355	4 769	3 898	2 968	1 942	976	230
1836	33 396	7 054	6 088	5 358	4 791	3 936	3 002	1 958	977	232
1837	33 555	7 035	6 150	5 363	4 808	3 974	3 036	1 977	979	233
1838	33 706	7 019	6 205	5 368	4 819	4 013	3 069	1 998	980	234
1839	33 862	7 012	6 264	5 368	4 826	4 053	3 102	2 021	981	235
1840	34 011	7 008	6 327	5 356	4 827	4 094	3 135	2 046	981	236
1841	34 167	7 012	6 338	5 399	4 826	4 133	3 167	2 071	984	237
1842	34 333	7 016	6 358	5 443	4 828	4 168	3 199	2 096	987	238
1843	34 493	7 050	6 340	5 489	4 832	4 199	3 231	2 121	993	239
1844	34 642	7 047	6 355	5 529	4 837	4 226	3 263	2 146	1 000	239
1845	34 790	7 039	6 365	5 581	4 841	4 250	3 294	2 172	1 008	240
1846	34 938	7 036	6 379	5 629	4 844	4 270	3 326	2 197	1 017	240
1847	35 077	7 043	6 365	5 687	4 849	4 285	3 358	2 222	1 028	241
1848	35 158	7 001	6 353	5 738	4 854	4 295	3 391	2 246	1 039	241
1849	35 274	6 991	6 348	5 792	4 854	4 301	3 425	2 270	1 052	241
1850	35 425	7 024	6 346	5 850	4 844	4 302	3 460	2 294	1 065	241
1851	35 574	7 019	6 350	5 864	4 888	4 306	3 499	2 327	1 079	242
1852	35 734	7 019	6 352	5 887	4 933	4 313	3 535	2 359	1 094	243
1853	35 888	7 017	6 385	5 874	4 980	4 321	3 567	2 390	1 109	245
1854	36 017	7 000	6 385	5 891	5 021	4 330	3 596	2 421	1 126	247
1855	36 136	6 973	6 379	5 903	5 074	4 339	3 622	2 452	1 143	250
1856	36 234	6 927	6 379	5 919	5 123	4 347	3 644	2 482	1 160	252
1857	36 379	6 936	6 390	5 908	5 182	4 356	3 662	2 513	1 178	255
1858	36 511	6 978	6 362	5 899	5 234	4 364	3 675	2 544	1 196	258
1859	36 666	7 020	6 357	5 896	5 289	4 370	3 685	2 576	1 213	261
1860	36 860	7 071	6 388	5 896	5 348	4 364	3 691	2 608	1 231	264
1861	36 997	7 089	6 391	5 901	5 362	4 405	3 695	2 638	1 248	268
1862	37 167	7 130	6 397	5 906	5 385	4 446	3 702	2 665	1 265	271
1863	37 335	7 173	6 402	5 939	5 375	4 490	3 709	2 689	1 282	275
1864	37 516	7 251	6 397	5 941	5 392	4 528	3 718	2 711	1 299	280
1865	37 688	7 330	6 382	5 939	5 405	4 577	3 725	2 731	1 315	284
1866	37 859	7 426	6 350	5 941	5 421	4 621	3 733	2 747	1 332	288
1867	38 030	7 485	6 361	5 953	5 413	4 675	3 741	2 761	1 348	293
1868	38 197	7 549	6 408	5 929	5 406	4 723	3 749	2 771	1 365	297
1869	38 346	7 576	6 451	5 926	5 405	4 772	3 754	2 778	1 382	301
1870	38 509	7 583	6 500	5 957	5 407	4 825	3 749	2 783	1 399	306
1871	36 374	7 200	6 140	5 608	5 091	4 550	3 558	2 616	1 324	287
1872	36 376	7 070	6 174	5 615	5 097	4 570	3 592	2 631	1 334	293
1873	36 508	7 071	6 212	5 620	5 127	4 562	3 629	2 645	1 343	298
1874	36 618	7 040	6 279	5 615	5 131	4 577	3 661	2 659	1 354	303
1875	36 735	7 022	6 349	5 601	5 130	4 589	3 701	2 671	1 364	307
1876	36 848	7 001	6 434	5 571	5 134	4 603	3 738	2 681	1 374	310
1877	36 974	6 996	6 485	5 580	5 146	4 597	3 782	2 691	1 384	314
1878	37 081	6 975	6 539	5 618	5 127	4 592	3 821	2 700	1 393	317
1879	37 182	6 965	6 560	5 652	5 126	4 592	3 861	2 706	1 402	320
1880	37 283	6 951	6 554	5 692	5 154	4 594	3 902	2 703	1 409	323
1881	37 371	6 911	6 601	5 712	5 160	4 600	3 913	2 731	1 417	325
1882	37 477	7 009	6 504	5 746	5 169	4 606	3 931	2 759	1 425	328
1883	37 580	7 007	6 505	5 784	5 175	4 633	3 924	2 789	1 433	330
1884	37 684	7 021	6 481	5 848	5 172	4 638	3 937	2 815	1 440	333
1885	37 788	7 026	6 469	5 916	5 161	4 638	3 948	2 847	1 447	335

1886	37 881	7 024	6 456	5 997	5 135	4 642	3 961	2 876	1 452	338
1887	37 965	7 001	6 455	6 047	5 144	4 654	3 957	2 910	1 457	340
1888	38 039	6 984	6 443	6 099	5 180	4 636	3 953	2 940	1 462	342
1889	38 101	6 958	6 442	6 120	5 214	4 636	3 953	2 970	1 464	344
1890	38 162	6 933	6 436	6 117	5 253	4 662	3 955	3 000	1 461	346
1891	38 188	6 881	6 406	6 163	5 272	4 668	3 961	3 009	1 479	348
1892	38 241	6 846	6 504	6 073	5 305	4 677	3 967	3 023	1 497	350
1893	38 285	6 801	6 508	6 076	5 342	4 683	3 990	3 017	1 515	351
1894	38 347	6 773	6 527	6 056	5 404	4 681	3 995	3 027	1 531	353
1895	38 390	6 727	6 538	6 048	5 468	4 671	3 996	3 037	1 550	355
1896	38 416	6 673	6 543	6 038	5 544	4 648	4 001	3 048	1 566	356
1897	38 471	6 656	6 529	6 040	5 591	4 657	4 011	3 045	1 585	357
1898	38 520	6 642	6 520	6 031	5 641	4 690	3 995	3 042	1 600	358
1899	38 548	6 620	6 503	6 032	5 662	4 721	3 995	3 043	1 613	359
1900	38 512	6 662	6 549	6 193	5 498	4 699	4 007	2 951	1 569	383
1901	38 486	6 672	6 513	6 198	5 498	4 707	4 013	2 945	1 558	381
1902	38 564	6 706	6 488	6 300	5 418	4 727	4 015	2 959	1 570	381
1903	38 657	6 758	6 446	6 276	5 470	4 749	4 024	2 986	1 565	382
1904	38 737	6 764	6 432	6 280	5 496	4 790	4 022	3 005	1 567	382
1905	38 800	6 761	6 412	6 264	5 542	4 840	4 012	3 018	1 568	382
1906	38 836	6 772	6 374	6 251	5 584	4 888	3 984	3 023	1 577	382
1907	38 893	6 726	6 402	6 219	5 636	4 926	3 997	3 018	1 586	382
1908	38 925	6 693	6 421	6 207	5 676	4 967	4 009	3 003	1 571	379
1909	39 024	6 701	6 429	6 202	5 726	4 983	4 019	3 006	1 574	384
1910	39 089	6 686	6 440	6 201	5 761	4 987	4 035	3 021	1 574	385
1911	39 228	6 709	6 480	6 180	5 779	5 006	4 054	3 037	1 585	397
1912	39 229	6 595	6 524	6 165	5 884	4 946	4 081	3 044	1 594	397
1913	39 337	6 555	6 579	6 144	5 869	5 005	4 109	3 059	1 617	401
1914	39 431	6 521	6 586	6 153	5 882	5 038	4 152	3 061	1 633	406
1915	39 231	6 475	6 538	6 000	5 797	5 081	4 207	3 066	1 653	415
1916	38 735	6 182	6 546	5 789	5 682	5 108	4 262	3 061	1 674	431
1917	38 287	5 818	6 538	5 685	5 569	5 142	4 309	3 087	1 690	447
1918	37 946	5 501	6 499	5 661	5 499	5 170	4 359	3 108	1 694	455
1919	37 458	5 194	6 480	5 572	5 370	5 170	4 368	3 125	1 707	472
1920	38 383	5 169	6 830	5 702	5 544	5 367	4 461	3 207	1 694	409
1921	38 773	5 277	6 867	5 844	5 550	5 375	4 473	3 244	1 720	424
1922	38 978	5 376	6 792	5 964	5 523	5 442	4 434	3 268	1 746	433
1923	39 248	5 422	6 774	6 157	5 515	5 409	4 489	3 291	1 755	437
1924	39 611	5 457	6 771	6 354	5 555	5 402	4 521	3 333	1 770	448
1925	39 981	5 513	6 762	6 557	5 600	5 385	4 567	3 371	1 771	455
1926	40 217	5 817	6 518	6 669	5 602	5 368	4 612	3 406	1 767	458
1927	40 404	6 163	6 155	6 749	5 669	5 328	4 658	3 442	1 782	459
1928	40 556	6 504	5 818	6 768	5 726	5 309	4 699	3 484	1 794	455
1929	40 741	6 793	5 531	6 802	5 800	5 295	4 742	3 501	1 813	463
1930	40 912	7 027	5 307	6 836	5 905	5 284	4 760	3 504	1 827	461
1931	41 257	7 008	5 390	6 885	6 068	5 275	4 762	3 523	1 864	484
1932	41 261	6 913	5 468	6 771	6 174	5 259	4 812	3 492	1 884	487
1933	41 276	6 844	5 481	6 696	6 294	5 230	4 786	3 537	1 907	500
1934	41 249	6 752	5 496	6 632	6 375	5 230	4 765	3 558	1 941	501
1935	41 249	6 676	5 515	6 564	6 456	5 216	4 742	3 596	1 971	513
1936	41 194	6 564	5 773	6 276	6 535	5 190	4 713	3 633	1 993	518
1937	41 198	6 439	6 102	5 928	6 567	5 251	4 684	3 678	2 022	526
1938	41 216	6 330	6 392	5 619	6 586	5 312	4 671	3 718	2 052	536
1939	39 385	5 910	6 317	5 097	6 296	5 134	4 462	3 617	2 012	539
1940	39 503	5 864	6 533	4 888	6 259	5 205	4 470	3 666	2 047	573
1941	37 388	5 648	6 435	4 091	5 467	5 212	4 396	3 618	1 987	533
1942	37 378	5 468	6 365	4 353	5 424	5 263	4 368	3 644	1 961	533
1943	37 127	5 341	6 277	4 483	5 297	5 262	4 329	3 619	1 984	534
1944	36 651	5 256	6 077	4 390	5 236	5 272	4 302	3 585	1 995	539
1945	36 753	5 240	6 078	4 462	5 202	5 337	4 302	3 577	2 020	535
1946	40 125	5 496	6 343	5 394	5 930	5 975	4 550	3 734	2 138	566
1947	40 448	5 701	6 257	5 724	5 598	6 028	4 619	3 730	2 198	591
1948	40 911	5 990	6 188	6 046	5 309	6 067	4 691	3 748	2 256	614
1949	41 313	6 259	6 107	6 309	5 048	6 109	4 765	3 765	2 313	639
1950	41 647	6 522	6 034	6 516	4 839	6 121	4 852	3 778	2 336	650
1951	42 010	6 830	5 881	6 487	4 905	6 125	4 966	3 785	2 358	673
1952	42 301	7 135	5 719	6 445	4 994	6 071	5 081	3 794	2 391	670
1953	42 618	7 386	5 615	6 428	5 021	6 045	5 209	3 798	2 410	707
1954	42 885	7 578	5 587	6 384	5 052	6 019	5 302	3 823	2 416	724
1955	43 228	7 785	5 558	6 361	5 096	5 985	5 403	3 840	2 442	758
1956	43 627	7 991	5 580	6 319	5 365	5 757	5 511	3 852	2 463	790
1957	44 059	8 016	5 810	6 285	5 714	5 460	5 572	3 916	2 471	815

1958	44 563	8 033	6 088	6 257	6 047	5 196	5 622	3 980	2 494	844
1959	45 015	8 019	6 368	6 199	6 334	4 961	5 679	4 056	2 525	874
1960	45 465	8 017	6 648	6 145	6 567	4 776	5 708	4 145	2 557	903
1961	45 904	8 013	6 978	6 009	6 562	4 864	5 732	4 250	2 573	923
1962	46 422	8 067	7 315	5 870	6 561	4 974	5 704	4 369	2 604	958
1963	47 573	8 187	7 718	5 933	6 690	5 100	5 777	4 543	2 642	984
1964	48 059	8 262	7 950	5 934	6 689	5 152	5 772	4 632	2 674	995
1965	48 562	8 325	8 186	5 924	6 694	5 211	5 756	4 726	2 712	1 027
1966	48 954	8 364	8 394	5 933	6 643	5 472	5 545	4 816	2 735	1 051
1967	49 374	8 404	8 410	6 141	6 596	5 811	5 259	4 870	2 803	1 080
1968	49 723	8 406	8 383	6 396	6 537	6 126	4 998	4 906	2 864	1 107
1969	50 108	8 420	8 337	6 686	6 481	6 411	4 768	4 957	2 917	1 131
1970	50 528	8 421	8 328	6 984	6 446	6 650	4 591	4 980	2 973	1 157
1971	51 016	8 444	8 328	7 335	6 335	6 653	4 680	5 012	3 051	1 179
1972	51 486	8 474	8 376	7 672	6 201	6 647	4 782	4 993	3 139	1 202
1973	51 916	8 499	8 402	7 955	6 112	6 654	4 830	5 002	3 233	1 228
1974	52 321	8 471	8 472	8 192	6 099	6 636	4 881	5 012	3 304	1 255
1975	52 600	8 360	8 528	8 417	6 070	6 618	4 935	5 011	3 376	1 285
1976	52 798	8 250	8 559	8 603	6 075	6 551	5 176	4 831	3 449	1 304
1977	53 019	8 117	8 587	8 605	6 296	6 497	5 493	4 578	3 501	1 345
1978	53 272	8 024	8 589	8 570	6 562	6 441	5 785	4 352	3 551	1 396
1979	53 481	7 921	8 590	8 515	6 836	6 370	6 045	4 154	3 610	1 440
1980	53 731	7 836	8 583	8 482	7 112	6 308	6 253	4 006	3 657	1 495
1981	54 029	7 786	8 594	8 447	7 434	6 179	6 240	4 103	3 698	1 548
1982	54 335	7 710	8 617	8 463	7 755	6 040	6 229	4 210	3 701	1 609
1983	54 650	7 642	8 660	8 459	8 025	5 951	6 233	4 272	3 731	1 677
1984	54 895	7 544	8 655	8 496	8 237	5 932	6 212	4 335	3 757	1 726
1985	55 157	7 508	8 583	8 531	8 450	5 916	6 203	4 403	3 778	1 785
1986	55 411	7 531	8 469	8 555	8 652	5 931	6 158	4 631	3 649	1 836
1987	55 682	7 586	8 334	8 575	8 660	6 146	6 115	4 915	3 462	1 890
1988	55 966	7 610	8 243	8 570	8 634	6 412	6 070	5 177	3 300	1 951
1989	56 270	7 647	8 146	8 573	8 594	6 695	6 013	5 413	3 166	2 022
1990	56 577	7 662	8 057	8 576	8 577	6 976	5 965	5 601	3 077	2 085
1991	56 841	7 619	7 986	8 575	8 552	7 302	5 852	5 605	3 199	2 151
1992	57 111	7 575	7 899	8 591	8 572	7 619	5 724	5 603	3 322	2 205
1993	57 369	7 518	7 812	8 616	8 573	7 892	5 650	5 620	3 407	2 281
1994	57 565	7 479	7 701	8 580	8 610	8 107	5 643	5 610	3 492	2 343
1995	57 753	7 427	7 658	8 470	8 638	8 319	5 641	5 612	3 578	2 410
1996	57 936	7 384	7 674	8 324	8 649	8 521	5 666	5 579	3 776	2 362
1997	58 116	7 334	7 722	8 165	8 653	8 530	5 884	5 547	4 009	2 272
1998	58 299	7 287	7 740	8 060	8 627	8 505	6 150	5 511	4 219	2 200
1999	58 497	7 249	7 769	7 961	8 605	8 464	6 427	5 466	4 405	2 152
2000	58 850	7 252	7 792	7 899	8 602	8 463	6 710	5 440	4 554	2 138
2001	59 249	7 286	7 767	7 881	8 614	8 453	7 035	5 359	4 575	2 279
2002	59 660	7 324	7 736	7 846	8 649	8 483	7 350	5 264	4 592	2 416
2003	60 067	7 366	7 702	7 805	8 696	8 495	7 624	5 219	4 624	2 534
2004	60 462	7 445	7 679	7 739	8 698	8 553	7 846	5 234	4 632	2 635
2005	60 825	7 509	7 642	7 725	8 633	8 598	8 058	5 248	4 653	2 760
2006	61 167	7 564	7 611	7 763	8 535	8 632	8 259	5 285	4 645	2 874
2007	61 538	7 631	7 573	7 837	8 421	8 663	8 277	5 502	4 641	2 993
2008	61 857	7 655	7 542	7 873	8 368	8 671	8 275	5 769	4 629	3 076
2009	62 170	7 683	7 516	7 912	8 303	8 678	8 250	6 042	4 611	3 175
2010	62 477	7 691	7 512	7 926	8 250	8 677	8 247	6 308	4 596	3 269
2011	62 777	7 668	7 542	7 892	8 236	8 688	8 234	6 610	4 535	3 372
2012	63 071	7 648	7 574	7 852	8 197	8 717	8 260	6 900	4 459	3 464
2013	63 357	7 636	7 610	7 808	8 148	8 756	8 267	7 153	4 428	3 551
2014	63 636	7 622	7 679	7 778	8 073	8 748	8 316	7 357	4 450	3 613
2015	63 907	7 605	7 744	7 739	8 058	8 684	8 364	7 560	4 476	3 677
2016	64 171	7 580	7 802	7 709	8 095	8 592	8 402	7 754	4 520	3 719
2017	64 429	7 566	7 839	7 672	8 163	8 483	8 436	7 781	4 730	3 759
2018	64 680	7 552	7 883	7 636	8 199	8 423	8 441	7 781	4 978	3 788
2019	64 926	7 540	7 911	7 611	8 238	8 360	8 452	7 767	5 233	3 813
2020	65 166	7 527	7 919	7 608	8 254	8 309	8 455	7 774	5 481	3 839
2021	65 402	7 515	7 897	7 638	8 221	8 297	8 470	7 771	5 757	3 838
2022	65 634	7 502	7 877	7 671	8 182	8 261	8 502	7 803	6 017	3 820
2023	65 862	7 489	7 865	7 708	8 139	8 215	8 543	7 818	6 245	3 839
2024	66 086	7 477	7 852	7 776	8 111	8 143	8 540	7 873	6 430	3 885
2025	66 308	7 466	7 835	7 843	8 072	8 129	8 482	7 927	6 614	3 941
2026	66 528	7 457	7 810	7 901	8 043	8 167	8 395	7 970	6 787	3 999
2027	66 746	7 450	7 796	7 938	8 008	8 235	8 293	8 010	6 824	4 192
2028	66 963	7 447	7 783	7 982	7 972	8 272	8 238	8 022	6 839	4 409
2029	67 179	7 447	7 771	8 011	7 949	8 312	8 179	8 039	6 842	4 629

2030	67 393	7 451	7 758	8 020	7 946	8 328	8 134	8 049	6 864	4 843
2031	67 605	7 459	7 746	7 998	7 978	8 297	8 126	8 069	6 877	5 055
2032	67 813	7 470	7 733	7 978	8 011	8 260	8 095	8 107	6 920	5 238
2033	68 017	7 485	7 720	7 967	8 049	8 220	8 054	8 153	6 947	5 421
2034	68 215	7 502	7 708	7 955	8 118	8 192	7 988	8 157	7 010	5 586
2035	68 405	7 520	7 698	7 938	8 184	8 156	7 978	8 108	7 072	5 753
2036	68 587	7 538	7 689	7 914	8 243	8 128	8 018	8 031	7 123	5 905
2037	68 760	7 555	7 682	7 900	8 281	8 094	8 087	7 939	7 171	6 051
2038	68 922	7 570	7 679	7 888	8 325	8 060	8 125	7 892	7 193	6 190
2039	69 073	7 583	7 679	7 876	8 355	8 038	8 167	7 842	7 219	6 314
2040	69 213	7 592	7 684	7 864	8 364	8 037	8 186	7 804	7 240	6 441
2041	69 341	7 599	7 692	7 852	8 343	8 070	8 159	7 803	7 270	6 554
2042	69 458	7 602	7 703	7 840	8 324	8 104	8 126	7 781	7 316	6 663
2043	69 566	7 603	7 718	7 828	8 314	8 143	8 089	7 749	7 369	6 755
2044	69 666	7 601	7 735	7 816	8 302	8 212	8 065	7 691	7 383	6 862
2045	69 759	7 596	7 753	7 806	8 286	8 279	8 031	7 687	7 350	6 970
2046	69 846	7 590	7 771	7 797	8 262	8 338	8 007	7 731	7 289	7 061
2047	69 928	7 582	7 788	7 791	8 249	8 376	7 977	7 802	7 214	7 148
2048	70 007	7 574	7 803	7 788	8 238	8 421	7 946	7 844	7 180	7 213
2049	70 083	7 564	7 816	7 789	8 227	8 452	7 927	7 889	7 142	7 277
2050	70 157	7 555	7 826	7 794	8 215	8 462	7 929	7 912	7 118	7 347
2051	70 222	7 547	7 833	7 802	8 204	8 441	7 964	7 890	7 127	7 415
2052	70 301	7 539	7 836	7 814	8 192	8 424	7 999	7 863	7 116	7 518
2053	70 372	7 532	7 837	7 829	8 180	8 414	8 039	7 831	7 096	7 616
2054	70 437	7 527	7 835	7 846	8 168	8 402	8 108	7 809	7 050	7 693
2055	70 496	7 522	7 830	7 864	8 158	8 387	8 175	7 778	7 051	7 731
2056	70 550	7 519	7 824	7 882	8 149	8 364	8 234	7 756	7 092	7 730
2057	70 599	7 517	7 816	7 900	8 143	8 351	8 272	7 728	7 158	7 714
2058	70 644	7 515	7 807	7 915	8 140	8 340	8 317	7 699	7 197	7 714
2059	70 686	7 515	7 798	7 928	8 141	8 328	8 346	7 682	7 237	7 710
2060	70 725	7 515	7 788	7 938	8 146	8 317	8 356	7 684	7 257	7 724
2061	70 762	7 515	7 779	7 945	8 155	8 305	8 336	7 718	7 238	7 771
2062	70 799	7 515	7 771	7 948	8 167	8 293	8 319	7 754	7 213	7 819
2063	70 836	7 515	7 765	7 949	8 182	8 281	8 309	7 793	7 184	7 858
2064	70 872	7 515	7 759	7 946	8 200	8 269	8 298	7 860	7 162	7 863
2065	70 909	7 515	7 754	7 942	8 219	8 259	8 283	7 924	7 132	7 881
2066	70 948	7 515	7 751	7 935	8 238	8 250	8 260	7 981	7 110	7 907
2067	70 988	7 515	7 748	7 928	8 257	8 244	8 247	8 017	7 085	7 946
2068	71 029	7 515	7 747	7 919	8 273	8 242	8 236	8 060	7 059	7 980
2069	71 071	7 515	7 746	7 909	8 286	8 243	8 225	8 088	7 044	8 016
2070	71 115	7 515	7 747	7 899	8 297	8 247	8 213	8 097	7 047	8 052
2071	71 159	7 515	7 747	7 890	8 304	8 256	8 202	8 078	7 081	8 086
2072	71 205	7 515	7 747	7 882	8 308	8 269	8 190	8 061	7 116	8 117
2073	71 250	7 515	7 747	7 876	8 308	8 285	8 178	8 051	7 153	8 138
2074	71 295	7 515	7 747	7 870	8 306	8 303	8 166	8 040	7 213	8 135
2075	71 339	7 515	7 747	7 865	8 301	8 322	8 156	8 026	7 272	8 136
2076	71 382	7 515	7 747	7 862	8 294	8 342	8 148	8 004	7 323	8 149
2077	71 423	7 515	7 747	7 859	8 286	8 360	8 142	7 992	7 356	8 167
2078	71 463	7 515	7 747	7 858	8 277	8 376	8 139	7 980	7 393	8 178
2079	71 501	7 515	7 747	7 857	8 267	8 390	8 140	7 970	7 417	8 199
2080	71 540	7 515	7 747	7 857	8 257	8 400	8 145	7 959	7 424	8 236
2081	71 578	7 515	7 747	7 857	8 247	8 407	8 154	7 947	7 407	8 296
2082	71 617	7 515	7 747	7 857	8 239	8 411	8 166	7 936	7 392	8 355
2083	71 657	7 515	7 747	7 857	8 232	8 411	8 182	7 924	7 383	8 406
2084	71 697	7 515	7 747	7 857	8 226	8 409	8 200	7 913	7 372	8 458
2085	71 736	7 515	7 747	7 857	8 221	8 404	8 219	7 903	7 359	8 512
2086	71 776	7 515	7 747	7 857	8 217	8 397	8 238	7 895	7 339	8 571
2087	71 816	7 515	7 747	7 857	8 215	8 389	8 256	7 889	7 328	8 620
2088	71 855	7 515	7 747	7 857	8 213	8 379	8 272	7 887	7 318	8 667
2089	71 894	7 515	7 747	7 857	8 212	8 369	8 286	7 888	7 308	8 712
2090	71 931	7 515	7 747	7 857	8 213	8 359	8 296	7 893	7 298	8 754
2091	71 966	7 515	7 747	7 857	8 213	8 350	8 303	7 901	7 287	8 794
2092	72 000	7 515	7 747	7 857	8 213	8 341	8 306	7 914	7 277	8 831
2093	72 031	7 515	7 747	7 857	8 213	8 334	8 307	7 929	7 266	8 865
2094	72 060	7 515	7 747	7 857	8 213	8 328	8 304	7 946	7 256	8 895
2095	72 087	7 515	7 747	7 857	8 213	8 323	8 299	7 965	7 247	8 921
2096	72 111	7 515	7 747	7 857	8 213	8 319	8 293	7 983	7 239	8 945
2097	72 134	7 515	7 747	7 857	8 213	8 317	8 284	8 001	7 234	8 967
2098	72 157	7 515	7 747	7 857	8 213	8 315	8 275	8 016	7 232	8 987
2099	72 179	7 515	7 747	7 857	8 213	8 314	8 265	8 029	7 233	9 005
2100	72 200	7 515	7 747	7 857	8 213	8 315	8 255	8 039	7 238	9 022

Table C4: Decedents by age group in France, 1820-2100 (male + female)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
(thousands)	Total	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
1820	752	308	39	49	44	45	58	84	84	41
1821	760	313	39	50	45	45	58	84	85	41
1822	766	317	38	50	45	46	58	85	86	41
1823	769	317	38	51	46	46	58	85	87	42
1824	775	320	38	51	46	47	59	85	87	42
1825	777	320	38	51	46	47	59	85	88	42
1826	783	323	38	51	47	48	59	85	88	43
1827	785	322	38	51	47	48	60	85	89	43
1828	786	321	38	51	48	49	60	86	89	43
1829	787	319	38	51	48	49	61	86	90	44
1830	788	318	38	51	49	50	62	86	90	44
1831	793	321	38	51	49	50	63	86	90	45
1832	789	314	39	51	49	51	63	86	91	45
1833	795	317	39	51	50	51	64	86	91	45
1834	800	319	39	51	50	52	65	87	91	46
1835	803	319	39	51	50	52	66	87	91	46
1836	802	315	40	51	51	53	66	88	91	46
1837	802	312	40	51	51	54	67	89	91	47
1838	804	312	40	51	51	54	68	89	92	47
1839	805	310	40	51	51	55	69	90	92	47
1840	809	311	41	51	51	55	69	92	92	47
1841	814	313	41	51	51	56	70	93	92	48
1842	817	313	41	52	51	56	71	94	92	48
1843	819	311	41	52	51	57	72	95	93	48
1844	822	311	41	52	51	57	72	96	93	48
1845	825	311	41	53	51	57	73	97	94	48
1846	826	309	41	53	51	58	74	98	94	48
1847	819	299	41	54	51	58	74	99	95	48
1848	823	299	41	54	51	58	75	101	96	48
1849	834	306	41	55	51	58	76	102	97	48
1850	804	304	40	51	46	53	70	93	99	48
1851	809	305	40	51	47	53	70	95	100	49
1852	810	302	40	51	47	53	71	96	101	49
1853	807	295	40	50	47	53	72	97	103	49
1854	804	289	39	50	47	53	72	99	104	49
1855	800	281	39	50	48	53	73	100	106	50
1856	806	284	39	50	48	53	73	101	107	50
1857	808	282	38	50	49	53	74	102	109	51
1858	813	284	38	50	49	53	74	103	110	51
1859	823	290	38	49	49	53	74	105	112	52
1860	819	283	37	49	50	53	74	106	114	53
1861	824	284	37	49	50	54	74	107	115	53
1862	826	283	37	49	50	54	74	108	117	54
1863	831	284	36	49	50	54	74	109	119	55
1864	832	283	36	49	50	55	74	110	120	56
1865	834	281	36	49	50	55	75	111	122	56
1866	835	279	35	48	50	56	75	112	123	57
1867	836	277	35	48	50	56	75	112	125	58
1868	834	272	35	48	49	57	75	113	126	59
1869	836	271	35	48	49	58	75	113	128	60
1870	838	270	35	48	49	58	75	113	129	61
1871	823	288	39	45	46	55	71	96	129	55
1872	833	295	39	45	46	55	71	96	130	56
1873	835	294	39	45	46	55	72	97	131	57
1874	837	293	39	44	46	55	72	97	131	58
1875	837	291	39	44	46	55	73	98	133	59
1876	839	290	39	44	46	55	74	98	134	59
1877	837	286	39	44	46	55	74	98	134	60
1878	835	281	39	44	46	55	75	99	135	61
1879	834	278	39	44	46	55	76	99	136	61
1880	831	273	39	44	46	55	77	99	137	62
1881	833	272	39	44	46	55	77	100	138	63
1882	833	270	38	44	46	55	78	101	139	63
1883	833	268	38	44	46	56	78	101	139	64
1884	833	266	37	44	45	56	78	102	140	64
1885	831	262	37	45	45	55	78	103	141	65

1886	828	257	36	45	45	55	78	104	141	65
1887	825	252	36	45	45	56	78	105	142	66
1888	821	246	36	46	45	55	78	106	142	66
1889	818	242	35	46	45	55	78	108	143	66
1890	811	234	35	45	45	56	78	109	143	67
1891	812	233	34	45	46	56	78	110	144	67
1892	811	230	35	45	46	56	78	110	145	68
1893	813	230	34	44	46	56	78	110	147	68
1894	811	226	34	44	46	56	78	110	148	68
1895	807	220	34	44	47	55	78	111	150	69
1896	810	220	34	44	47	55	78	111	152	69
1897	810	219	33	43	48	55	78	111	153	69
1898	807	214	33	43	48	56	78	111	155	69
1899	808	213	33	43	48	56	78	111	157	69
1900	802	209	33	44	47	56	78	107	154	74
1901	791	191	28	47	49	57	79	120	146	75
1902	767	182	27	46	47	56	77	117	142	73
1903	759	178	27	45	46	54	74	117	143	75
1904	767	181	27	45	45	54	75	118	145	77
1905	775	170	27	45	47	58	79	124	148	79
1906	785	179	27	45	48	59	79	124	148	78
1907	797	160	26	46	50	63	83	131	158	80
1908	749	156	25	43	47	59	79	121	145	74
1909	760	144	24	42	47	59	81	128	154	80
1910	708	137	23	40	45	56	75	117	141	73
1911	780	174	25	42	46	56	78	123	154	83
1912	697	129	23	40	46	55	76	116	140	71
1913	707	134	24	39	46	55	75	117	143	74
1914	915	104	80	185	109	57	69	107	135	70
1915	952	101	63	208	131	66	71	108	135	68
1916	812	79	46	151	103	58	69	105	133	69
1917	731	78	37	102	75	52	69	107	138	73
1918	934	105	56	167	131	79	82	113	135	67
1919	633	81	27	52	49	51	70	104	131	69
1920	678	119	26	38	40	51	76	112	141	74
1921	698	130	25	37	38	52	77	116	145	78
1922	692	98	22	36	38	55	79	122	157	85
1923	670	110	22	36	36	52	76	115	144	79
1924	683	97	22	37	37	54	79	121	152	84
1925	712	106	23	38	38	56	82	125	154	90
1926	717	113	23	39	38	55	81	125	153	89
1927	680	98	21	38	36	50	77	121	151	89
1928	678	106	20	37	35	49	77	122	148	85
1929	743	108	19	39	38	53	85	135	168	98
1930	653	92	17	36	37	50	79	121	143	79
1931	683	88	16	36	37	49	80	125	158	94
1932	664	87	15	33	36	48	81	122	152	89
1933	664	80	14	31	37	49	81	124	155	93
1934	638	76	12	30	37	47	79	121	150	86
1935	662	69	12	30	39	49	82	127	159	95
1936	646	67	12	27	37	47	78	125	159	93
1937	633	64	13	26	38	47	76	123	156	91
1938	651	62	13	25	38	49	77	126	163	98
1939	623	56	12	21	34	45	72	122	162	97
1940	850	73	20	87	75	57	82	143	191	122
1941	665	58	14	24	37	52	77	129	169	104
1942	658	57	16	31	36	46	70	128	169	105
1943	697	65	26	67	49	51	66	118	157	98
1944	857	73	38	109	78	75	77	128	170	109
1945	665	102	16	39	37	45	61	113	154	98
1946	547	76	10	16	21	34	54	102	143	91
1947	538	73	8	15	18	35	53	98	144	93
1948	513	59	7	14	17	36	54	97	140	90
1949	574	64	6	13	15	36	57	105	165	112
1950	535	54	5	12	14	35	57	99	154	104
1951	566	52	5	11	14	36	61	104	166	117
1952	525	47	4	10	13	33	59	98	155	107
1953	557	42	4	10	12	34	63	102	168	122
1954	519	41	4	9	12	32	61	96	152	112
1955	526	39	4	9	11	31	62	96	155	119
1956	546	36	3	8	12	31	65	99	161	130
1957	532	35	4	9	12	28	65	99	155	126

1958	501	32	3	8	12	24	59	91	146	125
1959	509	31	4	8	13	23	61	93	147	129
1960	521	28	3	7	13	22	62	97	150	138
1961	500	27	4	7	13	22	60	95	142	131
1962	541	27	4	7	14	22	62	103	154	148
1963	558	27	4	7	13	23	63	109	158	152
1964	520	26	5	7	13	21	59	105	145	139
1965	544	24	5	7	13	22	60	110	152	150
1966	529	23	5	7	13	23	57	110	145	145
1967	543	22	5	7	13	25	55	113	150	153
1968	553	22	6	7	12	26	52	114	155	159
1969	573	21	6	8	13	29	52	121	164	160
1970	542	20	6	8	12	28	46	110	154	158
1971	554	20	6	9	12	29	46	111	158	164
1972	550	18	6	9	12	29	45	109	160	161
1973	559	18	6	9	11	28	44	107	165	170
1974	553	16	6	9	11	28	44	104	166	169
1975	560	14	6	9	10	29	44	104	170	175
1976	557	13	6	10	10	28	46	99	171	175
1977	536	12	6	10	10	27	47	90	165	170
1978	547	11	6	9	10	27	50	87	168	180
1979	542	11	6	10	10	25	53	81	165	181
1980	547	11	6	10	11	25	54	76	166	189
1981	555	11	5	9	11	24	53	75	167	199
1982	543	10	5	9	12	23	53	74	161	197
1983	560	10	5	10	12	22	53	73	163	213
1984	542	9	5	10	12	21	51	71	157	207
1985	552	9	4	9	13	21	51	70	157	219
1986	547	9	4	9	13	20	50	72	149	221
1987	527	8	4	9	13	20	47	75	137	215
1988	525	8	4	9	13	20	46	78	129	218
1989	529	8	4	9	13	21	44	81	122	227
1990	526	8	4	9	13	21	42	82	115	232
1991	525	8	4	9	14	22	40	82	113	233
1992	522	7	3	9	14	23	39	80	111	235
1993	532	6	3	9	14	24	38	80	111	247
1994	520	6	3	9	14	25	37	78	107	242
1995	532	5	3	8	14	26	36	78	108	254
1996	536	5	3	7	13	26	36	77	114	256
1997	530	5	3	7	11	25	36	74	120	249
1998	534	5	3	6	11	25	36	72	128	248
1999	538	5	3	7	11	25	37	73	129	250
2000	535	5	3	6	10	25	38	69	138	242
2001	531	5	3	6	10	25	40	65	134	244
2002	535	4	2	6	10	24	42	63	132	252
2003	552	4	2	5	10	24	44	62	134	268
2004	509	4	2	5	9	22	43	57	123	243
2005	528	4	2	5	9	22	45	57	124	260
2006	516	4	2	4	8	21	46	56	119	255
2007	521	4	2	4	8	21	46	57	116	264
2008	547	4	2	5	8	22	44	59	121	283
2009	552	4	2	5	8	21	43	60	119	290
2010	557	3	2	4	8	21	42	61	117	297
2011	562	3	2	4	8	21	41	63	114	305
2012	568	3	2	4	8	21	41	66	111	314
2013	574	3	2	4	7	20	40	67	108	322
2014	580	3	2	4	7	20	40	69	107	329
2015	586	3	2	4	7	20	39	70	105	337
2016	592	3	2	4	7	19	39	71	104	343
2017	597	3	2	4	7	19	38	70	105	349
2018	601	3	2	4	7	19	38	69	108	353
2019	605	3	2	3	7	18	37	68	110	357
2020	608	3	2	3	7	18	37	66	113	360
2021	611	2	2	3	6	18	36	65	117	361
2022	613	2	2	3	6	17	36	64	121	361
2023	616	2	1	3	6	17	35	63	125	362
2024	618	2	1	3	6	16	35	63	128	363
2025	621	2	1	3	6	16	34	62	131	365
2026	624	2	1	3	6	16	33	61	134	367
2027	627	2	1	3	6	16	32	61	133	373
2028	630	2	1	3	6	16	32	60	131	380
2029	635	2	1	3	5	16	31	59	129	388

2030	639	2	1	3	5	16	30	58	127	397
2031	645	2	1	3	5	15	30	57	125	406
2032	651	2	1	3	5	15	29	57	124	416
2033	659	2	1	3	5	15	28	56	122	426
2034	667	2	1	3	5	15	28	55	121	438
2035	676	2	1	2	5	14	27	54	120	450
2036	686	2	1	2	5	14	27	53	119	463
2037	697	2	1	2	5	14	27	52	118	476
2038	708	2	1	2	5	14	26	51	117	490
2039	719	2	1	2	5	13	26	50	116	504
2040	729	2	1	2	5	13	26	49	114	517
2041	739	2	1	2	5	13	25	48	113	530
2042	747	1	1	2	5	13	25	47	112	542
2043	755	1	1	2	5	13	24	46	111	552
2044	760	1	1	2	4	13	24	44	110	561
2045	765	1	1	2	4	13	23	44	108	569
2046	768	1	1	2	4	13	23	43	106	576
2047	771	1	1	2	4	13	22	43	103	582
2048	773	1	1	2	4	12	22	42	102	586
2049	775	1	1	2	4	12	22	42	100	591
2050	783	1	1	2	4	12	22	42	100	600
2051	769	1	1	2	4	12	22	42	100	586
2052	776	1	1	2	4	12	22	42	99	594
2053	783	1	1	2	4	12	22	42	98	601
2054	789	1	1	2	4	12	22	42	97	608
2055	794	1	1	2	4	12	22	42	97	613
2056	799	1	1	2	4	12	22	42	98	617
2057	803	1	1	2	4	12	22	41	99	620
2058	806	1	1	2	4	12	23	41	100	623
2059	809	1	1	2	4	12	23	41	101	624
2060	811	1	1	2	4	12	23	41	101	625
2061	812	1	1	2	4	12	23	41	101	627
2062	812	1	1	2	4	12	23	41	100	628
2063	812	1	1	2	4	12	23	41	100	628
2064	811	1	1	2	4	12	23	42	100	627
2065	810	1	1	2	4	12	23	42	100	625
2066	809	1	1	2	4	12	22	42	100	624
2067	807	1	1	2	4	12	22	43	99	623
2068	806	1	1	2	4	12	22	43	99	622
2069	805	1	1	2	4	12	22	43	99	621
2070	804	1	1	2	4	12	22	43	98	620
2071	803	1	1	2	4	12	22	43	98	619
2072	803	1	1	2	4	12	22	43	99	619
2073	803	1	1	2	4	12	22	43	99	619
2074	804	1	1	2	4	12	22	43	100	619
2075	806	1	1	2	4	12	22	43	101	620
2076	807	1	1	2	4	12	22	43	102	621
2077	809	1	1	2	4	12	22	43	102	622
2078	809	1	1	2	4	12	22	43	103	621
2079	810	1	1	2	4	12	22	43	104	621
2080	810	1	1	2	4	12	22	43	104	621
2081	809	1	1	2	4	12	22	43	104	620
2082	808	1	1	2	4	12	22	43	103	620
2083	808	1	1	2	4	12	22	42	103	620
2084	808	1	1	2	4	12	22	42	103	620
2085	808	1	1	2	4	12	22	42	103	620
2086	808	1	1	2	4	12	22	42	103	621
2087	809	1	1	2	4	12	22	42	103	621
2088	809	1	1	2	4	12	22	42	102	622
2089	811	1	1	2	4	12	23	42	102	624
2090	812	1	1	2	4	12	23	42	102	625
2091	814	1	1	2	4	12	23	42	102	628
2092	817	1	1	2	4	12	23	42	102	630
2093	819	1	1	2	4	12	23	42	102	632
2094	822	1	1	2	4	12	23	43	102	635
2095	824	1	1	2	4	12	23	43	101	637
2096	825	1	1	2	4	12	23	43	101	638
2097	826	1	1	2	4	12	23	43	101	639
2098	826	1	1	2	4	12	23	43	101	640
2099	826	1	1	2	4	12	22	43	101	639
2100	825	1	1	2	4	12	22	43	101	639

Table C5: Average age of parenthood in France, 1900-2050

Year of birth of children	Average age of parents at the birth of their children			Year of birth of parents	Average age of parents at the birth of their children		Year of death of parents	Average age of parents at the birth of their children	
	[1]	[2]	[3]		[4]	[5]		[6]	[7]
	Mothers	Fathers	Diff.		Mothers	Fathers		Mothers	Fathers
				1870	28.80	33.49	1900	28.78	33.47
1901	29.37	34.06	4.69	1871	28.76	33.45	1901	28.78	33.47
1902	29.33	34.00	4.67	1872	28.72	33.39	1902	28.78	33.47
1903	29.36	33.99	4.63	1873	28.67	33.30	1903	28.77	33.46
1904	29.33	33.82	4.49	1874	28.63	33.12	1904	28.77	33.46
1905	29.25	33.80	4.55	1875	28.58	33.13	1905	28.77	33.46
1906	29.22	33.71	4.49	1876	28.54	33.03	1906	28.76	33.46
1907	28.97	33.82	4.85	1877	28.50	33.35	1907	28.76	33.46
1908	28.92	33.77	4.85	1878	28.46	33.31	1908	28.76	33.45
1909	28.88	33.71	4.83	1879	28.43	33.26	1909	28.76	33.45
1910	28.87	33.69	4.82	1880	28.40	33.22	1910	28.75	33.44
1911	28.81	33.62	4.81	1881	28.37	33.18	1911	28.75	33.44
1912	28.74	33.55	4.81	1882	28.35	33.16	1912	28.75	33.43
1913	28.72	33.47	4.75	1883	28.33	33.08	1913	28.75	33.43
1914	28.75	33.53	4.78	1884	28.31	33.09	1914	28.76	33.26
1915	29.48	34.38	4.90	1885	28.30	33.20	1915	28.76	33.26
1916	30.03	34.86	4.83	1886	28.32	33.14	1916	28.76	33.29
1917	30.01	34.71	4.70	1887	28.36	33.06	1917	28.76	33.33
1918	30.18	34.75	4.57	1888	28.45	33.01	1918	28.74	33.29
1919	30.13	34.60	4.47	1889	28.55	33.01	1919	28.75	33.38
1920	29.27	33.33	4.06	1890	28.66	32.73	1920	28.75	33.41
1921	28.71	32.78	4.07	1891	28.79	32.86	1921	28.75	33.40
1922	28.71	32.78	4.07	1892	28.92	32.99	1922	28.75	33.40
1923	28.72	32.83	4.11	1893	29.02	33.13	1923	28.74	33.39
1924	28.67	32.87	4.20	1894	29.07	33.27	1924	28.74	33.38
1925	28.59	32.86	4.27	1895	29.05	33.32	1925	28.74	33.37
1926	28.52	32.79	4.27	1896	28.95	33.22	1926	28.73	33.36
1927	28.45	32.73	4.28	1897	28.79	33.07	1927	28.73	33.36
1928	28.46	32.77	4.31	1898	28.61	32.92	1928	28.72	33.35
1929	28.35	32.62	4.27	1899	28.44	32.71	1929	28.72	33.34
1930	28.26	32.55	4.29	1900	28.34	32.63	1930	28.72	33.33
1931	28.16	32.44	4.28	1901	28.27	32.55	1931	28.72	33.33
1932	28.20	32.46	4.26	1902	28.25	32.51	1932	28.72	33.32
1933	28.11	32.37	4.26	1903	28.26	32.52	1933	28.71	33.31
1934	28.03	32.27	4.24	1904	28.29	32.54	1934	28.71	33.29
1935	27.92	32.19	4.27	1905	28.35	32.62	1935	28.71	33.28
1936	27.90	32.20	4.30	1906	28.41	32.71	1936	28.71	33.27
1937	27.90	32.16	4.26	1907	28.46	32.72	1937	28.70	33.26
1938	27.88	32.09	4.21	1908	28.51	32.72	1938	28.70	33.24
1939	27.88	32.08	4.20	1909	28.61	32.81	1939	28.70	33.24
1940	28.42	32.51	4.09	1910	28.67	32.76	1940	28.70	33.02
1941	28.66	32.51	3.85	1911	28.67	32.52	1941	28.69	33.20
1942	28.62	32.21	3.59	1912	28.72	32.31	1942	28.68	33.16
1943	28.39	31.67	3.28	1913	28.73	32.01	1943	28.66	33.02
1944	28.56	31.87	3.31	1914	28.69	32.00	1944	28.64	32.90
1945	28.58	31.91	3.33	1915	28.67	32.00	1945	28.65	33.06
1946	28.77	32.07	3.30	1916	28.65	31.95	1946	28.64	33.14
1947	28.37	31.70	3.33	1917	28.60	31.93	1947	28.64	33.13
1948	28.30	31.77	3.47	1918	28.54	32.01	1948	28.63	33.11
1949	28.21	31.73	3.52	1919	28.53	32.05	1949	28.62	33.12
1950	28.16	31.69	3.53	1920	28.40	31.93	1950	28.61	33.09
1951	28.10	31.62	3.52	1921	28.31	31.83	1951	28.61	33.08
1952	28.10	31.71	3.61	1922	28.23	31.84	1952	28.59	33.06
1953	28.01	31.62	3.61	1923	28.12	31.73	1953	28.59	33.05
1954	28.01	31.65	3.64	1924	27.94	31.58	1954	28.57	33.02
1955	27.93	31.58	3.65	1925	27.77	31.43	1955	28.57	33.00
1956	27.85	31.48	3.63	1926	27.68	31.31	1956	28.56	32.98
1957	27.87	31.55	3.68	1927	27.55	31.23	1957	28.55	32.95
1958	27.81	31.54	3.73	1928	27.48	31.21	1958	28.54	32.93
1959	27.74	31.48	3.74	1929	27.47	31.21	1959	28.53	32.91

1960	27.60	31.32	3.72	1930	27.46	31.18	1960	28.52	32.89
1961	27.55	31.24	3.69	1931	27.41	31.10	1961	28.51	32.85
1962	27.49	31.15	3.66	1932	27.34	31.00	1962	28.51	32.84
1963	27.41	30.96	3.55	1933	27.28	30.83	1963	28.50	32.81
1964	27.35	30.75	3.40	1934	27.17	30.57	1964	28.50	32.77
1965	27.28	30.55	3.27	1935	27.09	30.36	1965	28.50	32.74
1966	27.30	30.41	3.11	1936	26.97	30.08	1966	28.49	32.70
1967	27.31	30.29	2.98	1937	26.82	29.80	1967	28.49	32.68
1968	27.29	30.18	2.89	1938	26.72	29.61	1968	28.49	32.65
1969	27.27	30.12	2.85	1939	26.56	29.41	1969	28.50	32.61
1970	27.16	29.97	2.81	1940	26.43	29.24	1970	28.49	32.58
1971	27.11	29.92	2.81	1941	26.24	29.05	1971	28.49	32.54
1972	26.98	29.83	2.85	1942	26.10	28.96	1972	28.49	32.50
1973	26.88	29.78	2.90	1943	26.00	28.90	1973	28.50	32.48
1974	26.78	29.75	2.97	1944	25.97	28.94	1974	28.50	32.44
1975	26.67	29.70	3.03	1945	25.95	28.98	1975	28.50	32.41
1976	26.55	29.59	3.04	1946	26.00	29.04	1976	28.50	32.37
1977	26.52	29.57	3.05	1947	26.13	29.18	1977	28.49	32.32
1978	26.59	29.69	3.10	1948	26.25	29.35	1978	28.49	32.30
1979	26.70	29.84	3.14	1949	26.32	29.46	1979	28.48	32.25
1980	26.81	29.96	3.15	1950	26.50	29.65	1980	28.47	32.21
1981	26.98	30.18	3.20	1951	26.58	29.78	1981	28.47	32.18
1982	27.06	30.28	3.22	1952	26.72	29.94	1982	28.45	32.13
1983	27.11	30.37	3.26	1953	26.83	30.09	1983	28.44	32.10
1984	27.25	30.50	3.25	1954	26.94	30.19	1984	28.42	32.05
1985	27.47	30.69	3.22	1955	27.03	30.24	1985	28.41	32.01
1986	27.65	30.87	3.22	1956	27.14	30.36	1986	28.39	31.96
1987	27.86	31.06	3.20	1957	27.26	30.46	1987	28.37	31.91
1988	28.03	31.22	3.19	1958	27.40	30.59	1988	28.35	31.87
1989	28.18	31.36	3.18	1959	27.57	30.75	1989	28.33	31.82
1990	28.31	31.48	3.17	1960	27.71	30.88	1990	28.32	31.78
1991	28.39	31.52	3.13	1961	27.89	31.02	1991	28.30	31.72
1992	28.54	31.67	3.13	1962	28.07	31.20	1992	28.29	31.68
1993	28.66	31.79	3.13	1963	28.29	31.42	1993	28.27	31.64
1994	28.81	31.93	3.12	1964	28.51	31.63	1994	28.26	31.58
1995	28.97	32.03	3.06	1965	28.73	31.79	1995	28.25	31.55
1996	29.10	32.15	3.05	1966	28.93	31.98	1996	28.23	31.51
1997	29.19	32.23	3.04	1967	29.11	32.15	1997	28.22	31.46
1998	29.30	32.32	3.02	1968	29.26	32.28	1998	28.21	31.41
1999	29.34	32.36	3.02	1969	29.44	32.46	1999	28.19	31.36
2000	29.37	32.37	3.00	1970	29.62	32.62	2000	28.17	31.31
2001	29.39	32.42	3.03	1971	29.79	32.82	2001	28.15	31.26
2002	29.47	32.50	3.03	1972	29.97	33.00	2002	28.13	31.21
2003	29.55	32.59	3.04	1973	30.10	33.14	2003	28.11	31.16
2004	29.59	32.63	3.04	1974	30.22	33.26	2004	28.06	31.10
2005	29.70	32.74	3.04	1975	30.33	33.37	2005	28.04	31.07
2006	29.80	32.84	3.04	1976	30.45	33.49	2006	27.99	31.01
2007	29.90	32.94	3.04	1977	30.55	33.59	2007	27.96	30.97
2008	29.90	32.94	3.04	1978	30.64	33.68	2008	27.94	30.95
				1979	30.72	33.76	2009	27.90	30.91
				1980	30.81	33.85	2010	27.86	30.87
				1981	30.90	33.94	2011	27.81	30.83
				1982	31.01	34.05	2012	27.77	30.79

Table C6: Average age of decedents and heirs in France, 1820-2100

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
	Average age of decedents (20-year and over)			Average age of heirs (children)			Average age of heirs (all heirs)	Age diff. decedents vs heirs	
	All decedents	Male decedents	Female decedents	All decedents	Male decedents	Female decedents		Children	All heirs
1820	**56.8**	57.1	56.5	**25.6**	23.6	27.7	**30.2**	31.2	26.6
1821	**56.8**	57.0	56.5	**25.5**	23.5	27.8	**30.2**	31.2	26.6
1822	**56.8**	56.9	56.6	**25.5**	23.4	27.8	**30.2**	31.2	26.6
1823	**56.8**	56.9	56.6	**25.5**	23.4	27.8	**30.2**	31.2	26.6
1824	**56.7**	56.8	56.7	**25.5**	23.3	27.9	**30.2**	31.2	26.5
1825	**56.7**	56.7	56.7	**25.5**	23.3	27.9	**30.2**	31.2	26.5
1826	**56.7**	56.7	56.8	**25.5**	23.2	28.0	**30.2**	31.2	26.5
1827	**56.7**	56.6	56.8	**25.5**	23.1	28.0	**30.2**	31.2	26.5
1828	**56.7**	56.6	56.9	**25.5**	23.1	28.1	**30.2**	31.2	26.5
1829	**56.7**	56.5	56.9	**25.6**	23.0	28.1	**30.2**	31.2	26.5
1830	**56.7**	56.5	57.0	**25.6**	23.0	28.2	**30.2**	31.2	26.5
1831	**56.7**	56.4	57.0	**25.6**	23.0	28.2	**30.2**	31.2	26.5
1832	**56.7**	56.4	57.1	**25.6**	22.9	28.3	**30.2**	31.2	26.5
1833	**56.8**	56.4	57.1	**25.6**	22.9	28.3	**30.2**	31.2	26.5
1834	**56.8**	56.3	57.2	**25.6**	22.8	28.4	**30.2**	31.2	26.5
1835	**56.8**	56.3	57.2	**25.6**	22.8	28.4	**30.3**	31.2	26.5
1836	**56.8**	56.3	57.3	**25.6**	22.8	28.5	**30.3**	31.1	26.5
1837	**56.8**	56.3	57.3	**25.6**	22.8	28.5	**30.3**	31.1	26.5
1838	**56.8**	56.2	57.3	**25.7**	22.8	28.5	**30.3**	31.1	26.5
1839	**56.8**	56.2	57.4	**25.7**	22.7	28.6	**30.3**	31.1	26.5
1840	**56.8**	56.2	57.4	**25.7**	22.8	28.6	**30.3**	31.1	26.5
1841	**56.8**	56.2	57.5	**25.7**	22.7	28.7	**30.3**	31.1	26.5
1842	**56.8**	56.2	57.5	**25.7**	22.7	28.7	**30.3**	31.1	26.5
1843	**56.8**	56.1	57.5	**25.7**	22.7	28.7	**30.3**	31.1	26.5
1844	**56.8**	56.1	57.5	**25.7**	22.6	28.7	**30.3**	31.1	26.5
1845	**56.8**	56.1	57.6	**25.7**	22.6	28.8	**30.3**	31.1	26.5
1846	**56.9**	56.1	57.6	**25.7**	22.6	28.8	**30.4**	31.1	26.5
1847	**56.9**	56.1	57.6	**25.7**	22.6	28.8	**30.4**	31.1	26.5
1848	**56.9**	56.1	57.7	**25.8**	22.6	28.9	**30.4**	31.1	26.5
1849	**56.9**	56.1	57.7	**25.8**	22.6	28.9	**30.4**	31.1	26.5
1850	**57.5**	56.7	58.4	**26.4**	23.2	29.6	**31.0**	31.1	26.5
1851	**57.6**	56.7	58.4	**26.4**	23.2	29.6	**31.1**	31.1	26.5
1852	**57.6**	56.7	58.5	**26.5**	23.2	29.7	**31.1**	31.1	26.5
1853	**57.7**	56.8	58.6	**26.6**	23.3	29.8	**31.2**	31.1	26.5
1854	**57.8**	56.8	58.7	**26.6**	23.4	29.9	**31.3**	31.1	26.5
1855	**57.8**	56.9	58.8	**26.7**	23.4	30.0	**31.4**	31.1	26.5
1856	**57.9**	57.0	58.9	**26.8**	23.5	30.1	**31.4**	31.1	26.5
1857	**58.0**	57.1	59.0	**26.9**	23.6	30.2	**31.5**	31.1	26.5
1858	**58.1**	57.1	59.1	**27.0**	23.6	30.3	**31.6**	31.1	26.5
1859	**58.2**	57.2	59.2	**27.1**	23.7	30.4	**31.7**	31.1	26.5
1860	**58.3**	57.3	59.3	**27.2**	23.8	30.5	**31.8**	31.1	26.5
1861	**58.4**	57.4	59.4	**27.3**	23.9	30.6	**31.9**	31.1	26.5
1862	**58.5**	57.5	59.6	**27.4**	24.0	30.8	**32.0**	31.1	26.5
1863	**58.6**	57.6	59.7	**27.5**	24.1	30.9	**32.1**	31.1	26.5
1864	**58.7**	57.6	59.8	**27.6**	24.2	31.0	**32.2**	31.1	26.5
1865	**58.8**	57.7	59.9	**27.7**	24.2	31.1	**32.3**	31.1	26.5
1866	**58.9**	57.8	60.0	**27.7**	24.3	31.2	**32.4**	31.1	26.5
1867	**59.0**	57.9	60.1	**27.8**	24.4	31.3	**32.5**	31.1	26.5
1868	**59.1**	58.0	60.2	**28.0**	24.5	31.4	**32.6**	31.1	26.5
1869	**59.2**	58.1	60.3	**28.1**	24.6	31.5	**32.7**	31.1	26.5
1870	**59.3**	58.1	60.4	**28.1**	24.7	31.6	**32.8**	31.2	26.5
1871	**59.3**	58.1	60.4	**28.1**	24.6	31.6	**32.8**	31.2	26.5
1872	**59.3**	58.2	60.5	**28.2**	24.7	31.7	**32.8**	31.2	26.5
1873	**59.4**	58.2	60.6	**28.3**	24.8	31.8	**32.9**	31.2	26.5
1874	**59.5**	58.3	60.7	**28.4**	24.8	31.9	**33.0**	31.2	26.5
1875	**59.6**	58.4	60.8	**28.5**	24.9	32.0	**33.1**	31.2	26.5
1876	**59.7**	58.5	61.0	**28.6**	25.0	32.2	**33.2**	31.2	26.5
1877	**59.8**	58.5	61.0	**28.6**	25.1	32.2	**33.3**	31.2	26.5
1878	**59.9**	58.6	61.1	**28.7**	25.1	32.3	**33.3**	31.2	26.5
1879	**59.9**	58.7	61.2	**28.7**	25.2	32.4	**33.4**	31.2	26.5
1880	**59.9**	58.7	61.2	**28.8**	25.2	32.4	**33.4**	31.2	26.5
1881	**60.0**	58.7	61.3	**28.8**	25.2	32.5	**33.5**	31.2	26.5
1882	**60.0**	58.8	61.3	**28.9**	25.3	32.5	**33.5**	31.2	26.5
1883	**60.1**	58.8	61.4	**28.9**	25.3	32.6	**33.6**	31.2	26.5
1884	**60.1**	58.8	61.4	**28.9**	25.3	32.6	**33.6**	31.2	26.5
1885	**60.1**	58.9	61.5	**29.0**	25.4	32.7	**33.6**	31.2	26.5

1886	**60.2**	58.9	61.5	**29.0**	25.4	32.7	**33.6**	31.2	26.5
1887	**60.2**	58.9	61.5	**29.0**	25.4	32.7	**33.7**	31.2	26.5
1888	**60.2**	58.9	61.6	**29.1**	25.5	32.8	**33.7**	31.2	26.5
1889	**60.3**	59.0	61.6	**29.1**	25.5	32.8	**33.8**	31.2	26.5
1890	**60.3**	59.0	61.7	**29.1**	25.5	32.9	**33.8**	31.2	26.5
1891	**60.4**	59.1	61.7	**29.2**	25.6	32.9	**33.8**	31.2	26.5
1892	**60.4**	59.2	61.8	**29.3**	25.7	33.0	**33.9**	31.2	26.5
1893	**60.5**	59.2	61.8	**29.3**	25.7	33.0	**34.0**	31.2	26.5
1894	**60.6**	59.3	61.9	**29.4**	25.8	33.1	**34.0**	31.2	26.5
1895	**60.6**	59.3	61.9	**29.4**	25.8	33.1	**34.1**	31.2	26.5
1896	**60.7**	59.4	62.0	**29.5**	25.9	33.2	**34.1**	31.2	26.5
1897	**60.7**	59.4	62.0	**29.5**	25.9	33.3	**34.2**	31.2	26.5
1898	**60.7**	59.5	62.1	**29.6**	26.0	33.3	**34.2**	31.2	26.5
1899	**60.8**	59.5	62.2	**29.6**	26.0	33.4	**34.3**	31.2	26.5
1900	**60.9**	60.0	62.0	**29.7**	26.5	33.2	**34.4**	31.2	26.6
1901	**60.5**	59.5	61.5	**29.3**	26.1	32.8	**34.0**	31.2	26.5
1902	**60.5**	59.6	61.5	**29.3**	26.1	32.7	**34.0**	31.2	26.5
1903	**60.8**	59.9	61.8	**29.6**	26.4	33.0	**34.3**	31.2	26.5
1904	**61.0**	60.0	62.0	**29.8**	26.5	33.2	**34.5**	31.2	26.5
1905	**60.9**	59.9	62.0	**29.7**	26.4	33.2	**34.4**	31.2	26.5
1906	**60.8**	59.8	61.9	**29.6**	26.4	33.1	**34.3**	31.2	26.5
1907	**60.9**	59.7	62.2	**29.7**	26.3	33.4	**34.4**	31.2	26.5
1908	**60.7**	59.5	62.0	**29.5**	26.1	33.3	**34.2**	31.2	26.5
1909	**61.3**	60.0	62.6	**30.1**	26.5	33.9	**34.8**	31.2	26.5
1910	**61.0**	59.8	62.3	**29.8**	26.4	33.6	**34.5**	31.2	26.5
1911	**61.5**	60.2	62.9	**30.3**	26.8	34.1	**35.0**	31.2	26.5
1912	**60.8**	59.5	62.3	**29.6**	26.0	33.6	**34.3**	31.2	26.5
1913	**61.1**	59.8	62.6	**30.0**	26.4	33.9	**34.6**	31.2	26.5
1914	**51.0**	44.9	63.1	**19.2**	11.7	34.4	**24.0**	31.8	26.9
1915	**49.5**	43.6	62.9	**17.7**	10.3	34.1	**22.5**	31.9	27.0
1916	**52.3**	46.4	63.3	**20.6**	13.2	34.6	**25.4**	31.7	26.9
1917	**56.0**	50.9	63.7	**24.5**	17.6	34.9	**29.2**	31.5	26.8
1918	**51.1**	46.7	58.0	**19.6**	13.4	29.3	**24.4**	31.5	26.7
1919	**59.7**	57.5	61.9	**28.6**	24.2	33.2	**33.2**	31.1	26.5
1920	**61.5**	60.5	62.5	**30.4**	27.1	33.7	**35.1**	31.1	26.4
1921	**62.0**	60.9	63.1	**30.9**	27.5	34.3	**35.5**	31.1	26.5
1922	**62.5**	61.4	63.6	**31.4**	28.0	34.9	**36.0**	31.1	26.5
1923	**62.1**	61.0	63.3	**31.0**	27.6	34.6	**35.7**	31.1	26.5
1924	**62.3**	61.0	63.5	**31.2**	27.7	34.8	**35.8**	31.1	26.5
1925	**62.4**	61.0	63.8	**31.3**	27.6	35.1	**35.9**	31.1	26.5
1926	**62.3**	61.0	63.6	**31.2**	27.6	34.9	**35.8**	31.1	26.5
1927	**62.7**	61.4	64.1	**31.7**	28.0	35.4	**36.3**	31.1	26.4
1928	**62.6**	61.2	64.0	**31.5**	27.8	35.3	**36.1**	31.1	26.4
1929	**63.1**	61.5	64.7	**32.0**	28.1	35.9	**36.6**	31.1	26.4
1930	**62.2**	60.7	63.8	**31.0**	27.3	35.0	**35.7**	31.1	26.5
1931	**63.1**	61.5	64.7	**32.0**	28.2	36.0	**36.7**	31.1	26.4
1932	**63.0**	61.4	64.7	**32.0**	28.1	36.0	**36.6**	31.1	26.4
1933	**63.3**	61.7	65.0	**32.3**	28.4	36.3	**36.9**	31.1	26.4
1934	**63.1**	61.4	65.0	**32.0**	28.1	36.3	**36.6**	31.1	26.5
1935	**63.4**	61.7	65.3	**32.4**	28.4	36.6	**37.0**	31.1	26.5
1936	**63.8**	62.0	65.7	**32.7**	28.7	37.0	**37.3**	31.1	26.5
1937	**63.8**	61.9	65.8	**32.7**	28.7	37.1	**37.3**	31.1	26.5
1938	**64.1**	62.1	66.3	**33.1**	28.9	37.6	**37.7**	31.1	26.4
1939	**64.8**	62.8	66.9	**33.8**	29.6	38.2	**38.4**	31.0	26.4
1940	**60.2**	54.9	67.6	**29.0**	21.9	38.9	**33.7**	31.2	26.5
1941	**64.4**	62.2	67.0	**33.4**	29.0	38.3	**38.0**	31.1	26.5
1942	**64.4**	62.0	67.0	**33.3**	28.8	38.4	**37.9**	31.1	26.4
1943	**60.7**	57.4	64.3	**29.7**	24.4	35.7	**34.3**	31.0	26.4
1944	**57.7**	53.6	62.4	**26.7**	20.7	33.8	**31.3**	30.9	26.4
1945	**63.4**	60.5	66.3	**32.5**	27.5	37.6	**37.1**	30.9	26.3
1946	**66.2**	64.3	68.1	**35.4**	31.2	39.4	**39.9**	30.9	26.3
1947	**66.7**	64.7	68.6	**35.8**	31.5	40.0	**40.3**	30.9	26.3
1948	**66.6**	64.6	68.8	**35.7**	31.5	40.1	**40.3**	30.9	26.3
1949	**68.0**	65.9	69.9	**37.1**	32.8	41.3	**41.7**	30.8	26.3
1950	**67.7**	65.6	69.9	**36.9**	32.5	41.2	**41.4**	30.9	26.3
1951	**68.3**	66.1	70.5	**37.4**	33.0	41.8	**42.0**	30.8	26.3
1952	**68.3**	66.1	70.5	**37.4**	33.0	41.9	**42.0**	30.8	26.3
1953	**68.8**	66.5	71.2	**38.0**	33.4	42.6	**42.6**	30.8	26.3
1954	**68.6**	66.2	71.0	**37.8**	33.2	42.4	**42.3**	30.8	26.3
1955	**68.9**	66.4	71.5	**38.1**	33.4	42.9	**42.7**	30.8	26.3
1956	**69.3**	66.6	72.0	**38.5**	33.6	43.4	**43.0**	30.8	26.3
1957	**69.1**	66.4	71.9	**38.3**	33.4	43.4	**42.9**	30.8	26.3
1958	**69.5**	66.7	72.4	**38.8**	33.8	43.9	**43.3**	30.7	26.2

1959	**69.6**	66.7	72.5	**38.9**	33.8	44.0	**43.4**	30.7	26.2
1960	**69.9**	67.1	72.9	**39.2**	34.2	44.4	**43.7**	30.7	26.2
1961	**69.8**	66.8	72.9	**39.1**	33.9	44.4	**43.6**	30.7	26.2
1962	**70.3**	67.2	73.4	**39.6**	34.3	44.9	**44.1**	30.7	26.2
1963	**70.3**	67.2	73.6	**39.6**	34.4	45.1	**44.1**	30.7	26.2
1964	**70.1**	66.9	73.4	**39.4**	34.1	44.9	**43.9**	30.7	26.2
1965	**70.3**	67.1	73.7	**39.6**	34.3	45.2	**44.1**	30.7	26.2
1966	**70.2**	66.9	73.7	**39.6**	34.2	45.2	**44.1**	30.6	26.2
1967	**70.5**	67.1	74.0	**39.9**	34.5	45.5	**44.3**	30.6	26.1
1968	**70.7**	67.3	74.3	**40.1**	34.7	45.8	**44.6**	30.6	26.1
1969	**70.6**	67.2	74.2	**40.0**	34.6	45.7	**44.5**	30.6	26.1
1970	**70.8**	67.3	74.5	**40.2**	34.7	46.0	**44.7**	30.6	26.1
1971	**71.0**	67.3	74.8	**40.4**	34.8	46.3	**44.9**	30.6	26.1
1972	**70.8**	67.2	74.7	**40.3**	34.7	46.2	**44.8**	30.6	26.1
1973	**71.3**	67.6	75.1	**40.7**	35.1	46.6	**45.2**	30.5	26.1
1974	**71.3**	67.6	75.3	**40.8**	35.2	46.8	**45.3**	30.5	26.1
1975	**71.5**	67.8	75.5	**41.0**	35.4	47.0	**45.5**	30.5	26.1
1976	**71.6**	67.8	75.7	**41.1**	35.4	47.2	**45.5**	30.5	26.0
1977	**71.6**	67.8	75.7	**41.1**	35.5	47.2	**45.5**	30.5	26.0
1978	**72.0**	68.2	76.0	**41.5**	35.9	47.5	**45.9**	30.5	26.0
1979	**72.0**	68.1	76.2	**41.5**	35.9	47.7	**46.0**	30.4	26.0
1980	**72.2**	68.3	76.5	**41.8**	36.1	48.0	**46.2**	30.4	26.0
1981	**72.6**	68.6	76.8	**42.2**	36.4	48.3	**46.6**	30.4	26.0
1982	**72.5**	68.5	76.8	**42.2**	36.4	48.3	**46.6**	30.4	25.9
1983	**72.9**	68.8	77.1	**42.6**	36.7	48.7	**47.0**	30.3	25.9
1984	**72.8**	68.8	77.2	**42.5**	36.7	48.8	**46.9**	30.3	25.9
1985	**73.2**	69.1	77.5	**42.9**	37.1	49.1	**47.3**	30.3	25.9
1986	**73.3**	69.2	77.7	**43.0**	37.2	49.3	**47.4**	30.2	25.9
1987	**73.3**	69.2	77.7	**43.1**	37.3	49.3	**47.4**	30.2	25.8
1988	**73.4**	69.2	77.9	**43.2**	37.4	49.5	**47.6**	30.2	25.8
1989	**73.6**	69.3	78.2	**43.5**	37.5	49.8	**47.8**	30.1	25.8
1990	**73.8**	69.4	78.4	**43.7**	37.7	50.1	**48.0**	30.1	25.8
1991	**73.8**	69.4	78.5	**43.7**	37.6	50.2	**48.0**	30.1	25.8
1992	**73.8**	69.4	78.6	**43.8**	37.8	50.3	**48.1**	30.0	25.7
1993	**74.1**	69.7	78.8	**44.1**	38.1	50.5	**48.4**	30.0	25.7
1994	**74.1**	69.7	78.8	**44.1**	38.1	50.5	**48.4**	30.0	25.7
1995	**74.4**	70.0	79.1	**44.4**	38.5	50.8	**48.7**	30.0	25.7
1996	**74.7**	70.4	79.3	**44.8**	38.9	51.1	**49.1**	29.9	25.6
1997	**75.0**	70.7	79.6	**45.2**	39.3	51.3	**49.4**	29.9	25.6
1998	**75.2**	71.0	79.7	**45.4**	39.5	51.5	**49.6**	29.8	25.6
1999	**75.2**	71.0	79.7	**45.4**	39.6	51.5	**49.7**	29.8	25.6
2000	**75.5**	71.2	79.9	**45.7**	39.9	51.8	**49.9**	29.8	25.5
2001	**75.5**	71.3	79.9	**45.8**	40.0	51.8	**50.0**	29.7	25.5
2002	**75.7**	71.4	80.1	**46.0**	40.2	51.9	**50.2**	29.7	25.5
2003	**76.0**	71.8	80.3	**46.4**	40.6	52.2	**50.6**	29.6	25.5
2004	**75.7**	71.7	79.9	**46.1**	40.6	51.8	**50.2**	29.6	25.4
2005	**76.1**	72.1	80.3	**46.5**	41.0	52.2	**50.6**	29.6	25.4
2006	**76.0**	72.1	80.1	**46.5**	41.1	52.1	**50.6**	29.5	25.4
2007	**76.3**	72.4	80.3	**46.8**	41.4	52.4	**50.9**	29.5	25.4
2008	**76.6**	72.7	80.6	**47.1**	41.8	52.7	**51.2**	29.5	25.3
2009	**76.8**	73.0	80.8	**47.3**	42.0	52.9	**51.5**	29.4	25.3
2010	**77.0**	73.2	80.9	**47.6**	42.3	53.1	**51.7**	29.4	25.3
2011	**77.2**	73.4	81.1	**47.8**	42.6	53.3	**51.9**	29.4	25.2
2012	**77.4**	73.7	81.3	**48.1**	42.9	53.5	**52.2**	29.3	25.2
2013	**77.6**	73.9	81.5	**48.4**	43.2	53.8	**52.5**	29.3	25.2
2014	**77.9**	74.2	81.8	**48.7**	43.4	54.1	**52.7**	29.2	25.2
2015	**78.1**	74.4	82.0	**49.0**	43.7	54.4	**53.0**	29.2	25.1
2016	**78.4**	74.6	82.3	**49.3**	44.0	54.7	**53.3**	29.1	25.1
2017	**78.6**	74.8	82.5	**49.5**	44.2	55.0	**53.6**	29.1	25.1
2018	**78.8**	75.0	82.7	**49.8**	44.4	55.2	**53.8**	29.0	25.0
2019	**79.0**	75.2	82.9	**50.0**	44.7	55.5	**54.0**	29.0	25.0
2020	**79.2**	75.4	83.1	**50.2**	44.9	55.7	**54.2**	29.0	25.0
2021	**79.3**	75.6	83.2	**50.4**	45.1	55.9	**54.4**	28.9	24.9
2022	**79.5**	75.7	83.3	**50.6**	45.3	56.0	**54.6**	28.9	24.9
2023	**79.6**	75.9	83.4	**50.8**	45.5	56.2	**54.7**	28.9	24.9
2024	**79.7**	76.1	83.5	**50.9**	45.7	56.3	**54.9**	28.8	24.9
2025	**79.8**	76.2	83.6	**51.0**	45.9	56.4	**55.0**	28.8	24.9
2026	**80.0**	76.4	83.7	**51.2**	46.1	56.5	**55.1**	28.8	24.8
2027	**80.1**	76.6	83.7	**51.3**	46.3	56.6	**55.3**	28.8	24.8
2028	**80.2**	76.8	83.8	**51.5**	46.5	56.7	**55.4**	28.7	24.8
2029	**80.3**	77.0	83.8	**51.6**	46.7	56.8	**55.5**	28.7	24.8
2030	**80.5**	77.2	83.9	**51.8**	46.9	56.9	**55.7**	28.7	24.8
2031	**80.6**	77.5	84.0	**51.9**	47.1	57.0	**55.8**	28.7	24.8

2032	**80.8**	77.7	84.1	**52.1**	47.3	57.1	**56.0**	28.7	24.8
2033	**81.0**	78.0	84.2	**52.3**	47.6	57.3	**56.2**	28.7	24.8
2034	**81.2**	78.2	84.3	**52.5**	47.8	57.4	**56.4**	28.7	24.8
2035	**81.4**	78.5	84.5	**52.7**	48.1	57.6	**56.6**	28.7	24.8
2036	**81.7**	78.8	84.7	**52.9**	48.3	57.8	**56.8**	28.8	24.8
2037	**81.9**	79.1	84.9	**53.1**	48.5	58.0	**57.1**	28.8	24.9
2038	**82.2**	79.4	85.1	**53.4**	48.8	58.2	**57.3**	28.8	24.9
2039	**82.5**	79.7	85.4	**53.6**	49.0	58.4	**57.6**	28.9	24.9
2040	**82.8**	80.0	85.6	**53.9**	49.2	58.6	**57.8**	28.9	25.0
2041	**83.1**	80.3	85.9	**54.1**	49.4	58.8	**58.1**	29.0	25.0
2042	**83.4**	80.5	86.2	**54.3**	49.6	59.0	**58.3**	29.1	25.0
2043	**83.6**	80.8	86.4	**54.5**	49.7	59.2	**58.5**	29.1	25.1
2044	**83.8**	81.0	86.6	**54.6**	49.8	59.3	**58.7**	29.2	25.2
2045	**84.0**	81.2	86.8	**54.7**	49.9	59.4	**58.8**	29.3	25.2
2046	**84.2**	81.3	87.0	**54.8**	49.9	59.5	**58.9**	29.4	25.3
2047	**84.4**	81.5	87.2	**54.9**	50.0	59.6	**59.0**	29.5	25.4
2048	**84.5**	81.7	87.3	**54.9**	50.1	59.6	**59.1**	29.6	25.4
2049	**84.7**	81.8	87.5	**55.0**	50.1	59.6	**59.2**	29.7	25.5
2050	**84.8**	81.9	87.5	**54.9**	50.1	59.6	**59.2**	29.9	25.6
2051	**84.4**	81.8	87.1	**54.4**	49.8	58.9	**58.7**	30.1	25.7
2052	**84.5**	81.8	87.1	**54.3**	49.8	58.8	**58.7**	30.2	25.8
2053	**84.6**	81.9	87.2	**54.3**	49.7	58.8	**58.7**	30.3	25.9
2054	**84.6**	82.0	87.3	**54.2**	49.7	58.7	**58.6**	30.4	26.0
2055	**84.7**	82.1	87.3	**54.1**	49.6	58.6	**58.6**	30.6	26.1
2056	**84.8**	82.1	87.4	**54.0**	49.6	58.5	**58.5**	30.7	26.2
2057	**84.8**	82.2	87.4	**53.9**	49.5	58.4	**58.5**	30.9	26.3
2058	**84.8**	82.2	87.4	**53.9**	49.5	58.3	**58.4**	31.0	26.4
2059	**84.9**	82.3	87.5	**53.8**	49.4	58.2	**58.4**	31.1	26.5
2060	**84.9**	82.3	87.5	**53.7**	49.3	58.0	**58.3**	31.2	26.6
2061	**84.9**	82.4	87.5	**53.5**	49.2	57.9	**58.3**	31.4	26.7
2062	**84.9**	82.4	87.5	**53.4**	49.1	57.8	**58.2**	31.5	26.7
2063	**84.9**	82.4	87.5	**53.3**	49.1	57.7	**58.1**	31.6	26.8
2064	**84.9**	82.4	87.5	**53.2**	49.0	57.5	**58.0**	31.7	26.9
2065	**84.9**	82.4	87.5	**53.1**	48.9	57.4	**57.9**	31.8	27.0
2066	**84.9**	82.4	87.5	**53.0**	48.8	57.3	**57.9**	31.9	27.1
2067	**84.9**	82.4	87.5	**52.9**	48.7	57.1	**57.8**	32.0	27.1
2068	**84.9**	82.4	87.5	**52.8**	48.7	57.0	**57.7**	32.1	27.2
2069	**84.8**	82.4	87.4	**52.7**	48.6	56.9	**57.6**	32.2	27.2
2070	**84.8**	82.4	87.4	**52.6**	48.5	56.8	**57.5**	32.3	27.3
2071	**84.8**	82.4	87.4	**52.5**	48.5	56.7	**57.5**	32.3	27.3
2072	**84.8**	82.4	87.3	**52.4**	48.4	56.6	**57.4**	32.4	27.4
2073	**84.8**	82.4	87.3	**52.3**	48.4	56.5	**57.4**	32.4	27.4
2074	**84.8**	82.4	87.3	**52.3**	48.4	56.4	**57.3**	32.5	27.4
2075	**84.8**	82.4	87.3	**52.3**	48.4	56.4	**57.3**	32.5	27.4
2076	**84.8**	82.4	87.3	**52.3**	48.4	56.4	**57.3**	32.5	27.5
2077	**84.8**	82.4	87.3	**52.3**	48.4	56.4	**57.3**	32.5	27.5
2078	**84.8**	82.4	87.4	**52.3**	48.4	56.4	**57.3**	32.5	27.5
2079	**84.8**	82.4	87.4	**52.3**	48.4	56.4	**57.3**	32.6	27.5
2080	**84.8**	82.4	87.4	**52.3**	48.4	56.4	**57.3**	32.6	27.5
2081	**84.8**	82.4	87.4	**52.2**	48.4	56.3	**57.3**	32.6	27.5
2082	**84.8**	82.4	87.3	**52.2**	48.4	56.3	**57.3**	32.6	27.5
2083	**84.8**	82.4	87.3	**52.2**	48.3	56.3	**57.3**	32.6	27.5
2084	**84.8**	82.4	87.3	**52.2**	48.3	56.3	**57.3**	32.6	27.5
2085	**84.8**	82.4	87.3	**52.2**	48.3	56.3	**57.3**	32.6	27.5
2086	**84.7**	82.4	87.3	**52.2**	48.3	56.3	**57.2**	32.6	27.5
2087	**84.7**	82.4	87.3	**52.1**	48.3	56.3	**57.2**	32.6	27.5
2088	**84.7**	82.4	87.2	**52.1**	48.3	56.2	**57.2**	32.6	27.5
2089	**84.7**	82.4	87.2	**52.1**	48.4	56.2	**57.2**	32.6	27.5
2090	**84.7**	82.4	87.2	**52.1**	48.4	56.2	**57.2**	32.6	27.5
2091	**84.7**	82.4	87.2	**52.2**	48.4	56.2	**57.2**	32.6	27.5
2092	**84.8**	82.5	87.2	**52.2**	48.4	56.2	**57.3**	32.6	27.5
2093	**84.8**	82.5	87.3	**52.2**	48.5	56.3	**57.3**	32.6	27.5
2094	**84.8**	82.5	87.3	**52.2**	48.5	56.3	**57.3**	32.6	27.5
2095	**84.9**	82.6	87.3	**52.3**	48.5	56.3	**57.4**	32.6	27.5
2096	**84.9**	82.6	87.4	**52.3**	48.5	56.4	**57.4**	32.6	27.5
2097	**84.9**	82.6	87.4	**52.3**	48.6	56.4	**57.4**	32.6	27.5
2098	**84.9**	82.6	87.4	**52.3**	48.6	56.4	**57.4**	32.6	27.5
2099	**84.9**	82.6	87.4	**52.4**	48.6	56.4	**57.4**	32.6	27.5
2100	**84.9**	82.6	87.4	**52.4**	48.6	56.4	**57.4**	32.6	27.5

Table C7: Average age of decedents and donors, France 1906-2006

	[1]	[2]	[3]	[4]	[5]	[6]
	Average age of decedents			Average age of donors	Difference: [5] = [1] - [4]	Difference: [5] = [2] - [4]
	Decedents with estate tax returns (20-yr-old +)	All decedents (20-yr-old +)	Difference: [3] = [1] - [2]			
1906	63.0	60.8	2.2			
1908	62.8	60.7	2.0			
1928	64.7	62.6	2.1			
1934	65.4	63.1	2.3			
1943	64.7	60.7	4.0			
1947	66.9	66.7	0.2			
1956	69.7	69.3	0.4			
1958	69.8	69.5	0.3			
1959	69.9	69.6	0.3			
1960	70.4	69.9	0.4			
1962	70.9	70.3	0.6	64.8	6.1	5.5
1964	71.1	70.1	1.0	65.3	5.8	4.8
1977	72.5	71.6	0.9	66.5	6.0	5.1
1984	73.7	72.8	0.9	66.8	6.9	6.0
1987	74.4	73.3	1.1	66.2	8.2	7.1
1994	76.2	74.1	2.1	67.0	9.2	7.1
2000	77.0	75.5	1.5	68.5	8.5	7.0
2006	77.8	76.0	1.8	70.0	7.8	6.0

Table C8: Average age of donors and donees in France, 1820-2100

	[1] Average age of donors	[2] Average age of donees	[3] Age diff. donors vs donees		[4] Average age of decedents and donors	[5] Average age of heirs and donees	[6] Age diff. givers vs receivers
					(weighted by relative importance of bequests and gifts)		
1820	49.8	18.7	31.1		55.0	27.2	27.8
1821	49.8	18.6	31.1		55.0	27.2	27.8
1822	49.8	18.6	31.1		54.9	27.2	27.8
1823	49.8	18.6	31.1		54.9	27.2	27.8
1824	49.7	18.6	31.1		54.9	27.2	27.7
1825	49.7	18.6	31.1		54.9	27.2	27.7
1826	49.7	18.6	31.1		54.9	27.2	27.7
1827	49.7	18.6	31.1		54.9	27.2	27.7
1828	49.7	18.6	31.1		54.9	27.2	27.7
1829	49.7	18.6	31.1		54.9	27.2	27.7
1830	49.7	18.6	31.1		55.0	27.3	27.7
1831	49.7	18.6	31.1		54.8	26.9	27.8
1832	49.7	18.6	31.1		55.1	27.4	27.6
1833	49.8	18.6	31.1		54.9	27.2	27.7
1834	49.8	18.6	31.1		54.9	27.1	27.7
1835	49.8	18.6	31.1		54.9	27.2	27.7
1836	49.8	18.6	31.1		54.9	27.1	27.8
1837	49.8	18.6	31.1		55.0	27.3	27.7
1838	49.8	18.7	31.1		54.8	27.0	27.8
1839	49.8	18.7	31.1		54.8	27.0	27.8
1840	49.8	18.7	31.1		54.9	27.0	27.8
1841	49.8	18.7	31.1		54.9	27.1	27.8
1842	49.8	18.7	31.1		54.9	27.1	27.8
1843	49.8	18.7	31.1		54.8	26.9	27.9
1844	49.8	18.7	31.1		54.8	27.0	27.8
1845	49.8	18.7	31.1		54.8	26.9	27.9
1846	49.9	18.7	31.1		54.7	26.8	27.9
1847	49.9	18.7	31.1		55.0	27.3	27.7
1848	49.9	18.7	31.1		55.1	27.4	27.7
1849	49.9	18.8	31.1		55.1	27.4	27.7
1850	50.5	19.4	31.1		55.7	28.1	27.7
1851	50.6	19.4	31.1		55.7	28.0	27.7
1852	50.6	19.5	31.1		56.0	28.4	27.6
1853	50.7	19.6	31.1		55.9	28.2	27.7
1854	50.8	19.6	31.1		55.9	28.2	27.7
1855	50.8	19.7	31.1		56.2	28.5	27.6
1856	50.9	19.8	31.1		56.1	28.5	27.7
1857	51.0	19.9	31.1		56.2	28.5	27.7
1858	51.1	20.0	31.1		56.4	28.8	27.6
1859	51.2	20.1	31.1		56.5	28.9	27.6
1860	51.3	20.2	31.1		56.7	29.1	27.6
1861	51.4	20.3	31.1		56.6	28.9	27.7
1862	51.5	20.4	31.1		56.8	29.1	27.6
1863	51.6	20.5	31.1		56.9	29.3	27.6
1864	51.7	20.6	31.1		57.1	29.5	27.6
1865	51.8	20.7	31.1		57.2	29.6	27.6
1866	51.9	20.8	31.1		57.3	29.8	27.5
1867	52.0	20.8	31.1		57.4	29.9	27.5
1868	52.1	21.0	31.1		57.6	30.0	27.5
1869	52.2	21.1	31.1		57.7	30.2	27.5
1870	52.3	21.1	31.1		58.1	30.7	27.3
1871	52.3	21.1	31.1		58.3	31.2	27.1
1872	52.3	21.2	31.1		57.7	30.2	27.6
1873	52.4	21.3	31.1		57.8	30.3	27.6
1874	52.5	21.4	31.1		58.1	30.6	27.5
1875	52.6	21.5	31.1		58.2	30.7	27.5
1876	52.7	21.6	31.1		58.4	31.0	27.4
1877	52.8	21.6	31.1		58.4	31.0	27.4
1878	52.9	21.7	31.1		58.5	31.1	27.4
1879	52.9	21.8	31.1		58.6	31.2	27.4
1880	52.9	21.8	31.1		58.7	31.3	27.4
1881	53.0	21.9	31.1		58.7	31.3	27.4
1882	53.0	21.9	31.1		58.8	31.4	27.4
1883	53.1	21.9	31.1		58.8	31.5	27.3

1884	53.1	22.0	31.1		58.9	31.6	27.3
1885	53.1	22.0	31.1		59.0	31.7	27.3
1886	53.2	22.0	31.1		59.0	31.7	27.3
1887	53.2	22.1	31.1		59.1	31.8	27.3
1888	53.2	22.1	31.1		59.1	31.9	27.3
1889	53.3	22.1	31.1		59.1	31.8	27.3
1890	53.3	22.2	31.1		59.3	32.1	27.2
1891	53.4	22.2	31.1		59.3	32.0	27.2
1892	53.4	22.3	31.1		59.5	32.3	27.2
1893	53.5	22.4	31.1		59.4	32.2	27.2
1894	53.6	22.4	31.1		59.5	32.2	27.2
1895	53.6	22.5	31.1		59.6	32.3	27.2
1896	53.7	22.5	31.1		59.6	32.3	27.2
1897	53.7	22.6	31.1		59.6	32.4	27.2
1898	53.7	22.6	31.1		59.6	32.4	27.3
1899	53.8	22.7	31.1		59.7	32.5	27.2
1900	53.9	22.8	31.1		60.0	32.8	27.2
1901	53.5	22.4	31.1		59.3	32.0	27.3
1902	53.5	22.3	31.1		59.4	32.1	27.3
1903	53.8	22.7	31.1		59.7	32.4	27.3
1904	54.0	22.8	31.1		59.9	32.7	27.2
1905	53.9	22.8	31.1		59.9	32.7	27.2
1906	53.8	22.7	31.1		59.7	32.4	27.3
1907	53.9	22.8	31.1		59.8	32.6	27.3
1908	53.7	22.6	31.1		59.6	32.4	27.2
1909	54.3	23.1	31.1		60.2	32.9	27.3
1910	54.0	22.9	31.1		59.8	32.5	27.3
1911	54.5	23.4	31.1		60.4	33.1	27.2
1912	53.8	22.7	31.1		59.7	32.5	27.3
1913	54.1	23.0	31.1		60.0	32.7	27.3
1914	44.0	13.0	31.0		49.8	22.2	27.6
1915	42.5	11.5	31.0		48.4	20.7	27.7
1916	45.3	14.3	31.0		51.1	23.6	27.6
1917	49.0	17.9	31.1		54.8	27.3	27.5
1918	44.1	13.2	31.0		50.0	22.5	27.5
1919	52.7	21.6	31.1		58.3	30.9	27.4
1920	54.5	23.4	31.1		60.1	32.7	27.4
1921	55.0	23.9	31.1		60.6	33.2	27.4
1922	55.5	24.4	31.1		61.1	33.7	27.4
1923	55.1	24.1	31.1		60.7	33.4	27.4
1924	55.3	24.2	31.1		60.9	33.5	27.4
1925	55.4	24.3	31.0		61.0	33.6	27.4
1926	55.3	24.3	31.0		60.9	33.5	27.4
1927	55.7	24.7	31.0		61.3	34.0	27.4
1928	55.6	24.6	31.0		61.2	33.8	27.4
1929	56.1	25.1	31.0		61.7	34.3	27.4
1930	55.2	24.2	31.0		60.8	33.4	27.4
1931	56.1	25.1	31.0		61.7	34.3	27.4
1932	56.0	25.1	30.9		61.6	34.3	27.3
1933	56.3	25.4	30.9		61.9	34.6	27.3
1934	56.1	25.2	30.9		61.7	34.3	27.4
1935	56.4	25.5	30.9		62.0	34.7	27.3
1936	56.8	25.9	30.9		62.4	35.0	27.3
1937	56.8	25.9	30.9		62.4	35.0	27.3
1938	57.1	26.2	30.9		62.7	35.4	27.3
1939	57.8	26.9	30.9		63.4	36.1	27.3
1940	53.2	22.4	30.8		58.8	31.4	27.4
1941	57.4	26.6	30.9		63.0	35.7	27.3
1942	57.4	26.5	30.9		63.0	35.6	27.3
1943	53.7	22.9	30.8		59.3	32.0	27.3
1944	50.7	19.9	30.8		56.8	29.9	26.9
1945	56.4	25.6	30.8		61.3	33.7	27.6
1946	59.2	28.4	30.8		64.3	36.7	27.6
1947	59.7	28.8	30.8		65.0	37.6	27.4
1948	59.6	28.8	30.8		64.7	37.2	27.5
1949	61.0	30.1	30.8		66.3	38.9	27.4
1950	60.7	29.9	30.8		65.8	38.3	27.5
1951	61.3	30.5	30.8		66.8	39.5	27.2
1952	61.3	30.5	30.8		67.0	39.8	27.1
1953	61.8	31.0	30.8		67.3	40.1	27.3
1954	61.6	30.8	30.8		67.3	40.2	27.1
1955	61.9	31.1	30.8		67.5	40.3	27.2
1956	62.3	31.5	30.8		67.3	39.7	27.5

1957	62.1	31.4	30.7	67.4	40.1	27.3
1958	62.5	31.8	30.7	68.0	40.9	27.2
1959	62.6	31.9	30.7	68.5	41.5	27.0
1960	62.9	32.2	30.7	68.6	41.5	27.1
1961	62.8	32.1	30.7	68.4	41.3	27.1
1962	63.3	32.6	30.7	68.8	41.6	27.1
1963	63.3	32.6	30.7	68.8	41.7	27.1
1964	63.1	32.4	30.7	68.6	41.4	27.1
1965	63.3	32.7	30.7	68.8	41.7	27.1
1966	63.2	32.6	30.7	68.7	41.6	27.1
1967	63.5	32.9	30.6	69.0	41.9	27.1
1968	63.7	33.1	30.6	69.2	42.1	27.1
1969	63.6	33.0	30.6	69.1	42.0	27.1
1970	63.8	33.3	30.6	69.3	42.2	27.1
1971	64.0	33.4	30.5	69.4	42.4	27.1
1972	63.8	33.3	30.5	69.3	42.3	27.0
1973	64.3	33.8	30.5	69.8	42.7	27.0
1974	64.3	33.9	30.5	69.8	42.8	27.0
1975	64.5	34.1	30.4	70.0	43.0	27.0
1976	64.6	34.2	30.4	70.1	43.0	27.0
1977	64.6	34.2	30.4	70.0	43.1	27.0
1978	65.0	34.6	30.4	70.4	43.4	27.0
1979	65.0	34.7	30.3	70.4	43.5	27.0
1980	65.2	34.9	30.3	70.7	43.7	26.9
1981	65.6	35.3	30.3	71.0	44.1	26.9
1982	65.5	35.3	30.2	71.0	44.1	26.9
1983	65.9	35.7	30.2	71.3	44.4	26.9
1984	65.8	35.7	30.1	71.3	44.4	26.9
1985	66.2	36.1	30.1	71.4	44.5	27.0
1986	66.3	36.2	30.0	71.3	44.3	27.0
1987	66.3	36.3	30.0	71.1	44.0	27.1
1988	66.4	36.5	29.9	71.2	44.1	27.1
1989	66.6	36.7	29.9	71.3	44.1	27.1
1990	66.8	37.0	29.8	71.4	44.2	27.2
1991	66.8	37.0	29.8	71.3	44.1	27.2
1992	66.8	37.2	29.7	71.3	44.1	27.2
1993	67.1	37.5	29.6	71.5	44.3	27.2
1994	67.1	37.5	29.5	71.3	44.2	27.2
1995	67.4	37.7	29.7	71.6	44.3	27.3
1996	67.7	37.9	29.8	71.9	44.5	27.4
1997	68.0	38.1	30.0	72.1	44.7	27.4
1998	68.2	38.1	30.1	72.2	44.7	27.5
1999	68.2	38.0	30.2	72.2	44.6	27.6
2000	68.5	38.2	30.3	72.4	44.7	27.7
2001	68.5	38.1	30.4	72.4	44.7	27.7
2002	68.7	38.1	30.6	72.5	44.8	27.8
2003	69.0	38.3	30.7	72.9	45.1	27.8
2004	68.7	37.9	30.8	72.6	44.7	27.8
2005	69.1	38.1	30.9	72.9	45.0	27.9
2006	69.0	38.0	31.1	72.9	44.9	27.9
2007	69.3	38.3	31.0	73.1	45.2	27.9
2008	69.6	38.6	30.9	73.4	45.6	27.9
2009	69.8	38.9	30.9	73.6	45.8	27.8
2010	70.0	39.1	30.9	73.8	46.0	27.8
2011	70.2	39.4	30.8	74.0	46.3	27.7
2012	70.4	39.6	30.8	74.3	46.5	27.7
2013	70.6	39.9	30.8	74.5	46.8	27.7
2014	70.9	40.2	30.7	74.8	47.1	27.7
2015	71.1	40.4	30.7	75.0	47.4	27.6
2016	71.4	40.7	30.7	75.2	47.6	27.6
2017	71.6	40.9	30.7	75.5	47.9	27.6
2018	71.8	41.2	30.7	75.7	48.1	27.6
2019	72.0	41.3	30.7	75.9	48.3	27.6
2020	72.2	41.5	30.7	76.0	48.5	27.5
2021	72.3	41.6	30.7	76.2	48.7	27.5
2022	72.5	41.7	30.7	76.3	48.8	27.5
2023	72.6	41.8	30.8	76.5	48.9	27.5
2024	72.7	41.9	30.8	76.6	49.0	27.5
2025	72.8	42.0	30.9	76.7	49.1	27.6
2026	73.0	42.0	30.9	76.8	49.2	27.6
2027	73.1	42.1	31.0	76.9	49.3	27.6
2028	73.2	42.1	31.1	77.1	49.4	27.6
2029	73.3	42.1	31.2	77.2	49.5	27.7

2030	73.5	42.2	31.3		77.3	49.6	27.7
2031	73.6	42.2	31.4		77.5	49.7	27.8
2032	73.8	42.3	31.5		77.7	49.9	27.8
2033	74.0	42.4	31.6		77.8	50.0	27.9
2034	74.2	42.5	31.7		78.1	50.1	27.9
2035	74.4	42.6	31.8		78.3	50.3	28.0
2036	74.7	42.8	31.9		78.5	50.5	28.0
2037	74.9	42.9	32.0		78.8	50.7	28.1
2038	75.2	43.1	32.1		79.1	50.9	28.1
2039	75.5	43.3	32.2		79.4	51.2	28.2
2040	75.8	43.5	32.3		79.7	51.4	28.3
2041	76.1	43.7	32.4		79.9	51.6	28.3
2042	76.4	43.8	32.5		80.2	51.8	28.4
2043	76.6	44.0	32.6		80.5	52.0	28.5
2044	76.8	44.1	32.7		80.7	52.1	28.6
2045	77.0	44.2	32.9		80.9	52.2	28.7
2046	77.2	44.2	33.0		81.1	52.3	28.7
2047	77.4	44.3	33.1		81.2	52.4	28.8
2048	77.5	44.3	33.2		81.4	52.5	28.9
2049	77.7	44.4	33.3		81.5	52.5	29.0
2050	77.8	44.3	33.5		81.6	52.5	29.1
2051	77.4	43.8	33.6		81.3	52.0	29.3
2052	77.5	43.8	33.7		81.4	52.0	29.4
2053	77.6	43.7	33.8		81.4	51.9	29.5
2054	77.6	43.7	34.0		81.5	51.9	29.6
2055	77.7	43.6	34.1		81.6	51.9	29.7
2056	77.8	43.6	34.1		81.6	51.8	29.8
2057	77.8	43.6	34.2		81.7	51.8	29.9
2058	77.8	43.5	34.3		81.7	51.7	30.0
2059	77.9	43.5	34.4		81.7	51.7	30.0
2060	77.9	43.4	34.5		81.8	51.6	30.1
2061	77.9	43.4	34.5		81.8	51.6	30.2
2062	77.9	43.3	34.6		81.8	51.5	30.3
2063	77.9	43.3	34.6		81.8	51.5	30.3
2064	77.9	43.2	34.7		81.8	51.4	30.4
2065	77.9	43.2	34.7		81.8	51.3	30.5
2066	77.9	43.1	34.8		81.8	51.2	30.5
2067	77.9	43.1	34.8		81.7	51.2	30.6
2068	77.9	43.0	34.8		81.7	51.1	30.6
2069	77.8	43.0	34.9		81.7	51.0	30.7
2070	77.8	43.0	34.9		81.7	51.0	30.7
2071	77.8	42.9	34.9		81.7	50.9	30.7
2072	77.8	42.9	34.9		81.6	50.9	30.7
2073	77.8	42.9	34.9		81.6	50.8	30.8
2074	77.8	42.8	34.9		81.6	50.8	30.8
2075	77.8	42.9	34.9		81.6	50.8	30.8
2076	77.8	42.9	34.9		81.6	50.8	30.8
2077	77.8	42.9	34.9		81.7	50.8	30.8
2078	77.8	42.9	34.9		81.7	50.9	30.8
2079	77.8	42.9	34.9		81.7	50.9	30.8
2080	77.8	42.9	34.9		81.7	50.8	30.8
2081	77.8	42.9	34.9		81.7	50.8	30.8
2082	77.8	42.9	34.9		81.6	50.8	30.8
2083	77.8	42.8	34.9		81.6	50.8	30.8
2084	77.8	42.8	34.9		81.6	50.8	30.8
2085	77.8	42.8	34.9		81.6	50.8	30.8
2086	77.7	42.8	34.9		81.6	50.8	30.8
2087	77.7	42.8	34.9		81.6	50.7	30.8
2088	77.7	42.8	34.9		81.6	50.7	30.8
2089	77.7	42.8	34.9		81.6	50.7	30.8
2090	77.7	42.8	34.9		81.6	50.7	30.8
2091	77.7	42.8	34.9		81.6	50.8	30.8
2092	77.8	42.8	34.9		81.6	50.8	30.8
2093	77.8	42.9	34.9		81.7	50.8	30.8
2094	77.8	42.9	34.9		81.7	50.8	30.8
2095	77.9	42.9	34.9		81.7	50.9	30.8
2096	77.9	43.0	34.9		81.7	50.9	30.8
2097	77.9	43.0	34.9		81.8	50.9	30.8
2098	77.9	43.0	34.9		81.8	50.9	30.8
2099	77.9	43.0	34.9		81.8	51.0	30.8
2100	77.9	43.0	34.9		81.8	51.0	30.8

Table D1: Simulation parameters, 1820-1913

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
	annualized macro series (current francs)							simulation series (1900 francs)							
	Real growth rate of national income g_t	National income Y_t	Savings rate s_t	Real rate of capital gains q_t	Private wealth W_t	Wealth-income ratio $\beta_t = W_t/Y_t$	Labor share $1-\alpha_t$	Per adult national income y_t	Per adult private wealth w_t	Per adult after-tax aug. labor income y_{Ldt}	After-tax rate of return r_{dt}	Savings rate in dispos. income s_{dt}	Real rate of capital gains q_t	Destr. rate d_t	Gift-bequest ratio v_t
1820	1.0%	10.8	8.1%	0.3%	58.3	537%	70%	804	4 319	526	5.5%	8.5%	0.3%	0.0%	35%
1821	1.0%	10.8	8.1%	0.3%	58.3	541%	70%	805	4 359	526	5.5%	8.5%	0.3%	0.0%	35%
1822	1.0%	10.3	8.1%	0.3%	55.9	546%	70%	806	4 399	527	5.4%	8.5%	0.3%	0.0%	35%
1823	1.0%	10.3	8.1%	0.3%	56.7	550%	70%	808	4 440	528	5.4%	8.5%	0.3%	0.0%	35%
1824	1.0%	10.4	8.1%	0.3%	57.5	554%	70%	809	4 482	529	5.3%	8.5%	0.3%	0.0%	35%
1825	1.0%	10.6	8.1%	0.3%	59.2	558%	70%	811	4 524	530	5.3%	8.5%	0.3%	0.0%	35%
1826	1.0%	11.1	8.1%	0.3%	62.6	562%	70%	813	4 568	531	5.3%	8.5%	0.3%	0.0%	35%
1827	1.0%	11.7	8.1%	0.3%	66.2	566%	70%	815	4 612	533	5.2%	8.5%	0.3%	0.0%	35%
1828	1.0%	13.0	8.1%	0.3%	73.8	570%	70%	817	4 657	534	5.2%	8.5%	0.3%	0.0%	35%
1829	1.0%	13.5	8.1%	0.3%	77.6	574%	70%	820	4 704	536	5.2%	8.5%	0.3%	0.0%	35%
1830	1.0%	13.3	8.2%	0.3%	77.1	578%	65%	822	4 751	503	5.9%	8.6%	0.3%	0.0%	34%
1831	1.0%	13.4	8.2%	0.3%	77.8	582%	65%	825	4 800	504	5.8%	8.6%	0.3%	0.0%	39%
1832	1.0%	13.4	8.2%	0.3%	78.6	586%	65%	828	4 849	506	5.8%	8.6%	0.3%	0.0%	32%
1833	1.0%	12.7	8.2%	0.3%	74.7	590%	65%	830	4 899	508	5.7%	8.6%	0.3%	0.0%	36%
1834	1.0%	12.7	8.2%	0.3%	75.3	594%	65%	833	4 949	509	5.7%	8.6%	0.3%	0.0%	36%
1835	1.0%	12.9	8.2%	0.3%	77.2	598%	65%	836	4 999	511	5.7%	8.6%	0.3%	0.0%	35%
1836	1.8%	13.3	8.2%	0.1%	79.3	596%	65%	846	5 046	517	5.7%	8.6%	0.1%	0.0%	38%
1837	1.8%	13.8	8.2%	0.1%	81.9	595%	65%	856	5 093	524	5.7%	8.6%	0.1%	0.0%	35%
1838	1.8%	14.7	8.2%	0.1%	87.1	593%	65%	867	5 142	530	5.7%	8.6%	0.1%	0.0%	40%
1839	1.8%	15.6	8.2%	0.1%	92.3	592%	65%	878	5 193	537	5.7%	8.6%	0.1%	0.0%	41%
1840	1.8%	15.6	9.6%	0.1%	92.1	590%	63%	889	5 250	528	6.0%	10.1%	0.1%	0.0%	40%
1841	1.8%	14.8	9.6%	0.1%	87.6	590%	63%	899	5 306	533	6.0%	10.1%	0.1%	0.0%	39%
1842	1.8%	15.5	9.6%	0.1%	91.6	590%	63%	909	5 362	539	6.0%	10.1%	0.1%	0.0%	38%
1843	1.8%	15.2	9.6%	0.1%	89.9	590%	63%	918	5 419	545	6.0%	10.1%	0.1%	0.0%	41%
1844	1.8%	16.1	9.6%	0.1%	94.8	590%	63%	929	5 479	551	6.0%	10.1%	0.1%	0.0%	40%
1845	1.8%	16.1	9.6%	0.1%	95.2	590%	63%	939	5 537	557	6.0%	10.1%	0.1%	0.0%	42%
1846	1.8%	17.6	9.6%	0.4%	103.9	591%	63%	950	5 616	563	6.0%	10.1%	0.4%	0.0%	44%
1847	1.8%	19.0	9.6%	0.4%	112.7	593%	63%	960	5 693	570	6.0%	10.1%	0.4%	0.0%	36%
1848	1.8%	16.7	9.6%	0.4%	99.0	594%	63%	972	5 774	577	6.0%	10.1%	0.4%	0.0%	34%
1849	1.8%	16.6	9.6%	0.4%	98.9	595%	63%	984	5 857	584	6.0%	10.1%	0.4%	0.0%	36%
1850	1.8%	16.7	10.1%	0.4%	99.8	597%	56%	996	5 944	521	7.2%	10.7%	0.4%	0.0%	34%
1851	1.8%	17.0	10.1%	0.4%	101.8	598%	56%	1 008	6 030	527	7.1%	10.7%	0.4%	0.0%	35%
1852	1.8%	18.1	10.1%	0.4%	108.5	600%	56%	1 019	6 116	533	7.1%	10.7%	0.4%	0.0%	31%
1853	1.8%	20.5	10.1%	0.4%	123.7	602%	56%	1 032	6 212	539	7.1%	10.7%	0.4%	0.0%	34%
1854	1.8%	23.4	10.1%	0.4%	141.3	604%	56%	1 044	6 303	546	7.1%	10.7%	0.4%	0.0%	36%
1855	1.8%	25.4	10.1%	0.4%	154.1	606%	56%	1 056	6 394	552	7.1%	10.7%	0.4%	0.0%	32%
1856	0.9%	26.1	10.1%	-0.1%	159.1	609%	56%	1 059	6 453	554	7.0%	10.7%	-0.1%	0.0%	34%
1857	0.9%	24.6	10.1%	-0.1%	151.1	613%	56%	1 063	6 518	556	7.0%	10.7%	-0.1%	0.0%	35%
1858	0.9%	22.6	10.1%	-0.1%	139.2	617%	56%	1 068	6 585	558	6.9%	10.7%	-0.1%	0.0%	32%
1859	0.9%	21.6	10.1%	-0.1%	133.9	620%	56%	1 072	6 652	561	6.9%	10.7%	-0.1%	0.0%	32%
1860	0.9%	24.3	9.3%	-0.1%	151.4	624%	56%	1 077	6 721	562	6.9%	9.8%	-0.1%	0.0%	31%
1861	0.9%	25.7	9.3%	-0.1%	161.3	627%	56%	1 082	6 780	565	6.8%	9.8%	-0.1%	0.0%	36%
1862	0.9%	25.2	9.3%	-0.1%	158.7	629%	56%	1 087	6 838	567	6.8%	9.8%	-0.1%	0.0%	33%
1863	0.9%	25.1	9.3%	-0.1%	158.8	632%	56%	1 091	6 897	570	6.8%	9.8%	-0.1%	0.0%	33%
1864	0.9%	24.6	9.3%	-0.1%	156.1	635%	56%	1 097	6 960	572	6.7%	9.8%	-0.1%	0.0%	30%
1865	0.9%	24.6	9.3%	-0.1%	157.0	637%	56%	1 102	7 022	575	6.7%	9.8%	-0.1%	0.0%	30%
1866	0.0%	25.8	9.3%	-1.3%	165.0	638%	56%	1 097	7 002	572	6.7%	9.8%	-1.3%	0.0%	29%
1867	0.0%	27.4	9.3%	-1.3%	175.1	639%	56%	1 092	6 983	570	6.7%	9.8%	-1.3%	0.0%	29%
1868	0.0%	27.9	9.3%	-1.3%	178.9	640%	56%	1 090	6 977	569	6.7%	9.8%	-1.3%	0.0%	28%
1869	0.0%	26.2	9.3%	-1.3%	167.8	641%	56%	1 086	6 965	567	6.7%	9.8%	-1.3%	0.0%	27%
1870	0.0%	26.8	7.8%	-1.3%	172.0	642%	58%	1 081	6 944	591	6.3%	8.2%	-1.3%	0.0%	21%
1871	0.0%	31.1	7.8%	-1.3%	199.9	642%	58%	1 146	7 356	627	6.3%	8.2%	-1.3%	0.0%	15%
1872	0.0%	28.9	7.8%	-1.3%	185.1	641%	58%	1 141	7 318	624	6.3%	8.2%	-1.3%	0.0%	30%
1873	0.0%	29.8	7.8%	-1.3%	190.7	641%	58%	1 136	7 282	622	6.3%	8.2%	-1.3%	0.0%	29%
1874	0.0%	30.3	7.8%	-1.3%	193.7	640%	58%	1 133	7 252	620	6.3%	8.2%	-1.3%	0.0%	27%
1875	0.0%	26.8	7.8%	-1.3%	171.5	640%	58%	1 129	7 225	618	6.3%	8.2%	-1.3%	0.0%	26%
1876	-0.1%	27.8	7.8%	-0.4%	179.2	645%	58%	1 126	7 267	616	6.2%	8.2%	-0.4%	0.0%	24%
1877	-0.1%	28.4	7.8%	-0.4%	185.1	651%	58%	1 121	7 299	613	6.2%	8.2%	-0.4%	0.0%	24%
1878	-0.1%	28.7	7.8%	-0.4%	188.7	657%	58%	1 117	7 333	611	6.1%	8.2%	-0.4%	0.0%	23%
1879	-0.1%	28.3	7.8%	-0.4%	187.3	662%	58%	1 111	7 361	608	6.1%	8.2%	-0.4%	0.0%	23%
1880	-0.1%	29.4	9.0%	-0.4%	196.4	668%	70%	1 105	7 379	724	4.4%	9.5%	-0.4%	0.0%	22%
1881	-0.1%	29.3	9.0%	-0.4%	197.9	675%	70%	1 100	7 423	721	4.4%	9.5%	-0.4%	0.0%	23%
1882	-0.1%	28.6	9.0%	-0.4%	195.2	682%	70%	1 094	7 459	717	4.3%	9.5%	-0.4%	0.0%	22%
1883	-0.1%	28.9	9.0%	-0.4%	199.1	688%	70%	1 089	7 494	713	4.3%	9.5%	-0.4%	0.0%	21%
1884	-0.1%	28.3	9.0%	-0.4%	196.5	695%	70%	1 083	7 526	709	4.2%	9.5%	-0.4%	0.0%	21%
1885	-0.1%	27.3	9.0%	-0.4%	191.3	702%	70%	1 077	7 558	705	4.2%	9.5%	-0.4%	0.0%	20%
1886	1.4%	27.6	9.0%	-0.3%	192.6	699%	70%	1 087	7 598	712	4.2%	9.5%	-0.3%	0.0%	20%
1887	1.4%	27.5	9.0%	-0.3%	191.8	696%	70%	1 097	7 639	719	4.2%	9.5%	-0.3%	0.0%	19%
1888	1.4%	26.8	9.0%	-0.3%	186.0	693%	70%	1 108	7 682	726	4.3%	9.5%	-0.3%	0.0%	19%
1889	1.4%	27.6	9.0%	-0.3%	190.6	691%	70%	1 119	7 731	733	4.3%	9.5%	-0.3%	0.0%	20%

1890	1.4%	28.5	10.0%	-0.3%	196.3	688%	74%	1 131	7 779	785	3.7%	10.5%	-0.3%	0.0%	17%
1891	1.4%	29.5	10.0%	-0.3%	202.1	686%	74%	1 142	7 834	793	3.7%	10.5%	-0.3%	0.0%	18%
1892	1.4%	29.6	10.0%	-0.3%	202.6	685%	74%	1 158	7 926	804	3.7%	10.5%	-0.3%	0.0%	17%
1893	1.4%	29.6	10.0%	-0.3%	201.9	683%	74%	1 170	7 991	812	3.7%	10.5%	-0.3%	0.0%	18%
1894	1.4%	30.9	10.0%	-0.3%	210.5	681%	74%	1 183	8 060	821	3.8%	10.5%	-0.3%	0.0%	18%
1895	1.4%	30.5	10.0%	-0.3%	207.4	680%	74%	1 196	8 128	830	3.8%	10.5%	-0.3%	0.0%	18%
1896	1.2%	30.4	10.0%	-0.2%	206.6	680%	74%	1 207	8 203	838	3.8%	10.5%	-0.2%	0.0%	18%
1897	1.2%	29.9	10.0%	-0.2%	203.5	680%	74%	1 217	8 275	845	3.8%	10.5%	-0.2%	0.0%	18%
1898	1.2%	30.7	10.0%	-0.2%	208.9	680%	74%	1 229	8 353	853	3.8%	10.5%	-0.2%	0.0%	19%
1899	1.2%	31.5	10.0%	-0.2%	214.4	680%	74%	1 241	8 433	861	3.8%	10.5%	-0.2%	0.0%	18%
1900	1.2%	31.9	7.1%	-0.2%	217.0	680%	74%	1 262	8 578	871	3.8%	7.5%	-0.2%	0.0%	16%
1901	1.2%	32.5	7.1%	-0.2%	219.9	677%	74%	1 277	8 647	882	3.8%	7.5%	-0.2%	0.0%	20%
1902	1.2%	32.5	7.1%	-0.2%	219.2	674%	74%	1 290	8 692	890	3.9%	7.5%	-0.2%	0.0%	19%
1903	1.2%	32.8	7.1%	-0.2%	219.8	671%	74%	1 301	8 733	898	3.9%	7.5%	-0.2%	0.0%	19%
1904	1.2%	32.7	7.1%	-0.2%	218.5	668%	74%	1 313	8 773	906	3.9%	7.5%	-0.2%	0.0%	18%
1905	1.2%	33.1	7.1%	-0.2%	220.1	666%	74%	1 324	8 815	914	3.9%	7.5%	-0.2%	0.0%	17%
1906	1.6%	34.0	7.1%	0.0%	225.4	663%	74%	1 342	8 892	926	3.9%	7.5%	0.0%	0.0%	19%
1907	1.6%	35.0	7.1%	0.0%	231.1	660%	74%	1 359	8 964	938	3.9%	7.5%	0.0%	0.0%	19%
1908	1.6%	36.4	7.1%	0.0%	239.1	657%	74%	1 378	9 049	951	4.0%	7.5%	0.0%	0.0%	18%
1909	1.6%	36.9	7.1%	0.0%	241.3	654%	74%	1 395	9 122	963	4.0%	7.5%	0.0%	0.0%	19%
1910	1.6%	38.7	8.3%	0.0%	251.6	651%	66%	1 413	9 200	868	5.2%	8.7%	0.0%	0.0%	21%
1911	1.6%	43.1	8.3%	0.0%	280.1	649%	66%	1 432	9 295	879	5.2%	8.7%	0.0%	0.0%	19%
1912	1.6%	43.3	8.3%	0.0%	280.7	648%	66%	1 450	9 392	890	5.2%	8.7%	0.0%	0.0%	19%
1913	1.6%	45.5	8.3%	0.0%	294.1	646%	66%	1 468	9 482	901	5.2%	8.7%	0.0%	0.0%	20%

Table D2: Comparison between annualized series & initial decennial estimates, 1820-1913

(billions current francs)	decennial averages of annualized series			initial decennial averages estimates			ratio		
	Y_t	W_t	$\beta_t = W_t/Y_t$	Y_t	W_t	$\beta_t = W_t/Y_t$	Y_t	W_t	$\beta_t = W_t/Y_t$
1820	11	63	557%	11	62	549%	100%	101%	101%
1830	14	80	590%	14	80	591%	100%	100%	100%
1840	16	97	592%	16	95	577%	99%	102%	102%
1850	22	131	607%	22	130	593%	99%	101%	102%
1860	26	163	634%	26	165	633%	98%	99%	100%
1870	29	185	646%	29	185	644%	100%	100%	100%
1880	28	194	689%	28	195	702%	101%	99%	98%
1890	30	205	682%	30	205	674%	99%	100%	101%
1900	34	225	666%	34	229	675%	100%	98%	99%
1910	43	277	648%	43	279	654%	100%	99%	99%

Table D3: Simulation parameters, 1896-2009

(2009 euros)	[1] Per adult national income y_t	[2] Per adult private wealth w_t	[3] Per adult after-tax aug. labor income y_{Ldt}	[4] After-tax rate of return r_{dt}	[5] Savings rate in dispos. income s_{dt}	[6] Real rate of capital gains q_t	[7] Destruction rate d_t	[8] Gift-bequest ratio v_t
1896	4 508 €	29 853 €	3 152 €	3.7%	12%	0%	0%	18%
1897	4 440 €	30 262 €	3 201 €	3.2%	11%	0%	0%	18%
1898	4 638 €	30 640 €	3 284 €	3.5%	11%	0%	0%	19%
1899	4 804 €	31 028 €	3 321 €	3.9%	12%	0%	0%	18%
1900	4 906 €	31 704 €	3 298 €	4.2%	10%	0%	0%	16%
1901	4 574 €	32 140 €	3 312 €	3.2%	6%	0%	0%	20%
1902	4 487 €	32 315 €	3 201 €	3.2%	10%	0%	0%	19%
1903	4 723 €	32 607 €	3 352 €	3.4%	8%	0%	0%	19%
1904	4 853 €	32 825 €	3 426 €	3.5%	5%	0%	0%	18%
1905	4 868 €	32 916 €	3 294 €	4.0%	8%	0%	0%	17%
1906	4 754 €	33 197 €	3 380 €	3.3%	6%	0%	0%	19%
1907	5 223 €	33 343 €	3 346 €	4.8%	9%	0%	0%	19%
1908	5 048 €	33 729 €	3 471 €	3.9%	8%	0%	0%	18%
1909	5 262 €	34 004 €	3 497 €	4.4%	6%	0%	0%	19%
1910	5 061 €	34 214 €	3 474 €	3.8%	8%	0%	0%	21%
1911	5 132 €	34 503 €	3 239 €	4.6%	4%	0%	0%	19%
1912	5 628 €	34 595 €	3 200 €	6.2%	12%	0%	0%	19%
1913	5 321 €	35 122 €	3 085 €	5.5%	10%	0%	0%	20%
1914	4 910 €	33 493 €	3 592 €	3.4%	1%	-6%	0%	20%
1915	4 638 €	31 816 €	3 795 €	2.7%	0%	-6%	-7%	20%
1916	5 252 €	28 318 €	3 902 €	5.4%	4%	-6%	-7%	20%
1917	5 200 €	24 997 €	3 787 €	6.3%	5%	-6%	-8%	20%
1918	4 558 €	21 808 €	3 633 €	5.2%	3%	-6%	-10%	20%
1919	4 848 €	18 860 €	3 560 €	8.1%	4%	-6%	0%	25%
1920	5 005 €	17 607 €	3 527 €	8.8%	24%	-6%	0%	25%
1921	5 756 €	17 635 €	3 974 €	10.1%	29%	-6%	0%	25%
1922	6 375 €	18 107 €	4 188 €	11.6%	25%	-6%	0%	25%
1923	6 427 €	18 423 €	4 075 €	12.0%	30%	-6%	0%	25%
1924	6 412 €	18 926 €	3 991 €	11.6%	26%	-6%	0%	25%
1925	6 539 €	19 181 €	4 014 €	11.5%	25%	-6%	0%	25%
1926	6 225 €	20 354 €	3 650 €	10.2%	22%	-1%	0%	25%
1927	6 089 €	21 219 €	3 570 €	9.4%	12%	-1%	0%	25%
1928	6 585 €	21 489 €	4 011 €	9.9%	22%	-1%	0%	25%
1929	6 619 €	22 410 €	3 980 €	9.3%	20%	-1%	0%	25%
1930	6 298 €	23 212 €	3 988 €	7.8%	17%	-1%	0%	25%
1931	6 039 €	23 675 €	3 908 €	6.8%	10%	-1%	0%	25%
1932	5 834 €	23 921 €	3 988 €	5.6%	3%	-1%	0%	25%
1933	5 864 €	23 754 €	3 969 €	6.4%	3%	-1%	0%	25%
1934	5 574 €	23 580 €	3 800 €	6.0%	3%	-1%	0%	25%
1935	5 967 €	23 402 €	3 979 €	7.1%	8%	-1%	0%	25%
1936	6 331 €	23 724 €	4 377 €	7.3%	18%	-1%	0%	25%
1937	6 098 €	24 686 €	4 224 €	6.5%	14%	-1%	0%	25%
1938	6 199 €	25 344 €	4 188 €	6.4%	11%	-1%	0%	25%
1939	7 193 €	26 919 €	4 630 €	7.1%	5%	-1%	0%	25%
1940	4 868 €	21 860 €	3 357 €	4.5%	5%	-20%	-6%	25%
1941	4 900 €	22 058 €	3 532 €	3.7%	4%	-1%	-6%	25%
1942	4 704 €	20 461 €	3 499 €	3.2%	3%	-1%	-6%	25%
1943	4 171 €	19 088 €	3 277 €	2.1%	1%	-1%	-7%	25%
1944	3 722 €	17 770 €	3 264 €	0.1%	-4%	-1%	-7%	14%
1945	4 739 €	16 095 €	4 031 €	0.2%	-2%	-1%	-8%	41%
1946	6 249 €	16 941 €	4 526 €	4.0%	4%	28%	0%	39%
1947	6 204 €	16 840 €	4 512 €	3.3%	3%	-1%	0%	31%
1948	6 995 €	16 668 €	4 890 €	5.0%	5%	-1%	0%	37%
1949	7 747 €	16 646 €	4 849 €	7.7%	17%	-1%	0%	32%
1950	8 242 €	17 408 €	4 875 €	9.2%	18%	-1%	0%	38%
1951	8 794 €	18 243 €	5 307 €	8.3%	17%	-1%	0%	27%
1952	9 062 €	19 078 €	5 614 €	6.8%	16%	-1%	0%	23%
1953	9 547 €	19 797 €	5 720 €	7.4%	14%	-1%	0%	28%

1954	10 091 €	20 515 €	6 139 €	7.7%	16%	-1%	0%	22%
1955	10 718 €	22 185 €	6 545 €	7.8%	18%	2%	0%	26%
1956	11 213 €	24 131 €	6 892 €	7.1%	15%	2%	0%	40%
1957	12 241 €	25 935 €	7 412 €	7.5%	17%	2%	0%	32%
1958	12 168 €	28 004 €	7 253 €	6.7%	17%	2%	0%	27%
1959	12 360 €	30 141 €	7 247 €	6.2%	16%	2%	0%	20%
1960	13 198 €	32 198 €	7 665 €	6.8%	19%	2%	0%	23%
1961	13 782 €	34 797 €	8 025 €	6.2%	18%	2%	0%	25%
1962	14 716 €	37 355 €	8 776 €	5.9%	19%	2%	0%	27%
1963	15 460 €	39 610 €	9 225 €	5.6%	18%	2%	0%	27%
1964	16 486 €	42 489 €	9 663 €	5.6%	18%	2%	0%	27%
1965	17 241 €	45 519 €	10 045 €	5.6%	19%	2%	0%	27%
1966	18 085 €	48 899 €	10 489 €	5.7%	19%	2%	0%	27%
1967	18 830 €	52 151 €	10 927 €	5.8%	20%	2%	0%	27%
1968	19 373 €	55 626 €	11 305 €	5.5%	20%	2%	0%	27%
1969	20 664 €	59 129 €	11 645 €	5.8%	19%	2%	0%	28%
1970	21 680 €	62 718 €	12 339 €	5.5%	20%	2%	0%	28%
1971	22 555 €	63 781 €	12 882 €	5.6%	20%	-2%	0%	28%
1972	23 434 €	65 749 €	13 485 €	5.4%	20%	-1%	0%	28%
1973	24 853 €	69 593 €	14 216 €	5.7%	21%	2%	0%	28%
1974	25 024 €	68 608 €	14 523 €	5.3%	19%	-6%	0%	28%
1975	24 721 €	71 471 €	15 106 €	4.1%	19%	0%	0%	28%
1976	25 814 €	74 521 €	15 469 €	3.8%	16%	0%	0%	28%
1977	26 275 €	76 905 €	15 774 €	3.9%	17%	0%	0%	28%
1978	26 928 €	78 571 €	16 452 €	3.6%	17%	-1%	0%	28%
1979	27 498 €	80 537 €	16 358 €	3.5%	15%	-1%	0%	28%
1980	27 002 €	80 464 €	16 323 €	3.1%	13%	-3%	0%	28%
1981	26 505 €	79 820 €	16 346 €	3.0%	12%	-3%	0%	29%
1982	26 758 €	78 578 €	16 625 €	2.7%	10%	-3%	0%	29%
1983	26 601 €	79 163 €	16 270 €	3.0%	10%	-1%	0%	29%
1984	26 667 €	80 505 €	15 691 €	3.5%	10%	0%	0%	29%
1985	26 892 €	80 762 €	15 557 €	4.0%	10%	-1%	0%	34%
1986	28 158 €	83 092 €	15 697 €	5.0%	13%	1%	0%	39%
1987	28 509 €	88 751 €	15 513 €	5.0%	11%	5%	0%	44%
1988	29 768 €	89 289 €	15 852 €	5.7%	13%	-1%	0%	46%
1989	30 683 €	95 330 €	16 071 €	5.7%	14%	4%	0%	49%
1990	30 934 €	102 002 €	16 357 €	5.2%	14%	5%	0%	52%
1991	30 677 €	101 069 €	16 425 €	5.1%	14%	-3%	0%	55%
1992	30 688 €	100 288 €	16 437 €	5.4%	15%	-3%	0%	58%
1993	30 000 €	99 166 €	16 282 €	5.3%	15%	-3%	0%	61%
1994	30 277 €	99 958 €	16 197 €	5.4%	15%	-2%	0%	64%
1995	30 624 €	99 078 €	16 408 €	5.5%	16%	-3%	0%	66%
1996	30 750 €	99 045 €	16 401 €	5.2%	14%	-3%	0%	69%
1997	31 338 €	102 996 €	16 518 €	5.3%	16%	1%	0%	72%
1998	32 408 €	106 005 €	16 868 €	5.4%	17%	0%	0%	75%
1999	33 419 €	110 299 €	17 375 €	5.1%	16%	1%	0%	78%
2000	34 265 €	121 756 €	17 837 €	4.7%	15%	8%	0%	81%
2001	34 545 €	127 148 €	18 361 €	4.2%	15%	2%	0%	81%
2002	34 298 €	129 888 €	18 752 €	4.0%	15%	0%	0%	81%
2003	34 347 €	136 687 €	18 641 €	4.1%	15%	3%	0%	81%
2004	34 740 €	148 075 €	18 828 €	3.7%	14%	6%	0%	81%
2005	35 120 €	165 488 €	18 926 €	3.2%	13%	10%	0%	81%
2006	35 970 €	183 356 €	19 271 €	2.9%	12%	10%	0%	82%
2007	36 927 €	198 802 €	19 790 €	2.9%	13%	7%	0%	82%
2008	36 342 €	204 511 €	19 809 €	2.7%	12%	2%	0%	82%
2009	35 380 €	195 200 €	19 285 €	2.7%	12%	-5%	0%	82%
2010	35 154 €	186 399 €	19 161 €	2.8%	12%	-5%	0%	82%

Table D4: Estimated age-labor income profile $y_{Ldt}(a)$ in France, 1820-2100

	Average augm. labor income of age group as a fraction of average augm. labor of individuals aged 50-to-59 year-old (all adults, working or not working, men and women) (augmented labor income = labor income + replacement income)							Ratio y_{Ldt}^{50-59} / y_{Ldt}^{20+} with estimated profile	Ratio y_{Ldt}^{50-59} / y_{Ldt}^{20+} with fixed 2006 profile
	20-29	30-39	40-49	50-59	60-69	70-79	80+		
1820	64%	87%	101%	100%	70%	10%	10%	127%	120%
1821	64%	87%	101%	100%	70%	10%	10%	127%	120%
1822	64%	87%	101%	100%	70%	10%	10%	127%	120%
1823	64%	87%	101%	100%	70%	10%	10%	127%	120%
1824	64%	87%	101%	100%	70%	10%	10%	127%	120%
1825	64%	87%	101%	100%	70%	10%	10%	127%	120%
1826	64%	87%	101%	100%	70%	10%	10%	127%	120%
1827	64%	87%	101%	100%	70%	10%	10%	127%	120%
1828	64%	87%	101%	100%	70%	10%	10%	127%	120%
1829	64%	87%	101%	100%	70%	10%	10%	127%	120%
1830	64%	87%	101%	100%	70%	10%	10%	126%	119%
1831	64%	87%	101%	100%	70%	10%	10%	126%	119%
1832	64%	87%	101%	100%	70%	10%	10%	126%	119%
1833	64%	87%	101%	100%	70%	10%	10%	126%	119%
1834	64%	87%	101%	100%	70%	10%	10%	126%	119%
1835	64%	87%	101%	100%	70%	10%	10%	126%	119%
1836	64%	87%	101%	100%	70%	10%	10%	126%	119%
1837	64%	87%	101%	100%	70%	10%	10%	126%	119%
1838	64%	87%	101%	100%	70%	10%	10%	126%	119%
1839	64%	87%	101%	100%	70%	10%	10%	126%	119%
1840	64%	87%	101%	100%	70%	10%	10%	125%	119%
1841	64%	87%	101%	100%	70%	10%	10%	125%	119%
1842	64%	87%	101%	100%	70%	10%	10%	125%	119%
1843	64%	87%	101%	100%	70%	10%	10%	125%	119%
1844	64%	87%	101%	100%	70%	10%	10%	125%	119%
1845	64%	87%	101%	100%	70%	10%	10%	125%	119%
1846	64%	87%	101%	100%	70%	10%	10%	125%	119%
1847	64%	87%	101%	100%	70%	10%	10%	126%	119%
1848	64%	87%	101%	100%	70%	10%	10%	126%	119%
1849	64%	87%	101%	100%	70%	10%	10%	126%	119%
1850	64%	87%	101%	100%	70%	10%	10%	126%	119%
1851	64%	87%	101%	100%	70%	10%	10%	126%	119%
1852	64%	87%	101%	100%	70%	10%	10%	126%	119%
1853	64%	87%	101%	100%	70%	10%	10%	126%	119%
1854	64%	87%	101%	100%	70%	10%	10%	126%	119%
1855	64%	87%	101%	100%	70%	10%	10%	126%	119%
1856	64%	87%	101%	100%	70%	10%	10%	126%	119%
1857	64%	87%	101%	100%	70%	10%	10%	126%	119%
1858	64%	87%	101%	100%	70%	10%	10%	126%	119%
1859	64%	87%	101%	100%	70%	10%	10%	126%	119%
1860	64%	87%	101%	100%	70%	10%	10%	126%	119%
1861	64%	87%	101%	100%	70%	10%	10%	126%	119%
1862	64%	87%	101%	100%	70%	10%	10%	126%	119%
1863	64%	87%	101%	100%	70%	10%	10%	126%	119%
1864	64%	87%	101%	100%	70%	10%	10%	126%	119%
1865	64%	87%	101%	100%	70%	10%	10%	126%	119%
1866	64%	87%	101%	100%	70%	10%	10%	126%	119%
1867	64%	87%	101%	100%	70%	10%	10%	127%	119%
1868	64%	87%	101%	100%	70%	10%	10%	127%	119%
1869	64%	87%	101%	100%	70%	10%	10%	127%	119%
1870	64%	87%	101%	100%	70%	10%	10%	127%	119%
1871	64%	87%	101%	100%	70%	10%	10%	127%	118%
1872	64%	87%	101%	100%	70%	10%	10%	127%	118%
1873	64%	87%	101%	100%	70%	10%	10%	127%	118%
1874	64%	87%	101%	100%	70%	10%	10%	127%	118%
1875	64%	87%	101%	100%	70%	10%	10%	127%	118%
1876	64%	87%	101%	100%	70%	10%	10%	127%	118%
1877	64%	87%	101%	100%	70%	10%	10%	127%	118%
1878	64%	87%	101%	100%	70%	10%	10%	127%	118%
1879	64%	87%	101%	100%	70%	10%	10%	127%	118%
1880	64%	87%	101%	100%	70%	10%	10%	127%	118%
1881	64%	87%	101%	100%	70%	10%	10%	127%	118%
1882	64%	87%	101%	100%	70%	10%	10%	127%	118%

1883	64%	87%	101%	100%	70%	10%	10%	127%	118%
1884	64%	87%	101%	100%	70%	10%	10%	127%	119%
1885	64%	87%	101%	100%	70%	10%	10%	127%	119%
1886	64%	87%	101%	100%	70%	10%	10%	127%	119%
1887	64%	87%	101%	100%	70%	10%	10%	127%	119%
1888	64%	87%	101%	100%	70%	10%	10%	127%	119%
1889	64%	87%	101%	100%	70%	10%	10%	127%	119%
1890	64%	87%	101%	100%	70%	10%	10%	127%	119%
1891	64%	87%	101%	100%	70%	10%	10%	127%	119%
1892	64%	87%	101%	100%	70%	10%	10%	127%	119%
1893	64%	87%	101%	100%	70%	10%	10%	127%	119%
1894	64%	87%	101%	100%	70%	10%	10%	127%	119%
1895	64%	87%	101%	100%	70%	10%	10%	128%	119%
1896	64%	87%	101%	100%	70%	10%	10%	128%	119%
1897	64%	87%	101%	100%	70%	10%	10%	128%	119%
1898	64%	87%	101%	100%	70%	10%	10%	128%	119%
1899	64%	87%	101%	100%	70%	10%	10%	128%	119%
1900	64%	87%	101%	100%	70%	10%	10%	128%	119%
1901	64%	87%	101%	100%	70%	13%	13%	127%	119%
1902	64%	87%	101%	100%	70%	14%	14%	127%	119%
1903	64%	87%	101%	100%	70%	13%	13%	127%	119%
1904	64%	87%	101%	100%	70%	10%	10%	128%	119%
1905	64%	87%	101%	100%	70%	14%	13%	127%	119%
1906	64%	87%	101%	100%	70%	13%	13%	127%	119%
1907	64%	87%	101%	100%	70%	13%	13%	127%	119%
1908	64%	87%	101%	100%	70%	15%	15%	127%	119%
1909	64%	87%	101%	100%	70%	15%	15%	127%	119%
1910	64%	87%	101%	100%	70%	18%	17%	126%	119%
1911	64%	87%	101%	100%	70%	17%	17%	127%	119%
1912	64%	87%	101%	100%	69%	17%	17%	127%	119%
1913	64%	87%	101%	100%	69%	16%	16%	127%	118%
1914	64%	87%	101%	100%	68%	14%	13%	127%	118%
1915	64%	87%	101%	100%	69%	35%	35%	124%	118%
1916	64%	87%	101%	100%	69%	52%	51%	122%	118%
1917	64%	87%	101%	100%	69%	43%	43%	123%	118%
1918	64%	87%	101%	100%	69%	52%	51%	122%	118%
1919	64%	87%	101%	100%	69%	54%	53%	122%	118%
1920	64%	87%	101%	100%	67%	35%	35%	124%	118%
1921	64%	87%	101%	100%	67%	37%	37%	124%	118%
1922	64%	87%	101%	100%	67%	39%	38%	124%	118%
1923	64%	87%	101%	100%	66%	33%	32%	125%	118%
1924	64%	87%	101%	100%	66%	31%	31%	126%	118%
1925	64%	87%	101%	100%	65%	31%	30%	126%	118%
1926	64%	87%	101%	100%	64%	23%	23%	127%	119%
1927	64%	87%	101%	100%	65%	34%	33%	126%	119%
1928	64%	87%	101%	100%	68%	53%	52%	123%	119%
1929	64%	87%	101%	100%	66%	39%	39%	125%	119%
1930	64%	87%	101%	100%	67%	48%	47%	124%	119%
1931	64%	87%	101%	100%	68%	54%	54%	123%	119%
1932	64%	87%	101%	100%	69%	60%	59%	122%	119%
1933	64%	87%	101%	100%	70%	67%	66%	121%	119%
1934	64%	87%	101%	100%	71%	70%	69%	120%	119%
1935	64%	87%	101%	100%	71%	71%	70%	120%	119%
1936	64%	87%	101%	100%	69%	63%	62%	121%	118%
1937	64%	87%	101%	100%	66%	51%	50%	123%	118%
1938	64%	87%	101%	100%	67%	53%	52%	123%	118%
1939	64%	87%	101%	100%	64%	40%	40%	125%	117%
1940	64%	87%	101%	100%	64%	42%	41%	125%	117%
1941	64%	87%	101%	100%	63%	39%	39%	124%	116%
1942	64%	87%	101%	100%	62%	37%	37%	125%	117%
1943	64%	87%	101%	100%	61%	35%	35%	126%	117%
1944	64%	87%	101%	100%	60%	31%	30%	127%	117%
1945	64%	87%	101%	100%	60%	32%	31%	127%	117%
1946	64%	87%	101%	100%	62%	39%	39%	125%	117%
1947	64%	87%	101%	100%	61%	39%	38%	126%	118%
1948	64%	87%	101%	100%	61%	40%	39%	126%	118%
1949	64%	87%	101%	100%	63%	46%	45%	125%	118%
1950	64%	87%	101%	100%	65%	51%	50%	124%	118%
1951	64%	87%	101%	100%	64%	50%	49%	124%	118%
1952	64%	87%	101%	100%	64%	49%	48%	125%	118%
1953	64%	87%	101%	100%	65%	51%	50%	124%	118%
1954	64%	87%	101%	100%	64%	51%	50%	124%	118%
1955	64%	87%	101%	100%	64%	51%	50%	124%	118%

1956	64%	87%	101%	100%	64%	51%	50%	124%	118%
1957	64%	87%	101%	100%	64%	51%	50%	125%	118%
1958	64%	87%	101%	100%	63%	49%	48%	125%	118%
1959	64%	87%	101%	100%	63%	49%	48%	125%	118%
1960	64%	87%	101%	100%	67%	55%	55%	124%	119%
1961	64%	87%	101%	100%	68%	57%	56%	123%	118%
1962	64%	87%	101%	100%	69%	57%	56%	123%	118%
1963	64%	87%	101%	100%	69%	58%	58%	122%	118%
1964	64%	87%	101%	100%	70%	60%	59%	122%	118%
1965	64%	87%	101%	100%	71%	61%	60%	122%	118%
1966	64%	87%	101%	100%	72%	61%	60%	122%	118%
1967	64%	87%	101%	100%	72%	61%	60%	122%	119%
1968	64%	87%	101%	100%	73%	62%	61%	122%	119%
1969	64%	87%	101%	100%	73%	62%	61%	122%	119%
1970	64%	87%	101%	100%	73%	60%	59%	123%	119%
1971	64%	87%	101%	100%	72%	59%	58%	123%	120%
1972	64%	87%	101%	100%	72%	59%	58%	124%	120%
1973	64%	87%	101%	100%	73%	59%	58%	124%	120%
1974	64%	87%	101%	100%	73%	59%	58%	124%	120%
1975	64%	87%	101%	100%	76%	64%	63%	123%	121%
1976	64%	87%	101%	100%	76%	64%	63%	123%	121%
1977	64%	87%	101%	100%	77%	66%	65%	122%	120%
1978	64%	87%	101%	100%	78%	68%	67%	121%	120%
1979	64%	87%	101%	100%	79%	69%	68%	121%	120%
1980	64%	87%	101%	100%	80%	70%	68%	120%	120%
1981	64%	87%	101%	100%	81%	71%	70%	120%	120%
1982	64%	87%	101%	100%	82%	73%	72%	119%	120%
1983	64%	87%	101%	100%	83%	73%	72%	119%	120%
1984	64%	87%	101%	100%	84%	75%	74%	119%	120%
1985	64%	87%	101%	100%	84%	75%	74%	119%	120%
1986	64%	87%	101%	100%	85%	76%	75%	118%	120%
1987	64%	87%	101%	100%	85%	76%	75%	118%	120%
1988	64%	87%	101%	100%	85%	76%	75%	118%	120%
1989	64%	87%	101%	100%	84%	75%	74%	118%	120%
1990	64%	87%	101%	100%	83%	73%	72%	119%	120%
1991	64%	87%	101%	100%	83%	73%	72%	119%	120%
1992	64%	87%	101%	100%	83%	74%	73%	118%	120%
1993	64%	87%	101%	100%	84%	75%	74%	118%	120%
1994	64%	87%	101%	100%	83%	74%	73%	118%	120%
1995	64%	87%	101%	100%	82%	73%	72%	118%	119%
1996	64%	87%	101%	100%	83%	74%	72%	118%	119%
1997	64%	87%	101%	100%	83%	74%	73%	118%	119%
1998	64%	87%	101%	100%	80%	71%	70%	119%	119%
1999	64%	87%	101%	100%	80%	70%	69%	119%	119%
2000	64%	87%	101%	100%	79%	69%	68%	119%	119%
2001	64%	87%	101%	100%	78%	68%	67%	119%	119%
2002	64%	87%	101%	100%	78%	69%	68%	119%	118%
2003	64%	87%	101%	100%	79%	70%	69%	119%	118%
2004	64%	87%	101%	100%	80%	70%	69%	118%	118%
2005	64%	87%	101%	100%	79%	70%	68%	119%	118%
2006	64%	87%	101%	100%	80%	70%	69%	118%	118%
2007	64%	87%	101%	100%	80%	70%	69%	118%	118%
2008	64%	87%	101%	100%	80%	70%	69%	118%	118%
2009	64%	87%	101%	100%	80%	70%	69%	118%	118%
2010	64%	87%	101%	100%	80%	70%	69%	119%	119%
2011	64%	87%	101%	100%	80%	70%	69%	119%	119%
2012	64%	87%	101%	100%	80%	70%	69%	119%	119%
2013	64%	87%	101%	100%	80%	70%	69%	119%	119%
2014	64%	87%	101%	100%	80%	70%	69%	119%	119%
2015	64%	87%	101%	100%	80%	70%	69%	119%	119%
2016	64%	87%	101%	100%	80%	70%	69%	119%	119%
2017	64%	87%	101%	100%	80%	70%	69%	119%	119%
2018	64%	87%	101%	100%	80%	70%	69%	119%	119%
2019	64%	87%	101%	100%	80%	70%	69%	119%	119%
2020	64%	87%	101%	100%	80%	70%	69%	119%	119%
2021	64%	87%	101%	100%	80%	70%	69%	119%	119%
2022	64%	87%	101%	100%	80%	70%	69%	119%	119%
2023	64%	87%	101%	100%	80%	70%	69%	120%	120%
2024	64%	87%	101%	100%	80%	70%	69%	120%	120%
2025	64%	87%	101%	100%	80%	70%	69%	120%	120%
2026	64%	87%	101%	100%	80%	70%	69%	120%	120%
2027	64%	87%	101%	100%	80%	70%	69%	120%	120%
2028	64%	87%	101%	100%	80%	70%	69%	120%	120%

2029	64%	87%	101%	100%	80%	70%	69%	120%	120%
2030	64%	87%	101%	100%	80%	70%	69%	121%	121%
2031	64%	87%	101%	100%	80%	70%	69%	121%	121%
2032	64%	87%	101%	100%	80%	70%	69%	121%	121%
2033	64%	87%	101%	100%	80%	70%	69%	121%	121%
2034	64%	87%	101%	100%	80%	70%	69%	121%	121%
2035	64%	87%	101%	100%	80%	70%	69%	121%	121%
2036	64%	87%	101%	100%	80%	70%	69%	121%	121%
2037	64%	87%	101%	100%	80%	70%	69%	121%	121%
2038	64%	87%	101%	100%	80%	70%	69%	121%	121%
2039	64%	87%	101%	100%	80%	70%	69%	121%	121%
2040	64%	87%	101%	100%	80%	70%	69%	121%	121%
2041	64%	87%	101%	100%	80%	70%	69%	121%	121%
2042	64%	87%	101%	100%	80%	70%	69%	121%	121%
2043	64%	87%	101%	100%	80%	70%	69%	121%	121%
2044	64%	87%	101%	100%	80%	70%	69%	121%	121%
2045	64%	87%	101%	100%	80%	70%	69%	121%	121%
2046	64%	87%	101%	100%	80%	70%	69%	121%	121%
2047	64%	87%	101%	100%	80%	70%	69%	121%	121%
2048	64%	87%	101%	100%	80%	70%	69%	121%	121%
2049	64%	87%	101%	100%	80%	70%	69%	121%	121%
2050	64%	87%	101%	100%	80%	70%	69%	121%	121%
2051	64%	87%	101%	100%	80%	70%	69%	121%	121%
2052	64%	87%	101%	100%	80%	70%	69%	122%	122%
2053	64%	87%	101%	100%	80%	70%	69%	122%	122%
2054	64%	87%	101%	100%	80%	70%	69%	122%	122%
2055	64%	87%	101%	100%	80%	70%	69%	122%	122%
2056	64%	87%	101%	100%	80%	70%	69%	122%	122%
2057	64%	87%	101%	100%	80%	70%	69%	122%	122%
2058	64%	87%	101%	100%	80%	70%	69%	122%	122%
2059	64%	87%	101%	100%	80%	70%	69%	122%	122%
2060	64%	87%	101%	100%	80%	70%	69%	122%	122%
2061	64%	87%	101%	100%	80%	70%	69%	122%	122%
2062	64%	87%	101%	100%	80%	70%	69%	122%	122%
2063	64%	87%	101%	100%	80%	70%	69%	122%	122%
2064	64%	87%	101%	100%	80%	70%	69%	122%	122%
2065	64%	87%	101%	100%	80%	70%	69%	122%	122%
2066	64%	87%	101%	100%	80%	70%	69%	122%	122%
2067	64%	87%	101%	100%	80%	70%	69%	122%	122%
2068	64%	87%	101%	100%	80%	70%	69%	122%	122%
2069	64%	87%	101%	100%	80%	70%	69%	122%	122%
2070	64%	87%	101%	100%	80%	70%	69%	122%	122%
2071	64%	87%	101%	100%	80%	70%	69%	122%	122%
2072	64%	87%	101%	100%	80%	70%	69%	122%	122%
2073	64%	87%	101%	100%	80%	70%	69%	122%	122%
2074	64%	87%	101%	100%	80%	70%	69%	122%	122%
2075	64%	87%	101%	100%	80%	70%	69%	122%	122%
2076	64%	87%	101%	100%	80%	70%	69%	122%	122%
2077	64%	87%	101%	100%	80%	70%	69%	122%	122%
2078	64%	87%	101%	100%	80%	70%	69%	122%	122%
2079	64%	87%	101%	100%	80%	70%	69%	122%	122%
2080	64%	87%	101%	100%	80%	70%	69%	122%	122%
2081	64%	87%	101%	100%	80%	70%	69%	122%	122%
2082	64%	87%	101%	100%	80%	70%	69%	122%	122%
2083	64%	87%	101%	100%	80%	70%	69%	122%	122%
2084	64%	87%	101%	100%	80%	70%	69%	122%	122%
2085	64%	87%	101%	100%	80%	70%	69%	122%	122%
2086	64%	87%	101%	100%	80%	70%	69%	122%	122%
2087	64%	87%	101%	100%	80%	70%	69%	122%	122%
2088	64%	87%	101%	100%	80%	70%	69%	122%	122%
2089	64%	87%	101%	100%	80%	70%	69%	122%	122%
2090	64%	87%	101%	100%	80%	70%	69%	122%	122%
2091	64%	87%	101%	100%	80%	70%	69%	122%	122%
2092	64%	87%	101%	100%	80%	70%	69%	122%	122%
2093	64%	87%	101%	100%	80%	70%	69%	122%	122%
2094	64%	87%	101%	100%	80%	70%	69%	122%	122%
2095	64%	87%	101%	100%	80%	70%	69%	122%	122%
2096	64%	87%	101%	100%	80%	70%	69%	122%	122%
2097	64%	87%	101%	100%	80%	70%	69%	122%	122%
2098	64%	87%	101%	100%	80%	70%	69%	122%	122%
2099	64%	87%	101%	100%	80%	70%	69%	122%	122%
2100	64%	87%	101%	100%	80%	70%	69%	122%	122%

Table D5: Summary simulation results 1820-1913

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
	Observed series		**Simulated series**											
	Inheritance flow - national income ratio $b_{yt} = B_t/Y_t$ and ratio μ_t^*		Observed gift-bequest ratio v_t						Gift-bequest ratio frozen to v_t=0%					
			a1: class savings (s_K=s/α, s_L=0)		a2: uniform savings (s=s_K=s_L)		a3: reverse class savings (s_K=0, s_L=s/(1-α))		b1: class savings (s_K=s/α, s_L=0)		b2: uniform savings (s=s_K=s_L)		b3: reverse class savings (s_K=0, s_L=s/(1-α))	
	b_{yt}	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*
1820	**20.3%**	166%	**21.0%**	170%	**20.5%**	166%	**20.3%**	165%	**15.9%**	128%	**15.5%**	125%	**15.3%**	124%
1830	**20.8%**	159%	**22.0%**	169%	**20.9%**	160%	**20.4%**	156%	**17.6%**	135%	**16.6%**	127%	**16.2%**	124%
1840	**21.1%**	165%	**19.8%**	152%	**19.0%**	145%	**18.6%**	142%	**17.2%**	131%	**16.2%**	124%	**15.7%**	120%
1850	**20.0%**	161%	**17.0%**	134%	**16.8%**	132%	**16.6%**	130%	**16.8%**	132%	**15.9%**	124%	**15.3%**	120%
1860	**20.2%**	148%	**18.6%**	137%	**18.5%**	135%	**18.1%**	133%	**18.7%**	137%	**17.7%**	130%	**17.0%**	124%
1870	**22.3%**	159%	**19.9%**	142%	**19.3%**	138%	**18.8%**	134%	**19.8%**	141%	**18.7%**	134%	**17.9%**	128%
1880	**24.4%**	159%	**21.7%**	144%	**20.8%**	138%	**20.3%**	134%	**21.1%**	140%	**20.0%**	133%	**19.4%**	129%
1890	**23.9%**	161%	**21.6%**	144%	**20.5%**	136%	**20.1%**	134%	**21.0%**	140%	**19.7%**	132%	**19.2%**	128%
1900	**24.1%**	159%	**22.0%**	148%	**20.9%**	140%	**20.6%**	138%	**21.1%**	142%	**19.8%**	133%	**19.4%**	130%
1910	**22.7%**	162%	**20.9%**	150%	**20.0%**	144%	**19.7%**	141%	**19.9%**	143%	**18.7%**	135%	**18.4%**	132%

Table D6: Summary simulation results 1900-2100

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
	Observed series		**Simulated series**													
	Inheritance flow - national income ratio $b_{yt} = B_t/Y_t$ and ratio μ_t^*		Uniform savings ($s=s_k=s_l$) (2010-2100: g=1.7%, (1-τ)r=3.0%, s=9.4%)						Estimated age-labor income profile (2010-2100: g=1.7%, (1-τ)r=3.0%, s=9.4%)							
			a1: estimated age-labor income profile		a2: flat age-labor income profile		a3: fixed 2006 age labor income profile		b1: class savings (s_k =s/α, s_L=0)		b2: reverse class savings (s_k =0,s_L=s/(1-α))		c1: uniform savings & gifts v_t frozen in 1980		c2: uniform savings & gifts frozen to v_t=0%	
	b_{yt}	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*
1900	**24.1%**	159%	**23.7%**	157%	**23.9%**	158%	**23.9%**	158%	**24.2%**	160%	**23.6%**	156%	**23.7%**	157%	**20.3%**	134%
1910	**22.7%**	162%	**21.5%**	153%	**21.7%**	155%	**21.7%**	155%	**22.4%**	160%	**21.1%**	151%	**21.5%**	153%	**18.8%**	134%
1920	**9.8%**	151%	**8.5%**	132%	**8.5%**	132%	**8.8%**	136%	**9.6%**	148%	**8.1%**	125%	**8.5%**	132%	**7.8%**	120%
1930	**11.0%**	142%	**10.0%**	128%	**10.3%**	132%	**10.3%**	133%	**11.3%**	145%	**9.5%**	122%	**10.0%**	128%	**9.3%**	120%
1940	**9.8%**	122%	**10.3%**	136%	**10.2%**	134%	**10.4%**	137%	**11.1%**	145%	**10.0%**	132%	**10.3%**	136%	**9.3%**	120%
1950	**4.3%**	124%	**5.3%**	151%	**5.4%**	153%	**5.4%**	154%	**6.0%**	172%	**5.1%**	146%	**5.3%**	151%	**4.8%**	137%
1960	**5.9%**	138%	**6.3%**	149%	**6.5%**	155%	**6.5%**	154%	**7.8%**	185%	**6.0%**	142%	**6.3%**	149%	**5.8%**	136%
1970	**6.2%**	145%	**6.8%**	159%	**7.0%**	165%	**7.0%**	163%	**8.9%**	209%	**6.4%**	151%	**6.8%**	159%	**6.1%**	143%
1980	**6.4%**	156%	**7.4%**	180%	**7.4%**	182%	**7.4%**	182%	**9.7%**	238%	**7.0%**	172%	**7.0%**	171%	**6.3%**	154%
1990	**7.7%**	192%	**9.1%**	227%	**9.0%**	223%	**9.1%**	226%	**11.9%**	295%	**8.7%**	216%	**7.4%**	185%	**6.8%**	168%
2000	**11.4%**	221%	**12.7%**	241%	**12.5%**	237%	**12.6%**	239%	**16.2%**	309%	**12.0%**	228%	**10.4%**	198%	**9.6%**	182%
2010	**14.5%**	223%	**14.4%**	227%	**14.4%**	227%	**14.4%**	227%	**16.8%**	265%	**13.8%**	217%	**13.1%**	206%	**12.1%**	191%
2020			**14.1%**	215%	**14.1%**	216%	**14.1%**	215%	**15.7%**	240%	**13.5%**	207%	**13.6%**	209%	**12.8%**	196%
2030			**14.5%**	211%	**14.6%**	212%	**14.6%**	212%	**16.3%**	237%	**14.1%**	205%	**14.2%**	206%	**13.5%**	196%
2040			**15.7%**	205%	**15.8%**	207%	**15.7%**	206%	**17.4%**	229%	**15.2%**	199%	**15.1%**	198%	**14.5%**	190%
2050			**16.0%**	203%	**16.2%**	205%	**16.0%**	203%	**18.4%**	233%	**15.5%**	196%	**15.4%**	194%	**14.9%**	188%
2060			**16.5%**	205%	**16.7%**	207%	**16.5%**	205%	**19.0%**	236%	**15.9%**	197%	**15.8%**	196%	**15.2%**	189%
2070			**16.3%**	204%	**16.5%**	206%	**16.3%**	204%	**18.7%**	233%	**15.8%**	197%	**15.6%**	195%	**14.9%**	187%
2080			**16.1%**	201%	**16.2%**	203%	**16.1%**	201%	**18.1%**	226%	**15.6%**	195%	**15.3%**	191%	**14.6%**	182%
2090			**16.0%**	197%	**16.1%**	199%	**16.0%**	197%	**17.8%**	219%	**15.5%**	191%	**15.1%**	186%	**14.4%**	177%

Table D6: Summary simulation results 1900-2100 (contd')

	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	[31]	[32]
	Simulated series															
	Uniform savings ($s=s_k=s_l$) & estimated age-labor income profile (2010-2100: growth slowdown to 1.0%)								Uniform savings ($s=s_k=s_l$) & estimated age-labor income profile (2010-2100: growth slowdown to 1.0%) (1900-2100: gifts frozen to v_t=0%)							
	d1: 2010-2100: g=1.0%, (1-τ)r=3.0%, s=9.4%		d2: 2010-2100: g=1.0%, (1-τ)r=5.0%, s=9.4%		d3: 2010-2100: g=1.0%, (1-τ)r=3.0%, s=6.0%		d4: 2010-2100: g=1.0%, (1-τ)r=5.0%, s=6.0%		e1: 2010-2100: g=1.0%, (1-τ)r=3.0%, s=9.4%		e2: 2010-2100: g=1.0%, (1-τ)r=5.0%, s=9.4%		e3: 2010-2100: g=1.0%, (1-τ)r=3.0%, s=6.0%		e4: 2010-2100: g=1.0%, (1-τ)r=5.0%, s=6.0%	
	$\mathbf{b_{yt}}$	μ_t^*	$\mathbf{b_{yt}}$	μ_t^*	$\mathbf{b_{yt}}$	μ_t^*	$\mathbf{b_{yt}}$	μ_t^*	$\mathbf{b_{yt}}$	μ_t^*	$\mathbf{b_{yt}}$	μ_t^*	$\mathbf{b_{yt}}$	μ_t^*	$\mathbf{b_{yt}}$	μ_t^*
1900	**23.7%**	157%	**23.7%**	157%	**23.7%**	157%	**23.7%**	157%	**20.3%**	134%	**20.3%**	134%	**20.3%**	134%	**20.3%**	134%
1910	**21.5%**	153%	**21.5%**	153%	**21.5%**	153%	**21.5%**	153%	**18.8%**	134%	**18.8%**	134%	**18.8%**	134%	**18.8%**	134%
1920	**8.5%**	132%	**8.5%**	132%	**8.5%**	132%	**8.5%**	132%	**7.8%**	120%	**7.8%**	120%	**7.8%**	120%	**7.8%**	120%
1930	**10.0%**	128%	**10.0%**	128%	**10.0%**	128%	**10.0%**	128%	**9.3%**	120%	**9.3%**	120%	**9.3%**	120%	**9.3%**	120%
1940	**10.3%**	136%	**10.3%**	136%	**10.3%**	136%	**10.3%**	136%	**9.3%**	120%	**9.3%**	120%	**9.3%**	120%	**9.3%**	120%
1950	**5.3%**	151%	**5.3%**	151%	**5.3%**	151%	**5.3%**	151%	**4.8%**	137%	**4.8%**	137%	**4.8%**	137%	**4.8%**	137%
1960	**6.3%**	149%	**6.3%**	149%	**6.3%**	149%	**6.3%**	149%	**5.8%**	136%	**5.8%**	136%	**5.8%**	136%	**5.8%**	136%
1970	**6.8%**	159%	**6.8%**	159%	**6.8%**	159%	**6.8%**	159%	**6.1%**	143%	**6.1%**	143%	**6.1%**	143%	**6.1%**	143%
1980	**7.4%**	180%	**7.4%**	180%	**7.4%**	180%	**7.4%**	180%	**6.3%**	154%	**6.3%**	154%	**6.3%**	154%	**6.3%**	154%
1990	**9.1%**	227%	**9.1%**	227%	**9.1%**	227%	**9.1%**	227%	**6.8%**	168%	**6.8%**	168%	**6.8%**	168%	**6.8%**	168%
2000	**12.7%**	241%	**12.7%**	241%	**12.7%**	241%	**12.7%**	241%	**9.6%**	182%	**9.6%**	182%	**9.6%**	182%	**9.6%**	182%
2010	**14.9%**	227%	**14.9%**	228%	**14.6%**	230%	**14.6%**	230%	**12.5%**	191%	**12.6%**	192%	**12.3%**	194%	**12.4%**	195%
2020	**15.3%**	216%	**15.5%**	218%	**14.4%**	220%	**14.5%**	222%	**14.0%**	197%	**14.3%**	202%	**13.4%**	204%	**13.5%**	207%
2030	**16.7%**	213%	**17.0%**	217%	**15.1%**	219%	**15.3%**	222%	**15.6%**	198%	**16.0%**	205%	**14.3%**	207%	**14.6%**	211%
2040	**18.8%**	208%	**19.3%**	214%	**16.5%**	215%	**16.7%**	219%	**17.5%**	194%	**18.2%**	201%	**15.5%**	203%	**15.9%**	208%
2050	**20.1%**	207%	**20.7%**	213%	**16.9%**	213%	**17.3%**	217%	**18.8%**	194%	**19.6%**	202%	**16.0%**	202%	**16.5%**	207%
2060	**21.5%**	210%	**22.1%**	216%	**17.4%**	215%	**17.8%**	219%	**20.0%**	196%	**20.8%**	204%	**16.4%**	202%	**16.9%**	208%
2070	**21.9%**	211%	**22.5%**	216%	**17.2%**	213%	**17.5%**	217%	**20.3%**	195%	**21.1%**	203%	**16.1%**	199%	**16.5%**	204%
2080	**22.1%**	207%	**22.7%**	212%	**16.9%**	209%	**17.2%**	213%	**20.4%**	191%	**21.1%**	198%	**15.7%**	194%	**16.1%**	198%
2090	**22.4%**	203%	**22.9%**	208%	**16.8%**	205%	**17.1%**	208%	**20.5%**	186%	**21.2%**	192%	**15.4%**	188%	**15.7%**	192%

Table D6: Summary simulation results 1900-2100 (end)

	[33]	[34]	[35]	[36]	[37]	[38]	[39]	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]
	Simulated series															
	Uniform savings ($s=s_k=s_l$) & estimated age-labor income profile (2010-2100: growth boom to 5.0%)								Uniform savings ($s=s_k=s_l$) & estimated age-labor income profile (2010-2100: growth boom to 5.0%) (1900-2100: gifts frozen to v_t=0%)							
	f1: 2010-2100: g=5.0%, (1-τ)r=3.0%, s=9.4%		f2: 2010-2100: g=5.0%, (1-τ)r=5.0%, s=9.4%		f3: 2010-2100: g=5.0%, (1-τ)r=3.0%, s=25.0%		f4: 2010-2100: g=5.0%, (1-τ)r=5.0%, s=25.0%		g1: 2010-2100: g=5.0%, (1-τ)r=3.0%, s=9.4%		g2: 2010-2100: g=5.0%, (1-τ)r=5.0%, s=9.4%		g3: 2010-2100: g=5.0%, (1-τ)r=3.0%, s=25.0%		g4: 2010-2100: g=5.0%, (1-τ)r=5.0%, s=25.0%	
	b_{yt}	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*	**b_{yt}**	μ_t^*
1900	**23.7%**	157%	**23.7%**	157%	**23.7%**	157%	**23.7%**	157%	**20.3%**	134%	**20.3%**	134%	**20.3%**	134%	**20.3%**	134%
1910	**21.5%**	153%	**21.5%**	153%	**21.5%**	153%	**21.5%**	153%	**18.8%**	134%	**18.8%**	134%	**18.8%**	134%	**18.8%**	134%
1920	**8.5%**	132%	**8.5%**	132%	**8.5%**	132%	**8.5%**	132%	**7.8%**	120%	**7.8%**	120%	**7.8%**	120%	**7.8%**	120%
1930	**10.0%**	128%	**10.0%**	128%	**10.0%**	128%	**10.0%**	128%	**9.3%**	120%	**9.3%**	120%	**9.3%**	120%	**9.3%**	120%
1940	**10.3%**	136%	**10.3%**	136%	**10.3%**	136%	**10.3%**	136%	**9.3%**	120%	**9.3%**	120%	**9.3%**	120%	**9.3%**	120%
1950	**5.3%**	151%	**5.3%**	151%	**5.3%**	151%	**5.3%**	151%	**4.8%**	137%	**4.8%**	137%	**4.8%**	137%	**4.8%**	137%
1960	**6.3%**	149%	**6.3%**	149%	**6.3%**	149%	**6.3%**	149%	**5.8%**	136%	**5.8%**	136%	**5.8%**	136%	**5.8%**	136%
1970	**6.8%**	159%	**6.8%**	159%	**6.8%**	159%	**6.8%**	159%	**6.1%**	143%	**6.1%**	143%	**6.1%**	143%	**6.1%**	143%
1980	**7.4%**	180%	**7.4%**	180%	**7.4%**	180%	**7.4%**	180%	**6.3%**	154%	**6.3%**	154%	**6.3%**	154%	**6.3%**	154%
1990	**9.1%**	227%	**9.1%**	227%	**9.1%**	227%	**9.1%**	227%	**6.8%**	168%	**6.8%**	168%	**6.8%**	168%	**6.8%**	168%
2000	**12.7%**	241%	**12.7%**	241%	**12.7%**	241%	**12.7%**	241%	**9.6%**	182%	**9.6%**	182%	**9.6%**	182%	**9.6%**	182%
2010	**12.6%**	227%	**12.6%**	228%	**13.6%**	218%	**13.7%**	219%	**10.5%**	190%	**10.6%**	191%	**11.2%**	179%	**11.4%**	182%
2020	**9.2%**	212%	**9.3%**	214%	**12.3%**	196%	**12.6%**	201%	**8.3%**	190%	**8.4%**	194%	**10.4%**	167%	**10.9%**	175%
2030	**7.5%**	202%	**7.6%**	206%	**12.0%**	186%	**12.4%**	192%	**6.7%**	180%	**6.9%**	186%	**10.0%**	156%	**10.7%**	166%
2040	**6.7%**	190%	**6.8%**	194%	**12.4%**	177%	**12.9%**	184%	**5.8%**	165%	**6.0%**	170%	**10.3%**	147%	**11.0%**	157%
2050	**5.9%**	180%	**6.0%**	184%	**12.4%**	172%	**12.9%**	179%	**5.1%**	155%	**5.2%**	160%	**10.4%**	144%	**11.1%**	154%
2060	**5.5%**	176%	**5.5%**	179%	**12.6%**	173%	**13.1%**	180%	**4.6%**	149%	**4.7%**	153%	**10.5%**	144%	**11.2%**	154%
2070	**5.1%**	173%	**5.1%**	176%	**12.5%**	174%	**13.0%**	181%	**4.2%**	143%	**4.3%**	147%	**10.3%**	144%	**11.0%**	153%
2080	**4.8%**	170%	**4.9%**	172%	**12.3%**	172%	**12.8%**	179%	**3.9%**	139%	**4.0%**	142%	**10.2%**	142%	**10.8%**	151%
2090	**4.7%**	167%	**4.7%**	169%	**12.3%**	171%	**12.8%**	177%	**3.8%**	135%	**3.9%**	138%	**10.1%**	140%	**10.7%**	148%

Table D7: Estimation and simulation results on lifetime ressources of cohorts 1800-2020
(scenario a1: 2010-2100: g=1.7%, (1-τ)r=3.0%, s=9.4%)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
	Lifetime ressources in € 2009 (capitalized at age 50)		Average capitalization factor (ratio between capitalized ressources and raw ressources)			**Share of inheritance in total lifetime ressources**	**Average inheritance as a fraction of average labor income ressources**	Top X% inheritance as a fraction of bottom 50% lifetime labor ressources			Fraction ε^x of cohort with inheritance > bottom 50% labor ressources
cohort (year of birth)	lifetime labor ressources	lifetime inheritance ressources	cap. factor labor	cap. factor inherit.	ratio λ^x			Top 50%	Top 10%	Top 1%	
1800	154 790 €	44 691 €	194%	232%	83%	**22%**	**29%**	91%	433%	2406%	8%
1801	156 990 €	45 986 €	196%	230%	85%	**23%**	**29%**	93%	439%	2441%	9%
1802	159 151 €	47 245 €	198%	229%	87%	**23%**	**30%**	94%	445%	2474%	9%
1803	161 262 €	48 455 €	200%	227%	88%	**23%**	**30%**	95%	451%	2504%	9%
1804	163 313 €	49 608 €	202%	226%	89%	**23%**	**30%**	96%	456%	2531%	9%
1805	165 291 €	50 880 €	204%	225%	91%	**24%**	**31%**	97%	462%	2565%	9%
1806	167 129 €	52 139 €	206%	223%	92%	**24%**	**31%**	99%	468%	2600%	9%
1807	168 810 €	53 349 €	207%	222%	93%	**24%**	**32%**	100%	474%	2634%	9%
1808	170 319 €	54 481 €	208%	221%	94%	**24%**	**32%**	101%	480%	2666%	9%
1809	171 635 €	55 593 €	209%	220%	95%	**24%**	**32%**	103%	486%	2699%	10%
1810	173 648 €	56 740 €	210%	219%	96%	**25%**	**33%**	103%	490%	2723%	10%
1811	175 608 €	57 284 €	212%	218%	97%	**25%**	**33%**	103%	489%	2718%	10%
1812	177 519 €	58 190 €	213%	218%	98%	**25%**	**33%**	104%	492%	2732%	10%
1813	179 373 €	58 982 €	214%	217%	98%	**25%**	**33%**	104%	493%	2740%	10%
1814	181 162 €	59 844 €	214%	216%	99%	**25%**	**33%**	105%	496%	2753%	10%
1815	182 883 €	60 951 €	215%	216%	100%	**25%**	**33%**	106%	500%	2777%	10%
1816	184 468 €	61 680 €	216%	215%	100%	**25%**	**33%**	106%	502%	2786%	10%
1817	185 901 €	62 687 €	216%	215%	101%	**25%**	**34%**	107%	506%	2810%	10%
1818	187 171 €	63 930 €	217%	214%	101%	**25%**	**34%**	108%	512%	2846%	10%
1819	188 267 €	66 116 €	217%	213%	102%	**26%**	**35%**	111%	527%	2927%	11%
1820	189 091 €	60 507 €	216%	212%	102%	**24%**	**32%**	101%	480%	2667%	10%
1821	189 897 €	60 597 €	215%	210%	102%	**24%**	**32%**	101%	479%	2659%	9%
1822	190 656 €	60 600 €	214%	209%	102%	**24%**	**32%**	101%	477%	2649%	9%
1823	191 343 €	61 400 €	213%	208%	102%	**24%**	**32%**	102%	481%	2674%	10%
1824	191 944 €	60 479 €	212%	207%	103%	**24%**	**32%**	100%	473%	2626%	9%
1825	192 459 €	61 318 €	211%	205%	103%	**24%**	**32%**	101%	478%	2655%	9%
1826	192 796 €	60 292 €	209%	203%	103%	**24%**	**31%**	99%	469%	2606%	9%
1827	192 931 €	61 390 €	208%	202%	103%	**24%**	**32%**	101%	477%	2652%	9%
1828	192 878 €	61 972 €	205%	201%	102%	**24%**	**32%**	102%	482%	2677%	10%
1829	192 459 €	62 958 €	203%	200%	102%	**25%**	**33%**	104%	491%	2726%	10%
1830	190 855 €	62 455 €	197%	196%	100%	**25%**	**33%**	104%	491%	2727%	10%
1831	188 753 €	60 858 €	193%	193%	100%	**24%**	**32%**	102%	484%	2687%	10%
1832	186 603 €	63 813 €	189%	190%	99%	**25%**	**34%**	108%	513%	2850%	10%
1833	184 544 €	60 809 €	185%	187%	99%	**25%**	**33%**	104%	494%	2746%	10%
1834	182 645 €	59 588 €	181%	184%	98%	**25%**	**33%**	103%	489%	2719%	10%
1835	181 074 €	59 465 €	176%	181%	97%	**25%**	**33%**	104%	493%	2737%	10%
1836	179 626 €	60 544 €	172%	178%	97%	**25%**	**34%**	107%	506%	2809%	10%
1837	177 847 €	60 535 €	170%	175%	97%	**25%**	**34%**	108%	511%	2836%	10%
1838	176 891 €	59 695 €	166%	173%	96%	**25%**	**34%**	107%	506%	2812%	10%
1839	176 537 €	59 656 €	162%	170%	95%	**25%**	**34%**	107%	507%	2816%	10%
1840	175 328 €	58 314 €	158%	167%	94%	**25%**	**33%**	105%	499%	2772%	10%
1841	174 028 €	56 549 €	154%	164%	94%	**25%**	**32%**	103%	487%	2708%	10%
1842	172 207 €	55 890 €	152%	160%	95%	**25%**	**32%**	103%	487%	2705%	10%
1843	171 329 €	55 748 €	149%	157%	95%	**25%**	**33%**	103%	488%	2712%	10%
1844	170 278 €	54 932 €	146%	154%	95%	**24%**	**32%**	102%	484%	2688%	10%
1845	170 117 €	54 085 €	143%	152%	94%	**24%**	**32%**	101%	477%	2649%	9%
1846	168 697 €	53 937 €	142%	149%	95%	**24%**	**32%**	101%	480%	2664%	9%
1847	168 762 €	57 151 €	140%	147%	95%	**25%**	**34%**	107%	508%	2822%	10%
1848	168 913 €	54 311 €	138%	145%	95%	**24%**	**32%**	102%	482%	2679%	10%
1849	171 285 €	51 547 €	138%	144%	96%	**23%**	**30%**	95%	451%	2508%	9%
1850	188 713 €	58 546 €	140%	149%	94%	**24%**	**31%**	98%	465%	2585%	9%
1851	187 402 €	57 333 €	139%	148%	94%	**23%**	**31%**	97%	459%	2549%	9%

1852	186 004 €	56 935 €	137%	145%	94%	**23%**	**31%**	97%	459%	2551%	9%
1853	185 628 €	58 057 €	135%	144%	94%	**24%**	**31%**	99%	469%	2606%	9%
1854	185 381 €	58 554 €	134%	142%	94%	**24%**	**32%**	100%	474%	2632%	9%
1855	187 664 €	60 094 €	133%	142%	94%	**24%**	**32%**	101%	480%	2669%	10%
1856	187 687 €	56 486 €	131%	141%	93%	**23%**	**30%**	95%	451%	2508%	9%
1857	188 703 €	57 708 €	133%	142%	94%	**23%**	**31%**	97%	459%	2548%	9%
1858	189 958 €	56 172 €	133%	142%	93%	**23%**	**30%**	94%	444%	2464%	9%
1859	194 570 €	53 887 €	132%	143%	93%	**22%**	**28%**	88%	415%	2308%	8%
1860	197 784 €	57 489 €	130%	143%	91%	**23%**	**29%**	92%	436%	2422%	8%
1861	198 279 €	55 828 €	132%	144%	91%	**22%**	**28%**	89%	422%	2346%	8%
1862	202 105 €	57 235 €	134%	148%	91%	**22%**	**28%**	90%	425%	2360%	8%
1863	204 689 €	57 239 €	136%	151%	90%	**22%**	**28%**	89%	419%	2330%	8%
1864	204 548 €	57 464 €	135%	150%	90%	**22%**	**28%**	89%	421%	2341%	8%
1865	202 489 €	56 949 €	133%	149%	90%	**22%**	**28%**	89%	422%	2344%	8%
1866	207 855 €	57 789 €	134%	151%	88%	**22%**	**28%**	88%	417%	2317%	8%
1867	210 721 €	59 377 €	137%	155%	88%	**22%**	**28%**	89%	423%	2348%	8%
1868	212 145 €	61 499 €	138%	158%	87%	**22%**	**29%**	92%	435%	2416%	8%
1869	225 567 €	63 267 €	142%	164%	86%	**22%**	**28%**	89%	421%	2337%	8%
1870	230 374 €	64 658 €	146%	173%	85%	**22%**	**28%**	89%	421%	2339%	8%
1871	253 843 €	82 534 €	151%	183%	83%	**25%**	**33%**	103%	484%	2682%	10%
1872	283 905 €	75 185 €	160%	196%	81%	**21%**	**26%**	84%	392%	2163%	8%
1873	299 939 €	81 949 €	171%	212%	81%	**21%**	**27%**	87%	402%	2209%	8%
1874	326 219 €	86 144 €	181%	226%	80%	**21%**	**26%**	84%	386%	2113%	8%
1875	348 369 €	91 633 €	190%	242%	79%	**21%**	**26%**	83%	381%	2082%	7%
1876	367 970 €	94 108 €	199%	254%	78%	**20%**	**26%**	81%	368%	2003%	7%
1877	380 675 €	99 696 €	205%	265%	77%	**21%**	**26%**	83%	375%	2030%	7%
1878	395 427 €	104 349 €	212%	277%	77%	**21%**	**26%**	84%	375%	2023%	8%
1879	404 773 €	104 977 €	220%	288%	76%	**21%**	**26%**	82%	366%	1967%	7%
1880	398 041 €	105 842 €	215%	281%	76%	**21%**	**27%**	84%	372%	1994%	8%
1881	401 890 €	102 350 €	216%	282%	77%	**20%**	**25%**	81%	354%	1889%	7%
1882	402 861 €	101 632 €	212%	279%	76%	**20%**	**25%**	80%	348%	1850%	7%
1883	404 220 €	100 630 €	212%	278%	76%	**20%**	**25%**	79%	341%	1805%	7%
1884	407 472 €	99 548 €	208%	276%	75%	**20%**	**24%**	77%	332%	1751%	7%
1885	416 801 €	99 536 €	206%	275%	75%	**19%**	**24%**	76%	322%	1692%	7%
1886	422 608 €	100 419 €	204%	273%	75%	**19%**	**24%**	75%	318%	1663%	7%
1887	426 154 €	98 601 €	200%	267%	75%	**19%**	**23%**	73%	308%	1600%	6%
1888	428 440 €	97 891 €	195%	262%	74%	**19%**	**23%**	72%	302%	1561%	6%
1889	430 843 €	95 054 €	193%	258%	75%	**18%**	**22%**	70%	289%	1489%	6%
1890	431 184 €	97 706 €	184%	247%	75%	**18%**	**23%**	72%	295%	1511%	6%
1891	415 953 €	89 199 €	177%	235%	75%	**18%**	**21%**	68%	277%	1412%	6%
1892	404 981 €	87 340 €	167%	223%	75%	**18%**	**22%**	68%	276%	1402%	6%
1893	390 908 €	78 686 €	157%	209%	75%	**17%**	**20%**	64%	256%	1292%	5%
1894	377 134 €	71 776 €	143%	181%	79%	**16%**	**19%**	60%	240%	1205%	5%
1895	380 259 €	67 557 €	130%	156%	84%	**15%**	**18%**	56%	222%	1110%	5%
1896	385 833 €	58 383 €	123%	140%	88%	**13%**	**15%**	48%	188%	933%	4%
1897	367 915 €	52 190 €	117%	128%	92%	**12%**	**14%**	45%	174%	863%	3%
1898	380 812 €	50 070 €	112%	116%	96%	**12%**	**13%**	42%	160%	789%	3%
1899	410 472 €	52 153 €	109%	115%	95%	**11%**	**13%**	40%	154%	752%	3%
1900	403 629 €	48 805 €	111%	116%	96%	**11%**	**12%**	38%	145%	705%	3%
1901	396 023 €	46 398 €	109%	116%	95%	**10%**	**12%**	37%	139%	674%	3%
1902	404 957 €	47 254 €	106%	114%	93%	**10%**	**12%**	37%	138%	661%	3%
1903	411 647 €	49 070 €	105%	114%	92%	**11%**	**12%**	38%	139%	666%	3%
1904	423 691 €	50 460 €	104%	114%	91%	**11%**	**12%**	38%	138%	655%	3%
1905	433 709 €	51 508 €	104%	114%	91%	**11%**	**12%**	38%	137%	643%	3%
1906	441 916 €	52 049 €	103%	114%	91%	**11%**	**12%**	37%	134%	628%	3%
1907	458 008 €	54 419 €	104%	114%	91%	**11%**	**12%**	38%	134%	624%	3%
1908	473 970 €	55 169 €	103%	114%	90%	**10%**	**12%**	37%	130%	601%	3%
1909	488 453 €	57 311 €	102%	113%	91%	**11%**	**12%**	37%	130%	596%	3%
1910	505 742 €	58 796 €	102%	112%	91%	**10%**	**12%**	37%	128%	581%	3%
1911	525 024 €	64 487 €	102%	111%	91%	**11%**	**12%**	39%	134%	604%	3%
1912	543 878 €	62 657 €	102%	110%	92%	**10%**	**12%**	36%	124%	557%	2%
1913	560 564 €	65 112 €	102%	109%	93%	**10%**	**12%**	37%	124%	552%	3%
1914	579 754 €	68 112 €	102%	108%	94%	**11%**	**12%**	37%	125%	548%	3%
1915	608 871 €	69 966 €	102%	108%	95%	**10%**	**11%**	36%	121%	527%	2%

1916	627 664 €	72 100 €	103%	107%	96%	**10%**	**11%**	36%	119%	517%	2%
1917	642 771 €	74 463 €	103%	106%	97%	**10%**	**12%**	37%	119%	512%	2%
1918	689 715 €	76 775 €	104%	105%	99%	**10%**	**11%**	35%	114%	482%	2%
1919	738 185 €	79 668 €	104%	104%	99%	**10%**	**11%**	34%	109%	459%	2%
1920	807 094 €	80 327 €	106%	103%	103%	**9%**	**10%**	32%	100%	415%	2%
1921	797 619 €	81 185 €	107%	103%	105%	**9%**	**10%**	32%	102%	424%	2%
1922	802 289 €	85 172 €	109%	102%	106%	**10%**	**11%**	34%	106%	442%	2%
1923	967 766 €	103 630 €	111%	102%	108%	**10%**	**11%**	34%	107%	446%	2%
1924	1 014 393 €	108 845 €	112%	101%	111%	**10%**	**11%**	34%	107%	447%	2%
1925	905 285 €	95 880 €	112%	100%	113%	**10%**	**11%**	34%	106%	441%	2%
1926	920 145 €	99 283 €	112%	98%	114%	**10%**	**11%**	34%	108%	450%	2%
1927	941 652 €	104 799 €	111%	97%	114%	**10%**	**11%**	35%	111%	464%	3%
1928	955 796 €	107 315 €	110%	96%	115%	**10%**	**11%**	36%	112%	468%	3%
1929	971 175 €	112 520 €	109%	95%	115%	**10%**	**12%**	37%	116%	483%	3%
1930	972 561 €	109 915 €	108%	93%	115%	**10%**	**11%**	36%	113%	471%	3%
1931	977 769 €	115 771 €	106%	92%	115%	**11%**	**12%**	37%	118%	493%	3%
1932	991 047 €	120 321 €	105%	91%	115%	**11%**	**12%**	38%	121%	506%	3%
1933	1 002 358 €	130 335 €	104%	90%	116%	**12%**	**13%**	41%	130%	542%	3%
1934	1 015 903 €	133 789 €	103%	89%	116%	**12%**	**13%**	42%	132%	549%	3%
1935	1 026 467 €	144 285 €	102%	89%	116%	**12%**	**14%**	45%	141%	586%	4%
1936	1 052 301 €	151 299 €	103%	89%	116%	**13%**	**14%**	46%	144%	599%	4%
1937	1 071 593 €	160 755 €	104%	90%	116%	**13%**	**15%**	48%	150%	625%	4%
1938	1 104 599 €	171 035 €	105%	91%	116%	**13%**	**15%**	49%	155%	645%	5%
1939	1 140 298 €	180 392 €	107%	92%	116%	**14%**	**16%**	50%	158%	659%	5%
1940	1 192 703 €	207 971 €	108%	93%	116%	**15%**	**17%**	55%	174%	727%	5%
1941	1 226 729 €	230 524 €	109%	94%	116%	**16%**	**19%**	60%	188%	783%	6%
1942	1 205 248 €	210 622 €	110%	94%	117%	**15%**	**17%**	55%	175%	728%	6%
1943	1 227 396 €	205 536 €	112%	95%	117%	**14%**	**17%**	53%	167%	698%	5%
1944	1 266 960 €	214 336 €	113%	96%	117%	**14%**	**17%**	54%	169%	705%	5%
1945	1 299 882 €	223 412 €	114%	97%	118%	**15%**	**17%**	54%	172%	716%	5%
1946	1 323 783 €	178 169 €	115%	98%	118%	**12%**	**13%**	43%	135%	561%	4%
1947	1 349 438 €	178 067 €	117%	99%	118%	**12%**	**13%**	42%	132%	550%	3%
1948	1 384 347 €	185 781 €	118%	100%	118%	**12%**	**13%**	42%	134%	559%	4%
1949	1 418 156 €	195 936 €	119%	101%	118%	**12%**	**14%**	44%	138%	576%	4%
1950	1 443 879 €	204 557 €	119%	101%	118%	**12%**	**14%**	45%	142%	590%	4%
1951	1 460 771 €	221 466 €	119%	101%	118%	**13%**	**15%**	48%	152%	632%	4%
1952	1 472 072 €	227 622 €	118%	101%	117%	**13%**	**15%**	49%	155%	644%	4%
1953	1 480 416 €	240 609 €	118%	101%	117%	**14%**	**16%**	51%	163%	677%	5%
1954	1 475 712 €	243 894 €	117%	101%	116%	**14%**	**17%**	52%	165%	689%	5%
1955	1 470 890 €	252 171 €	116%	100%	115%	**15%**	**17%**	54%	171%	714%	5%
1956	1 471 606 €	259 925 €	114%	100%	115%	**15%**	**18%**	56%	177%	736%	6%
1957	1 469 730 €	266 452 €	112%	99%	114%	**15%**	**18%**	57%	181%	755%	6%
1958	1 463 395 €	275 992 €	111%	98%	113%	**16%**	**19%**	60%	189%	786%	6%
1959	1 462 634 €	278 606 €	109%	97%	112%	**16%**	**19%**	60%	190%	794%	6%
1960	1 466 116 €	290 064 €	107%	97%	111%	**17%**	**20%**	63%	198%	824%	7%
1961	1 448 341 €	293 147 €	106%	97%	110%	**17%**	**20%**	64%	202%	843%	7%
1962	1 452 957 €	306 762 €	104%	96%	108%	**17%**	**21%**	67%	211%	880%	8%
1963	1 453 531 €	306 103 €	103%	96%	107%	**17%**	**21%**	67%	211%	877%	8%
1964	1 458 939 €	311 720 €	102%	96%	106%	**18%**	**21%**	68%	214%	890%	8%
1965	1 455 419 €	324 467 €	101%	96%	105%	**18%**	**22%**	71%	223%	929%	8%
1966	1 464 340 €	334 440 €	99%	95%	104%	**19%**	**23%**	72%	228%	952%	9%
1967	1 463 761 €	351 026 €	98%	95%	104%	**19%**	**24%**	76%	240%	999%	9%
1968	1 467 609 €	358 923 €	97%	95%	103%	**20%**	**24%**	77%	245%	1019%	10%
1969	1 470 610 €	361 837 €	97%	95%	102%	**20%**	**25%**	78%	246%	1025%	10%
1970	1 476 910 €	367 060 €	96%	94%	101%	**20%**	**25%**	79%	249%	1036%	10%
1971	1 496 590 €	367 699 €	95%	94%	101%	**20%**	**25%**	78%	246%	1024%	10%
1972	1 514 812 €	377 846 €	94%	94%	100%	**20%**	**25%**	79%	249%	1039%	10%
1973	1 533 670 €	395 975 €	94%	94%	99%	**21%**	**26%**	82%	258%	1076%	11%
1974	1 569 224 €	431 889 €	93%	94%	99%	**22%**	**28%**	87%	275%	1147%	12%
1975	1 602 973 €	471 644 €	92%	94%	98%	**23%**	**29%**	93%	294%	1226%	13%
1976	1 628 571 €	493 123 €	92%	94%	98%	**23%**	**30%**	96%	303%	1262%	14%
1977	1 649 590 €	487 382 €	91%	94%	98%	**23%**	**30%**	94%	295%	1231%	13%
1978	1 676 081 €	499 905 €	91%	93%	97%	**23%**	**30%**	94%	298%	1243%	13%
1979	1 691 253 €	491 834 €	91%	93%	97%	**23%**	**29%**	92%	291%	1212%	13%

1980	1 703 473 €	471 266 €	91%	93%	97%	**22%**	**28%**	88%	277%	1153%	12%
1981	1 721 133 €	476 780 €	90%	93%	97%	**22%**	**28%**	88%	277%	1154%	12%
1982	1 740 296 €	488 717 €	90%	92%	97%	**22%**	**28%**	89%	281%	1170%	12%
1983	1 765 998 €	524 111 €	90%	92%	97%	**23%**	**30%**	94%	297%	1237%	13%
1984	1 785 723 €	520 559 €	90%	92%	97%	**23%**	**29%**	92%	292%	1215%	13%
1985	1 807 798 €	522 454 €	89%	92%	98%	**22%**	**29%**	92%	289%	1204%	13%
1986	1 830 118 €	519 236 €	89%	91%	98%	**22%**	**28%**	90%	284%	1182%	12%
1987	1 853 004 €	530 763 €	89%	91%	98%	**22%**	**29%**	91%	286%	1193%	13%
1988	1 877 039 €	536 773 €	89%	91%	98%	**22%**	**29%**	91%	286%	1192%	13%
1989	1 903 145 €	544 542 €	89%	90%	98%	**22%**	**29%**	91%	286%	1192%	13%
1990	1 930 557 €	555 004 €	88%	90%	98%	**22%**	**29%**	91%	287%	1198%	13%
1991	1 959 363 €	566 548 €	88%	90%	98%	**22%**	**29%**	92%	289%	1205%	13%
1992	1 990 253 €	584 602 €	88%	90%	98%	**23%**	**29%**	93%	294%	1224%	13%
1993	2 025 404 €	618 370 €	88%	90%	98%	**23%**	**31%**	97%	305%	1272%	14%
1994	2 054 076 €	622 728 €	88%	90%	97%	**23%**	**30%**	96%	303%	1263%	14%
1995	2 081 173 €	618 218 €	88%	90%	97%	**23%**	**30%**	94%	297%	1238%	13%
1996	2 110 094 €	619 607 €	88%	90%	97%	**23%**	**29%**	93%	294%	1223%	13%
1997	2 143 135 €	636 169 €	87%	90%	97%	**23%**	**30%**	94%	297%	1237%	13%
1998	2 172 473 €	634 118 €	87%	90%	97%	**23%**	**29%**	92%	292%	1216%	13%
1999	2 200 936 €	627 204 €	87%	90%	97%	**22%**	**28%**	90%	285%	1187%	12%
2000	2 228 332 €	612 651 €	87%	90%	97%	**22%**	**27%**	87%	275%	1146%	12%
2001	2 237 716 €	624 232 €	90%	90%	100%	**22%**	**28%**	88%	279%	1162%	12%
2002	2 271 094 €	640 218 €	90%	90%	100%	**22%**	**28%**	89%	282%	1175%	12%
2003	2 303 291 €	649 184 €	90%	91%	100%	**22%**	**28%**	89%	282%	1174%	12%
2004	2 334 866 €	656 165 €	90%	91%	100%	**22%**	**28%**	89%	281%	1171%	12%
2005	2 365 553 €	659 102 €	91%	91%	100%	**22%**	**28%**	88%	279%	1161%	12%
2006	2 398 961 €	678 260 €	91%	91%	100%	**22%**	**28%**	90%	283%	1178%	12%
2007	2 430 396 €	689 602 €	91%	91%	100%	**22%**	**28%**	90%	284%	1182%	12%
2008	2 461 157 €	700 611 €	92%	92%	100%	**22%**	**28%**	90%	285%	1186%	12%
2009	2 491 219 €	711 317 €	92%	92%	100%	**22%**	**29%**	90%	286%	1190%	12%
2010	2 520 563 €	722 016 €	93%	92%	101%	**22%**	**29%**	91%	286%	1194%	13%
2011	2 549 275 €	733 181 €	94%	93%	101%	**22%**	**29%**	91%	288%	1198%	13%
2012	2 577 303 €	744 795 €	94%	93%	102%	**22%**	**29%**	92%	289%	1204%	13%
2013	2 604 661 €	756 847 €	95%	93%	102%	**23%**	**29%**	92%	291%	1211%	13%
2014	2 631 318 €	769 250 €	96%	94%	102%	**23%**	**29%**	93%	292%	1218%	13%
2015	2 657 306 €	781 904 €	97%	94%	103%	**23%**	**29%**	93%	294%	1226%	13%
2016	2 682 687 €	794 960 €	98%	95%	103%	**23%**	**30%**	94%	296%	1235%	13%
2017	2 707 416 €	808 370 €	99%	95%	104%	**23%**	**30%**	95%	299%	1244%	13%
2018	2 731 518 €	822 174 €	100%	96%	104%	**23%**	**30%**	95%	301%	1254%	14%
2019	2 754 991 €	835 138 €	101%	96%	105%	**23%**	**30%**	96%	303%	1263%	14%
2020	2 777 782 €	848 152 €	102%	97%	105%	**23%**	**31%**	97%	305%	1272%	14%
2021	2 799 534 €	861 113 €	103%	98%	105%	**24%**	**31%**	97%	308%	1282%	14%
2022	2 820 530 €	873 713 €	104%	99%	106%	**24%**	**31%**	98%	310%	1291%	14%
2023	2 840 745 €	885 618 €	105%	99%	106%	**24%**	**31%**	99%	312%	1299%	14%
2024	2 860 196 €	896 513 €	106%	100%	106%	**24%**	**31%**	99%	313%	1306%	15%
2025	2 878 871 €	906 216 €	107%	101%	106%	**24%**	**31%**	100%	315%	1312%	15%
2026	2 896 742 €	914 696 €	109%	102%	107%	**24%**	**32%**	100%	316%	1316%	15%
2027	2 913 791 €	922 006 €	110%	103%	107%	**24%**	**32%**	100%	316%	1318%	15%
2028	2 929 971 €	928 209 €	111%	104%	107%	**24%**	**32%**	100%	317%	1320%	15%
2029	2 945 241 €	933 418 €	112%	104%	108%	**24%**	**32%**	100%	317%	1321%	15%
2030	2 959 591 €	937 774 €	114%	105%	108%	**24%**	**32%**	100%	317%	1320%	15%

Table D8: Estimation and simulation results on lifetime ressources of cohorts 1850-2020
(scenario d2: 2010-2100: g=1.0%, (1-τ)r=5.0%, s=9.4%)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]		[10]
	lifetime ressources in € 2009 (capitalized at age 50)		average capitalization factor (ratio between capitalized ressources and raw ressources)			**Share of inheritance in total lifetime ressources**	**Average inheritance as a fraction of average labor income ressources**	Top X% inheritance as a fraction of bottom 50% lifetime labor ressources			Fraction ε^x of cohort with inheritance > bottom 50% labor ressources
cohort (year of birth)	lifetime labor ressources	lifetime inheritance ressources	cap. factor labor	cap. factor inherit.	ratio λ^x	**α^{*x}**		Top 50%	Top 10%	Top 1%	
1800	154 790 €	44 691 €	194%	232%	83%	**22%**	**29%**	91%	433%	2406%	8%
1801	156 990 €	45 986 €	196%	230%	85%	**23%**	**29%**	93%	439%	2441%	9%
1802	159 151 €	47 245 €	198%	229%	87%	**23%**	**30%**	94%	445%	2474%	9%
1803	161 262 €	48 455 €	200%	227%	88%	**23%**	**30%**	95%	451%	2504%	9%
1804	163 313 €	49 608 €	202%	226%	89%	**23%**	**30%**	96%	456%	2531%	9%
1805	165 291 €	50 880 €	204%	225%	91%	**24%**	**31%**	97%	462%	2565%	9%
1806	167 129 €	52 139 €	206%	223%	92%	**24%**	**31%**	99%	468%	2600%	9%
1807	168 810 €	53 349 €	207%	222%	93%	**24%**	**32%**	100%	474%	2634%	9%
1808	170 319 €	54 481 €	208%	221%	94%	**24%**	**32%**	101%	480%	2666%	9%
1809	171 635 €	55 593 €	209%	220%	95%	**24%**	**32%**	103%	486%	2699%	10%
1810	173 648 €	56 740 €	210%	219%	96%	**25%**	**33%**	103%	490%	2723%	10%
1811	175 608 €	57 284 €	212%	218%	97%	**25%**	**33%**	103%	489%	2718%	10%
1812	177 519 €	58 190 €	213%	218%	98%	**25%**	**33%**	104%	492%	2732%	10%
1813	179 373 €	58 982 €	214%	217%	98%	**25%**	**33%**	104%	493%	2740%	10%
1814	181 162 €	59 844 €	214%	216%	99%	**25%**	**33%**	105%	496%	2753%	10%
1815	182 883 €	60 951 €	215%	216%	100%	**25%**	**33%**	106%	500%	2777%	10%
1816	184 468 €	61 680 €	216%	215%	100%	**25%**	**33%**	106%	502%	2786%	10%
1817	185 901 €	62 687 €	216%	215%	101%	**25%**	**34%**	107%	506%	2810%	10%
1818	187 171 €	63 930 €	217%	214%	101%	**25%**	**34%**	108%	512%	2846%	10%
1819	188 267 €	66 116 €	217%	213%	102%	**26%**	**35%**	111%	527%	2927%	11%
1820	189 091 €	60 507 €	216%	212%	102%	**24%**	**32%**	101%	480%	2667%	10%
1821	189 897 €	60 597 €	215%	210%	102%	**24%**	**32%**	101%	479%	2659%	9%
1822	190 656 €	60 600 €	214%	209%	102%	**24%**	**32%**	101%	477%	2649%	9%
1823	191 343 €	61 400 €	213%	208%	102%	**24%**	**32%**	102%	481%	2674%	10%
1824	191 944 €	60 479 €	212%	207%	103%	**24%**	**32%**	100%	473%	2626%	9%
1825	192 459 €	61 318 €	211%	205%	103%	**24%**	**32%**	101%	478%	2655%	9%
1826	192 796 €	60 292 €	209%	203%	103%	**24%**	**31%**	99%	469%	2606%	9%
1827	192 931 €	61 390 €	208%	202%	103%	**24%**	**32%**	101%	477%	2652%	9%
1828	192 878 €	61 972 €	205%	201%	102%	**24%**	**32%**	102%	482%	2678%	10%
1829	192 459 €	62 958 €	203%	200%	102%	**25%**	**33%**	104%	491%	2726%	10%
1830	190 856 €	62 455 €	197%	196%	100%	**25%**	**33%**	104%	491%	2727%	10%
1831	188 753 €	60 858 €	193%	193%	100%	**24%**	**32%**	102%	484%	2687%	10%
1832	186 601 €	63 813 €	189%	190%	99%	**25%**	**34%**	108%	513%	2850%	10%
1833	184 544 €	60 809 €	185%	187%	99%	**25%**	**33%**	104%	494%	2746%	10%
1834	182 643 €	59 588 €	181%	184%	98%	**25%**	**33%**	103%	489%	2719%	10%
1835	181 074 €	59 465 €	176%	181%	97%	**25%**	**33%**	104%	493%	2737%	10%
1836	179 628 €	60 544 €	172%	178%	97%	**25%**	**34%**	107%	506%	2809%	10%
1837	177 847 €	60 535 €	170%	175%	97%	**25%**	**34%**	108%	511%	2836%	10%
1838	176 893 €	59 695 €	166%	173%	96%	**25%**	**34%**	107%	506%	2812%	10%
1839	176 534 €	59 656 €	162%	170%	95%	**25%**	**34%**	107%	507%	2816%	10%
1840	175 324 €	58 314 €	158%	167%	94%	**25%**	**33%**	105%	499%	2772%	10%
1841	174 032 €	56 549 €	154%	164%	94%	**25%**	**32%**	103%	487%	2708%	10%
1842	172 203 €	55 890 €	152%	160%	95%	**25%**	**32%**	103%	487%	2705%	10%
1843	171 324 €	55 748 €	149%	157%	95%	**25%**	**33%**	103%	488%	2712%	10%
1844	170 283 €	54 932 €	146%	154%	95%	**24%**	**32%**	102%	484%	2688%	10%
1845	170 112 €	54 085 €	143%	152%	94%	**24%**	**32%**	101%	477%	2649%	9%
1846	168 702 €	53 937 €	142%	149%	95%	**24%**	**32%**	101%	480%	2664%	9%
1847	168 762 €	57 151 €	140%	147%	95%	**25%**	**34%**	107%	508%	2822%	10%
1848	168 907 €	54 311 €	138%	145%	95%	**24%**	**32%**	102%	482%	2680%	10%
1849	171 176 €	51 531 €	138%	144%	96%	**23%**	**30%**	95%	452%	2509%	9%
1850	188 713 €	58 546 €	140%	149%	94%	**24%**	**31%**	98%	465%	2585%	9%
1851	187 402 €	57 333 €	139%	148%	94%	**23%**	**31%**	97%	459%	2549%	9%
1852	186 004 €	56 935 €	137%	145%	94%	**23%**	**31%**	97%	459%	2551%	9%
1853	185 619 €	58 057 €	135%	144%	94%	**24%**	**31%**	99%	469%	2606%	9%
1854	185 381 €	58 554 €	134%	142%	94%	**24%**	**32%**	100%	474%	2632%	9%
1855	187 664 €	60 094 €	133%	142%	94%	**24%**	**32%**	101%	480%	2669%	10%
1856	187 677 €	56 486 €	131%	141%	93%	**23%**	**30%**	95%	451%	2508%	9%
1857	188 703 €	57 708 €	133%	142%	94%	**23%**	**31%**	97%	459%	2548%	9%
1858	189 968 €	56 172 €	133%	142%	93%	**23%**	**30%**	94%	444%	2464%	9%

1859	194 570 €	53 887 €	132%	143%	93%	**22%**	**28%**	88%	415%	2308%	8%
1860	197 774 €	57 489 €	130%	143%	91%	**23%**	**29%**	92%	436%	2422%	8%
1861	198 279 €	55 828 €	132%	144%	91%	**22%**	**28%**	89%	422%	2346%	8%
1862	202 105 €	57 235 €	134%	148%	91%	**22%**	**28%**	90%	425%	2360%	8%
1863	204 689 €	57 239 €	136%	151%	90%	**22%**	**28%**	89%	419%	2330%	8%
1864	204 560 €	57 464 €	135%	150%	90%	**22%**	**28%**	89%	421%	2341%	8%
1865	202 502 €	56 949 €	133%	149%	90%	**22%**	**28%**	89%	422%	2344%	8%
1866	207 855 €	57 789 €	134%	151%	88%	**22%**	**28%**	88%	417%	2317%	8%
1867	210 736 €	59 377 €	137%	155%	88%	**22%**	**28%**	89%	423%	2348%	8%
1868	212 130 €	61 499 €	138%	158%	87%	**22%**	**29%**	92%	435%	2416%	8%
1869	225 567 €	63 267 €	142%	164%	86%	**22%**	**28%**	89%	421%	2337%	8%
1870	230 374 €	64 658 €	146%	173%	85%	**22%**	**28%**	89%	421%	2339%	8%
1871	253 843 €	82 534 €	151%	183%	83%	**25%**	**33%**	103%	484%	2682%	10%
1872	283 905 €	75 185 €	160%	196%	81%	**21%**	**26%**	84%	392%	2163%	7%
1873	299 939 €	81 949 €	171%	212%	81%	**21%**	**27%**	87%	402%	2209%	8%
1874	326 243 €	86 144 €	181%	226%	80%	**21%**	**26%**	84%	386%	2112%	7%
1875	348 395 €	91 633 €	190%	242%	79%	**21%**	**26%**	83%	381%	2082%	7%
1876	367 941 €	94 108 €	199%	254%	78%	**20%**	**26%**	81%	368%	2004%	7%
1877	380 675 €	99 696 €	205%	265%	77%	**21%**	**26%**	83%	375%	2030%	7%
1878	395 392 €	104 349 €	212%	277%	77%	**21%**	**26%**	84%	375%	2023%	7%
1879	404 773 €	104 977 €	220%	288%	76%	**21%**	**26%**	82%	366%	1967%	7%
1880	398 041 €	105 842 €	215%	281%	76%	**21%**	**27%**	84%	372%	1994%	8%
1881	401 890 €	102 350 €	216%	282%	77%	**20%**	**25%**	81%	354%	1889%	7%
1882	402 861 €	101 632 €	212%	279%	76%	**20%**	**25%**	80%	348%	1850%	7%
1883	404 220 €	100 630 €	212%	278%	76%	**20%**	**25%**	79%	341%	1805%	7%
1884	407 472 €	99 548 €	208%	276%	75%	**20%**	**24%**	77%	332%	1751%	7%
1885	416 801 €	99 536 €	206%	275%	75%	**19%**	**24%**	76%	322%	1692%	7%
1886	422 608 €	100 419 €	204%	273%	75%	**19%**	**24%**	75%	318%	1663%	6%
1887	426 154 €	98 601 €	200%	267%	75%	**19%**	**23%**	73%	308%	1600%	6%
1888	428 440 €	97 891 €	195%	262%	74%	**19%**	**23%**	72%	302%	1561%	6%
1889	430 843 €	95 054 €	193%	258%	75%	**18%**	**22%**	70%	289%	1489%	6%
1890	431 184 €	97 706 €	184%	247%	75%	**18%**	**23%**	72%	295%	1511%	6%
1891	415 953 €	89 199 €	177%	235%	75%	**18%**	**21%**	68%	277%	1412%	6%
1892	404 981 €	87 340 €	167%	223%	75%	**18%**	**22%**	68%	276%	1402%	6%
1893	390 908 €	78 686 €	157%	209%	75%	**17%**	**20%**	64%	256%	1292%	5%
1894	377 134 €	71 776 €	143%	181%	79%	**16%**	**19%**	60%	240%	1205%	5%
1895	380 259 €	67 557 €	130%	156%	84%	**15%**	**18%**	56%	222%	1110%	4%
1896	385 833 €	58 383 €	123%	140%	88%	**13%**	**15%**	48%	188%	933%	4%
1897	367 915 €	52 190 €	117%	128%	92%	**12%**	**14%**	45%	174%	863%	3%
1898	380 812 €	50 070 €	112%	116%	96%	**12%**	**13%**	42%	160%	789%	3%
1899	410 472 €	52 153 €	109%	115%	95%	**11%**	**13%**	40%	154%	752%	3%
1900	403 629 €	48 805 €	111%	116%	96%	**11%**	**12%**	38%	145%	705%	3%
1901	396 023 €	46 398 €	109%	116%	95%	**10%**	**12%**	37%	139%	674%	2%
1902	404 957 €	47 254 €	106%	114%	93%	**10%**	**12%**	37%	138%	661%	2%
1903	411 647 €	49 070 €	105%	114%	92%	**11%**	**12%**	38%	139%	666%	3%
1904	423 691 €	50 460 €	104%	114%	91%	**11%**	**12%**	38%	138%	655%	2%
1905	433 709 €	51 508 €	104%	114%	91%	**11%**	**12%**	38%	137%	643%	2%
1906	441 916 €	52 049 €	103%	114%	91%	**11%**	**12%**	37%	134%	628%	2%
1907	458 008 €	54 419 €	104%	114%	91%	**11%**	**12%**	38%	134%	624%	2%
1908	473 970 €	55 169 €	103%	114%	90%	**10%**	**12%**	37%	130%	601%	2%
1909	488 453 €	57 311 €	102%	113%	91%	**11%**	**12%**	37%	130%	596%	2%
1910	505 742 €	58 796 €	102%	112%	91%	**10%**	**12%**	37%	128%	581%	2%
1911	525 009 €	64 487 €	102%	111%	91%	**11%**	**12%**	39%	134%	604%	3%
1912	543 852 €	62 656 €	102%	110%	92%	**10%**	**12%**	36%	124%	557%	2%
1913	560 520 €	65 110 €	102%	109%	93%	**10%**	**12%**	37%	124%	552%	2%
1914	579 679 €	68 109 €	102%	108%	94%	**11%**	**12%**	37%	125%	548%	2%
1915	608 744 €	69 961 €	102%	108%	95%	**10%**	**11%**	36%	121%	527%	2%
1916	627 472 €	72 092 €	103%	107%	96%	**10%**	**11%**	36%	119%	517%	2%
1917	642 497 €	74 450 €	103%	106%	97%	**10%**	**12%**	37%	119%	512%	2%
1918	689 317 €	76 756 €	104%	105%	99%	**10%**	**11%**	35%	114%	483%	2%
1919	737 582 €	79 642 €	104%	104%	100%	**10%**	**11%**	34%	109%	459%	2%
1920	806 251 €	80 292 €	106%	103%	104%	**9%**	**10%**	32%	100%	415%	2%
1921	796 508 €	81 139 €	108%	103%	105%	**9%**	**10%**	32%	102%	424%	2%
1922	800 857 €	85 111 €	110%	102%	107%	**10%**	**11%**	34%	106%	443%	2%
1923	965 598 €	103 537 €	112%	102%	109%	**10%**	**11%**	34%	107%	447%	2%
1924	1 011 566 €	108 724 €	113%	101%	112%	**10%**	**11%**	34%	107%	448%	2%
1925	902 228 €	95 750 €	114%	99%	114%	**10%**	**11%**	34%	106%	442%	2%
1926	916 361 €	99 122 €	113%	98%	115%	**10%**	**11%**	34%	108%	451%	2%
1927	937 009 €	104 596 €	113%	97%	116%	**10%**	**11%**	35%	112%	465%	2%
1928	950 181 €	107 069 €	112%	96%	117%	**10%**	**11%**	36%	113%	470%	2%
1929	964 402 €	112 217 €	111%	95%	117%	**10%**	**12%**	37%	116%	485%	2%

1930	964 705 €	109 570 €	110%	93%	118%	**10%**	**11%**	36%	114%	473%	2%
1931	968 521 €	115 348 €	109%	92%	119%	**11%**	**12%**	38%	119%	496%	3%
1932	980 241 €	119 811 €	107%	90%	119%	**11%**	**12%**	39%	122%	509%	3%
1933	989 863 €	129 694 €	106%	89%	120%	**12%**	**13%**	41%	131%	546%	3%
1934	1 001 398 €	133 029 €	106%	88%	120%	**12%**	**13%**	42%	133%	554%	3%
1935	1 009 904 €	143 342 €	106%	88%	120%	**12%**	**14%**	45%	142%	591%	3%
1936	1 033 090 €	150 161 €	107%	88%	121%	**13%**	**15%**	46%	145%	606%	3%
1937	1 049 658 €	159 373 €	108%	89%	122%	**13%**	**15%**	48%	152%	633%	4%
1938	1 079 320 €	169 362 €	110%	90%	122%	**14%**	**16%**	50%	157%	654%	4%
1939	1 111 250 €	178 395 €	112%	91%	123%	**14%**	**16%**	51%	161%	669%	4%
1940	1 158 939 €	205 371 €	113%	92%	123%	**15%**	**18%**	56%	177%	738%	5%
1941	1 188 127 €	227 282 €	114%	92%	124%	**16%**	**19%**	61%	191%	797%	5%
1942	1 163 472 €	207 299 €	116%	93%	125%	**15%**	**18%**	56%	178%	742%	5%
1943	1 180 536 €	201 910 €	118%	93%	126%	**15%**	**17%**	54%	171%	713%	4%
1944	1 213 428 €	210 121 €	119%	94%	126%	**15%**	**17%**	55%	173%	722%	4%
1945	1 240 035 €	218 526 €	121%	95%	128%	**15%**	**18%**	56%	176%	734%	5%
1946	1 256 901 €	173 847 €	122%	95%	128%	**12%**	**14%**	44%	138%	576%	3%
1947	1 275 104 €	173 288 €	124%	96%	129%	**12%**	**14%**	43%	136%	566%	3%
1948	1 301 107 €	180 275 €	126%	97%	130%	**12%**	**14%**	44%	139%	577%	3%
1949	1 325 312 €	189 536 €	127%	97%	131%	**13%**	**14%**	45%	143%	596%	3%
1950	1 340 953 €	197 213 €	127%	97%	131%	**13%**	**15%**	47%	147%	613%	3%
1951	1 347 136 €	212 750 €	127%	97%	131%	**14%**	**16%**	50%	158%	658%	4%
1952	1 347 109 €	217 823 €	127%	97%	132%	**14%**	**16%**	51%	162%	674%	4%
1953	1 343 524 €	229 306 €	127%	96%	132%	**15%**	**17%**	54%	171%	711%	4%
1954	1 327 253 €	231 425 €	126%	96%	131%	**15%**	**17%**	55%	174%	727%	4%
1955	1 310 902 €	238 169 €	125%	95%	132%	**15%**	**18%**	58%	182%	757%	5%
1956	1 298 096 €	244 283 €	123%	94%	131%	**16%**	**19%**	60%	188%	784%	5%
1957	1 282 458 €	249 113 €	121%	93%	131%	**16%**	**19%**	62%	194%	809%	5%
1958	1 262 283 €	256 609 €	119%	91%	130%	**17%**	**20%**	64%	203%	847%	6%
1959	1 246 007 €	257 525 €	117%	90%	129%	**17%**	**21%**	65%	207%	861%	6%
1960	1 232 946 €	266 454 €	115%	89%	129%	**18%**	**22%**	68%	216%	900%	6%
1961	1 224 601 €	272 707 €	115%	90%	128%	**18%**	**22%**	71%	223%	928%	6%
1962	1 233 819 €	288 870 €	115%	91%	127%	**19%**	**23%**	74%	234%	976%	7%
1963	1 238 838 €	291 637 €	116%	92%	126%	**19%**	**24%**	75%	235%	981%	7%
1964	1 247 128 €	300 317 €	116%	92%	126%	**19%**	**24%**	76%	241%	1003%	7%
1965	1 247 308 €	315 913 €	116%	93%	125%	**20%**	**25%**	80%	253%	1055%	8%
1966	1 256 190 €	328 872 €	117%	94%	124%	**21%**	**26%**	83%	262%	1091%	8%
1967	1 256 537 €	348 406 €	117%	95%	124%	**22%**	**28%**	88%	277%	1155%	9%
1968	1 259 482 €	359 366 €	117%	95%	123%	**22%**	**29%**	90%	285%	1189%	9%
1969	1 260 466 €	365 237 €	117%	96%	123%	**22%**	**29%**	92%	290%	1207%	9%
1970	1 263 015 €	373 333 €	118%	96%	122%	**23%**	**30%**	94%	296%	1232%	10%
1971	1 276 585 €	376 637 €	118%	97%	122%	**23%**	**30%**	93%	295%	1229%	10%
1972	1 287 593 €	389 577 €	118%	98%	121%	**23%**	**30%**	96%	303%	1261%	10%
1973	1 298 187 €	410 738 €	118%	98%	121%	**24%**	**32%**	100%	316%	1318%	11%
1974	1 320 796 €	450 444 €	118%	99%	120%	**25%**	**34%**	108%	341%	1421%	12%
1975	1 340 192 €	494 295 €	118%	99%	119%	**27%**	**37%**	117%	369%	1537%	14%
1976	1 352 682 €	518 980 €	118%	99%	119%	**28%**	**38%**	121%	384%	1599%	14%
1977	1 361 815 €	514 729 €	119%	100%	119%	**27%**	**38%**	120%	378%	1575%	14%
1978	1 372 419 €	529 399 €	119%	100%	119%	**28%**	**39%**	122%	386%	1607%	15%
1979	1 373 127 €	521 862 €	119%	100%	119%	**28%**	**38%**	120%	380%	1584%	14%
1980	1 370 215 €	500 597 €	119%	100%	119%	**27%**	**37%**	116%	365%	1522%	13%
1981	1 371 398 €	506 670 €	119%	100%	120%	**27%**	**37%**	117%	369%	1539%	14%
1982	1 371 828 €	519 264 €	119%	100%	120%	**27%**	**38%**	120%	379%	1577%	14%
1983	1 375 189 €	556 438 €	119%	99%	120%	**29%**	**40%**	128%	405%	1686%	16%
1984	1 374 427 €	551 951 €	119%	99%	120%	**29%**	**40%**	127%	402%	1673%	15%
1985	1 373 725 €	552 889 €	119%	99%	120%	**29%**	**40%**	127%	402%	1677%	16%
1986	1 371 194 €	548 111 €	118%	98%	120%	**29%**	**40%**	127%	400%	1666%	15%
1987	1 365 538 €	558 667 €	118%	98%	120%	**29%**	**41%**	130%	409%	1705%	16%
1988	1 358 882 €	563 199 €	117%	97%	120%	**29%**	**41%**	131%	414%	1727%	16%
1989	1 352 267 €	569 655 €	116%	97%	120%	**30%**	**42%**	133%	421%	1755%	17%
1990	1 344 429 €	579 009 €	115%	97%	119%	**30%**	**43%**	136%	431%	1794%	17%
1991	1 348 860 €	589 442 €	115%	96%	119%	**30%**	**44%**	138%	437%	1821%	18%
1992	1 354 233 €	606 683 €	114%	96%	119%	**31%**	**45%**	142%	448%	1867%	18%
1993	1 361 550 €	640 210 €	114%	96%	118%	**32%**	**47%**	149%	470%	1959%	20%
1994	1 365 601 €	643 294 €	114%	96%	118%	**32%**	**47%**	149%	471%	1963%	20%
1995	1 368 792 €	637 292 €	114%	96%	118%	**32%**	**47%**	147%	466%	1940%	19%
1996	1 372 768 €	637 431 €	113%	96%	118%	**32%**	**46%**	147%	464%	1935%	19%
1997	1 378 529 €	653 168 €	113%	96%	118%	**32%**	**47%**	150%	474%	1974%	20%
1998	1 382 412 €	649 766 €	113%	96%	117%	**32%**	**47%**	149%	470%	1958%	20%
1999	1 385 838 €	641 378 €	113%	96%	117%	**32%**	**46%**	147%	463%	1928%	19%
2000	1 388 682 €	625 418 €	113%	96%	117%	**31%**	**45%**	143%	450%	1877%	18%

2001	1 391 325 €	636 116 €	116%	97%	120%	**31%**	**46%**	145%	457%	1905%	19%
2002	1 397 401 €	651 221 €	115%	97%	119%	**32%**	**47%**	148%	466%	1942%	19%
2003	1 402 898 €	659 103 €	116%	97%	119%	**32%**	**47%**	149%	470%	1958%	20%
2004	1 408 207 €	664 908 €	116%	97%	119%	**32%**	**47%**	150%	472%	1967%	20%
2005	1 413 193 €	666 570 €	116%	97%	119%	**32%**	**47%**	149%	472%	1965%	20%
2006	1 419 697 €	684 581 €	116%	98%	119%	**33%**	**48%**	153%	482%	2009%	20%
2007	1 425 460 €	694 643 €	116%	98%	119%	**33%**	**49%**	154%	487%	2030%	21%
2008	1 431 144 €	704 347 €	117%	98%	119%	**33%**	**49%**	156%	492%	2051%	21%
2009	1 436 746 €	713 747 €	118%	99%	119%	**33%**	**50%**	157%	497%	2070%	21%
2010	1 442 266 €	723 166 €	118%	99%	119%	**33%**	**50%**	159%	501%	2089%	22%
2011	1 447 743 €	733 101 €	119%	99%	120%	**34%**	**51%**	160%	506%	2110%	22%
2012	1 453 145 €	743 554 €	120%	100%	120%	**34%**	**51%**	162%	512%	2132%	22%
2013	1 458 460 €	754 531 €	121%	100%	120%	**34%**	**52%**	164%	517%	2156%	23%
2014	1 463 662 €	765 952 €	122%	101%	120%	**34%**	**52%**	166%	523%	2180%	23%
2015	1 468 751 €	777 718 €	123%	102%	121%	**35%**	**53%**	168%	530%	2206%	23%
2016	1 473 757 €	789 970 €	124%	102%	121%	**35%**	**54%**	170%	536%	2233%	24%
2017	1 478 643 €	802 645 €	125%	103%	121%	**35%**	**54%**	172%	543%	2262%	24%
2018	1 483 407 €	815 763 €	126%	104%	122%	**35%**	**55%**	174%	550%	2291%	25%
2019	1 488 038 €	828 688 €	128%	105%	122%	**36%**	**56%**	176%	557%	2320%	25%
2020	1 492 498 €	841 765 €	129%	106%	122%	**36%**	**56%**	179%	564%	2350%	26%
2021	1 496 705 €	854 884 €	131%	107%	122%	**36%**	**57%**	181%	571%	2380%	26%
2022	1 500 692 €	867 741 €	132%	108%	122%	**37%**	**58%**	183%	578%	2409%	27%
2023	1 504 442 €	880 009 €	134%	109%	122%	**37%**	**58%**	185%	585%	2437%	27%
2024	1 507 965 €	891 380 €	135%	110%	122%	**37%**	**59%**	187%	591%	2463%	28%
2025	1 511 244 €	901 686 €	137%	112%	123%	**37%**	**60%**	189%	597%	2486%	28%
2026	1 514 267 €	910 909 €	139%	113%	123%	**38%**	**60%**	190%	602%	2506%	28%
2027	1 517 019 €	919 115 €	140%	114%	123%	**38%**	**61%**	192%	606%	2524%	29%
2028	1 519 473 €	926 385 €	142%	116%	123%	**38%**	**61%**	193%	610%	2540%	29%
2029	1 521 607 €	932 851 €	144%	117%	123%	**38%**	**61%**	194%	613%	2554%	29%
2030	1 523 415 €	938 634 €	146%	119%	123%	**38%**	**62%**	195%	616%	2567%	29%

Table D9: Estimation and simulation results on inheritance share in aggregate wealth 1850-2100
(scenario a1: 2010-2100: g=1.7%, (1-τ)r=3.0%, s=9.4%)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
	Aggregate wealth stocks in billions € 2009				**Share of inherited wealth in aggregate private wealth W_t**			Capit. factor	Share of inherited wealth received more than X years ago			
	Private wealth W_t	Nominal inherited wealth	Real inherited wealth	Capitalized inherited wealth					X=30 years		X=50 years	
		$\hat{B}_{t0}$	$\hat{B}_t$	$\tilde{B}_t$	φ_{t0}^M	φ_t^M	φ_t^{KS}	$\tilde{B}_t / \hat{B}_t$	$\hat{B}_t$	$\tilde{B}_t$	$\hat{B}_t$	$\tilde{B}_t$
1850	481	339	339	825	70%	**70%**	**172%**	244%	0%	0%	0%	0%
1851	491	351	349	888	71%	**71%**	**181%**	255%	2%	4%	0%	0%
1852	502	360	359	954	72%	**72%**	**190%**	266%	4%	8%	0%	0%
1853	512	353	369	1 023	69%	**72%**	**200%**	277%	6%	12%	0%	0%
1854	523	324	379	1 095	62%	**72%**	**209%**	289%	7%	16%	0%	0%
1855	534	298	389	1 172	56%	**73%**	**219%**	301%	9%	20%	0%	0%
1856	543	288	399	1 251	53%	**74%**	**231%**	314%	10%	23%	0%	0%
1857	551	294	407	1 327	53%	**74%**	**241%**	326%	12%	26%	0%	0%
1858	560	326	415	1 405	58%	**74%**	**251%**	339%	13%	29%	0%	0%
1859	568	370	423	1 485	65%	**74%**	**261%**	351%	14%	32%	0%	0%
1860	577	400	431	1 568	69%	**75%**	**272%**	364%	16%	35%	0%	0%
1861	585	368	439	1 653	63%	**75%**	**283%**	377%	17%	37%	0%	0%
1862	593	360	447	1 741	61%	**75%**	**294%**	389%	18%	40%	0%	0%
1863	601	382	455	1 831	64%	**76%**	**305%**	402%	19%	42%	0%	0%
1864	609	398	464	1 924	65%	**76%**	**316%**	415%	19%	44%	0%	0%
1865	618	421	472	2 017	68%	**76%**	**327%**	427%	20%	46%	0%	0%
1866	619	434	480	2 113	70%	**78%**	**342%**	440%	21%	48%	0%	0%
1867	619	423	483	2 184	68%	**78%**	**353%**	452%	22%	50%	0%	0%
1868	620	409	485	2 255	66%	**78%**	**364%**	465%	22%	52%	0%	0%
1869	621	412	487	2 326	66%	**78%**	**374%**	477%	23%	54%	0%	0%
1870	622	451	490	2 395	72%	**79%**	**385%**	489%	23%	55%	0%	0%
1871	622	449	491	2 454	72%	**79%**	**395%**	500%	24%	57%	1%	2%
1872	621	393	491	2 512	63%	**79%**	**405%**	511%	24%	58%	1%	5%
1873	620	437	494	2 571	70%	**80%**	**414%**	520%	25%	59%	2%	7%
1874	620	434	496	2 628	70%	**80%**	**424%**	529%	25%	61%	2%	9%
1875	619	437	498	2 683	71%	**80%**	**433%**	538%	25%	62%	2%	11%
1876	624	505	500	2 737	81%	**80%**	**438%**	547%	25%	63%	3%	13%
1877	629	495	506	2 811	79%	**80%**	**447%**	555%	26%	64%	3%	14%
1878	634	492	512	2 883	78%	**81%**	**455%**	563%	26%	65%	3%	16%
1879	639	496	518	2 952	78%	**81%**	**462%**	570%	26%	65%	4%	18%
1880	644	513	524	3 017	80%	**81%**	**469%**	576%	26%	66%	4%	19%
1881	650	501	530	3 032	77%	**82%**	**467%**	572%	26%	67%	4%	21%
1882	656	512	536	3 043	78%	**82%**	**464%**	568%	26%	67%	4%	22%
1883	662	533	542	3 050	81%	**82%**	**461%**	563%	25%	67%	5%	23%
1884	668	536	547	3 052	80%	**82%**	**457%**	558%	25%	68%	5%	24%
1885	673	557	553	3 050	83%	**82%**	**453%**	552%	25%	68%	5%	26%
1886	680	586	558	3 044	86%	**82%**	**448%**	545%	25%	68%	5%	27%
1887	687	596	564	3 039	87%	**82%**	**443%**	538%	25%	68%	5%	28%
1888	694	612	570	3 032	88%	**82%**	**437%**	532%	25%	68%	5%	28%
1889	700	645	576	3 023	92%	**82%**	**432%**	525%	24%	68%	5%	29%
1890	707	643	583	3 012	91%	**82%**	**426%**	517%	24%	68%	5%	30%
1891	716	637	588	2 983	89%	**82%**	**417%**	507%	24%	68%	5%	31%
1892	724	632	594	2 953	87%	**82%**	**408%**	497%	24%	68%	5%	31%
1893	732	646	600	2 921	88%	**82%**	**399%**	487%	24%	68%	5%	32%
1894	740	663	606	2 889	90%	**82%**	**390%**	477%	24%	68%	5%	32%
1895	749	650	613	2 856	87%	**82%**	**381%**	466%	24%	68%	5%	32%
1896	758	675	619	2 823	89%	**82%**	**372%**	456%	24%	68%	5%	33%
1897	768	694	626	2 791	90%	**82%**	**364%**	446%	23%	67%	5%	33%
1898	777	720	633	2 759	93%	**81%**	**355%**	436%	23%	67%	5%	33%
1899	786	717	640	2 727	91%	**81%**	**347%**	426%	23%	66%	5%	33%
1900	802	714	648	2 695	89%	**81%**	**336%**	416%	23%	66%	5%	33%
1901	813	724	658	2 681	89%	**81%**	**330%**	407%	23%	66%	5%	33%
1902	820	730	670	2 644	89%	**82%**	**322%**	394%	23%	65%	5%	33%
1903	830	748	681	2 610	90%	**82%**	**315%**	383%	23%	64%	5%	32%

1904	838	762	693	2 581	91%	**83%**	**308%**	373%	22%	64%	5%	32%
1905	844	782	704	2 554	93%	**83%**	**303%**	363%	22%	63%	5%	31%
1906	853	792	715	2 536	93%	**84%**	**297%**	355%	22%	62%	5%	31%
1907	859	790	726	2 504	92%	**85%**	**291%**	345%	22%	62%	5%	30%
1908	871	789	738	2 503	91%	**85%**	**288%**	339%	22%	61%	4%	30%
1909	881	780	748	2 492	89%	**85%**	**283%**	333%	22%	60%	4%	29%
1910	888	791	759	2 487	89%	**85%**	**280%**	328%	22%	59%	4%	28%
1911	898	776	770	2 479	86%	**86%**	**276%**	322%	22%	58%	4%	28%
1912	903	716	780	2 482	79%	**86%**	**275%**	318%	22%	58%	4%	27%
1913	920	734	790	2 536	80%	**86%**	**276%**	321%	22%	57%	4%	27%
1914	882	720	799	2 572	82%	**91%**	**292%**	322%	22%	56%	4%	27%
1915	834	730	763	2 419	88%	**91%**	**290%**	317%	22%	56%	4%	26%
1916	736	622	680	2 115	84%	**92%**	**287%**	311%	22%	56%	4%	26%
1917	648	562	599	1 881	87%	**92%**	**290%**	314%	22%	55%	4%	26%
1918	566	474	523	1 667	84%	**92%**	**295%**	319%	22%	55%	4%	26%
1919	486	369	449	1 444	76%	**92%**	**297%**	321%	23%	55%	4%	25%
1920	465	299	427	1 425	64%	**92%**	**307%**	334%	23%	55%	4%	25%
1921	470	222	406	1 405	47%	**87%**	**299%**	346%	23%	54%	4%	25%
1922	485	263	387	1 400	54%	**80%**	**288%**	362%	23%	54%	4%	24%
1923	498	281	369	1 413	56%	**74%**	**283%**	383%	23%	53%	4%	23%
1924	518	259	353	1 437	50%	**68%**	**277%**	408%	23%	53%	4%	23%
1925	531	234	338	1 456	44%	**64%**	**274%**	431%	23%	52%	4%	22%
1926	568	226	324	1 471	40%	**57%**	**259%**	454%	23%	52%	4%	22%
1927	596	181	327	1 540	30%	**55%**	**258%**	472%	22%	52%	4%	21%
1928	607	183	329	1 603	30%	**54%**	**264%**	486%	22%	52%	4%	21%
1929	637	194	332	1 677	31%	**52%**	**263%**	505%	22%	52%	4%	21%
1930	663	195	337	1 739	29%	**51%**	**262%**	516%	22%	51%	4%	20%
1931	683	205	341	1 791	30%	**50%**	**262%**	526%	22%	52%	4%	20%
1932	691	226	345	1 822	33%	**50%**	**264%**	528%	22%	52%	4%	20%
1933	688	262	350	1 834	38%	**51%**	**267%**	524%	21%	52%	4%	19%
1934	684	283	355	1 860	41%	**52%**	**272%**	524%	21%	52%	4%	19%
1935	680	307	359	1 883	45%	**53%**	**277%**	525%	21%	53%	4%	19%
1936	685	347	364	1 923	51%	**53%**	**281%**	529%	21%	53%	4%	19%
1937	707	334	368	1 968	47%	**52%**	**278%**	534%	21%	54%	4%	19%
1938	722	274	373	2 002	38%	**52%**	**277%**	536%	21%	54%	4%	19%
1939	731	253	379	2 033	35%	**52%**	**278%**	536%	21%	55%	4%	18%
1940	593	251	385	2 078	42%	**65%**	**351%**	540%	20%	55%	4%	18%
1941	558	222	297	1 572	40%	**53%**	**282%**	529%	20%	55%	3%	18%
1942	523	199	284	1 461	38%	**54%**	**279%**	514%	20%	56%	3%	18%
1943	487	175	271	1 346	36%	**56%**	**276%**	497%	19%	56%	3%	18%
1944	450	148	256	1 224	33%	**57%**	**272%**	478%	19%	56%	3%	18%
1945	409	130	241	1 081	32%	**59%**	**264%**	449%	19%	57%	3%	18%
1946	479	94	226	954	20%	**47%**	**199%**	423%	19%	57%	3%	18%
1947	480	69	299	1 239	14%	**62%**	**258%**	414%	18%	58%	3%	18%
1948	479	54	302	1 230	11%	**63%**	**257%**	407%	18%	59%	3%	18%
1949	482	41	305	1 244	8%	**63%**	**258%**	407%	19%	59%	3%	18%
1950	506	47	309	1 284	9%	**61%**	**254%**	416%	18%	59%	3%	18%
1951	535	55	313	1 348	10%	**59%**	**252%**	430%	18%	60%	3%	19%
1952	562	58	317	1 399	10%	**56%**	**249%**	441%	18%	60%	3%	19%
1953	586	63	321	1 435	11%	**55%**	**245%**	447%	18%	60%	3%	19%
1954	610	79	326	1 477	13%	**53%**	**242%**	453%	17%	60%	3%	20%
1955	663	92	330	1 527	14%	**50%**	**230%**	463%	17%	60%	3%	20%
1956	725	105	348	1 640	15%	**48%**	**226%**	472%	17%	60%	3%	21%
1957	784	119	370	1 750	15%	**47%**	**223%**	473%	17%	60%	3%	21%
1958	852	133	392	1 876	16%	**46%**	**220%**	478%	17%	60%	3%	21%
1959	923	131	414	1 997	14%	**45%**	**216%**	482%	17%	60%	3%	22%
1960	992	140	437	2 114	14%	**44%**	**213%**	483%	17%	60%	3%	22%
1961	1 076	155	463	2 249	14%	**43%**	**209%**	486%	17%	60%	3%	22%
1962	1 160	172	490	2 385	15%	**42%**	**206%**	486%	17%	60%	3%	23%
1963	1 254	188	521	2 514	15%	**42%**	**200%**	482%	17%	60%	3%	23%
1964	1 353	207	555	2 643	15%	**41%**	**195%**	476%	17%	60%	3%	23%
1965	1 459	227	590	2 786	16%	**40%**	**191%**	472%	17%	59%	3%	24%
1966	1 574	252	629	2 936	16%	**40%**	**186%**	467%	17%	59%	3%	26%
1967	1 698	278	670	3 099	16%	**39%**	**183%**	463%	17%	59%	3%	27%
1968	1 832	307	715	3 272	17%	**39%**	**179%**	458%	17%	59%	3%	27%
1969	1 972	332	764	3 444	17%	**39%**	**175%**	451%	17%	58%	3%	29%
1970	2 119	353	818	3 635	17%	**39%**	**172%**	445%	16%	58%	3%	29%

1971	2 184	379	873	3 831	17%	**40%**	**175%**	439%	16%	57%	3%	28%
1972	2 277	404	893	3 869	18%	**39%**	**170%**	433%	16%	57%	3%	28%
1973	2 437	426	922	3 942	17%	**38%**	**162%**	428%	16%	57%	3%	28%
1974	2 427	447	980	4 133	18%	**40%**	**170%**	422%	16%	56%	3%	28%
1975	2 552	438	962	4 004	17%	**38%**	**157%**	416%	16%	56%	3%	28%
1976	2 682	441	1 005	4 065	16%	**37%**	**152%**	404%	16%	56%	3%	28%
1977	2 793	456	1 054	4 131	16%	**38%**	**148%**	392%	16%	56%	3%	27%
1978	2 880	469	1 102	4 207	16%	**38%**	**146%**	382%	16%	56%	3%	27%
1979	2 977	486	1 138	4 217	16%	**38%**	**142%**	370%	15%	55%	3%	27%
1980	3 002	495	1 177	4 236	16%	**39%**	**141%**	360%	15%	55%	3%	26%
1981	3 005	491	1 193	4 157	16%	**40%**	**138%**	348%	15%	54%	3%	26%
1982	2 987	490	1 206	4 064	16%	**40%**	**136%**	337%	14%	54%	3%	26%
1983	3 036	494	1 212	3 951	16%	**40%**	**130%**	326%	14%	53%	3%	25%
1984	3 115	511	1 253	3 954	16%	**40%**	**127%**	316%	14%	52%	2%	25%
1985	3 155	537	1 307	4 026	17%	**41%**	**128%**	308%	13%	52%	2%	24%
1986	3 275	574	1 349	4 068	18%	**41%**	**124%**	302%	13%	51%	2%	24%
1987	3 529	633	1 428	4 261	18%	**40%**	**121%**	298%	13%	50%	2%	23%
1988	3 582	693	1 561	4 609	19%	**44%**	**129%**	295%	13%	50%	2%	22%
1989	3 859	756	1 610	4 750	20%	**42%**	**123%**	295%	13%	49%	2%	22%
1990	4 168	818	1 760	5 173	20%	**42%**	**124%**	294%	13%	48%	2%	21%
1991	4 168	889	1 929	5 627	21%	**46%**	**135%**	292%	13%	47%	2%	21%
1992	4 176	959	1 952	5 661	23%	**47%**	**136%**	290%	12%	47%	2%	21%
1993	4 169	1 035	1 978	5 729	25%	**47%**	**137%**	290%	12%	46%	2%	20%
1994	4 237	1 116	1 992	5 745	26%	**47%**	**136%**	288%	12%	46%	2%	20%
1995	4 227	1 198	2 041	5 878	28%	**48%**	**139%**	288%	12%	45%	2%	20%
1996	4 247	1 281	2 055	5 910	30%	**48%**	**139%**	288%	12%	44%	3%	20%
1997	4 435	1 360	2 079	5 955	31%	**47%**	**134%**	287%	12%	44%	3%	20%
1998	4 587	1 454	2 199	6 276	32%	**48%**	**137%**	285%	12%	43%	2%	20%
1999	4 796	1 558	2 294	6 533	32%	**48%**	**136%**	285%	12%	43%	2%	19%
2000	5 334	1 672	2 420	6 849	31%	**45%**	**128%**	283%	13%	42%	2%	19%
2001	5 619	1 778	2 729	7 634	32%	**49%**	**136%**	280%	13%	42%	2%	18%
2002	5 793	1 887	2 913	8 052	33%	**50%**	**139%**	276%	13%	41%	2%	18%
2003	6 151	1 992	3 043	8 303	32%	**49%**	**135%**	273%	13%	41%	2%	17%
2004	6 713	2 104	3 278	8 831	31%	**49%**	**132%**	269%	13%	41%	2%	17%
2005	7 558	2 212	3 622	9 640	29%	**48%**	**128%**	266%	13%	40%	2%	16%
2006	8 433	2 351	4 153	10 856	28%	**49%**	**129%**	261%	13%	40%	2%	16%
2007	9 211	2 509	4 728	12 135	27%	**51%**	**132%**	257%	13%	40%	2%	16%
2008	9 543	2 688	5 272	13 302	28%	**55%**	**139%**	252%	13%	39%	2%	15%
2009	9 169	2 846	5 562	13 772	31%	**61%**	**150%**	248%	13%	39%	2%	15%
2010	8 812	3 057	5 428	13 243	35%	**62%**	**150%**	244%	13%	39%	2%	15%
2011	8 969	3 264	5 290	12 746	36%	**59%**	**142%**	241%	13%	39%	2%	14%
2012	9 128	3 473	5 453	12 988	38%	**60%**	**142%**	238%	14%	39%	2%	14%
2013	9 290	3 682	5 617	13 236	40%	**60%**	**142%**	236%	14%	38%	2%	13%
2014	9 455	3 892	5 782	13 490	41%	**61%**	**143%**	233%	14%	38%	2%	13%
2015	9 623	4 104	5 947	13 750	43%	**62%**	**143%**	231%	14%	38%	2%	13%
2016	9 793	4 316	6 114	14 016	44%	**62%**	**143%**	229%	14%	38%	2%	13%
2017	9 966	4 530	6 281	14 286	45%	**63%**	**143%**	227%	14%	39%	2%	13%
2018	10 142	4 745	6 450	14 562	47%	**64%**	**144%**	226%	15%	39%	2%	12%
2019	10 321	4 960	6 618	14 843	48%	**64%**	**144%**	224%	15%	39%	2%	12%
2020	10 502	5 175	6 787	15 127	49%	**65%**	**144%**	223%	15%	39%	2%	12%
2021	10 687	5 391	6 955	15 417	50%	**65%**	**144%**	222%	16%	39%	2%	12%
2022	10 875	5 606	7 124	15 710	52%	**66%**	**144%**	221%	16%	40%	2%	12%
2023	11 066	5 821	7 292	16 008	53%	**66%**	**145%**	220%	16%	40%	2%	12%
2024	11 260	6 035	7 460	16 310	54%	**66%**	**145%**	219%	17%	40%	2%	12%
2025	11 457	6 250	7 629	16 615	55%	**67%**	**145%**	218%	17%	40%	2%	12%
2026	11 658	6 465	7 797	16 925	55%	**67%**	**145%**	217%	17%	40%	2%	11%
2027	11 862	6 680	7 966	17 240	56%	**67%**	**145%**	216%	18%	41%	2%	11%
2028	12 069	6 895	8 136	17 559	57%	**67%**	**145%**	216%	18%	41%	2%	11%
2029	12 279	7 112	8 307	17 883	58%	**68%**	**146%**	215%	19%	41%	2%	11%
2030	12 494	7 329	8 480	18 212	59%	**68%**	**146%**	215%	19%	42%	2%	11%
2031	12 711	7 549	8 654	18 547	59%	**68%**	**146%**	214%	20%	42%	3%	11%
2032	12 932	7 771	8 832	18 887	60%	**68%**	**146%**	214%	20%	42%	3%	11%
2033	13 157	7 995	9 012	19 235	61%	**68%**	**146%**	213%	21%	43%	3%	11%
2034	13 386	8 223	9 196	19 589	61%	**69%**	**146%**	213%	21%	43%	3%	11%
2035	13 618	8 454	9 385	19 951	62%	**69%**	**147%**	213%	21%	43%	3%	11%
2036	13 854	8 689	9 578	20 320	63%	**69%**	**147%**	212%	22%	43%	3%	11%
2037	14 094	8 929	9 776	20 698	63%	**69%**	**147%**	212%	22%	44%	3%	11%
2038	14 338	9 174	9 980	21 085	64%	**70%**	**147%**	211%	23%	44%	3%	12%

2039	14 587	9 423	10 189	21 480	65%	**70%**	**147%**	211%	23%	44%	3%	12%
2040	14 839	9 678	10 404	21 883	65%	**70%**	**147%**	210%	23%	44%	3%	12%
2041	15 095	9 937	10 625	22 295	66%	**70%**	**148%**	210%	23%	44%	3%	12%
2042	15 356	10 200	10 850	22 715	66%	**71%**	**148%**	209%	23%	44%	3%	12%
2043	15 620	10 466	11 079	23 141	67%	**71%**	**148%**	209%	23%	44%	3%	12%
2044	15 890	10 735	11 312	23 573	68%	**71%**	**148%**	208%	23%	44%	3%	12%
2045	16 163	11 005	11 548	24 011	68%	**71%**	**149%**	208%	23%	44%	3%	12%
2046	16 441	11 277	11 786	24 453	69%	**72%**	**149%**	207%	23%	44%	3%	13%
2047	16 724	11 549	12 025	24 898	69%	**72%**	**149%**	207%	23%	44%	4%	13%
2048	17 012	11 821	12 265	25 346	69%	**72%**	**149%**	207%	23%	44%	4%	13%
2049	17 304	12 093	12 506	25 797	70%	**72%**	**149%**	206%	23%	44%	4%	13%
2050	17 601	12 365	12 749	26 251	70%	**72%**	**149%**	206%	23%	44%	4%	13%
2051	17 903	12 640	12 995	26 706	71%	**73%**	**149%**	206%	23%	43%	4%	13%
2052	18 210	12 903	13 230	27 147	71%	**73%**	**149%**	205%	23%	43%	4%	13%
2053	18 522	13 170	13 471	27 590	71%	**73%**	**149%**	205%	23%	43%	4%	13%
2054	18 839	13 440	13 716	28 036	71%	**73%**	**149%**	204%	23%	43%	4%	13%
2055	19 161	13 714	13 966	28 484	72%	**73%**	**149%**	204%	23%	43%	4%	13%
2056	19 489	13 991	14 221	28 935	72%	**73%**	**148%**	203%	23%	42%	4%	14%
2057	19 822	14 272	14 481	29 389	72%	**73%**	**148%**	203%	23%	42%	4%	14%
2058	20 160	14 556	14 745	29 846	72%	**73%**	**148%**	202%	22%	42%	4%	14%
2059	20 504	14 843	15 013	30 307	72%	**73%**	**148%**	202%	22%	42%	4%	14%
2060	20 854	15 132	15 285	30 773	73%	**73%**	**148%**	201%	22%	41%	4%	13%
2061	21 210	15 424	15 561	31 242	73%	**73%**	**147%**	201%	22%	41%	4%	13%
2062	21 571	15 718	15 840	31 716	73%	**73%**	**147%**	200%	22%	41%	4%	13%
2063	21 939	16 014	16 123	32 194	73%	**73%**	**147%**	200%	21%	40%	4%	13%
2064	22 312	16 313	16 409	32 678	73%	**74%**	**146%**	199%	21%	40%	4%	13%
2065	22 692	16 612	16 698	33 167	73%	**74%**	**146%**	199%	21%	40%	4%	13%
2066	23 078	16 914	16 989	33 662	73%	**74%**	**146%**	198%	21%	40%	4%	13%
2067	23 470	17 218	17 284	34 163	73%	**74%**	**146%**	198%	21%	39%	4%	12%
2068	23 869	17 524	17 582	34 671	73%	**74%**	**145%**	197%	21%	39%	4%	12%
2069	24 274	17 832	17 883	35 187	73%	**74%**	**145%**	197%	21%	39%	4%	12%
2070	24 686	18 143	18 188	35 711	73%	**74%**	**145%**	196%	21%	39%	4%	12%
2071	25 105	18 457	18 496	36 244	74%	**74%**	**144%**	196%	21%	38%	4%	12%
2072	25 530	18 775	18 808	36 786	74%	**74%**	**144%**	196%	20%	38%	4%	11%
2073	25 963	19 096	19 125	37 338	74%	**74%**	**144%**	195%	20%	38%	4%	11%
2074	26 403	19 420	19 446	37 901	74%	**74%**	**144%**	195%	20%	38%	4%	11%
2075	26 850	19 750	19 772	38 475	74%	**74%**	**143%**	195%	20%	38%	4%	11%
2076	27 305	20 084	20 103	39 062	74%	**74%**	**143%**	194%	20%	38%	3%	10%
2077	27 767	20 423	20 439	39 661	74%	**74%**	**143%**	194%	20%	37%	3%	10%
2078	28 236	20 767	20 782	40 274	74%	**74%**	**143%**	194%	20%	37%	3%	10%
2079	28 714	21 117	21 129	40 898	74%	**74%**	**142%**	194%	20%	37%	3%	10%
2080	29 199	21 470	21 481	41 536	74%	**74%**	**142%**	193%	20%	37%	3%	10%
2081	29 692	21 829	21 838	42 187	74%	**74%**	**142%**	193%	20%	37%	3%	10%
2082	30 194	22 192	22 199	42 850	73%	**74%**	**142%**	193%	20%	37%	3%	10%
2083	30 703	22 559	22 565	43 526	73%	**73%**	**142%**	193%	20%	36%	3%	9%
2084	31 221	22 930	22 936	44 215	73%	**73%**	**142%**	193%	20%	36%	3%	9%
2085	31 748	23 307	23 312	44 918	73%	**73%**	**141%**	193%	20%	36%	3%	9%
2086	32 283	23 690	23 693	45 635	73%	**73%**	**141%**	193%	20%	36%	3%	9%
2087	32 827	24 078	24 081	46 367	73%	**73%**	**141%**	193%	20%	36%	3%	9%
2088	33 381	24 471	24 474	47 114	73%	**73%**	**141%**	193%	20%	36%	3%	9%
2089	33 943	24 871	24 873	47 876	73%	**73%**	**141%**	192%	20%	36%	3%	9%
2090	34 514	25 277	25 279	48 653	73%	**73%**	**141%**	192%	20%	36%	3%	9%
2091	35 095	25 691	25 692	49 448	73%	**73%**	**141%**	192%	20%	36%	3%	9%
2092	35 686	26 112	26 113	50 259	73%	**73%**	**141%**	192%	20%	36%	3%	9%
2093	36 286	26 540	26 541	51 088	73%	**73%**	**141%**	192%	20%	36%	3%	9%
2094	36 896	26 977	26 977	51 934	73%	**73%**	**141%**	193%	20%	36%	3%	8%
2095	37 517	27 421	27 422	52 798	73%	**73%**	**141%**	193%	20%	36%	3%	8%
2096	38 147	27 874	27 874	53 681	73%	**73%**	**141%**	193%	20%	36%	3%	8%
2097	38 788	28 334	28 334	54 581	73%	**73%**	**141%**	193%	20%	36%	3%	8%
2098	39 440	28 801	28 801	55 498	73%	**73%**	**141%**	193%	20%	37%	3%	8%
2099	40 102	29 276	29 276	56 433	73%	**73%**	**141%**	193%	20%	37%	3%	8%
2100	40 775	29 757	29 757	57 385	73%	**73%**	**141%**	193%	20%	37%	3%	8%

Table D10: Estimation and simulation results on inheritance share in aggregate wealth 1850-2100
(scenario d2: 2010-2100: g=1.0%, (1-τ)r=5.0%, s=9.4%)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
	Aggregate wealth stocks in billions € 2009				**Share of inherited wealth in aggregate private wealth W_t**			Capit. factor	Share of inherited wealth received more than X years ago			
	Private wealth W_t	Nominal inherited wealth	Real inherited wealth	Capitalized inherited wealth					X=30 years		X=50 years	
		$\hat{B}_{t0}$	$\hat{B}_t$	$\tilde{B}_t$	φ_{t0}^M	φ_t^M	φ_t^{KS}	$\tilde{B}_t / \hat{B}_t$	$\hat{B}_t$	$\tilde{B}_t$	$\hat{B}_t$	$\tilde{B}_t$
1850	481	339	339	825	70%	**70%**	**172%**	244%	0%	0%	0%	0%
1851	491	351	349	888	71%	**71%**	**181%**	255%	2%	4%	0%	0%
1852	502	360	359	954	72%	**72%**	**190%**	266%	4%	8%	0%	0%
1853	512	353	369	1 023	69%	**72%**	**200%**	277%	6%	12%	0%	0%
1854	523	324	379	1 095	62%	**72%**	**209%**	289%	7%	16%	0%	0%
1855	534	298	389	1 172	56%	**73%**	**219%**	301%	9%	20%	0%	0%
1856	543	288	399	1 251	53%	**74%**	**231%**	314%	10%	23%	0%	0%
1857	551	294	407	1 327	53%	**74%**	**241%**	326%	12%	26%	0%	0%
1858	560	326	415	1 405	58%	**74%**	**251%**	339%	13%	29%	0%	0%
1859	568	370	423	1 485	65%	**74%**	**261%**	351%	14%	32%	0%	0%
1860	577	400	431	1 568	69%	**75%**	**272%**	364%	16%	35%	0%	0%
1861	585	368	439	1 653	63%	**75%**	**283%**	377%	17%	37%	0%	0%
1862	593	360	447	1 741	61%	**75%**	**294%**	389%	18%	40%	0%	0%
1863	601	382	455	1 831	64%	**76%**	**305%**	402%	19%	42%	0%	0%
1864	609	398	464	1 924	65%	**76%**	**316%**	415%	19%	44%	0%	0%
1865	618	421	472	2 017	68%	**76%**	**327%**	427%	20%	46%	0%	0%
1866	619	434	480	2 113	70%	**78%**	**342%**	440%	21%	48%	0%	0%
1867	619	423	483	2 184	68%	**78%**	**353%**	452%	22%	50%	0%	0%
1868	620	409	485	2 255	66%	**78%**	**364%**	465%	22%	52%	0%	0%
1869	621	412	487	2 326	66%	**78%**	**374%**	477%	23%	54%	0%	0%
1870	622	451	490	2 395	72%	**79%**	**385%**	489%	23%	55%	0%	0%
1871	622	449	491	2 454	72%	**79%**	**395%**	500%	24%	57%	1%	2%
1872	621	393	491	2 512	63%	**79%**	**405%**	511%	24%	58%	1%	5%
1873	620	437	494	2 571	70%	**80%**	**414%**	520%	25%	59%	2%	7%
1874	620	434	496	2 628	70%	**80%**	**424%**	529%	25%	61%	2%	9%
1875	619	437	498	2 683	71%	**80%**	**433%**	538%	25%	62%	2%	11%
1876	624	505	500	2 737	81%	**80%**	**438%**	547%	25%	63%	3%	13%
1877	629	495	506	2 811	79%	**80%**	**447%**	555%	26%	64%	3%	14%
1878	634	492	512	2 883	78%	**81%**	**455%**	563%	26%	65%	3%	16%
1879	639	496	518	2 952	78%	**81%**	**462%**	570%	26%	65%	4%	18%
1880	644	513	524	3 017	80%	**81%**	**469%**	576%	26%	66%	4%	19%
1881	650	501	530	3 032	77%	**82%**	**467%**	572%	26%	67%	4%	21%
1882	656	512	536	3 043	78%	**82%**	**464%**	568%	26%	67%	4%	22%
1883	662	533	542	3 050	81%	**82%**	**461%**	563%	25%	67%	5%	23%
1884	668	536	547	3 052	80%	**82%**	**457%**	558%	25%	68%	5%	24%
1885	673	557	553	3 050	83%	**82%**	**453%**	552%	25%	68%	5%	26%
1886	680	586	558	3 044	86%	**82%**	**448%**	545%	25%	68%	5%	27%
1887	687	596	564	3 039	87%	**82%**	**443%**	538%	25%	68%	5%	28%
1888	694	612	570	3 032	88%	**82%**	**437%**	532%	25%	68%	5%	28%
1889	700	645	576	3 023	92%	**82%**	**432%**	525%	24%	68%	5%	29%
1890	707	643	583	3 012	91%	**82%**	**426%**	517%	24%	68%	5%	30%
1891	716	637	588	2 983	89%	**82%**	**417%**	507%	24%	68%	5%	31%
1892	724	632	594	2 953	87%	**82%**	**408%**	497%	24%	68%	5%	31%
1893	732	646	600	2 921	88%	**82%**	**399%**	487%	24%	68%	5%	32%
1894	740	663	606	2 889	90%	**82%**	**390%**	477%	24%	68%	5%	32%
1895	749	650	613	2 856	87%	**82%**	**381%**	466%	24%	68%	5%	32%
1896	758	675	619	2 823	89%	**82%**	**372%**	456%	24%	68%	5%	33%
1897	768	694	626	2 791	90%	**82%**	**364%**	446%	23%	67%	5%	33%
1898	777	720	633	2 759	93%	**81%**	**355%**	436%	23%	67%	5%	33%
1899	786	717	640	2 727	91%	**81%**	**347%**	426%	23%	66%	5%	33%
1900	802	714	648	2 695	89%	**81%**	**336%**	416%	23%	66%	5%	33%
1901	813	724	658	2 681	89%	**81%**	**330%**	407%	23%	66%	5%	33%
1902	820	730	670	2 644	89%	**82%**	**322%**	394%	23%	65%	5%	33%
1903	830	748	681	2 610	90%	**82%**	**315%**	383%	23%	64%	5%	32%

1904	838	762	693	2 581	91%	**83%**	**308%**	373%	22%	64%	5%	32%
1905	844	782	704	2 554	93%	**83%**	**303%**	363%	22%	63%	5%	31%
1906	853	792	715	2 536	93%	**84%**	**297%**	355%	22%	62%	5%	31%
1907	859	790	726	2 504	92%	**85%**	**291%**	345%	22%	62%	5%	30%
1908	871	789	738	2 503	91%	**85%**	**288%**	339%	22%	61%	4%	30%
1909	881	780	748	2 492	89%	**85%**	**283%**	333%	22%	60%	4%	29%
1910	888	791	759	2 487	89%	**85%**	**280%**	328%	22%	59%	4%	28%
1911	898	776	770	2 479	86%	**86%**	**276%**	322%	22%	58%	4%	28%
1912	903	716	780	2 482	79%	**86%**	**275%**	318%	22%	58%	4%	27%
1913	920	734	790	2 536	80%	**86%**	**276%**	321%	22%	57%	4%	27%
1914	882	720	799	2 572	82%	**91%**	**292%**	322%	22%	56%	4%	27%
1915	834	730	763	2 419	88%	**91%**	**290%**	317%	22%	56%	4%	26%
1916	736	622	680	2 115	84%	**92%**	**287%**	311%	22%	56%	4%	26%
1917	648	562	599	1 881	87%	**92%**	**290%**	314%	22%	55%	4%	26%
1918	566	474	523	1 667	84%	**92%**	**295%**	319%	22%	55%	4%	26%
1919	486	369	449	1 444	76%	**92%**	**297%**	321%	23%	55%	4%	25%
1920	465	299	427	1 425	64%	**92%**	**307%**	334%	23%	55%	4%	25%
1921	470	222	406	1 405	47%	**87%**	**299%**	346%	23%	54%	4%	25%
1922	485	263	387	1 400	54%	**80%**	**288%**	362%	23%	54%	4%	24%
1923	498	281	369	1 413	56%	**74%**	**283%**	383%	23%	53%	4%	23%
1924	518	259	353	1 437	50%	**68%**	**277%**	408%	23%	53%	4%	23%
1925	531	234	338	1 456	44%	**64%**	**274%**	431%	23%	52%	4%	22%
1926	568	226	324	1 471	40%	**57%**	**259%**	454%	23%	52%	4%	22%
1927	596	181	327	1 540	30%	**55%**	**258%**	472%	22%	52%	4%	21%
1928	607	183	329	1 603	30%	**54%**	**264%**	486%	22%	52%	4%	21%
1929	637	194	332	1 677	31%	**52%**	**263%**	505%	22%	52%	4%	21%
1930	663	195	337	1 739	29%	**51%**	**262%**	516%	22%	51%	4%	20%
1931	683	205	341	1 791	30%	**50%**	**262%**	526%	22%	52%	4%	20%
1932	691	226	345	1 822	33%	**50%**	**264%**	528%	22%	52%	4%	20%
1933	688	262	350	1 834	38%	**51%**	**267%**	524%	21%	52%	4%	19%
1934	684	283	355	1 860	41%	**52%**	**272%**	524%	21%	52%	4%	19%
1935	680	307	359	1 883	45%	**53%**	**277%**	525%	21%	53%	4%	19%
1936	685	347	364	1 923	51%	**53%**	**281%**	529%	21%	53%	4%	19%
1937	707	334	368	1 968	47%	**52%**	**278%**	534%	21%	54%	4%	19%
1938	722	274	373	2 002	38%	**52%**	**277%**	536%	21%	54%	4%	19%
1939	731	253	379	2 033	35%	**52%**	**278%**	536%	21%	55%	4%	18%
1940	593	251	385	2 078	42%	**65%**	**351%**	540%	20%	55%	4%	18%
1941	558	222	297	1 572	40%	**53%**	**282%**	529%	20%	55%	3%	18%
1942	523	199	284	1 461	38%	**54%**	**279%**	514%	20%	56%	3%	18%
1943	487	175	271	1 346	36%	**56%**	**276%**	497%	19%	56%	3%	18%
1944	450	148	256	1 224	33%	**57%**	**272%**	478%	19%	56%	3%	18%
1945	409	130	241	1 081	32%	**59%**	**264%**	449%	19%	57%	3%	18%
1946	479	94	226	954	20%	**47%**	**199%**	423%	19%	57%	3%	18%
1947	480	69	299	1 239	14%	**62%**	**258%**	414%	18%	58%	3%	18%
1948	479	54	302	1 230	11%	**63%**	**257%**	407%	18%	59%	3%	18%
1949	482	41	305	1 244	8%	**63%**	**258%**	407%	19%	59%	3%	18%
1950	506	47	309	1 284	9%	**61%**	**254%**	416%	18%	59%	3%	18%
1951	535	55	313	1 348	10%	**59%**	**252%**	430%	18%	60%	3%	19%
1952	562	58	317	1 399	10%	**56%**	**249%**	441%	18%	60%	3%	19%
1953	586	63	321	1 435	11%	**55%**	**245%**	447%	18%	60%	3%	19%
1954	610	79	326	1 477	13%	**53%**	**242%**	453%	17%	60%	3%	20%
1955	663	92	330	1 527	14%	**50%**	**230%**	463%	17%	60%	3%	20%
1956	725	105	348	1 640	15%	**48%**	**226%**	472%	17%	60%	3%	21%
1957	784	119	370	1 750	15%	**47%**	**223%**	473%	17%	60%	3%	21%
1958	852	133	392	1 876	16%	**46%**	**220%**	478%	17%	60%	3%	21%
1959	923	131	414	1 997	14%	**45%**	**216%**	482%	17%	60%	3%	22%
1960	992	140	437	2 114	14%	**44%**	**213%**	483%	17%	60%	3%	22%
1961	1 076	155	463	2 249	14%	**43%**	**209%**	486%	17%	60%	3%	22%
1962	1 160	172	490	2 385	15%	**42%**	**206%**	486%	17%	60%	3%	23%
1963	1 254	188	521	2 514	15%	**42%**	**200%**	482%	17%	60%	3%	23%
1964	1 353	207	555	2 643	15%	**41%**	**195%**	476%	17%	60%	3%	23%
1965	1 459	227	590	2 786	16%	**40%**	**191%**	472%	17%	59%	3%	24%
1966	1 574	252	629	2 936	16%	**40%**	**186%**	467%	17%	59%	3%	26%
1967	1 698	278	670	3 099	16%	**39%**	**183%**	463%	17%	59%	3%	27%
1968	1 832	307	715	3 272	17%	**39%**	**179%**	458%	17%	59%	3%	27%
1969	1 972	332	764	3 444	17%	**39%**	**175%**	451%	17%	58%	3%	29%
1970	2 119	353	818	3 635	17%	**39%**	**172%**	445%	16%	58%	3%	29%

1971	2 184	379	873	3 831	17%	**40%**	**175%**	439%	16%	57%	3%	28%
1972	2 277	404	893	3 869	18%	**39%**	**170%**	433%	16%	57%	3%	28%
1973	2 437	426	922	3 942	17%	**38%**	**162%**	428%	16%	57%	3%	28%
1974	2 427	447	980	4 133	18%	**40%**	**170%**	422%	16%	56%	3%	28%
1975	2 552	438	962	4 004	17%	**38%**	**157%**	416%	16%	56%	3%	28%
1976	2 682	441	1 005	4 065	16%	**37%**	**152%**	404%	16%	56%	3%	28%
1977	2 793	456	1 054	4 131	16%	**38%**	**148%**	392%	16%	56%	3%	27%
1978	2 880	469	1 102	4 207	16%	**38%**	**146%**	382%	16%	56%	3%	27%
1979	2 977	486	1 138	4 217	16%	**38%**	**142%**	370%	15%	55%	3%	27%
1980	3 002	495	1 177	4 236	16%	**39%**	**141%**	360%	15%	55%	3%	26%
1981	3 005	491	1 193	4 157	16%	**40%**	**138%**	348%	15%	54%	3%	26%
1982	2 987	490	1 206	4 064	16%	**40%**	**136%**	337%	14%	54%	3%	26%
1983	3 036	494	1 212	3 951	16%	**40%**	**130%**	326%	14%	53%	3%	25%
1984	3 115	511	1 253	3 954	16%	**40%**	**127%**	316%	14%	52%	2%	25%
1985	3 155	537	1 307	4 026	17%	**41%**	**128%**	308%	13%	52%	2%	24%
1986	3 275	574	1 349	4 068	18%	**41%**	**124%**	302%	13%	51%	2%	24%
1987	3 529	633	1 428	4 261	18%	**40%**	**121%**	298%	13%	50%	2%	23%
1988	3 582	693	1 561	4 609	19%	**44%**	**129%**	295%	13%	50%	2%	22%
1989	3 859	756	1 610	4 750	20%	**42%**	**123%**	295%	13%	49%	2%	22%
1990	4 168	818	1 760	5 173	20%	**42%**	**124%**	294%	13%	48%	2%	21%
1991	4 168	889	1 929	5 627	21%	**46%**	**135%**	292%	13%	47%	2%	21%
1992	4 176	959	1 952	5 661	23%	**47%**	**136%**	290%	12%	47%	2%	21%
1993	4 169	1 035	1 978	5 729	25%	**47%**	**137%**	290%	12%	46%	2%	20%
1994	4 237	1 116	1 992	5 745	26%	**47%**	**136%**	288%	12%	46%	2%	20%
1995	4 227	1 198	2 041	5 878	28%	**48%**	**139%**	288%	12%	45%	2%	20%
1996	4 247	1 281	2 055	5 910	30%	**48%**	**139%**	288%	12%	44%	3%	20%
1997	4 435	1 360	2 079	5 955	31%	**47%**	**134%**	287%	12%	44%	3%	20%
1998	4 587	1 454	2 199	6 276	32%	**48%**	**137%**	285%	12%	43%	2%	20%
1999	4 796	1 558	2 294	6 533	32%	**48%**	**136%**	285%	12%	43%	2%	19%
2000	5 334	1 672	2 420	6 849	31%	**45%**	**128%**	283%	13%	42%	2%	19%
2001	5 619	1 778	2 729	7 634	32%	**49%**	**136%**	280%	13%	42%	2%	18%
2002	5 793	1 887	2 913	8 052	33%	**50%**	**139%**	276%	13%	41%	2%	18%
2003	6 151	1 992	3 043	8 303	32%	**49%**	**135%**	273%	13%	41%	2%	17%
2004	6 713	2 104	3 278	8 831	31%	**49%**	**132%**	269%	13%	41%	2%	17%
2005	7 558	2 212	3 622	9 640	29%	**48%**	**128%**	266%	13%	40%	2%	16%
2006	8 433	2 351	4 153	10 856	28%	**49%**	**129%**	261%	13%	40%	2%	16%
2007	9 211	2 509	4 728	12 135	27%	**51%**	**132%**	257%	13%	40%	2%	16%
2008	9 543	2 688	5 272	13 302	28%	**55%**	**139%**	252%	13%	39%	2%	15%
2009	9 169	2 846	5 562	13 772	31%	**61%**	**150%**	248%	13%	39%	2%	15%
2010	8 812	3 057	5 428	13 243	35%	**62%**	**150%**	244%	13%	39%	2%	15%
2011	8 969	3 264	5 290	12 746	36%	**59%**	**142%**	241%	13%	39%	2%	14%
2012	9 127	3 473	5 453	13 240	38%	**60%**	**145%**	243%	14%	39%	2%	14%
2013	9 287	3 682	5 617	13 751	40%	**60%**	**148%**	245%	14%	38%	2%	13%
2014	9 449	3 893	5 782	14 277	41%	**61%**	**151%**	247%	14%	38%	2%	13%
2015	9 612	4 105	5 949	14 819	43%	**62%**	**154%**	249%	14%	38%	2%	13%
2016	9 777	4 319	6 116	15 378	44%	**63%**	**157%**	251%	14%	39%	2%	13%
2017	9 943	4 534	6 285	15 952	46%	**63%**	**160%**	254%	14%	39%	2%	13%
2018	10 112	4 749	6 454	16 542	47%	**64%**	**164%**	256%	15%	39%	2%	12%
2019	10 282	4 966	6 624	17 149	48%	**64%**	**167%**	259%	15%	39%	2%	12%
2020	10 453	5 182	6 794	17 770	50%	**65%**	**170%**	262%	15%	40%	2%	12%
2021	10 626	5 399	6 964	18 408	51%	**66%**	**173%**	264%	16%	40%	2%	12%
2022	10 801	5 616	7 134	19 061	52%	**66%**	**176%**	267%	16%	40%	2%	12%
2023	10 978	5 832	7 304	19 729	53%	**67%**	**180%**	270%	16%	41%	2%	12%
2024	11 157	6 049	7 474	20 414	54%	**67%**	**183%**	273%	17%	41%	2%	12%
2025	11 337	6 265	7 643	21 113	55%	**67%**	**186%**	276%	17%	41%	2%	12%
2026	11 519	6 481	7 813	21 829	56%	**68%**	**189%**	279%	17%	42%	2%	12%
2027	11 703	6 697	7 984	22 560	57%	**68%**	**193%**	283%	18%	42%	2%	12%
2028	11 889	6 914	8 155	23 308	58%	**69%**	**196%**	286%	18%	43%	2%	12%
2029	12 077	7 131	8 327	24 072	59%	**69%**	**199%**	289%	19%	43%	2%	12%
2030	12 266	7 350	8 500	24 852	60%	**69%**	**203%**	292%	19%	44%	2%	12%
2031	12 458	7 571	8 676	25 649	61%	**70%**	**206%**	296%	20%	45%	3%	12%
2032	12 651	7 793	8 854	26 462	62%	**70%**	**209%**	299%	20%	45%	3%	12%
2033	12 846	8 018	9 035	27 293	62%	**70%**	**212%**	302%	21%	46%	3%	12%
2034	13 043	8 246	9 220	28 142	63%	**71%**	**216%**	305%	21%	46%	3%	12%
2035	13 243	8 477	9 408	29 007	64%	**71%**	**219%**	308%	21%	47%	3%	12%
2036	13 444	8 712	9 601	29 891	65%	**71%**	**222%**	311%	22%	48%	3%	12%
2037	13 647	8 952	9 799	30 792	66%	**72%**	**226%**	314%	22%	48%	3%	13%
2038	13 852	9 195	10 002	31 711	66%	**72%**	**229%**	317%	23%	49%	3%	13%

2039	14 059	9 444	10 210	32 646	67%	**73%**	**232%**	320%	23%	50%	3%	13%
2040	14 269	9 696	10 423	33 598	68%	**73%**	**235%**	322%	23%	50%	3%	14%
2041	14 480	9 953	10 641	34 565	69%	**73%**	**239%**	325%	23%	50%	3%	14%
2042	14 694	10 213	10 863	35 546	70%	**74%**	**242%**	327%	23%	51%	3%	14%
2043	14 910	10 475	11 089	36 540	70%	**74%**	**245%**	330%	23%	52%	3%	14%
2044	15 127	10 740	11 317	37 545	71%	**75%**	**248%**	332%	23%	52%	3%	15%
2045	15 347	11 006	11 548	38 558	72%	**75%**	**251%**	334%	23%	52%	3%	15%
2046	15 570	11 271	11 780	39 579	72%	**76%**	**254%**	336%	24%	53%	3%	15%
2047	15 794	11 537	12 012	40 606	73%	**76%**	**257%**	338%	24%	53%	4%	15%
2048	16 021	11 802	12 245	41 636	74%	**76%**	**260%**	340%	24%	54%	4%	16%
2049	16 250	12 066	12 479	42 669	74%	**77%**	**263%**	342%	24%	54%	4%	16%
2050	16 481	12 328	12 712	43 703	75%	**77%**	**265%**	344%	24%	54%	4%	17%
2051	16 715	12 592	12 947	44 729	75%	**77%**	**268%**	345%	23%	54%	4%	17%
2052	16 951	12 844	13 172	45 733	76%	**78%**	**270%**	347%	23%	55%	4%	17%
2053	17 189	13 099	13 400	46 727	76%	**78%**	**272%**	349%	23%	55%	4%	18%
2054	17 429	13 355	13 631	47 711	77%	**78%**	**274%**	350%	23%	55%	4%	18%
2055	17 672	13 614	13 866	48 685	77%	**78%**	**275%**	351%	23%	55%	4%	18%
2056	17 918	13 875	14 104	49 646	77%	**79%**	**277%**	352%	23%	55%	4%	19%
2057	18 166	14 137	14 345	50 596	78%	**79%**	**279%**	353%	23%	55%	4%	19%
2058	18 416	14 401	14 589	51 534	78%	**79%**	**280%**	353%	23%	55%	5%	19%
2059	18 669	14 666	14 836	52 460	79%	**79%**	**281%**	354%	23%	55%	5%	20%
2060	18 925	14 932	15 085	53 374	79%	**80%**	**282%**	354%	22%	55%	5%	20%
2061	19 183	15 199	15 335	54 277	79%	**80%**	**283%**	354%	22%	55%	4%	20%
2062	19 443	15 465	15 588	55 167	80%	**80%**	**284%**	354%	22%	54%	4%	20%
2063	19 707	15 732	15 841	56 047	80%	**80%**	**284%**	354%	22%	54%	4%	20%
2064	19 972	15 999	16 096	56 917	80%	**81%**	**285%**	354%	22%	54%	4%	20%
2065	20 241	16 266	16 351	57 778	80%	**81%**	**285%**	353%	22%	54%	4%	21%
2066	20 512	16 532	16 607	58 631	81%	**81%**	**286%**	353%	22%	54%	4%	21%
2067	20 786	16 798	16 865	59 477	81%	**81%**	**286%**	353%	21%	54%	4%	20%
2068	21 062	17 064	17 122	60 317	81%	**81%**	**286%**	352%	21%	54%	4%	20%
2069	21 342	17 330	17 381	61 153	81%	**81%**	**287%**	352%	21%	54%	4%	20%
2070	21 624	17 597	17 641	61 986	81%	**82%**	**287%**	351%	21%	53%	4%	20%
2071	21 909	17 863	17 902	62 819	82%	**82%**	**287%**	351%	21%	53%	4%	20%
2072	22 197	18 131	18 164	63 653	82%	**82%**	**287%**	350%	21%	53%	4%	20%
2073	22 488	18 398	18 428	64 488	82%	**82%**	**287%**	350%	21%	53%	4%	20%
2074	22 781	18 667	18 693	65 328	82%	**82%**	**287%**	349%	21%	53%	4%	20%
2075	23 078	18 937	18 960	66 173	82%	**82%**	**287%**	349%	21%	53%	4%	19%
2076	23 377	19 209	19 228	67 025	82%	**82%**	**287%**	349%	21%	53%	4%	19%
2077	23 680	19 482	19 499	67 886	82%	**82%**	**287%**	348%	21%	53%	4%	19%
2078	23 985	19 757	19 772	68 757	82%	**82%**	**287%**	348%	21%	52%	4%	19%
2079	24 294	20 034	20 046	69 638	82%	**83%**	**287%**	347%	21%	52%	3%	19%
2080	24 606	20 312	20 322	70 531	83%	**83%**	**287%**	347%	21%	52%	3%	18%
2081	24 921	20 591	20 600	71 436	83%	**83%**	**287%**	347%	21%	52%	3%	18%
2082	25 239	20 872	20 879	72 354	83%	**83%**	**287%**	347%	21%	52%	3%	18%
2083	25 560	21 153	21 160	73 285	83%	**83%**	**287%**	346%	21%	52%	3%	18%
2084	25 884	21 436	21 442	74 230	83%	**83%**	**287%**	346%	21%	52%	3%	18%
2085	26 212	21 721	21 726	75 190	83%	**83%**	**287%**	346%	21%	52%	3%	18%
2086	26 543	22 009	22 012	76 166	83%	**83%**	**287%**	346%	21%	52%	3%	18%
2087	26 877	22 298	22 301	77 158	83%	**83%**	**287%**	346%	21%	52%	3%	17%
2088	27 214	22 589	22 592	78 166	83%	**83%**	**287%**	346%	21%	52%	3%	17%
2089	27 555	22 883	22 885	79 193	83%	**83%**	**287%**	346%	21%	52%	3%	17%
2090	27 899	23 179	23 181	80 236	83%	**83%**	**288%**	346%	21%	52%	3%	17%
2091	28 247	23 478	23 480	81 299	83%	**83%**	**288%**	346%	21%	52%	3%	17%
2092	28 598	23 781	23 782	82 380	83%	**83%**	**288%**	346%	21%	52%	3%	17%
2093	28 953	24 086	24 087	83 481	83%	**83%**	**288%**	347%	21%	52%	3%	17%
2094	29 311	24 394	24 395	84 601	83%	**83%**	**289%**	347%	21%	52%	3%	17%
2095	29 673	24 706	24 706	85 741	83%	**83%**	**289%**	347%	22%	52%	3%	17%
2096	30 039	25 021	25 021	86 902	83%	**83%**	**289%**	347%	22%	52%	3%	16%
2097	30 408	25 339	25 339	88 083	83%	**83%**	**290%**	348%	22%	52%	3%	16%
2098	30 781	25 660	25 660	89 285	83%	**83%**	**290%**	348%	22%	52%	3%	16%
2099	31 157	25 983	25 983	90 508	83%	**83%**	**290%**	348%	22%	52%	3%	16%
2100	31 538	26 309	26 309	91 751	83%	**83%**	**291%**	349%	22%	52%	3%	16%

Table D5: Detailed simulation results 1820-1913, scenario a1

(class savings: s_K=s/α ,s_L=0)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
	Simulated age-wealth profiles (average wealth as a fraction of average wealth of individuals aged 50-to-59 year-old)									Simulated aggregate ratios			Observed aggregate ratios		
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	b_{yt}	μ_t*	μ_t	β_t	α_{dt}	r_{dt}
1820	2%	8%	31%	39%	49%	100%	123%	127%	123%	**19.9%**	166%	122%	537%	31%	5.5%
1821	2%	10%	32%	43%	52%	100%	128%	136%	134%	**20.2%**	167%	123%	541%	31%	5.5%
1822	3%	11%	34%	47%	55%	100%	134%	146%	146%	**20.5%**	168%	124%	546%	31%	5.4%
1823	3%	12%	36%	51%	58%	100%	140%	157%	160%	**20.7%**	169%	125%	550%	31%	5.4%
1824	3%	13%	38%	57%	62%	100%	146%	169%	175%	**21.0%**	170%	126%	554%	31%	5.3%
1825	3%	15%	40%	63%	67%	100%	154%	182%	192%	**21.2%**	171%	126%	558%	31%	5.3%
1826	3%	16%	43%	69%	72%	100%	161%	197%	210%	**21.4%**	172%	127%	562%	31%	5.3%
1827	3%	18%	45%	77%	79%	100%	170%	213%	229%	**21.5%**	172%	127%	566%	31%	5.2%
1828	3%	19%	47%	85%	86%	100%	179%	230%	251%	**21.8%**	173%	127%	570%	31%	5.2%
1829	3%	20%	50%	94%	94%	100%	189%	249%	274%	**21.8%**	172%	128%	574%	31%	5.2%
1830	3%	22%	52%	104%	103%	100%	200%	268%	298%	**21.8%**	170%	127%	578%	36%	5.9%
1831	3%	22%	54%	104%	106%	100%	189%	265%	303%	**22.7%**	177%	127%	582%	36%	5.8%
1832	3%	23%	56%	104%	110%	100%	178%	262%	308%	**21.5%**	166%	126%	586%	36%	5.8%
1833	3%	22%	57%	103%	112%	100%	166%	256%	310%	**22.2%**	170%	125%	590%	36%	5.7%
1834	3%	22%	57%	102%	115%	100%	155%	251%	312%	**22.3%**	170%	125%	594%	36%	5.7%
1835	3%	22%	58%	101%	117%	100%	143%	244%	313%	**22.0%**	167%	123%	598%	36%	5.7%
1836	3%	21%	57%	99%	118%	100%	132%	238%	312%	**22.1%**	168%	122%	596%	36%	5.7%
1837	3%	20%	57%	96%	120%	100%	121%	231%	310%	**21.4%**	163%	121%	595%	36%	5.7%
1838	3%	20%	56%	93%	120%	100%	111%	223%	307%	**21.9%**	167%	120%	593%	36%	5.7%
1839	3%	19%	55%	91%	121%	100%	101%	216%	303%	**21.7%**	166%	118%	592%	36%	5.7%
1840	3%	18%	53%	87%	120%	100%	93%	209%	299%	**21.2%**	162%	116%	590%	38%	6.0%
1841	3%	17%	52%	87%	117%	100%	90%	190%	284%	**20.8%**	160%	115%	590%	38%	6.0%
1842	3%	17%	51%	86%	114%	100%	87%	173%	270%	**20.3%**	156%	113%	590%	38%	6.0%
1843	2%	16%	49%	84%	110%	100%	85%	156%	258%	**20.5%**	157%	111%	590%	38%	6.0%
1844	2%	16%	47%	83%	107%	100%	83%	142%	247%	**20.0%**	154%	110%	590%	38%	6.0%
1845	2%	15%	46%	81%	103%	100%	82%	129%	238%	**20.1%**	154%	108%	590%	38%	6.0%
1846	2%	15%	44%	79%	100%	100%	81%	117%	229%	**20.0%**	153%	106%	591%	38%	6.0%
1847	2%	15%	42%	78%	96%	100%	80%	107%	222%	**18.8%**	143%	105%	592%	38%	6.0%
1848	2%	14%	40%	75%	93%	100%	80%	98%	215%	**18.3%**	139%	104%	594%	38%	6.0%
1849	2%	14%	38%	73%	90%	100%	80%	91%	209%	**18.3%**	139%	102%	595%	38%	6.0%
1850	2%	13%	36%	71%	87%	100%	81%	85%	204%	**17.1%**	138%	103%	596%	45%	7.2%
1851	2%	13%	36%	71%	88%	100%	83%	84%	185%	**17.1%**	137%	102%	598%	45%	7.1%
1852	2%	12%	35%	70%	90%	100%	86%	84%	169%	**16.5%**	131%	101%	600%	45%	7.1%
1853	2%	12%	35%	70%	91%	100%	89%	84%	155%	**16.9%**	134%	100%	602%	45%	7.1%
1854	2%	12%	35%	69%	92%	100%	92%	85%	144%	**17.1%**	135%	99%	603%	45%	7.1%
1855	2%	12%	34%	68%	93%	100%	95%	86%	136%	**16.6%**	130%	99%	605%	45%	7.1%
1856	2%	11%	34%	67%	93%	100%	98%	88%	129%	**17.0%**	133%	99%	609%	45%	7.0%
1857	2%	11%	34%	66%	94%	100%	102%	90%	125%	**17.3%**	133%	99%	612%	45%	7.0%
1858	2%	11%	33%	65%	94%	100%	105%	93%	122%	**17.1%**	131%	99%	616%	45%	6.9%
1859	2%	11%	33%	64%	95%	100%	109%	96%	121%	**17.4%**	132%	100%	620%	45%	6.9%
1860	1%	11%	33%	63%	95%	100%	113%	100%	121%	**17.5%**	132%	101%	623%	45%	6.9%
1861	1%	10%	32%	62%	93%	100%	111%	101%	114%	**18.4%**	137%	101%	626%	45%	6.8%
1862	1%	10%	31%	61%	92%	100%	109%	102%	110%	**18.3%**	136%	102%	629%	45%	6.8%
1863	1%	10%	31%	60%	90%	100%	107%	104%	108%	**18.5%**	137%	103%	631%	45%	6.8%
1864	1%	10%	30%	59%	88%	100%	106%	106%	107%	**18.5%**	135%	104%	634%	45%	6.7%
1865	1%	10%	30%	58%	87%	100%	105%	109%	108%	**18.7%**	136%	105%	637%	45%	6.7%
1866	1%	10%	29%	58%	85%	100%	104%	111%	109%	**18.9%**	137%	106%	638%	45%	6.7%
1867	1%	10%	29%	57%	84%	100%	103%	114%	111%	**19.1%**	138%	107%	639%	45%	6.7%
1868	1%	9%	29%	57%	83%	100%	102%	117%	114%	**19.3%**	139%	108%	640%	45%	6.7%
1869	1%	9%	29%	57%	81%	100%	102%	121%	118%	**19.4%**	139%	109%	641%	45%	6.7%
1870	1%	9%	29%	57%	80%	100%	101%	124%	121%	**18.8%**	134%	110%	642%	42%	6.3%
1871	1%	9%	28%	56%	80%	100%	103%	123%	124%	**17.8%**	129%	112%	641%	42%	6.3%
1872	1%	9%	28%	56%	80%	100%	105%	121%	126%	**20.3%**	147%	113%	641%	42%	6.3%
1873	1%	9%	28%	56%	81%	100%	107%	121%	129%	**20.3%**	147%	114%	640%	42%	6.3%
1874	1%	9%	28%	57%	81%	100%	108%	121%	133%	**20.0%**	145%	114%	639%	42%	6.3%
1875	1%	9%	29%	57%	82%	100%	110%	121%	138%	**20.1%**	145%	115%	639%	42%	6.3%
1876	1%	9%	29%	58%	82%	100%	112%	122%	143%	**20.0%**	143%	115%	645%	42%	6.2%
1877	1%	9%	29%	58%	83%	100%	114%	123%	149%	**20.4%**	144%	116%	650%	42%	6.2%
1878	1%	9%	29%	59%	84%	100%	115%	124%	156%	**20.5%**	143%	116%	656%	42%	6.1%
1879	1%	9%	29%	60%	86%	100%	117%	126%	162%	**20.8%**	144%	117%	661%	42%	6.1%
1880	1%	9%	30%	60%	87%	100%	119%	128%	169%	**20.9%**	143%	117%	667%	31%	4.4%
1881	1%	9%	29%	60%	87%	100%	118%	130%	164%	**21.4%**	145%	118%	674%	31%	4.4%
1882	1%	9%	29%	60%	87%	100%	118%	131%	160%	**21.5%**	144%	118%	681%	31%	4.3%
1883	1%	9%	29%	60%	86%	100%	117%	131%	156%	**21.7%**	144%	119%	687%	31%	4.3%
1884	1%	9%	28%	60%	86%	100%	116%	132%	155%	**21.9%**	144%	119%	694%	31%	4.2%
1885	1%	9%	28%	60%	86%	100%	115%	133%	154%	**22.0%**	143%	119%	701%	31%	4.2%
1886	1%	8%	27%	60%	86%	100%	114%	133%	155%	**22.0%**	144%	120%	698%	31%	4.2%
1887	1%	8%	27%	60%	86%	100%	112%	133%	155%	**21.9%**	144%	120%	695%	31%	4.2%

1888	1%	8%	26%	59%	86%	100%	111%	133%	156%	**21.7%**	143%	121%	692%	31%	4.3%
1889	1%	8%	26%	58%	86%	100%	110%	133%	158%	**21.9%**	145%	121%	690%	31%	4.3%
1890	1%	8%	26%	58%	85%	100%	108%	134%	160%	**21.4%**	142%	121%	687%	27%	3.7%
1891	1%	8%	25%	57%	85%	100%	108%	133%	159%	**21.6%**	144%	122%	685%	27%	3.7%
1892	1%	8%	26%	56%	85%	100%	108%	132%	159%	**21.3%**	142%	122%	683%	27%	3.7%
1893	1%	8%	26%	56%	85%	100%	109%	131%	159%	**21.6%**	144%	122%	682%	27%	3.7%
1894	1%	8%	25%	55%	85%	100%	109%	130%	159%	**21.6%**	145%	122%	680%	27%	3.8%
1895	1%	8%	25%	54%	85%	100%	109%	128%	159%	**21.5%**	144%	122%	679%	27%	3.8%
1896	1%	8%	25%	53%	85%	100%	109%	127%	160%	**21.7%**	145%	123%	679%	27%	3.8%
1897	1%	8%	25%	53%	85%	100%	109%	125%	161%	**21.7%**	145%	123%	679%	27%	3.8%
1898	1%	8%	25%	52%	84%	100%	109%	124%	161%	**21.9%**	146%	123%	678%	27%	3.8%
1899	1%	8%	25%	51%	84%	100%	109%	123%	162%	**21.7%**	145%	123%	678%	27%	3.8%
1900	1%	7%	24%	53%	84%	100%	113%	126%	153%	**21.5%**	143%	123%	678%	27%	3.8%
1901	1%	7%	24%	53%	84%	100%	113%	128%	154%	**22.6%**	148%	123%	676%	27%	3.8%
1902	1%	8%	24%	54%	83%	100%	113%	127%	153%	**21.8%**	147%	123%	673%	27%	3.9%
1903	1%	8%	24%	53%	83%	100%	112%	129%	154%	**21.6%**	148%	124%	670%	27%	3.9%
1904	1%	8%	24%	53%	82%	100%	111%	129%	153%	**21.6%**	148%	125%	667%	27%	3.9%
1905	1%	8%	24%	52%	81%	100%	110%	129%	152%	**22.0%**	146%	125%	664%	27%	3.9%
1906	1%	8%	23%	51%	79%	100%	109%	127%	151%	**22.2%**	149%	125%	661%	27%	3.9%
1907	1%	8%	24%	51%	79%	100%	110%	127%	151%	**23.1%**	148%	125%	658%	27%	3.9%
1908	1%	8%	24%	51%	79%	100%	111%	128%	152%	**21.3%**	147%	125%	655%	27%	4.0%
1909	1%	8%	24%	50%	79%	100%	111%	129%	152%	**22.4%**	150%	126%	652%	27%	4.0%
1910	1%	8%	24%	50%	79%	100%	111%	129%	153%	**20.8%**	152%	126%	649%	35%	5.2%
1911	1%	8%	24%	50%	79%	100%	111%	129%	152%	**21.8%**	151%	127%	648%	35%	5.2%
1912	1%	8%	25%	50%	81%	100%	112%	128%	153%	**20.0%**	148%	125%	646%	35%	5.2%
1913	1%	8%	25%	50%	80%	100%	112%	128%	155%	**0.0%**	0%	0%	645%	35%	5.2%

Table D5: Detailed simulation results 1820-1913, scenario b1

(class savings: s_K=s/α ,s_L=0) (gift-bequest ratio frozen at 0%)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
	Simulated age-wealth profiles (average wealth as a fraction of average wealth of individuals aged 50-to-59 year-old)									**Simulated aggregate ratios**			**Observed aggregate ratios**		
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	b_{yt}	μ_t*	μ_t	β_t	α_{dt}	r_{dt}
1820	2%	8%	31%	39%	49%	100%	123%	127%	123%	**14.7%**	122%	122%	537%	31%	5.5%
1821	2%	9%	31%	42%	52%	100%	127%	134%	132%	**15.0%**	124%	124%	541%	31%	5.5%
1822	2%	9%	31%	45%	55%	100%	131%	141%	142%	**15.2%**	125%	125%	546%	31%	5.4%
1823	2%	9%	31%	48%	58%	100%	136%	149%	152%	**15.5%**	127%	127%	550%	31%	5.4%
1824	2%	10%	32%	51%	62%	100%	141%	158%	163%	**15.8%**	128%	128%	554%	31%	5.3%
1825	2%	10%	32%	55%	66%	100%	147%	166%	174%	**16.0%**	129%	129%	558%	31%	5.3%
1826	2%	10%	32%	58%	70%	100%	152%	176%	186%	**16.3%**	130%	130%	562%	31%	5.3%
1827	2%	10%	32%	62%	74%	100%	159%	186%	198%	**16.5%**	132%	132%	566%	31%	5.2%
1828	2%	10%	31%	66%	79%	100%	165%	196%	210%	**16.7%**	133%	133%	570%	31%	5.2%
1829	1%	10%	31%	70%	84%	100%	172%	207%	223%	**16.9%**	133%	133%	574%	31%	5.2%
1830	1%	10%	30%	74%	89%	100%	179%	218%	236%	**17.1%**	134%	134%	578%	36%	5.9%
1831	1%	10%	30%	72%	90%	100%	170%	214%	236%	**17.3%**	135%	135%	582%	36%	5.8%
1832	1%	10%	30%	70%	90%	100%	162%	210%	236%	**17.4%**	135%	135%	586%	36%	5.8%
1833	1%	9%	29%	68%	91%	100%	154%	206%	236%	**17.6%**	135%	135%	590%	36%	5.7%
1834	1%	9%	29%	66%	92%	100%	146%	202%	236%	**17.7%**	135%	135%	594%	36%	5.7%
1835	1%	9%	28%	63%	92%	100%	139%	199%	236%	**17.8%**	135%	135%	598%	36%	5.7%
1836	1%	8%	28%	61%	92%	100%	132%	195%	236%	**17.7%**	135%	135%	596%	36%	5.7%
1837	1%	8%	27%	59%	92%	100%	126%	192%	235%	**17.7%**	135%	135%	595%	36%	5.7%
1838	1%	8%	26%	56%	92%	100%	119%	190%	235%	**17.6%**	134%	134%	593%	36%	5.7%
1839	1%	7%	25%	53%	92%	100%	114%	187%	234%	**17.5%**	134%	134%	592%	36%	5.7%
1840	1%	7%	24%	51%	91%	100%	109%	185%	234%	**17.4%**	134%	134%	590%	38%	6.0%
1841	1%	7%	24%	50%	89%	100%	108%	175%	226%	**17.4%**	133%	133%	590%	38%	6.0%
1842	1%	6%	23%	50%	86%	100%	107%	165%	219%	**17.3%**	133%	133%	590%	38%	6.0%
1843	1%	6%	23%	49%	83%	100%	107%	155%	214%	**17.2%**	132%	132%	590%	38%	6.0%
1844	1%	6%	22%	48%	81%	100%	106%	147%	210%	**17.2%**	132%	132%	590%	38%	6.0%
1845	1%	6%	22%	47%	78%	100%	106%	140%	207%	**17.1%**	131%	131%	590%	38%	6.0%
1846	1%	6%	21%	46%	76%	100%	106%	133%	205%	**17.1%**	131%	131%	591%	38%	6.0%
1847	1%	6%	20%	45%	73%	100%	106%	128%	204%	**17.1%**	130%	130%	592%	38%	6.0%
1848	1%	6%	20%	45%	71%	100%	106%	123%	204%	**17.1%**	130%	130%	594%	38%	6.0%
1849	1%	6%	19%	44%	69%	100%	107%	120%	204%	**17.1%**	129%	129%	595%	38%	6.0%
1850	1%	6%	18%	43%	67%	100%	107%	117%	205%	**16.3%**	131%	131%	596%	45%	7.2%
1851	1%	6%	19%	43%	68%	100%	110%	119%	194%	**16.4%**	131%	131%	598%	45%	7.1%
1852	1%	6%	19%	44%	69%	100%	113%	122%	185%	**16.4%**	131%	131%	600%	45%	7.1%
1853	1%	6%	19%	44%	70%	100%	116%	124%	179%	**16.5%**	131%	131%	602%	45%	7.1%
1854	1%	6%	19%	44%	71%	100%	120%	127%	174%	**16.6%**	131%	131%	603%	45%	7.1%
1855	1%	6%	19%	44%	72%	100%	123%	131%	171%	**16.7%**	131%	131%	605%	45%	7.1%
1856	1%	6%	19%	44%	73%	100%	126%	134%	170%	**16.9%**	131%	131%	609%	45%	7.0%
1857	1%	6%	20%	44%	74%	100%	130%	138%	171%	**17.1%**	132%	132%	612%	45%	7.0%
1858	1%	6%	20%	44%	75%	100%	133%	143%	173%	**17.3%**	132%	132%	616%	45%	6.9%
1859	1%	6%	20%	44%	75%	100%	137%	147%	176%	**17.5%**	133%	133%	620%	45%	6.9%
1860	1%	6%	20%	44%	77%	100%	141%	152%	180%	**17.8%**	134%	134%	623%	45%	6.9%
1861	1%	6%	20%	44%	76%	100%	138%	153%	177%	**18.0%**	135%	135%	626%	45%	6.8%
1862	1%	6%	20%	44%	75%	100%	135%	154%	175%	**18.2%**	135%	135%	629%	45%	6.8%
1863	1%	6%	20%	44%	74%	100%	133%	155%	175%	**18.5%**	136%	136%	631%	45%	6.8%
1864	1%	6%	20%	44%	74%	100%	131%	157%	175%	**18.7%**	137%	137%	634%	45%	6.7%
1865	1%	6%	20%	44%	73%	100%	129%	159%	177%	**18.9%**	138%	138%	636%	45%	6.7%
1866	1%	6%	20%	44%	73%	100%	128%	160%	179%	**19.1%**	138%	138%	637%	45%	6.7%
1867	1%	6%	20%	44%	72%	100%	126%	162%	181%	**19.2%**	139%	139%	639%	45%	6.7%
1868	1%	6%	20%	44%	72%	100%	125%	164%	184%	**19.4%**	139%	139%	640%	45%	6.7%
1869	1%	6%	20%	44%	71%	100%	124%	166%	188%	**19.5%**	140%	140%	641%	45%	6.7%
1870	1%	6%	20%	44%	70%	100%	122%	167%	191%	**19.7%**	140%	140%	641%	42%	6.3%
1871	1%	6%	20%	45%	71%	100%	123%	165%	194%	**19.5%**	142%	142%	641%	42%	6.3%
1872	1%	6%	20%	45%	71%	100%	124%	163%	195%	**19.6%**	142%	142%	640%	42%	6.3%
1873	1%	6%	20%	45%	72%	100%	125%	161%	197%	**19.6%**	142%	142%	640%	42%	6.3%
1874	1%	6%	20%	45%	72%	100%	125%	159%	199%	**19.6%**	142%	142%	639%	42%	6.3%
1875	1%	6%	21%	46%	73%	100%	126%	158%	202%	**19.6%**	141%	141%	639%	42%	6.3%
1876	1%	6%	21%	46%	74%	100%	127%	157%	206%	**19.8%**	141%	141%	644%	42%	6.2%
1877	1%	6%	21%	47%	75%	100%	128%	157%	210%	**20.0%**	141%	141%	650%	42%	6.2%
1878	1%	6%	21%	47%	76%	100%	129%	157%	214%	**20.2%**	141%	141%	656%	42%	6.1%
1879	1%	6%	21%	48%	77%	100%	130%	157%	219%	**20.4%**	141%	141%	661%	42%	6.1%
1880	1%	6%	21%	48%	78%	100%	132%	158%	224%	**20.5%**	141%	141%	667%	31%	4.4%
1881	1%	6%	21%	48%	78%	100%	131%	157%	216%	**20.7%**	141%	141%	674%	31%	4.4%
1882	1%	6%	21%	48%	78%	100%	130%	157%	210%	**20.9%**	141%	141%	680%	31%	4.3%
1883	1%	6%	20%	47%	77%	100%	128%	156%	204%	**21.1%**	140%	140%	687%	31%	4.3%
1884	1%	6%	20%	47%	77%	100%	127%	156%	200%	**21.3%**	140%	140%	694%	31%	4.2%
1885	1%	6%	20%	47%	77%	100%	126%	155%	198%	**21.5%**	140%	140%	701%	31%	4.2%
1886	1%	6%	19%	48%	77%	100%	125%	155%	196%	**21.4%**	140%	140%	698%	31%	4.2%
1887	1%	6%	19%	47%	77%	100%	123%	154%	195%	**21.4%**	140%	140%	695%	31%	4.2%

1888	1%	6%	19%	47%	77%	100%	122%	153%	194%	**21.3%**	140%	140%	692%	31%	4.3%
1889	1%	6%	19%	46%	77%	100%	120%	153%	194%	**21.2%**	140%	140%	689%	31%	4.3%
1890	1%	6%	19%	46%	76%	100%	119%	154%	194%	**21.1%**	140%	140%	687%	27%	3.7%
1891	1%	6%	18%	45%	76%	100%	119%	152%	192%	**21.1%**	141%	141%	685%	27%	3.7%
1892	1%	5%	19%	45%	76%	100%	119%	150%	190%	**21.0%**	140%	140%	683%	27%	3.7%
1893	1%	5%	19%	45%	76%	100%	120%	150%	190%	**21.0%**	140%	140%	682%	27%	3.7%
1894	1%	5%	19%	44%	76%	100%	120%	148%	189%	**21.0%**	140%	140%	680%	27%	3.8%
1895	1%	5%	18%	44%	76%	100%	120%	146%	188%	**20.9%**	140%	140%	678%	27%	3.8%
1896	1%	5%	18%	43%	76%	100%	120%	145%	188%	**21.0%**	140%	140%	678%	27%	3.8%
1897	1%	5%	18%	43%	76%	100%	120%	144%	188%	**21.0%**	140%	140%	678%	27%	3.8%
1898	1%	5%	18%	42%	75%	100%	120%	142%	188%	**21.0%**	140%	140%	678%	27%	3.8%
1899	1%	5%	18%	42%	75%	100%	120%	141%	188%	**21.0%**	140%	140%	678%	27%	3.8%
1900	1%	5%	18%	43%	75%	100%	125%	146%	178%	**21.1%**	141%	141%	678%	27%	3.8%
1901	1%	5%	18%	43%	75%	100%	125%	147%	179%	**21.4%**	140%	140%	675%	27%	3.8%
1902	1%	5%	17%	43%	75%	100%	125%	147%	178%	**20.7%**	140%	140%	672%	27%	3.9%
1903	1%	5%	17%	43%	74%	100%	124%	149%	179%	**20.6%**	142%	142%	670%	27%	3.9%
1904	1%	5%	17%	43%	74%	100%	123%	149%	178%	**20.8%**	142%	142%	667%	27%	3.9%
1905	1%	5%	17%	42%	73%	100%	122%	149%	177%	**21.3%**	142%	142%	664%	27%	3.9%
1906	1%	5%	17%	42%	71%	100%	121%	147%	175%	**21.2%**	142%	142%	661%	27%	3.9%
1907	1%	5%	17%	41%	71%	100%	121%	147%	176%	**22.2%**	142%	142%	658%	27%	3.9%
1908	1%	5%	18%	41%	71%	100%	122%	148%	176%	**20.4%**	142%	142%	655%	27%	4.0%
1909	1%	5%	18%	41%	71%	100%	122%	148%	177%	**21.4%**	144%	144%	652%	27%	4.0%
1910	1%	5%	18%	41%	71%	100%	122%	148%	177%	**19.6%**	143%	143%	649%	35%	5.2%
1911	1%	5%	18%	41%	71%	100%	122%	148%	176%	**20.9%**	145%	145%	648%	35%	5.2%
1912	1%	5%	18%	40%	72%	100%	123%	147%	177%	**19.2%**	142%	142%	646%	35%	5.2%
1913	1%	5%	18%	41%	72%	100%	123%	147%	180%	**0.0%**	0%	0%	644%	35%	5.2%

Table D6: Detailed simulation results 1900-2100, scenario a1

(uniform savings $s=s_K=s_L$) (2010-2100: g=1.7%, (1-τ)r=3.0%, s=9.4%) (estimated age-labor income profile)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
	Simulated age-wealth profiles (average wealth as a fraction of average wealth of individuals aged 50-to-59 year-old)									**Simulated aggregate ratios**			**Observed aggregate ratios**		
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	b_{yt}	μ_t^*	μ_t	β_t	α_{dt}	r_{dt}
1900	2%	8%	27%	60%	68%	100%	158%	151%	191%	**22.1%**	154%	133%	646%	29%	4.2%
1901	2%	9%	28%	61%	72%	100%	156%	157%	193%	**25.3%**	160%	133%	703%	24%	3.2%
1902	2%	10%	30%	63%	75%	100%	153%	163%	193%	**25.1%**	158%	133%	720%	25%	3.2%
1903	2%	10%	31%	64%	79%	100%	150%	168%	193%	**23.9%**	159%	133%	690%	25%	3.4%
1904	2%	11%	32%	65%	83%	100%	146%	173%	192%	**23.3%**	158%	133%	676%	25%	3.5%
1905	2%	11%	33%	66%	86%	100%	143%	178%	193%	**23.7%**	155%	133%	676%	28%	4.0%
1906	2%	11%	33%	67%	90%	100%	139%	182%	192%	**24.8%**	157%	132%	698%	25%	3.3%
1907	2%	11%	33%	67%	94%	100%	136%	186%	194%	**23.5%**	156%	131%	638%	32%	4.8%
1908	2%	11%	34%	68%	97%	100%	132%	189%	194%	**22.6%**	154%	130%	668%	28%	3.9%
1909	2%	11%	33%	68%	101%	100%	129%	191%	194%	**23.0%**	156%	131%	646%	30%	4.4%
1910	2%	11%	33%	69%	104%	100%	126%	194%	196%	**22.3%**	156%	129%	676%	27%	3.8%
1911	2%	10%	33%	68%	102%	100%	121%	182%	193%	**23.2%**	154%	130%	672%	33%	4.6%
1912	2%	10%	32%	67%	101%	100%	116%	170%	193%	**19.4%**	151%	127%	615%	40%	6.2%
1913	1%	10%	32%	66%	99%	100%	112%	159%	190%	**21.0%**	152%	127%	660%	39%	5.5%
1914	1%	9%	31%	65%	97%	100%	108%	149%	186%	**22.6%**	119%	99%	682%	24%	3.4%
1915	2%	11%	32%	63%	93%	100%	105%	141%	184%	**23.1%**	112%	93%	686%	19%	2.7%
1916	4%	13%	32%	61%	90%	100%	102%	134%	179%	**16.8%**	118%	98%	539%	28%	5.4%
1917	4%	14%	33%	60%	87%	100%	100%	127%	175%	**14.4%**	126%	105%	481%	29%	6.3%
1918	4%	14%	33%	60%	84%	100%	97%	122%	170%	**15.7%**	110%	92%	478%	24%	5.2%
1919	5%	15%	34%	58%	81%	100%	95%	116%	165%	**10.3%**	130%	108%	389%	30%	8.1%
1920	4%	14%	34%	56%	77%	100%	93%	117%	202%	**10.3%**	145%	121%	352%	31%	8.8%
1921	4%	13%	35%	58%	79%	100%	93%	112%	178%	**8.9%**	142%	118%	306%	31%	10.1%
1922	3%	12%	35%	61%	80%	100%	94%	105%	160%	**8.3%**	138%	115%	284%	33%	11.6%
1923	2%	11%	35%	63%	83%	100%	95%	102%	146%	**7.6%**	133%	111%	287%	35%	12.0%
1924	2%	10%	35%	64%	84%	100%	96%	98%	134%	**7.9%**	130%	108%	295%	35%	11.6%
1925	1%	9%	34%	65%	86%	100%	97%	95%	125%	**7.9%**	128%	107%	293%	35%	11.5%
1926	1%	9%	34%	67%	87%	100%	99%	94%	119%	**8.6%**	126%	105%	327%	36%	10.2%
1927	1%	9%	33%	67%	89%	100%	100%	93%	115%	**8.7%**	126%	105%	348%	36%	9.4%
1928	1%	9%	32%	67%	89%	100%	103%	93%	114%	**8.0%**	125%	104%	326%	35%	9.9%
1929	1%	8%	31%	67%	90%	100%	104%	93%	112%	**9.2%**	126%	105%	339%	34%	9.3%
1930	1%	8%	29%	66%	90%	100%	106%	93%	111%	**8.7%**	124%	104%	369%	31%	7.8%
1931	1%	7%	28%	65%	91%	100%	105%	93%	104%	**9.9%**	126%	105%	392%	29%	6.8%
1932	1%	7%	26%	64%	91%	100%	105%	94%	102%	**10.1%**	127%	106%	410%	25%	5.6%
1933	1%	6%	25%	62%	91%	100%	105%	95%	99%	**10.2%**	128%	107%	405%	28%	6.4%
1934	1%	6%	23%	60%	91%	100%	104%	96%	98%	**10.3%**	129%	107%	423%	27%	6.0%
1935	1%	6%	22%	58%	91%	100%	104%	98%	97%	**10.2%**	130%	109%	392%	29%	7.1%
1936	1%	5%	22%	56%	91%	100%	103%	99%	97%	**9.6%**	131%	109%	375%	28%	7.3%
1937	1%	5%	23%	55%	90%	100%	101%	100%	98%	**10.2%**	130%	109%	405%	28%	6.5%
1938	1%	5%	24%	54%	89%	100%	100%	101%	97%	**10.7%**	130%	108%	409%	28%	6.4%
1939	1%	4%	24%	53%	89%	100%	99%	100%	95%	**9.9%**	129%	108%	374%	29%	7.1%
1940	1%	4%	25%	52%	88%	100%	98%	100%	89%	**14.4%**	115%	96%	449%	23%	4.5%
1941	1%	5%	29%	57%	87%	100%	98%	100%	92%	**12.8%**	121%	101%	450%	19%	3.7%
1942	1%	5%	26%	55%	86%	100%	97%	99%	92%	**12.2%**	122%	102%	435%	16%	3.2%
1943	1%	5%	25%	54%	85%	100%	96%	97%	91%	**12.5%**	115%	96%	458%	11%	2.1%
1944	1%	5%	24%	52%	83%	100%	97%	96%	92%	**14.7%**	104%	92%	477%	0%	0.1%
1945	1%	6%	24%	51%	81%	100%	97%	96%	92%	**10.5%**	144%	102%	340%	1%	0.2%
1946	1%	6%	21%	46%	76%	100%	99%	99%	100%	**7.1%**	161%	116%	271%	13%	4.0%
1947	1%	6%	20%	48%	75%	100%	100%	99%	103%	**6.7%**	153%	117%	271%	11%	3.3%
1948	1%	6%	19%	50%	75%	100%	101%	99%	106%	**6.0%**	162%	118%	238%	15%	5.0%
1949	1%	6%	19%	52%	74%	100%	101%	99%	109%	**6.0%**	159%	121%	215%	21%	7.7%
1950	1%	5%	19%	55%	74%	100%	101%	99%	110%	**5.7%**	165%	120%	211%	25%	9.2%
1951	1%	5%	21%	55%	75%	100%	101%	98%	109%	**5.5%**	151%	119%	207%	22%	8.3%
1952	1%	5%	22%	55%	76%	100%	102%	97%	108%	**4.9%**	146%	119%	211%	19%	6.8%
1953	0%	4%	22%	55%	77%	100%	103%	97%	106%	**5.4%**	152%	119%	207%	20%	7.4%
1954	0%	4%	22%	55%	78%	100%	103%	97%	105%	**4.7%**	143%	118%	203%	20%	7.7%
1955	0%	4%	22%	55%	79%	100%	104%	97%	104%	**5.0%**	148%	118%	207%	21%	7.8%
1956	0%	3%	22%	55%	81%	100%	105%	97%	103%	**6.0%**	164%	118%	215%	20%	7.1%
1957	0%	3%	22%	54%	85%	100%	105%	97%	103%	**5.3%**	154%	117%	212%	21%	7.5%
1958	0%	3%	22%	53%	88%	100%	105%	96%	102%	**5.2%**	148%	116%	230%	21%	6.7%
1959	0%	3%	21%	53%	91%	100%	106%	96%	101%	**5.2%**	139%	116%	244%	20%	6.2%
1960	0%	2%	20%	52%	93%	100%	106%	96%	101%	**5.6%**	144%	117%	244%	22%	6.8%
1961	0%	2%	20%	52%	92%	100%	106%	97%	101%	**5.6%**	145%	116%	252%	21%	6.2%
1962	0%	2%	20%	52%	90%	100%	105%	97%	99%	**6.1%**	147%	116%	254%	20%	5.9%
1963	0%	2%	19%	51%	89%	100%	105%	97%	99%	**6.3%**	148%	117%	256%	19%	5.6%
1964	0%	2%	18%	51%	88%	100%	104%	97%	99%	**5.9%**	148%	117%	258%	20%	5.6%
1965	0%	2%	18%	50%	87%	100%	103%	97%	98%	**6.3%**	149%	117%	264%	20%	5.6%

1966	0%	1%	17%	49%	84%	100%	101%	96%	96%	**6.3%**	149%	117%	270%	21%	5.7%
1967	0%	1%	16%	48%	80%	100%	98%	93%	93%	**6.6%**	150%	118%	277%	22%	5.8%
1968	0%	1%	15%	46%	76%	100%	96%	91%	91%	**7.0%**	152%	119%	287%	21%	5.5%
1969	0%	1%	14%	44%	73%	100%	93%	89%	89%	**7.2%**	153%	120%	286%	23%	5.8%
1970	0%	1%	13%	43%	71%	100%	91%	88%	87%	**6.9%**	155%	122%	289%	22%	5.5%
1971	0%	1%	12%	43%	72%	100%	92%	88%	88%	**6.8%**	156%	122%	283%	22%	5.6%
1972	0%	1%	12%	44%	73%	100%	93%	89%	88%	**6.7%**	157%	123%	281%	21%	5.4%
1973	0%	1%	12%	44%	73%	100%	93%	89%	89%	**6.8%**	158%	124%	280%	22%	5.7%
1974	0%	1%	12%	44%	73%	100%	94%	88%	88%	**6.5%**	158%	124%	274%	20%	5.3%
1975	0%	1%	13%	44%	73%	100%	94%	88%	88%	**7.0%**	159%	124%	289%	16%	4.1%
1976	0%	1%	13%	44%	75%	100%	97%	89%	90%	**6.9%**	160%	125%	289%	15%	3.8%
1977	0%	1%	13%	43%	76%	100%	102%	91%	92%	**6.7%**	161%	125%	293%	16%	3.9%
1978	0%	1%	13%	42%	77%	100%	106%	93%	94%	**6.8%**	162%	126%	292%	14%	3.6%
1979	0%	1%	13%	42%	78%	100%	110%	94%	95%	**6.8%**	163%	127%	293%	15%	3.5%
1980	0%	1%	12%	41%	79%	100%	113%	95%	95%	**6.9%**	164%	128%	298%	13%	3.1%
1981	0%	1%	12%	39%	79%	100%	113%	95%	95%	**7.1%**	165%	129%	301%	13%	3.0%
1982	0%	1%	11%	38%	79%	100%	112%	95%	94%	**6.8%**	166%	129%	294%	11%	2.7%
1983	0%	1%	11%	37%	78%	100%	112%	96%	94%	**7.1%**	168%	131%	298%	13%	3.0%
1984	0%	1%	10%	36%	78%	100%	112%	96%	94%	**7.0%**	170%	132%	302%	15%	3.5%
1985	0%	1%	10%	35%	77%	100%	112%	97%	94%	**7.4%**	179%	134%	300%	17%	4.0%
1986	0%	1%	9%	33%	76%	100%	111%	99%	95%	**7.5%**	188%	135%	295%	21%	5.0%
1987	0%	1%	9%	33%	74%	100%	108%	102%	95%	**7.9%**	196%	136%	311%	22%	5.0%
1988	0%	1%	9%	32%	71%	100%	107%	104%	95%	**7.7%**	201%	137%	300%	24%	5.7%
1989	0%	1%	9%	32%	69%	100%	105%	106%	95%	**8.2%**	206%	138%	311%	25%	5.7%
1990	0%	1%	9%	31%	67%	100%	104%	107%	96%	**8.8%**	211%	139%	330%	25%	5.2%
1991	0%	1%	9%	31%	65%	100%	103%	105%	94%	**8.8%**	215%	139%	329%	24%	5.1%
1992	0%	1%	9%	30%	63%	100%	102%	103%	93%	**8.8%**	219%	139%	327%	25%	5.4%
1993	0%	2%	9%	30%	62%	100%	101%	101%	92%	**9.2%**	223%	139%	331%	24%	5.3%
1994	0%	2%	9%	30%	61%	100%	101%	100%	92%	**9.0%**	226%	138%	330%	25%	5.4%
1995	0%	2%	10%	30%	60%	100%	101%	99%	91%	**9.1%**	229%	138%	324%	25%	5.5%
1996	0%	2%	10%	30%	60%	100%	101%	97%	91%	**9.2%**	232%	137%	322%	24%	5.2%
1997	0%	2%	10%	31%	61%	100%	103%	97%	94%	**9.4%**	235%	137%	329%	25%	5.3%
1998	0%	2%	11%	32%	63%	100%	106%	98%	97%	**9.4%**	237%	136%	327%	25%	5.4%
1999	0%	2%	11%	33%	64%	100%	108%	98%	99%	**9.6%**	239%	135%	330%	24%	5.1%
2000	0%	2%	11%	34%	66%	100%	110%	99%	101%	**10.4%**	243%	135%	355%	24%	4.7%
2001	0%	2%	12%	35%	67%	100%	113%	101%	101%	**10.5%**	242%	134%	368%	23%	4.2%
2002	0%	2%	12%	36%	68%	100%	116%	102%	101%	**10.8%**	240%	133%	379%	22%	4.0%
2003	0%	2%	12%	36%	69%	100%	119%	103%	101%	**11.6%**	240%	133%	398%	23%	4.1%
2004	0%	2%	12%	37%	70%	100%	120%	103%	101%	**11.3%**	239%	132%	426%	22%	3.7%
2005	0%	2%	11%	37%	70%	100%	122%	105%	101%	**12.9%**	240%	132%	471%	22%	3.2%
2006	0%	2%	11%	37%	70%	100%	124%	106%	102%	**13.6%**	240%	132%	510%	22%	2.9%
2007	0%	2%	11%	37%	70%	100%	122%	106%	102%	**14.4%**	241%	133%	538%	22%	2.9%
2008	0%	2%	10%	36%	70%	100%	120%	107%	102%	**15.9%**	243%	134%	563%	22%	2.7%
2009	0%	2%	10%	36%	70%	100%	118%	106%	99%	**15.3%**	239%	132%	552%	22%	2.7%
2010	0%	2%	10%	36%	70%	100%	116%	106%	97%	**14.6%**	236%	130%	530%	22%	2.8%
2011	0%	2%	10%	35%	70%	100%	114%	106%	96%	**14.5%**	234%	128%	531%	23%	3.0%
2012	0%	2%	10%	35%	69%	100%	112%	107%	94%	**14.5%**	232%	127%	532%	23%	3.0%
2013	0%	2%	10%	34%	69%	100%	111%	108%	93%	**14.5%**	230%	126%	532%	23%	3.0%
2014	0%	2%	10%	34%	69%	100%	110%	109%	92%	**14.5%**	228%	125%	533%	23%	3.0%
2015	0%	2%	10%	33%	69%	100%	110%	109%	91%	**14.4%**	226%	124%	534%	23%	3.0%
2016	0%	2%	9%	33%	69%	100%	109%	110%	90%	**14.4%**	225%	123%	534%	23%	3.0%
2017	0%	2%	9%	32%	69%	100%	110%	108%	90%	**14.4%**	223%	123%	535%	23%	3.0%
2018	0%	2%	9%	31%	69%	100%	110%	107%	89%	**14.4%**	222%	122%	535%	23%	3.0%
2019	0%	2%	9%	30%	68%	100%	111%	106%	88%	**14.3%**	220%	121%	536%	23%	3.0%
2020	0%	2%	9%	30%	68%	100%	111%	104%	87%	**14.3%**	219%	120%	537%	23%	3.0%
2021	0%	2%	9%	29%	67%	100%	112%	103%	87%	**14.2%**	218%	120%	537%	23%	3.0%
2022	0%	2%	9%	29%	67%	100%	112%	103%	87%	**14.1%**	217%	119%	538%	23%	3.0%
2023	0%	2%	9%	29%	66%	100%	113%	103%	87%	**14.1%**	216%	119%	538%	23%	3.0%
2024	0%	2%	8%	29%	66%	100%	114%	103%	87%	**14.0%**	215%	118%	539%	23%	3.0%
2025	0%	2%	8%	28%	65%	100%	114%	102%	87%	**14.0%**	214%	118%	539%	23%	3.0%
2026	0%	1%	8%	28%	64%	100%	113%	102%	87%	**14.0%**	214%	117%	540%	23%	3.0%
2027	0%	1%	8%	28%	63%	100%	113%	102%	86%	**14.0%**	213%	117%	540%	23%	3.0%
2028	0%	1%	8%	28%	62%	100%	113%	103%	85%	**14.0%**	213%	117%	541%	23%	3.0%
2029	0%	1%	8%	27%	61%	100%	114%	103%	85%	**14.0%**	213%	117%	541%	23%	3.0%
2030	0%	1%	8%	27%	60%	100%	114%	104%	85%	**14.0%**	212%	117%	542%	23%	3.0%
2031	0%	1%	8%	27%	60%	100%	115%	105%	85%	**14.1%**	212%	117%	542%	23%	3.0%
2032	0%	1%	8%	27%	60%	100%	116%	106%	85%	**14.2%**	212%	117%	543%	23%	3.0%
2033	0%	1%	8%	27%	60%	100%	116%	107%	86%	**14.3%**	212%	116%	543%	23%	3.0%
2034	0%	1%	8%	26%	60%	100%	116%	108%	86%	**14.4%**	212%	116%	544%	23%	3.0%
2035	0%	1%	8%	26%	60%	100%	117%	108%	86%	**14.6%**	211%	116%	544%	23%	3.0%
2036	0%	1%	8%	26%	61%	100%	119%	110%	87%	**14.7%**	211%	116%	545%	24%	3.0%
2037	0%	1%	8%	26%	61%	100%	121%	111%	88%	**14.9%**	211%	116%	545%	24%	3.0%
2038	0%	1%	8%	27%	62%	100%	122%	112%	89%	**15.1%**	210%	116%	546%	24%	3.0%
2039	0%	1%	8%	27%	62%	100%	124%	114%	90%	**15.2%**	210%	115%	546%	24%	3.0%
2040	0%	1%	8%	27%	62%	100%	125%	115%	90%	**15.4%**	209%	115%	546%	24%	3.0%
2041	0%	1%	8%	26%	62%	100%	125%	115%	90%	**15.5%**	208%	114%	547%	24%	3.0%
2042	0%	1%	8%	26%	61%	100%	125%	115%	90%	**15.6%**	207%	114%	547%	24%	3.0%
2043	0%	1%	8%	26%	61%	100%	125%	114%	89%	**15.7%**	207%	114%	548%	24%	3.0%
2044	0%	1%	8%	26%	60%	100%	125%	115%	89%	**15.7%**	206%	113%	548%	24%	3.0%

2045	0%	1%	8%	26%	60%	100%	125%	115%	89%	**15.8%**	205%	113%	549%	24%	3.0%
2046	0%	1%	8%	25%	59%	100%	124%	116%	89%	**15.8%**	204%	112%	549%	24%	3.0%
2047	0%	1%	8%	25%	59%	100%	123%	117%	88%	**15.8%**	204%	112%	549%	24%	3.0%
2048	0%	1%	7%	25%	58%	100%	122%	117%	88%	**15.7%**	203%	112%	550%	24%	3.0%
2049	0%	1%	7%	25%	58%	100%	122%	118%	88%	**15.7%**	202%	111%	550%	24%	3.0%
2050	0%	1%	7%	25%	58%	100%	122%	119%	88%	**15.8%**	202%	111%	550%	24%	3.0%
2051	0%	1%	7%	25%	58%	100%	123%	120%	89%	**15.5%**	202%	111%	551%	24%	3.0%
2052	0%	1%	7%	25%	58%	100%	124%	121%	90%	**15.7%**	202%	111%	551%	24%	3.0%
2053	0%	1%	8%	25%	58%	100%	125%	122%	90%	**15.8%**	202%	111%	551%	24%	3.0%
2054	0%	1%	8%	25%	59%	100%	126%	123%	91%	**16.0%**	203%	111%	552%	24%	3.0%
2055	0%	1%	8%	26%	59%	100%	127%	124%	92%	**16.1%**	203%	112%	552%	24%	3.0%
2056	0%	1%	8%	26%	60%	100%	128%	125%	93%	**16.2%**	203%	112%	552%	24%	3.0%
2057	0%	1%	8%	26%	60%	100%	129%	125%	94%	**16.3%**	203%	112%	553%	24%	3.0%
2058	0%	1%	8%	26%	60%	100%	130%	125%	95%	**16.4%**	204%	112%	553%	24%	3.0%
2059	0%	1%	8%	27%	61%	100%	130%	124%	95%	**16.4%**	204%	112%	553%	24%	3.0%
2060	0%	2%	8%	27%	61%	100%	130%	124%	96%	**16.5%**	204%	112%	554%	24%	3.0%
2061	0%	2%	8%	27%	61%	100%	129%	124%	95%	**16.5%**	204%	112%	554%	24%	3.0%
2062	0%	2%	8%	27%	61%	100%	129%	124%	95%	**16.5%**	205%	112%	554%	24%	3.0%
2063	0%	2%	8%	27%	61%	100%	128%	124%	95%	**16.5%**	205%	113%	555%	24%	3.0%
2064	0%	2%	8%	27%	62%	100%	127%	124%	95%	**16.5%**	205%	113%	555%	24%	3.0%
2065	0%	2%	8%	27%	62%	100%	126%	124%	95%	**16.5%**	205%	113%	555%	24%	3.0%
2066	0%	2%	8%	27%	62%	100%	125%	124%	94%	**16.5%**	205%	113%	555%	24%	3.0%
2067	0%	2%	8%	27%	62%	100%	124%	124%	94%	**16.5%**	205%	113%	556%	24%	3.0%
2068	0%	2%	8%	27%	62%	100%	123%	124%	93%	**16.5%**	205%	113%	556%	24%	3.0%
2069	0%	2%	8%	27%	62%	100%	122%	123%	93%	**16.4%**	205%	113%	556%	24%	3.0%
2070	0%	2%	8%	27%	62%	100%	122%	123%	93%	**16.4%**	205%	113%	556%	24%	3.0%
2071	0%	2%	8%	27%	62%	100%	122%	122%	92%	**16.4%**	205%	113%	557%	24%	3.0%
2072	0%	2%	8%	27%	62%	100%	121%	121%	92%	**16.4%**	205%	113%	557%	24%	3.0%
2073	0%	2%	8%	27%	62%	100%	121%	120%	92%	**16.4%**	205%	113%	557%	24%	3.0%
2074	0%	2%	8%	27%	62%	100%	121%	119%	91%	**16.3%**	205%	113%	557%	24%	3.0%
2075	0%	2%	8%	27%	62%	100%	120%	117%	91%	**16.3%**	204%	112%	558%	24%	3.0%
2076	0%	2%	8%	27%	62%	100%	120%	116%	91%	**16.3%**	204%	112%	558%	24%	3.0%
2077	0%	2%	8%	27%	62%	100%	120%	115%	90%	**16.3%**	204%	112%	558%	24%	3.0%
2078	0%	2%	8%	27%	62%	100%	120%	115%	90%	**16.3%**	203%	112%	558%	24%	3.0%
2079	0%	2%	8%	27%	62%	100%	120%	114%	90%	**16.3%**	203%	111%	559%	24%	3.0%
2080	0%	2%	8%	27%	62%	100%	120%	114%	89%	**16.2%**	202%	111%	559%	24%	3.0%
2081	0%	2%	8%	27%	62%	100%	120%	114%	89%	**16.2%**	202%	111%	559%	24%	3.0%
2082	0%	2%	8%	27%	62%	100%	120%	113%	88%	**16.2%**	202%	111%	559%	24%	3.0%
2083	0%	2%	8%	27%	62%	100%	121%	113%	88%	**16.1%**	202%	111%	559%	24%	3.0%
2084	0%	2%	8%	27%	62%	100%	121%	114%	88%	**16.1%**	201%	111%	560%	24%	3.0%
2085	0%	2%	8%	27%	62%	100%	121%	114%	87%	**16.1%**	201%	111%	560%	24%	3.0%
2086	0%	2%	8%	28%	62%	100%	121%	114%	87%	**16.0%**	201%	110%	560%	24%	3.0%
2087	0%	2%	8%	28%	62%	100%	122%	114%	87%	**16.0%**	200%	110%	560%	24%	3.0%
2088	0%	2%	8%	28%	62%	100%	122%	114%	87%	**16.0%**	200%	110%	560%	24%	3.0%
2089	0%	2%	8%	28%	62%	100%	122%	115%	86%	**16.0%**	200%	110%	561%	24%	3.0%
2090	0%	2%	8%	28%	62%	100%	122%	115%	86%	**16.0%**	199%	109%	561%	24%	3.0%
2091	0%	2%	8%	28%	62%	100%	122%	115%	86%	**16.0%**	199%	109%	561%	24%	3.0%
2092	0%	2%	8%	28%	63%	100%	122%	115%	86%	**16.0%**	198%	109%	561%	24%	3.0%
2093	0%	2%	8%	28%	63%	100%	122%	115%	86%	**16.0%**	198%	109%	561%	24%	3.0%
2094	0%	2%	8%	28%	63%	100%	122%	115%	86%	**16.0%**	197%	108%	562%	24%	3.0%
2095	0%	2%	8%	28%	62%	100%	122%	116%	85%	**16.0%**	197%	108%	562%	24%	3.0%
2096	0%	2%	8%	28%	62%	100%	122%	116%	85%	**16.0%**	196%	108%	562%	24%	3.0%
2097	0%	2%	8%	27%	62%	100%	121%	116%	85%	**15.9%**	196%	108%	562%	24%	3.0%
2098	0%	2%	8%	27%	62%	100%	121%	116%	85%	**15.9%**	196%	108%	562%	24%	3.0%
2099	0%	2%	8%	27%	62%	100%	121%	116%	85%	**15.9%**	195%	107%	562%	24%	3.0%
2100	0%	2%	8%	27%	62%	100%	121%	116%	85%	0.0%	0%	0%	563%	24%	3.0%

Table D6: Detailed simulation results 1900-2100, scenario c2

(uniformed savings) (2010-2100: g=1.7%, r=(1-τ)3.0%, s=9.4%) (1900-2100: gift/bequest ratio frozen at 0%)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
	Simulated age-wealth profiles (average wealth as a fraction of average wealth of individuals aged 50-to-59 year-old)									Simulated aggregate ratios			Observed aggregate ratios		
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	b_{yt}	μ_t*	μ_t	β_t	α_{dt}	r_{dt}
1900	2%	8%	27%	60%	68%	100%	158%	151%	191%	19%	133%	133%	646%	29%	4.2%
1901	2%	9%	28%	60%	71%	100%	155%	156%	191%	21%	133%	133%	703%	24%	3.2%
1902	2%	9%	28%	61%	75%	100%	152%	160%	189%	21%	133%	133%	720%	25%	3.2%
1903	2%	9%	28%	61%	78%	100%	148%	164%	187%	20%	134%	134%	690%	25%	3.4%
1904	2%	9%	28%	61%	80%	100%	145%	168%	185%	20%	135%	135%	676%	25%	3.5%
1905	2%	8%	28%	60%	83%	100%	141%	171%	184%	21%	135%	135%	676%	28%	4.0%
1906	2%	8%	27%	60%	86%	100%	138%	174%	181%	21%	134%	134%	698%	25%	3.3%
1907	2%	8%	27%	59%	88%	100%	135%	177%	182%	20%	135%	135%	638%	32%	4.8%
1908	1%	8%	26%	59%	91%	100%	132%	179%	180%	20%	134%	134%	668%	28%	3.9%
1909	1%	7%	25%	58%	93%	100%	129%	181%	179%	20%	135%	135%	646%	30%	4.4%
1910	1%	7%	24%	57%	96%	100%	127%	183%	180%	19%	135%	135%	676%	27%	3.8%
1911	1%	7%	23%	56%	93%	100%	123%	173%	177%	20%	136%	136%	672%	33%	4.6%
1912	1%	6%	23%	54%	92%	100%	119%	163%	178%	17%	133%	133%	615%	40%	6.2%
1913	1%	6%	22%	53%	89%	100%	116%	154%	175%	18%	134%	134%	660%	39%	5.5%
1914	1%	6%	22%	52%	87%	100%	113%	146%	172%	19%	102%	102%	682%	24%	3.4%
1915	1%	7%	22%	51%	84%	100%	110%	140%	171%	20%	96%	96%	686%	19%	2.7%
1916	2%	8%	23%	50%	81%	100%	108%	134%	168%	15%	102%	102%	539%	28%	5.4%
1917	2%	9%	23%	49%	79%	100%	106%	129%	165%	13%	111%	111%	481%	29%	6.3%
1918	3%	9%	24%	48%	76%	100%	103%	124%	161%	14%	96%	96%	478%	24%	5.2%
1919	3%	10%	24%	47%	74%	100%	101%	120%	157%	9%	116%	116%	389%	30%	8.1%
1920	3%	9%	24%	45%	71%	100%	100%	122%	194%	9%	131%	131%	352%	31%	8.8%
1921	2%	8%	25%	47%	72%	100%	100%	117%	173%	8%	128%	128%	306%	31%	10.1%
1922	2%	7%	26%	49%	73%	100%	101%	111%	158%	8%	125%	125%	284%	33%	11.6%
1923	1%	7%	26%	52%	75%	100%	103%	109%	146%	7%	121%	121%	287%	35%	12.0%
1924	1%	6%	27%	53%	77%	100%	104%	106%	135%	7%	119%	119%	295%	35%	11.6%
1925	1%	6%	26%	54%	79%	100%	105%	104%	128%	7%	117%	117%	293%	35%	11.5%
1926	1%	5%	26%	55%	80%	100%	107%	103%	123%	8%	116%	116%	327%	36%	10.2%
1927	1%	5%	25%	56%	81%	100%	108%	102%	120%	8%	116%	116%	348%	36%	9.4%
1928	1%	5%	24%	56%	81%	100%	111%	103%	120%	7%	116%	116%	326%	35%	9.9%
1929	1%	5%	23%	56%	82%	100%	112%	104%	118%	9%	116%	116%	339%	34%	9.3%
1930	1%	5%	22%	56%	82%	100%	114%	104%	118%	8%	115%	115%	369%	31%	7.8%
1931	1%	5%	21%	55%	83%	100%	113%	104%	112%	9%	117%	117%	392%	29%	6.8%
1932	1%	4%	20%	54%	83%	100%	114%	106%	110%	9%	118%	118%	410%	25%	5.6%
1933	1%	4%	18%	52%	83%	100%	113%	108%	108%	10%	119%	119%	405%	28%	6.4%
1934	1%	4%	17%	50%	82%	100%	113%	109%	108%	10%	120%	120%	423%	27%	6.0%
1935	1%	4%	16%	49%	82%	100%	113%	112%	108%	10%	122%	122%	392%	29%	7.1%
1936	1%	4%	16%	47%	82%	100%	112%	113%	109%	9%	123%	123%	375%	28%	7.3%
1937	1%	3%	17%	46%	81%	100%	110%	114%	110%	10%	122%	122%	405%	28%	6.5%
1938	1%	3%	17%	45%	81%	100%	109%	115%	110%	10%	122%	122%	409%	28%	6.4%
1939	1%	3%	18%	44%	80%	100%	108%	115%	108%	9%	121%	121%	374%	29%	7.1%
1940	1%	3%	18%	43%	80%	100%	107%	114%	101%	13%	106%	106%	449%	23%	4.5%
1941	1%	3%	21%	47%	79%	100%	107%	114%	105%	12%	114%	114%	450%	19%	3.7%
1942	1%	3%	19%	45%	78%	100%	106%	114%	106%	11%	115%	115%	435%	16%	3.2%
1943	1%	3%	18%	44%	77%	100%	106%	112%	105%	12%	107%	107%	458%	11%	2.1%
1944	1%	4%	18%	43%	76%	100%	106%	111%	106%	14%	101%	101%	477%	0%	0.1%
1945	1%	4%	17%	42%	74%	100%	107%	111%	107%	8%	115%	115%	340%	1%	0.2%
1946	1%	4%	14%	37%	68%	100%	109%	115%	116%	6%	133%	133%	271%	13%	4.0%
1947	1%	4%	14%	38%	68%	100%	111%	116%	120%	6%	135%	135%	271%	11%	3.3%
1948	1%	4%	13%	39%	66%	100%	112%	116%	123%	5%	137%	137%	238%	15%	5.0%
1949	1%	4%	13%	40%	65%	100%	113%	117%	127%	5%	141%	141%	215%	21%	7.7%
1950	1%	3%	14%	43%	66%	100%	113%	117%	129%	5%	139%	139%	211%	25%	9.2%
1951	0%	3%	15%	43%	66%	100%	113%	117%	128%	5%	139%	139%	207%	22%	8.3%
1952	0%	3%	16%	43%	67%	100%	114%	117%	129%	5%	138%	138%	211%	19%	6.8%
1953	0%	3%	17%	44%	68%	100%	115%	118%	127%	5%	138%	138%	207%	20%	7.4%
1954	0%	3%	17%	45%	69%	100%	116%	119%	126%	4%	137%	137%	203%	20%	7.7%
1955	0%	3%	18%	45%	70%	100%	117%	119%	126%	5%	137%	137%	207%	21%	7.8%
1956	0%	3%	18%	45%	73%	100%	118%	119%	126%	5%	137%	137%	215%	20%	7.1%
1957	0%	2%	18%	45%	76%	100%	118%	120%	126%	5%	136%	136%	212%	21%	7.5%
1958	0%	2%	18%	45%	79%	100%	118%	120%	125%	5%	136%	136%	230%	21%	6.7%
1959	0%	2%	17%	45%	82%	100%	119%	120%	126%	5%	136%	136%	244%	20%	6.2%
1960	0%	2%	17%	45%	84%	100%	119%	120%	127%	5%	136%	136%	244%	22%	6.8%
1961	0%	2%	17%	46%	83%	100%	118%	121%	127%	5%	135%	135%	252%	21%	6.2%
1962	0%	1%	17%	46%	82%	100%	117%	121%	126%	6%	135%	135%	254%	20%	5.9%
1963	0%	1%	16%	46%	81%	100%	116%	121%	126%	6%	136%	136%	256%	19%	5.6%
1964	0%	1%	16%	45%	81%	100%	115%	121%	126%	5%	135%	135%	258%	20%	5.6%
1965	0%	1%	15%	45%	80%	100%	114%	121%	126%	6%	136%	136%	264%	20%	5.6%
1966	0%	1%	15%	44%	77%	100%	111%	119%	123%	6%	135%	135%	270%	21%	5.7%
1967	0%	1%	14%	43%	74%	100%	108%	115%	120%	6%	137%	137%	277%	22%	5.8%

1968	0%	1%	13%	41%	71%	100%	105%	112%	117%	6%	138%	138%	287%	21%	5.5%
1969	0%	1%	12%	40%	69%	100%	102%	109%	114%	6%	139%	139%	286%	23%	5.8%
1970	0%	1%	11%	39%	67%	100%	100%	107%	112%	6%	140%	140%	289%	22%	5.5%
1971	0%	1%	11%	39%	67%	100%	101%	108%	113%	6%	141%	141%	283%	22%	5.6%
1972	0%	1%	11%	39%	68%	100%	102%	108%	114%	6%	141%	141%	281%	21%	5.4%
1973	0%	1%	11%	39%	68%	100%	102%	107%	114%	6%	143%	143%	280%	22%	5.7%
1974	0%	1%	11%	39%	69%	100%	103%	107%	113%	6%	142%	142%	274%	20%	5.3%
1975	0%	1%	11%	39%	69%	100%	103%	106%	113%	6%	143%	143%	289%	16%	4.1%
1976	0%	1%	11%	39%	70%	100%	107%	107%	116%	6%	144%	144%	289%	15%	3.8%
1977	0%	1%	11%	38%	71%	100%	112%	110%	118%	6%	144%	144%	293%	16%	3.9%
1978	0%	1%	11%	38%	72%	100%	117%	111%	119%	6%	145%	145%	292%	14%	3.6%
1979	0%	1%	11%	37%	73%	100%	121%	112%	121%	6%	146%	146%	293%	15%	3.5%
1980	0%	1%	11%	36%	73%	100%	125%	114%	121%	6%	147%	147%	298%	13%	3.1%
1981	0%	1%	11%	35%	73%	100%	124%	114%	121%	6%	148%	148%	301%	13%	3.0%
1982	0%	1%	10%	34%	73%	100%	124%	115%	120%	6%	149%	149%	294%	11%	2.7%
1983	0%	1%	9%	33%	73%	100%	124%	116%	120%	6%	151%	151%	298%	13%	3.0%
1984	0%	1%	9%	32%	72%	100%	124%	117%	120%	6%	153%	153%	302%	15%	3.5%
1985	0%	1%	8%	31%	71%	100%	124%	118%	121%	6%	155%	155%	300%	17%	4.0%
1986	0%	1%	8%	30%	70%	100%	123%	121%	122%	6%	157%	157%	295%	21%	5.0%
1987	0%	1%	8%	29%	67%	100%	120%	126%	123%	6%	159%	159%	311%	22%	5.0%
1988	0%	1%	8%	28%	65%	100%	119%	130%	124%	6%	160%	160%	300%	24%	5.7%
1989	0%	1%	8%	28%	63%	100%	118%	135%	125%	6%	162%	162%	311%	25%	5.7%
1990	0%	1%	8%	27%	61%	100%	117%	139%	127%	7%	164%	164%	330%	25%	5.2%
1991	0%	1%	8%	26%	59%	100%	117%	137%	126%	7%	165%	165%	329%	24%	5.1%
1992	0%	1%	8%	25%	57%	100%	117%	136%	126%	7%	166%	166%	327%	25%	5.4%
1993	0%	1%	8%	25%	56%	100%	117%	135%	126%	7%	167%	167%	331%	24%	5.3%
1994	0%	1%	8%	25%	55%	100%	118%	136%	127%	7%	168%	168%	330%	25%	5.4%
1995	0%	1%	8%	25%	54%	100%	119%	136%	129%	7%	169%	169%	324%	25%	5.5%
1996	0%	1%	8%	25%	54%	100%	120%	135%	133%	7%	170%	170%	322%	24%	5.2%
1997	0%	1%	9%	25%	55%	100%	124%	136%	141%	7%	171%	171%	329%	25%	5.3%
1998	0%	1%	9%	26%	56%	100%	128%	138%	150%	7%	172%	172%	327%	25%	5.4%
1999	0%	1%	9%	27%	57%	100%	132%	140%	159%	7%	173%	173%	330%	24%	5.1%
2000	0%	1%	10%	28%	58%	100%	135%	144%	167%	7%	174%	174%	355%	24%	4.7%
2001	0%	1%	10%	28%	58%	100%	140%	148%	170%	8%	175%	175%	368%	23%	4.2%
2002	0%	1%	10%	29%	59%	100%	145%	152%	172%	8%	177%	177%	379%	22%	4.0%
2003	0%	1%	10%	29%	60%	100%	148%	156%	174%	9%	179%	179%	398%	23%	4.1%
2004	0%	1%	9%	29%	60%	100%	151%	160%	178%	8%	179%	179%	426%	22%	3.7%
2005	0%	1%	9%	29%	60%	100%	153%	163%	182%	10%	182%	182%	471%	22%	3.2%
2006	0%	1%	9%	29%	60%	100%	156%	168%	186%	10%	184%	184%	510%	22%	2.9%
2007	0%	1%	9%	29%	60%	100%	154%	171%	189%	11%	186%	186%	538%	22%	2.9%
2008	0%	1%	8%	29%	59%	100%	151%	174%	192%	12%	191%	191%	563%	22%	2.7%
2009	0%	1%	8%	28%	59%	100%	149%	176%	192%	12%	190%	190%	552%	22%	2.7%
2010	0%	1%	8%	28%	59%	100%	147%	179%	192%	12%	189%	189%	530%	22%	2.8%
2011	0%	1%	8%	27%	59%	100%	144%	183%	193%	12%	190%	190%	531%	23%	3.0%
2012	0%	1%	8%	27%	59%	100%	143%	187%	195%	12%	190%	190%	532%	23%	3.0%
2013	0%	2%	8%	26%	58%	100%	141%	190%	196%	12%	190%	190%	532%	23%	3.0%
2014	0%	2%	8%	26%	58%	100%	141%	192%	199%	12%	191%	191%	533%	23%	3.0%
2015	0%	2%	8%	25%	58%	100%	140%	194%	201%	12%	191%	191%	534%	23%	3.0%
2016	0%	2%	8%	25%	58%	100%	139%	195%	204%	12%	191%	191%	534%	23%	3.0%
2017	0%	2%	8%	25%	58%	100%	140%	193%	207%	12%	192%	192%	535%	23%	3.0%
2018	0%	2%	8%	24%	58%	100%	140%	189%	209%	12%	192%	192%	535%	23%	3.0%
2019	0%	1%	8%	24%	58%	100%	141%	185%	212%	13%	193%	193%	536%	23%	3.0%
2020	0%	1%	8%	24%	57%	100%	141%	182%	214%	13%	194%	194%	537%	23%	3.0%
2021	0%	2%	8%	24%	57%	100%	141%	179%	218%	13%	194%	194%	537%	23%	3.0%
2022	0%	2%	8%	24%	56%	100%	142%	177%	222%	13%	195%	195%	538%	23%	3.0%
2023	0%	2%	8%	24%	56%	100%	143%	175%	225%	13%	196%	196%	538%	23%	3.0%
2024	0%	2%	8%	24%	55%	100%	143%	174%	227%	13%	196%	196%	539%	23%	3.0%
2025	0%	2%	8%	24%	55%	100%	142%	172%	228%	13%	197%	197%	539%	23%	3.0%
2026	0%	2%	8%	24%	54%	100%	142%	171%	229%	13%	197%	197%	540%	23%	3.0%
2027	0%	2%	8%	24%	53%	100%	141%	171%	224%	13%	198%	198%	540%	23%	3.0%
2028	0%	2%	8%	24%	53%	100%	142%	171%	220%	13%	198%	198%	541%	23%	3.0%
2029	0%	2%	8%	24%	52%	100%	142%	172%	217%	13%	198%	198%	541%	23%	3.0%
2030	0%	2%	8%	24%	52%	100%	142%	173%	214%	13%	198%	198%	542%	23%	3.0%
2031	0%	2%	8%	24%	52%	100%	143%	174%	212%	13%	198%	198%	542%	23%	3.0%
2032	0%	2%	8%	24%	52%	100%	144%	175%	211%	13%	198%	198%	543%	23%	3.0%
2033	0%	2%	8%	24%	53%	100%	144%	176%	209%	13%	197%	197%	543%	23%	3.0%
2034	0%	2%	8%	24%	53%	100%	144%	176%	208%	13%	196%	196%	544%	23%	3.0%
2035	0%	2%	8%	24%	53%	100%	145%	176%	207%	13%	196%	196%	544%	23%	3.0%
2036	0%	2%	8%	24%	53%	100%	147%	177%	207%	14%	195%	195%	545%	24%	3.0%
2037	0%	2%	8%	24%	54%	100%	149%	179%	208%	14%	194%	194%	545%	24%	3.0%
2038	0%	2%	8%	24%	54%	100%	150%	180%	209%	14%	193%	193%	546%	24%	3.0%
2039	0%	2%	8%	24%	54%	100%	152%	182%	209%	14%	192%	192%	546%	24%	3.0%
2040	0%	2%	8%	24%	54%	100%	153%	183%	209%	14%	191%	191%	546%	24%	3.0%
2041	0%	2%	8%	24%	54%	100%	153%	183%	209%	14%	190%	190%	547%	24%	3.0%
2042	0%	2%	8%	24%	53%	100%	153%	183%	208%	14%	190%	190%	547%	24%	3.0%
2043	0%	2%	8%	24%	53%	100%	153%	183%	208%	14%	189%	189%	548%	24%	3.0%
2044	0%	2%	8%	24%	52%	100%	153%	183%	208%	14%	189%	189%	548%	24%	3.0%
2045	0%	2%	8%	24%	52%	100%	153%	184%	207%	15%	189%	189%	549%	24%	3.0%
2046	0%	2%	8%	24%	51%	100%	153%	186%	207%	15%	189%	189%	549%	24%	3.0%

2047	0%	2%	8%	24%	51%	100%	152%	188%	207%	15%	189%	189%	549%	24%	3.0%
2048	0%	2%	8%	24%	51%	100%	151%	189%	208%	15%	189%	189%	550%	24%	3.0%
2049	0%	2%	8%	24%	51%	100%	151%	190%	209%	15%	190%	190%	550%	24%	3.0%
2050	0%	2%	8%	24%	51%	100%	151%	192%	210%	15%	190%	190%	550%	24%	3.0%
2051	0%	2%	8%	24%	51%	100%	152%	193%	211%	14%	188%	188%	551%	24%	3.0%
2052	0%	2%	8%	24%	51%	100%	153%	194%	212%	15%	188%	188%	551%	24%	3.0%
2053	0%	2%	8%	24%	52%	100%	154%	196%	214%	15%	188%	188%	551%	24%	3.0%
2054	0%	2%	9%	25%	52%	100%	155%	198%	215%	15%	188%	188%	552%	24%	3.0%
2055	0%	2%	9%	25%	52%	100%	157%	199%	218%	15%	188%	188%	552%	24%	3.0%
2056	0%	2%	9%	25%	53%	100%	157%	199%	220%	15%	188%	188%	552%	24%	3.0%
2057	0%	2%	9%	25%	53%	100%	158%	198%	222%	15%	188%	188%	553%	24%	3.0%
2058	0%	2%	9%	25%	53%	100%	159%	198%	224%	15%	188%	188%	553%	24%	3.0%
2059	0%	2%	9%	25%	54%	100%	159%	197%	226%	15%	188%	188%	553%	24%	3.0%
2060	0%	2%	9%	25%	54%	100%	158%	196%	226%	15%	188%	188%	554%	24%	3.0%
2061	0%	2%	9%	25%	54%	100%	157%	195%	225%	15%	188%	188%	554%	24%	3.0%
2062	0%	2%	9%	25%	54%	100%	156%	195%	225%	15%	188%	188%	554%	24%	3.0%
2063	0%	2%	9%	25%	54%	100%	155%	195%	224%	15%	189%	189%	555%	24%	3.0%
2064	0%	2%	9%	25%	54%	100%	153%	194%	224%	15%	189%	189%	555%	24%	3.0%
2065	0%	2%	9%	25%	54%	100%	152%	194%	223%	15%	189%	189%	555%	24%	3.0%
2066	0%	2%	9%	25%	54%	100%	150%	193%	222%	15%	189%	189%	555%	24%	3.0%
2067	0%	2%	9%	25%	54%	100%	149%	192%	221%	15%	189%	189%	556%	24%	3.0%
2068	0%	2%	9%	25%	54%	100%	148%	192%	220%	15%	189%	189%	556%	24%	3.0%
2069	0%	2%	9%	25%	54%	100%	148%	191%	219%	15%	189%	189%	556%	24%	3.0%
2070	0%	2%	9%	25%	54%	100%	147%	190%	218%	15%	189%	189%	556%	24%	3.0%
2071	0%	2%	9%	25%	54%	100%	147%	188%	217%	15%	189%	189%	557%	24%	3.0%
2072	0%	2%	9%	25%	54%	100%	146%	186%	216%	15%	188%	188%	557%	24%	3.0%
2073	0%	2%	9%	25%	54%	100%	146%	184%	215%	15%	188%	188%	557%	24%	3.0%
2074	0%	2%	9%	25%	54%	100%	146%	182%	214%	15%	187%	187%	557%	24%	3.0%
2075	0%	2%	9%	25%	54%	100%	146%	180%	214%	15%	186%	186%	558%	24%	3.0%
2076	0%	2%	9%	25%	54%	100%	146%	179%	213%	15%	186%	186%	558%	24%	3.0%
2077	0%	2%	9%	25%	54%	100%	145%	178%	212%	15%	185%	185%	558%	24%	3.0%
2078	0%	2%	9%	25%	54%	100%	145%	176%	212%	15%	185%	185%	558%	24%	3.0%
2079	0%	2%	9%	25%	54%	100%	145%	175%	211%	15%	184%	184%	559%	24%	3.0%
2080	0%	2%	9%	25%	54%	100%	145%	175%	210%	15%	184%	184%	559%	24%	3.0%
2081	0%	2%	9%	25%	54%	100%	146%	175%	209%	15%	184%	184%	559%	24%	3.0%
2082	0%	2%	9%	25%	54%	100%	146%	175%	208%	15%	183%	183%	559%	24%	3.0%
2083	0%	2%	9%	25%	54%	100%	146%	175%	207%	15%	183%	183%	559%	24%	3.0%
2084	0%	2%	9%	25%	54%	100%	146%	175%	207%	15%	183%	183%	560%	24%	3.0%
2085	0%	2%	9%	25%	54%	100%	147%	176%	206%	15%	182%	182%	560%	24%	3.0%
2086	0%	2%	9%	25%	54%	100%	147%	176%	205%	15%	182%	182%	560%	24%	3.0%
2087	0%	2%	9%	25%	54%	100%	147%	176%	205%	14%	181%	181%	560%	24%	3.0%
2088	0%	2%	9%	25%	54%	100%	147%	177%	204%	14%	181%	181%	560%	24%	3.0%
2089	0%	2%	9%	25%	54%	100%	148%	177%	204%	14%	180%	180%	561%	24%	3.0%
2090	0%	2%	9%	25%	55%	100%	148%	177%	204%	14%	180%	180%	561%	24%	3.0%
2091	0%	2%	9%	25%	55%	100%	148%	177%	203%	14%	179%	179%	561%	24%	3.0%
2092	0%	2%	9%	25%	55%	100%	148%	178%	203%	14%	178%	178%	561%	24%	3.0%
2093	0%	2%	9%	25%	55%	100%	147%	178%	203%	14%	178%	178%	561%	24%	3.0%
2094	0%	2%	9%	25%	55%	100%	147%	178%	203%	14%	177%	177%	562%	24%	3.0%
2095	0%	2%	9%	25%	55%	100%	147%	178%	203%	14%	177%	177%	562%	24%	3.0%
2096	0%	2%	9%	25%	55%	100%	147%	178%	202%	14%	176%	176%	562%	24%	3.0%
2097	0%	2%	9%	25%	54%	100%	146%	179%	202%	14%	176%	176%	562%	24%	3.0%
2098	0%	2%	9%	25%	54%	100%	146%	179%	202%	14%	176%	176%	562%	24%	3.0%
2099	0%	2%	9%	25%	54%	100%	146%	179%	202%	14%	176%	176%	562%	24%	3.0%
2100	0%	2%	9%	25%	54%	100%	146%	178%	202%	0%	0%	0%	563%	24%	3.0%

Table E1: Illustration of the μ(g) steady-state formula

(proposition 3: exogenous saving model, closed economy, equations (E1)-(E4))

(b_y*=μ*m*β* computed for fixed β*=s/g=600%, i.e. assuming that s_K and s_L adjusts; μ* unaffected by β*)

α 30%	1-α 70%	β* 600%	**Class savings (s_L=0 & s_K>0)**		**Uniform savings (s_L=s_K=s) & ρ=1**		**Partial class savings (s_L/s<1) & ρ=1**		**Uniform savings (s_L=s_K=s) & replacement rate ρ<1**			
A 20	H 30	R 60					s_L/s	50%	ρ	50%	ρ	0%
D	I = D-H	g	μ*=μ(g)	b_y*	μ*=μ(g)	b_y*	μ*=μ(g)	b_y*	μ*=μ(g)	b_y*	μ*=μ(g)	b_y*
60	30	0%	133%	20%	133%	20%	133%	20%	133%	20%	133%	20%
70	40	0%	167%	20%	167%	20%	167%	20%	167%	20%	167%	20%
80	**50**	**0%**	**200%**	**20%**	**200%**	**20%**	**200%**	**20%**	**200%**	**20%**	**200%**	**20%**
60	30	1%	133%	20%	129%	19%	131%	20%	129%	19%	129%	19%
70	40	1%	167%	20%	156%	19%	161%	19%	153%	18%	150%	18%
80	**50**	**1%**	**200%**	**20%**	**181%**	**18%**	**190%**	**19%**	**176%**	**18%**	**168%**	**17%**
60	30	2%	133%	20%	125%	19%	129%	19%	125%	19%	125%	19%
70	40	2%	167%	20%	147%	18%	156%	19%	142%	17%	136%	16%
80	**50**	**2%**	**200%**	**20%**	**166%**	**17%**	**181%**	**18%**	**156%**	**16%**	**142%**	**14%**
60	30	3%	133%	20%	122%	18%	127%	19%	122%	18%	122%	18%
70	40	3%	167%	20%	139%	17%	151%	18%	132%	16%	123%	15%
80	**50**	**3%**	**200%**	**20%**	**153%**	**15%**	**173%**	**17%**	**140%**	**14%**	**120%**	**12%**
60	30	4%	133%	20%	119%	18%	125%	19%	119%	18%	119%	18%
70	40	4%	167%	20%	133%	16%	147%	18%	123%	15%	112%	13%
80	**50**	**4%**	**200%**	**20%**	**143%**	**14%**	**166%**	**17%**	**127%**	**13%**	**102%**	**10%**
60	30	5%	133%	20%	116%	17%	123%	18%	116%	17%	116%	17%
70	40	5%	167%	20%	127%	15%	143%	17%	116%	14%	102%	12%
80	**50**	**5%**	**200%**	**20%**	**135%**	**13%**	**159%**	**16%**	**116%**	**12%**	**86%**	**9%**
60	30	10%	133%	20%	107%	16%	116%	17%	107%	16%	107%	16%
70	40	10%	167%	20%	111%	13%	127%	15%	91%	11%	66%	8%
80	**50**	**10%**	**200%**	**20%**	**112%**	**11%**	**135%**	**13%**	**83%**	**8%**	**40%**	**4%**

Table E2: Illustration of the μ(g,r) steady-state formula
(proposition 4: exogenous saving model, open economy, equation (E5)) (case ρ=1)
(b_y*=μ*m*β** computed for fixed β**=s_L/[g-r(s_K-s_L)]=600%, i.e. assuming that s_L adjusts; μ* unaffected by β**)

s_K 20%	β** 600%	**μ(g,r) for given r**			**μ(g,r) for given g**			**μ(g,r) for given r-g**		
A 20	H 30	r	5%		g	2%		r-g	3%	
D	I = D-H	g	μ*=μ(g,r)	b_y*	r	μ*=μ(g,r)	b_y*	g	μ*=μ(g,r)	b_y*
60	30	0%	133%	20%	0%	122%	18%	0%	133%	20%
70	40	0%	167%	20%	0%	140%	17%	0%	167%	20%
80	**50**	**0%**	**200%**	**20%**	**0%**	**155%**	**15%**	**0%**	**200%**	**20%**
60	30	1%	133%	20%	1%	123%	18%	1%	132%	20%
70	40	1%	167%	20%	1%	142%	17%	1%	163%	20%
80	**50**	**1%**	**200%**	**20%**	**1%**	**158%**	**16%**	**1%**	**194%**	**19%**
60	30	2%	127%	19%	2%	124%	19%	2%	127%	19%
70	40	2%	152%	18%	2%	144%	17%	2%	152%	18%
80	**50**	**2%**	**174%**	**17%**	**2%**	**162%**	**16%**	**2%**	**174%**	**17%**
60	30	3%	122%	18%	3%	125%	19%	3%	123%	18%
70	40	3%	140%	17%	3%	147%	18%	3%	142%	17%
80	**50**	**3%**	**155%**	**15%**	**3%**	**166%**	**17%**	**3%**	**158%**	**16%**
60	30	4%	118%	18%	4%	126%	19%	4%	119%	18%
70	40	4%	131%	16%	4%	149%	18%	4%	134%	16%
80	**50**	**4%**	**141%**	**14%**	**4%**	**170%**	**17%**	**4%**	**146%**	**15%**
60	30	5%	114%	17%	5%	127%	19%	5%	116%	17%
70	40	5%	124%	15%	5%	152%	18%	5%	128%	15%
80	**50**	**5%**	**130%**	**13%**	**5%**	**174%**	**17%**	**5%**	**136%**	**14%**
60	30	10%	104%	16%	10%	133%	20%	10%	106%	16%
70	40	10%	106%	13%	10%	167%	20%	10%	109%	13%
80	**50**	**10%**	**107%**	**11%**	**10%**	**200%**	**20%**	**10%**	**111%**	**11%**

Table E3: Illustration of the lifecycle formulas $s_L(r\text{-}g)$ and $\beta_L(r\text{-}g)$

(proposition 7: dynastic model, equations (E8)-(E9))

A	H	**$s_L(r^*\text{-}g)$ and $\beta_L(r^*\text{-}g)$** ($\beta^*=\alpha/r^*$ computed for g=0% and $r^*=r^*$-g=θ; s_L and β_L unaffected by β*)				**$s_L(r^*\text{-}g)$ and $\beta_L(r^*\text{-}g)$ for given r*** ($\beta^*=\alpha/r^*$ fixed at 600%, i.e. assuming θ adjusts; s_L and β_L unaffected by β*)			r*	**$s_L(r^*\text{-}g)$ and $\beta_L(r^*\text{-}g)$ with endogenous $r^*=\theta+\sigma g$ and $\beta^*=\alpha/r^*$** (s_L and β_L unaffected by β*)		θ
20	30								5%			2%
R	α											σ
60	30%											2
D	I = D-H	r*-g	$\overline{s}_L$	$(1-\alpha)\overline{\beta}_L$	$\frac{(1-\alpha)\overline{\beta}_L}{\beta^*}$	g	$\overline{s}_L$	$(1-\alpha)\overline{\beta}_L$	$\frac{(1-\alpha)\overline{\beta}_L}{\beta^*}$	$\overline{s}_L$	$(1-\alpha)\overline{\beta}_L$	$\frac{(1-\alpha)\overline{\beta}_L}{\beta^*}$
60	30	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
70	40	0%	20%	280%	0%	0%	6%	199%	33%	13%	249%	17%
80	**50**	**0%**	**33%**	**467%**	**0%**	**0%**	**9%**	**341%**	**57%**	**21%**	**425%**	**28%**
60	30	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
70	40	1%	16%	265%	9%	1%	8%	215%	36%	10%	232%	31%
80	**50**	**1%**	**27%**	**448%**	**15%**	**1%**	**12%**	**369%**	**62%**	**16%**	**398%**	**53%**
60	30	2%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%
70	40	2%	13%	249%	17%	2%	10%	232%	39%	8%	215%	43%
80	**50**	**2%**	**21%**	**425%**	**28%**	**2%**	**16%**	**398%**	**66%**	**12%**	**369%**	**74%**
60	30	3%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%
70	40	3%	10%	232%	23%	3%	13%	249%	42%	6%	199%	53%
80	**50**	**3%**	**16%**	**398%**	**40%**	**3%**	**21%**	**425%**	**71%**	**9%**	**341%**	**91%**
60	30	4%	0%	0%	0%	4%	0%	0%	0%	0%	0%	0%
70	40	4%	8%	215%	29%	4%	16%	265%	44%	4%	183%	61%
80	**50**	**4%**	**12%**	**369%**	**49%**	**4%**	**27%**	**448%**	**75%**	**7%**	**313%**	**104%**
60	30	5%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%
70	40	5%	6%	199%	33%	5%	20%	280%	47%	3%	168%	67%
80	**50**	**5%**	**9%**	**341%**	**57%**	**5%**	**33%**	**467%**	**78%**	**5%**	**287%**	**115%**
60	30	10%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%
70	40	10%	1%	132%	44%	10%	43%	320%	53%	1%	113%	83%
80	**50**	**10%**	**2%**	**222%**	**74%**	**10%**	**67%**	**465%**	**77%**	**1%**	**190%**	**139%**

Table E4: Illustration of the steady-state formula μ(ρ) formula

(proposition 7: dynastic model, equation (E10))

($b_y^*=\mu^* m^* \beta^*$ computed for fixed $\beta^*=\alpha/r^*=600\%$, i.e. assuming that θ and/or σ adjust; μ* unaffected by β*)

α	r*	β*	$\mu^* = \overline{\mu}[1 - \frac{(1-\rho)(1-\alpha)\overline{\beta}_L}{\beta^*}]$									
30%	5%	600%										
A	H	R										
20	30	60	ρ	100%	ρ	80%	ρ	50%	ρ	30%	ρ	0%
D	I = D-H	g	μ*=μ(ρ)	b_y^*	μ*=μ(ρ)	b_y^*	μ*=μ(ρ)	b_y^*	μ*=μ(ρ)	b_y^*	μ*=μ(ρ)	b_y^*
60	30	0%	133%	20%	133%	20%	133%	20%	133%	20%	133%	20%
70	40	0%	167%	20%	156%	19%	139%	17%	128%	15%	111%	13%
80	**50**	**0%**	**200%**	**20%**	**177%**	**18%**	**143%**	**14%**	**121%**	**12%**	**86%**	**9%**
60	30	1%	133%	20%	133%	20%	133%	20%	133%	20%	133%	20%
70	40	1%	167%	20%	155%	19%	137%	16%	125%	15%	107%	13%
80	**50**	**1%**	**200%**	**20%**	**175%**	**18%**	**138%**	**14%**	**114%**	**11%**	**77%**	**8%**
60	30	2%	133%	20%	133%	20%	133%	20%	133%	20%	133%	20%
70	40	2%	167%	20%	154%	18%	134%	16%	122%	15%	102%	12%
80	**50**	**2%**	**200%**	**20%**	**173%**	**17%**	**134%**	**13%**	**107%**	**11%**	**67%**	**7%**
60	30	3%	133%	20%	133%	20%	133%	20%	133%	20%	133%	20%
70	40	3%	167%	20%	153%	18%	132%	16%	118%	14%	97%	12%
80	**50**	**3%**	**200%**	**20%**	**172%**	**17%**	**129%**	**13%**	**101%**	**10%**	**58%**	**6%**
60	30	4%	133%	20%	133%	20%	133%	20%	133%	20%	133%	20%
70	40	4%	167%	20%	152%	18%	130%	16%	115%	14%	93%	11%
80	**50**	**4%**	**200%**	**20%**	**170%**	**17%**	**125%**	**13%**	**95%**	**10%**	**51%**	**5%**
60	30	5%	133%	20%	133%	20%	133%	20%	133%	20%	133%	20%
70	40	5%	167%	20%	151%	18%	128%	15%	112%	13%	89%	11%
80	**50**	**5%**	**200%**	**20%**	**169%**	**17%**	**122%**	**12%**	**91%**	**9%**	**44%**	**4%**
60	30	10%	133%	20%	133%	20%	133%	20%	133%	20%	133%	20%
70	40	10%	167%	20%	149%	18%	122%	15%	104%	13%	78%	9%
80	**50**	**10%**	**200%**	**20%**	**169%**	**17%**	**123%**	**12%**	**92%**	**9%**	**45%**	**5%**

Table E5: Illustration of the λ formula and b_y*=b_y(g,r) formula

(propositions 8-9: wealth-in-the-utility-function model, equations (E12)-(E13) and (E17))

A	H									
20	30									
R	1-α		ρ	s_B	ρ	s_B	ρ	s_B	ρ	s_B
60	70%		100%	10%	80%	10%	50%	10%	0%	10%
D	I = D-H	r-g	λ	b_y*	λ	b_y*	λ	b_y*	λ	b_y*
60	30	0%	100%	8%	100%	8%	100%	8%	100%	8%
70	40	0%	100%	8%	100%	8%	100%	8%	100%	8%
80	**50**	**0%**	**100%**	**8%**	**100%**	**8%**	**100%**	**8%**	**100%**	**8%**
60	30	1%	91%	10%	91%	10%	91%	10%	91%	10%
70	40	1%	96%	10%	97%	11%	98%	11%	101%	11%
80	**50**	**1%**	**102%**	**11%**	**103%**	**11%**	**105%**	**12%**	**111%**	**12%**
60	30	2%	84%	13%	84%	13%	84%	13%	84%	13%
70	40	2%	94%	15%	96%	15%	98%	15%	103%	16%
80	**50**	**2%**	**106%**	**17%**	**109%**	**17%**	**114%**	**18%**	**125%**	**20%**
60	30	3%	79%	18%	79%	18%	79%	18%	79%	18%
70	40	3%	94%	22%	96%	22%	100%	23%	106%	24%
80	**50**	**3%**	**114%**	**26%**	**118%**	**27%**	**126%**	**29%**	**143%**	**33%**
60	30	4%	74%	26%	74%	26%	74%	26%	74%	26%
70	40	4%	96%	33%	99%	34%	103%	36%	111%	39%
80	**50**	**4%**	**126%**	**44%**	**131%**	**46%**	**142%**	**49%**	**166%**	**58%**
60	30	5%	71%	41%	71%	41%	71%	41%	71%	41%
70	40	5%	100%	57%	103%	58%	108%	61%	118%	67%
80	**50**	**5%**	**142%**	**81%**	**149%**	**85%**	**163%**	**92%**	**194%**	**110%**

Table E6: Illustration of the b_y*, β* and μ* formulas

(propositions 8-9, wealth-in-the-utility-function model, equations (E11)-(E15)) (ρ=1)

(open economy, r=5%, θ=2%, σ=5, s_B=10%)

A	H	θ	σ	$\bar{r}$	r
20	30	2%	5	8%	5%
R	α	1-α	ρ	s_B	
60	30%	70%	100%	10%	

D	I = D-H	g	r	r-g	s_B	λ	b_y*	g_c	s_L	(1-α)$β_L$*	$β_B$*	$β_p$*	$β_K$*=α/r	μ*	β*	$\hat{b}_y$ *
60	30	0%	5%	5%	10%	71%	41%	1%	17%	356%	993%	1349%	600%	120%	981%	29%
70	40	0%	5%	5%	10%	100%	57%	1%	18%	561%	1390%	1951%	600%	145%	1164%	34%
80	**50**	**0%**	**5%**	**5%**	**10%**	**142%**	**81%**	**1%**	**19%**	**857%**	**1977%**	**2834%**	**600%**	**171%**	**1339%**	**38%**
60	30	1%	5%	4%	10%	74%	26%	1%	5%	226%	557%	782%	600%	132%	717%	24%
70	40	1%	5%	4%	10%	96%	33%	1%	4%	336%	720%	1056%	600%	159%	860%	27%
80	**50**	**1%**	**5%**	**4%**	**10%**	**126%**	**44%**	**1%**	**3%**	**489%**	**941%**	**1430%**	**600%**	**184%**	**1011%**	**31%**
60	30	2%	5%	3%	10%	79%	18%	1%	-11%	108%	341%	449%	600%	160%	486%	19%
70	40	2%	5%	3%	10%	94%	22%	1%	-15%	143%	409%	553%	600%	195%	566%	22%
80	**50**	**2%**	**5%**	**3%**	**10%**	**114%**	**26%**	**1%**	**-19%**	**194%**	**494%**	**689%**	**600%**	**227%**	**659%**	**25%**
60	30	3%	5%	2%	10%	84%	13%	1%	-32%	-1%	222%	221%	600%	238%	272%	16%
70	40	3%	5%	2%	10%	94%	15%	1%	-41%	-30%	248%	219%	600%	336%	270%	18%
80	**50**	**3%**	**5%**	**2%**	**10%**	**106%**	**17%**	**1%**	**-49%**	**-60%**	**280%**	**220%**	**600%**	**452%**	**271%**	**20%**
60	30	4%	5%	1%	10%	91%	10%	1%	-58%	-106%	150%	44%	600%	903%	61%	14%
70	40	4%	5%	1%	10%	96%	11%	1%	-75%	-194%	159%	-36%	600%	-1470%	-52%	15%
80	**50**	**4%**	**5%**	**1%**	**10%**	**102%**	**11%**	**1%**	**-92%**	**-297%**	**168%**	**-130%**	**600%**	**-514%**	**-204%**	**17%**
60	30	5%	5%	0%	10%	100%	8%	1%	-91%	-212%	106%	-106%	600%	-294%	-164%	12%
70	40	5%	5%	0%	10%	100%	8%	1%	-123%	-361%	106%	-255%	600%	-153%	-445%	14%
80	**50**	**5%**	**5%**	**0%**	**10%**	**100%**	**8%**	**1%**	-156%	**-539%**	**106%**	**-433%**	**600%**	**-108%**	**-894%**	**16%**

Table E7: Illustration of the b_y*, β* and μ* formulas

(propositions 8-9, wealth-in-the-utility-function model, equations (E11)-(E15)) (ρ=1)

(open economy, r=5%, s_B=10%, θ and σ adjust so that g_c=g)

A	H	$\bar{r}$	r													
20	30	8%	5%													
R	α	1-α	ρ	s_B												
60	30%	70%	100%	10%												
D	I = D-H	g	r	r-g	s_B	λ	b_y*	g_c	s_L	(1-α)$β_L$*	$β_B$*	$β_p$*	$β_K$*=α/r	μ*	β*	$\widehat{b}_y$ *
60	30	0%	5%	5%	10%	71%	41%	0%	10%	307%	962%	1269%	600%	128%	951%	30%
70	40	0%	5%	5%	10%	100%	57%	0%	10%	486%	1347%	1833%	600%	155%	1134%	35%
80	**50**	**0%**	**5%**	**5%**	**10%**	**142%**	**81%**	**0%**	**10%**	**751%**	**1915%**	**2666%**	**600%**	**182%**	**1311%**	**40%**
60	30	1%	5%	4%	10%	74%	26%	1%	10%	257%	568%	826%	600%	125%	742%	23%
70	40	1%	5%	4%	10%	96%	33%	1%	10%	384%	735%	1119%	600%	150%	888%	27%
80	**50**	**1%**	**5%**	**4%**	**10%**	**126%**	**44%**	**1%**	**10%**	**556%**	**961%**	**1516%**	**600%**	**173%**	**1040%**	**30%**
60	30	2%	5%	3%	10%	79%	18%	2%	10%	218%	365%	583%	600%	123%	588%	18%
70	40	2%	5%	3%	10%	94%	22%	2%	10%	308%	439%	747%	600%	144%	696%	20%
80	**50**	**2%**	**5%**	**3%**	**10%**	**114%**	**26%**	**2%**	**10%**	**421%**	**530%**	**951%**	**600%**	**164%**	**809%**	**22%**
60	30	3%	5%	2%	10%	84%	13%	3%	10%	186%	249%	435%	600%	121%	474%	14%
70	40	3%	5%	2%	10%	94%	15%	3%	10%	251%	279%	530%	600%	139%	549%	15%
80	**50**	**3%**	**5%**	**2%**	**10%**	**106%**	**17%**	**3%**	**10%**	**327%**	**314%**	**640%**	**600%**	**155%**	**628%**	**16%**
60	30	4%	5%	1%	10%	91%	10%	4%	10%	161%	176%	337%	600%	118%	388%	11%
70	40	4%	5%	1%	10%	96%	11%	4%	10%	208%	186%	394%	600%	133%	439%	12%
80	**50**	**4%**	**5%**	**1%**	**10%**	**102%**	**11%**	**4%**	**10%**	**259%**	**196%**	**455%**	**600%**	**146%**	**491%**	**12%**
60	30	5%	5%	0%	10%	100%	8%	5%	10%	140%	128%	268%	600%	116%	322%	9%
70	40	5%	5%	0%	10%	100%	8%	5%	10%	175%	128%	303%	600%	128%	356%	9%
80	**50**	**5%**	**5%**	**0%**	**10%**	**100%**	**8%**	**5%**	**10%**	**210%**	**128%**	**338%**	**600%**	**138%**	**389%**	**9%**

Table E8: Illustration of the b_y*, β* and μ* formulas

(propositions 8-9, wealth-in-the-utility-function model, equations (E11)-(E15)) (ρ=1)

(closed economy, r=5%, θ=0%, σ=∞, s_B adjusts so that $\beta^*=(1-\alpha)\beta_L+\beta_B=\alpha/r^*$ is fixed to 600%)

A	H	θ	σ	r
20	30	0%	10000	5%
R	α	1-α	ρ	
60	30%	70%	100%	

D	I = D-H	g	r*	r-g	s_B	λ	b_y*	g_c	s_L	(1-α)β_L*	β_B*	β*	β_K*=α/r	μ*
60	30	0%	5%	5%	6%	71%	19%	0%	6%	189%	411%	600%	600%	126%
70	40	0%	5%	5%	5%	100%	18%	0%	5%	223%	378%	600%	600%	150%
80	**50**	**0%**	**5%**	**5%**	**3%**	**142%**	**17%**	**0%**	**3%**	**249%**	**351%**	**600%**	**600%**	**173%**
60	30	1%	5%	4%	9%	74%	22%	0%	-5%	152%	448%	600%	600%	146%
70	40	1%	5%	4%	7%	96%	22%	0%	-9%	166%	434%	600%	600%	183%
80	**50**	**1%**	**5%**	**4%**	**6%**	**126%**	**22%**	**0%**	**-12%**	**173%**	**427%**	**600%**	**600%**	**222%**
60	30	2%	5%	3%	13%	79%	25%	0%	-18%	125%	475%	600%	600%	164%
70	40	2%	5%	3%	11%	94%	25%	0%	-25%	123%	477%	600%	600%	211%
80	**50**	**2%**	**5%**	**3%**	**10%**	**114%**	**26%**	**0%**	**-32%**	**115%**	**485%**	**600%**	**600%**	**263%**
60	30	3%	5%	2%	17%	84%	27%	0%	-32%	108%	492%	600%	600%	178%
70	40	3%	5%	2%	16%	94%	28%	0%	-44%	93%	507%	600%	600%	233%
80	**50**	**3%**	**5%**	**2%**	**16%**	**106%**	**29%**	**0%**	**-55%**	**73%**	**527%**	**600%**	**600%**	**294%**
60	30	4%	5%	1%	23%	91%	28%	0%	-47%	101%	498%	600%	600%	189%
70	40	4%	5%	1%	23%	96%	30%	0%	-66%	76%	523%	600%	600%	248%
80	**50**	**4%**	**5%**	**1%**	**23%**	**102%**	**32%**	**0%**	**-83%**	**46%**	**554%**	**600%**	**600%**	**315%**
60	30	5%	5%	0%	30%	100%	29%	0%	-63%	104%	496%	600%	600%	196%
70	40	5%	5%	0%	31%	100%	31%	0%	-89%	74%	527%	600%	600%	257%
80	**50**	**5%**	**5%**	**0%**	**32%**	**100%**	**32%**	**0%**	**-116%**	**38%**	**562%**	**600%**	**600%**	**325%**

Table E9: Illustration of the b_y*, β* and μ* formulas

(propositions 8-9, wealth-in-the-utility-function model, equations (E11)-(E15)) (ρ=1)

(closed economy, r*=5%, θ=2%, σ=5, s_B adjusts so that $\beta^*=(1-\alpha)\beta_L+\beta_B=\alpha/r^*$ is fixed to 600%)

A	H	θ	σ	r
20	30	2%	5	5%
R	α	1-α	ρ	
60	30%	70%	100%	

D	I = D-H	g	r*	r-g	s_B	λ	b_y*	g_c	s_L	$(1-\alpha)\beta_L$*	β_B*	β*	β_K*=α/r	μ*
60	30	0%	5%	5%	6%	71%	17%	1%	13%	224%	376%	600%	600%	112%
70	40	0%	5%	5%	4%	100%	15%	1%	13%	274%	327%	600%	600%	127%
80	**50**	**0%**	**5%**	**5%**	**3%**	**142%**	**14%**	**1%**	**12%**	**316%**	**284%**	**600%**	**600%**	**136%**
60	30	1%	5%	4%	8%	74%	20%	1%	3%	183%	417%	600%	600%	134%
70	40	1%	5%	4%	7%	96%	19%	1%	0%	209%	391%	600%	600%	162%
80	**50**	**1%**	**5%**	**4%**	**5%**	**126%**	**19%**	**1%**	**-2%**	**227%**	**373%**	**600%**	**600%**	**190%**
60	30	2%	5%	3%	12%	79%	23%	1%	-9%	152%	448%	600%	600%	152%
70	40	2%	5%	3%	11%	94%	23%	1%	-15%	160%	440%	600%	600%	192%
80	**50**	**2%**	**5%**	**3%**	**9%**	**114%**	**23%**	**1%**	**-20%**	**160%**	**440%**	**600%**	**600%**	**235%**
60	30	3%	5%	2%	16%	84%	25%	1%	-22%	132%	468%	600%	600%	168%
70	40	3%	5%	2%	15%	94%	26%	1%	-32%	125%	475%	600%	600%	216%
80	**50**	**3%**	**5%**	**2%**	**15%**	**106%**	**27%**	**1%**	**-41%**	**111%**	**489%**	**600%**	**600%**	**270%**
60	30	4%	5%	1%	22%	91%	27%	1%	-37%	122%	478%	600%	600%	179%
70	40	4%	5%	1%	22%	96%	28%	1%	-52%	104%	497%	600%	600%	233%
80	**50**	**4%**	**5%**	**1%**	**22%**	**102%**	**29%**	**1%**	**-67%**	**79%**	**521%**	**600%**	**600%**	**295%**
60	30	5%	5%	0%	29%	100%	28%	1%	-52%	121%	479%	600%	600%	188%
70	40	5%	5%	0%	30%	100%	29%	1%	-74%	96%	504%	600%	600%	245%
80	**50**	**5%**	**5%**	**0%**	**31%**	**100%**	**31%**	**1%**	**-97%**	**65%**	**535%**	**600%**	**600%**	**308%**

Table E10: Illustration of the b_y*, β* and μ* formulas

(propositions 8-9, wealth-in-the-utility-function model, equations (E11)-(E15)) (ρ=1)

(closed economy, θ=2%, σ=5, s_B=10%, r* adjusts so that $\beta^*=(1-\alpha)\beta_L+\beta_B=\alpha/r^*$)

A	H	θ	σ											
20	30	2%	5											
R	α	1-α	ρ											
60	30%	70%	100%											
D	I = D-H	g	r*	r*-g	s_B	λ	b_y*	g_c	s_L	$(1-\alpha)\beta_L$*	β_B*	β*	β_K*=α/r	μ*
60	30	0%	4%	4%	10%	75%	24%	0%	15%	277%	519%	796%	796%	119%
70	40	0%	3%	3%	10%	95%	25%	0%	14%	367%	529%	895%	895%	139%
80	**50**	**0%**	**3%**	**3%**	**10%**	**114%**	**26%**	**0%**	**14%**	**459%**	**538%**	**997%**	**997%**	**157%**
60	30	1%	5%	4%	10%	76%	22%	1%	3%	201%	456%	656%	656%	134%
70	40	1%	4%	3%	10%	95%	23%	0%	0%	251%	466%	717%	717%	162%
80	**50**	**1%**	**4%**	**3%**	**10%**	**113%**	**24%**	**0%**	**-3%**	**298%**	**478%**	**776%**	**776%**	**189%**
60	30	2%	5%	3%	10%	77%	21%	1%	-9%	133%	415%	549%	549%	154%
70	40	2%	5%	3%	10%	94%	23%	1%	-15%	154%	433%	587%	587%	192%
80	**50**	**2%**	**5%**	**3%**	**10%**	**112%**	**24%**	**1%**	**-20%**	**169%**	**451%**	**620%**	**620%**	**233%**
60	30	3%	6%	3%	10%	77%	21%	1%	-22%	75%	392%	467%	467%	178%
70	40	3%	6%	3%	10%	94%	23%	1%	-30%	73%	417%	490%	490%	231%
80	**50**	**3%**	**6%**	**3%**	**10%**	**113%**	**25%**	**1%**	**-38%**	**67%**	**444%**	**510%**	**510%**	**289%**
60	30	4%	7%	3%	10%	77%	21%	1%	-35%	23%	380%	403%	403%	208%
70	40	4%	7%	3%	10%	95%	23%	1%	-45%	5%	413%	418%	418%	278%
80	**50**	**4%**	**7%**	**3%**	**10%**	**114%**	**26%**	**1%**	**-55%**	**-14%**	**446%**	**431%**	**431%**	**355%**
60	30	5%	8%	3%	10%	76%	21%	1%	-48%	-21%	374%	353%	353%	242%
70	40	5%	8%	3%	10%	95%	24%	1%	-60%	-50%	414%	363%	363%	331%
80	**50**	**5%**	**8%**	**3%**	**10%**	**115%**	**27%**	**1%**	**-72%**	**-78%**	**452%**	**373%**	**373%**	**429%**

Table E11: Illustration of the b_y*, β* and μ* formulas

(propositions 8-9, wealth-in-the-utility-function model, equations (E11)-(E15)) (ρ=1)

(closed economy, θ and σ adjust so that g_c=g, s_B=10%, r* adjusts so that β*=(1-α)$β_L$+$β_B$=α/r*)

A	H													
20	30													
R	α	1-α	ρ											
60	30%	70%	100%											
D	I = D-H	g	r*	r*-g	s_B	λ	b_y*	g_c	s_L	(1-α)$β_L$*	$β_B$*	β*	$β_K$*=α/r	μ*
60	30	0%	4%	4%	10%	75%	24%	0%	10%	251%	529%	780%	780%	125%
70	40	0%	3%	3%	10%	95%	26%	0%	10%	337%	540%	877%	877%	147%
80	**50**	**0%**	**3%**	**3%**	**10%**	**115%**	**27%**	**0%**	**10%**	**428%**	**550%**	**979%**	**979%**	**165%**
60	30	1%	4%	3%	10%	77%	21%	1%	10%	234%	441%	675%	675%	124%
70	40	1%	4%	3%	10%	94%	22%	1%	10%	309%	440%	749%	749%	144%
80	**50**	**1%**	**4%**	**3%**	**10%**	**111%**	**22%**	**1%**	**10%**	**384%**	**438%**	**822%**	**822%**	**161%**
60	30	2%	5%	3%	10%	78%	18%	2%	10%	220%	374%	593%	593%	123%
70	40	2%	5%	3%	10%	94%	18%	2%	10%	284%	366%	650%	650%	142%
80	**50**	**2%**	**4%**	**2%**	**10%**	**108%**	**18%**	**2%**	**10%**	**348%**	**357%**	**705%**	**705%**	**157%**
60	30	3%	6%	3%	10%	80%	16%	3%	10%	207%	321%	528%	528%	122%
70	40	3%	5%	2%	10%	94%	16%	3%	10%	263%	309%	573%	573%	140%
80	**50**	**3%**	**5%**	**2%**	**10%**	**105%**	**16%**	**3%**	**10%**	**318%**	**296%**	**614%**	**614%**	**154%**
60	30	4%	6%	2%	10%	82%	14%	4%	10%	195%	280%	475%	475%	121%
70	40	4%	6%	2%	10%	94%	14%	4%	10%	245%	265%	510%	510%	138%
80	**50**	**4%**	**6%**	**2%**	**10%**	**104%**	**14%**	**4%**	**10%**	**292%**	**250%**	**542%**	**542%**	**151%**
60	30	5%	7%	2%	10%	84%	13%	5%	10%	185%	246%	431%	431%	121%
70	40	5%	7%	2%	10%	95%	12%	5%	10%	230%	229%	459%	459%	136%
80	**50**	**5%**	**6%**	**1%**	**10%**	**102%**	**12%**	**5%**	**10%**	**270%**	**214%**	**484%**	**484%**	**148%**

Table E12: Illustration of the φ^M and φ^{KS} steady-state formulas
(uncapitalized and capitalized inheritance shares in aggregate wealth)
(working paper, section 7.3, equations (7.6)-(7.7), case $b_y=\beta/H$)

H 30				
g	φ^M	r-g	φ^{KS}	φ^{KS}/φ^M
0%	100%	0%	100%	100%
1%	86%	1%	117%	135%
2%	75%	2%	137%	182%
3%	66%	3%	162%	246%
4%	58%	4%	193%	332%
5%	52%	5%	232%	448%
10%	32%	10%	636%	2009%
1.7%	78%	3.0%	162%	207%
1.0%	86%	5.0%	232%	269%