Income Concentration in a Context of Late Development: An Investigation of Top Incomes in Brazil using Tax Records, 1933–2013[1]

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Abstract

This paper presents new estimates on income concentration in Brazil over its development trajectory from 1933 to 2013 using individual tax records. The findings confirm Brazil's status as one of the world's most unequal countries, with concentration levels unrivalled elsewhere. Income has been highly concentrated at the top of the distribution, with the top 1 per cent amassing a share of 27 percent in 2013, and consistently fluctuating around 25 per cent since the mid 1970's. The majority of the income of the very rich in Brazil is not subject to the personal income tax, explaining their low tax liability and the difference between top shares of taxable income and top shares of total income, the latter registering much higher levels of concentration. We also present evidence that household surveys underestimate the extent of income inequality in Brazil. The overall findings illustrate the additional taxable capacity of top income groups, especially in a context where they are not investing as much in the productive capacities of the economy as their share of total income would justify.

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1. Introduction

The research strategy of analysing income inequality on the basis of top income shares derived from income tax data has received growing impetus since the publication of numerous individual country studies in the early 2000's spontaneously formed a unified and coordinated research project. The output of this research can be found in the collected series by Atkinson & Piketty (2007, 2010), as well as on the online website, The World Top Incomes Database, where time series exist for over thirty countries, across five continents, and spanning long time horizons – often covering more than 50 years.[3] This research is directly inspired from the pioneering work of Simon Kuznets (1953, 1955), who primarily examined income concentration in the United States. Contemporary researchers took off where Kuznets left off, by examining the cases of the most developed OECD countries, namely the France, U.S. and the U.K., whose relevant fiscal data was readily accessible. But like Kuznets (1955) before them, these researchers were compelled to study the evolutions of top incomes in underdeveloped countries wherever data availability made it possible, so as to be better able to uncover any common or distinct dynamics at play between distribution and growth in countries at different stages of their development cycle. Atkinson & Piketty (2010) is a testimony to this effect, including various late developing countries, such as Argentina, India, China, Indonesia, and Singapore.[4] Since then, the Latin American experience has been supplemented by studies on Colombia (Londoño Vélez, 2012) and Uruguay (Burdín et al. 2014); Asia has supplied by works on Korea (Kim & Kim, 2014), Malaysia (Atkinson, 2015) and Taiwan (Chu et al. 2015), while South Africa (Alvaredo & Atkinson, 2010) and Tanzania (Atkinson, 2011) have given representation to the African continent. The present

[3] See http://topincomes.parisschoolofeconomics.eu/

[4] See Alvaredo (2010), Banerjee & Piketty (2010), Piketty & Qian (2009), Leigh & Van der Eng (2009) and Atkinson (2010). China's estimates of top shares are based on household survey data, rather than income tax data, due to the unavailability of the latter.

paper follows this line of research by analysing the case of Brazil, a notable absentee from the above list of late developing countries.[5]

Investigating income concentration in Brazil can be motivated from numerous fronts. Firstly, Brazil is part of a region historically characterised by high and persistent levels of income inequality, since at least the late 19th century (Williamson, 2015). And it is a notable stand-out country of the region - in any report on income distribution by the OECD, the United Nations or the World Bank, Brazil usually features near the summit of the inequality rankings, as measured by household survey data, alongside regional counterparts such as Chile or Colombia. Moreover, Brazil partakes in the regional characteristic that sources the high inequality in the disproportionate concentration of income among individuals at the top of the distribution – individuals at least within the top 10 per cent of income recipients – rather than in income differences between lower segments of the distribution (Székely & Hilgert, 1999, Palma, 2011). Given that the studies underpinning these conclusions are without exception in using data from household surveys, which are prone to misrepresent the incomes of the very rich, a complementary analysis using income tax statistics is necessary to evaluate the conventional wisdom.

This necessity is even more pressing when an expansive consensus has developed, heralding the marked decline in inequality in Latin America since the new millennium. Brazil has again proven to be an exemplary case study in this context (López-Calva & Lustig, 2010a). During most of the first decade of the 2000's it was the household per capita income of the bottom 10 per cent of families that is reported to have grown roughly three times faster than the national average (around 2.5 per cent), while the per capital income of the richest 10 per cent of households experienced the slowest growth (below average) in the entire distribution, as measured in household surveys. This apparent decrease in the polarisation of income

[5] Medeiros et al. (2015) has been the first attempt to fill this gap for Brazil, in using tax data to evaluate inequality from the top for the recent years 2006-2012.

was accompanied by a notable fall in the country's Gini coefficient from approximately the average for the previous thirty years of around 0.59 in 2001 to a historically low level of around 0.55 in 2007 (Barros et al. 2010). This figure continued to drop over the following six years, reaching, by 2013, a level of about 0.52.[6] This is a significant decrease by any standards, which turned Brazil into a global reference point in the debate on inequality (especially in Western media), with its flagship conditional cash transfer programs (most notably the *Bolsa Familia* program)[7], and made Lula da Silva one of the most popular heads of state in the world.[8]

This 'success story', evidenced from survey-based measures, has been judged to be due largely to the decline in labour income inequality and non-labour inequality, rather than to demographic factors or employment prospects of the poor (Lopez-Calva et al., 2012). It is a narrative that associates the change to a rise of the bottom of the distribution, rather than any significant decrease of the top. Generally, the decline in labour income inequality is attributed to a lower skill premium – due to changes in the composition of supply and demand for labour and to the increase in the minimum wage raising the earnings of unskilled workers –; a fall in the inequality of education, and to a lower segmentation of labour markets between rural and urban workers and between primary and secondary/tertiary workers. This latter factor could be sourced in the faster growth of some productive sectors in Brazilian agriculture as opposed to that in more industrial areas (Barros et al., 2010). The decline in non-labour inequality has been sourced in the expansion in the coverage of government cash transfers to the poor – such as *Benefício de Prestação Continuada*, (a transfer to the elderly and disabled) and *Bolsa Família* – and an increase in the

[6] See SEDLAC (CEDLAS and The World Bank).

[7] Starting in 2003 from an amalgamation of previous transfer programs, *Bolsa Familia* is a means-tested transfer program targeted at poor families that provides cash subsidies for child and mother healthcare and for primary and secondary school enrolment.

[8] Lula da Silva's Workers Party has been in government since 2003; Lula's mandate lasting between 2003 and 2011.

average social security benefit, propelled in part by the increase in the minimum wage, since some social security benefits, such as non-contributory pensions, are indexed to the it (ibid).[9]

It goes without saying that the role of the government in the above narrative is highly significant, since a large portion of the equalizing forces are reported to come from either government sponsored cash transfers or government legislation such as the minimum wage, whose effect seem to be accurately captured in the survey-based Gini. On the contrary, the contribution of changes in the distribution of income from capital assets (rents, interests and dividends) is hardly noticeable in the statistics (ibid). The implication of this is that these income flows may not be adequately captured in the Gini – their small contribution to overall inequality, and even to non-labour income inequality, lends weight to the hypothesis that the Gini measure does not accurately describe what is going on at the top of the distribution.

The absence of the very rich in Brazil from surveys has been a growing concern, given randomness in the sampling of household surveys and that the capital assets they are generally dependent upon are either not well measured or are not observed, due to the reluctance of the richest individuals to disclose all of their assets.[10] Székely & Hilgert (1999) found that Brazil's principle household survey (the PNAD) did have relatively good coverage of high incomes for the mid-1990's, and yet the majority of the income of the top 10 per cent comprised of labour income from employees and self-employed workers, similar to the Latin American average.[11] But given what is now known about countries like Colombia, this seems to be a highly distorted picture. Indeed, the authors point out that their analysis does not exclude

[9] Between 2003 and 2013, Brazil's minimum wage increased by 74 per cent in real terms.

[10] Additionally, the rich may refuse to engage in a perceived time-consuming task such as answering a comprehensive household surveys, or statisticians may intentionally remove extreme observations, like those associated to the incomes of very rich, so as to not generate biases in the results. After all, a survey's primary concern is representativeness, not completeness.

[11] This apparent contradiction is due to the authors' evaluation criteria, by which they compare the income of managers of medium and large firms reported in firm-level surveys to the income of the richest individuals reported in household surveys.

the possibility that Latin American inequality is the result of individuals at the top living off capital income. They are careful in stating that what it does reveal is that 'the inequality we are able to measure with household surveys in Latin American countries is informative about a spectrum of society that does *not* include the richest households' (emphasis added). Similarly, in assessing the believed decline in Latin American inequality since the 2000's, Lopez-Calva and Lustig (2010b) focus their analysis on changes in labour income inequality and changes in the size and distribution of government transfers for the very reason that capital incomes are underreported in household surveys.[12] The limits of using household surveys to evaluate the extent of income inequality are thus well understood, and yet belief in the Brazilian 'success story' remains unquestioned. This paper seeks to bridge these empirical drawbacks by using a novel data source in order to properly evaluate conventional beliefs concerning inequality in the country.

Brazil is also an interesting case study because it is somewhat of a unique combination of inequality, size and development. Unlike other similarly judged unequal countries, like Colombia or South Africa, Brazil is a major economy by international standards, with the world's seventh largest GDP.[13] From an economic point of view, Brazil has experienced remarkable transformations since its colonial period officially ended with the 1891 Constitution proclaiming it a Federal Republic, with a particularly eventful 20th century. No less dramatic have been its political and social evolutions.

An early commodity boom, was followed the economic side-effects of World Wars, and later by an active, state-fomented industrialization program that propelled the economy onto one of the fastest growth rates observed anywhere during the first

[12] They take the observation that an average total monthly household income, of the two richest households in the Brazilian 2006 survey, of $70,357 to be evidence that the incomes of the rich are not captured by the survey.

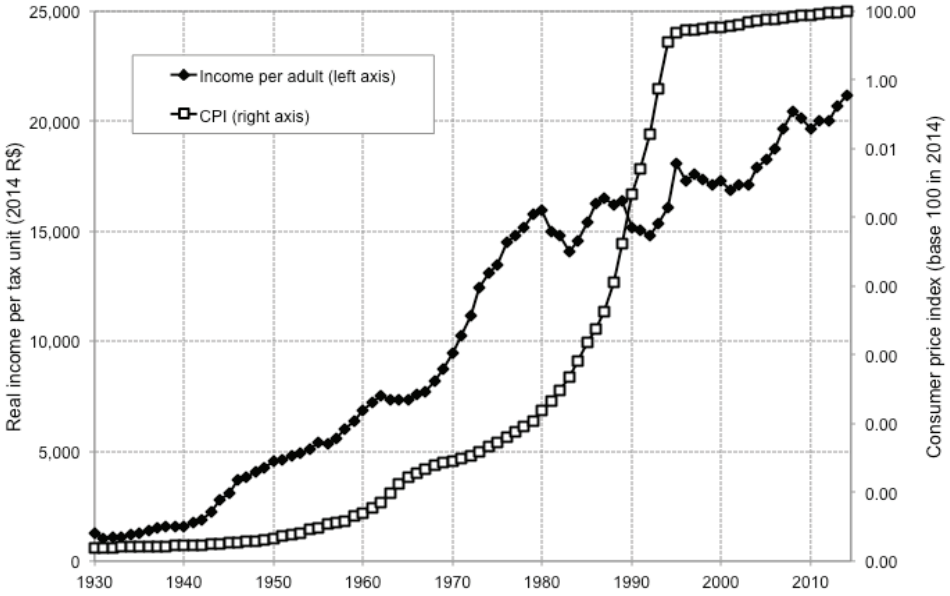
[13] The data currently available for India and China suggest lower levels of inequality, while there is limited data to be able to properly evaluate the case of Russia. The only major economy with comparable levels of inequality at present, one could argue, is the U.S.

three quarters of the century, before stagnating structural bottlenecks and into a developing world debt crisis during the 1980's, accompanied by mounting hyperinflation. In between, women were granted the right to vote in the early 1930's, which ironically coincided with the autocratic regime of Getúlio Vargas (1930-1945); a spell of political turmoil in the early 1960's was followed by a military *coup d'état* in 1964, which took over the reins of the country until 1985; while in 1988 universal suffrage was finally achieved when the literacy requirement for voting was abolished. Brazil then succumbed to the wave of market liberalisation and financialisation engulfing developing countries from the early 1990's, particularly in Latin America. This culminated in 1994 with the *Plano Real*, a set of macroeconomic monetary measures intended to stabilize the economy from runaway inflation, after at least four failed stabilization attempts (Baer, 2014; Cowell et al., 1998; Engerman & Sokoloff, 2001; Palma, 2012). The growth performance of this Washington Consensus period was poor, by historical standards, with the economy slowly contracting, until the late-1990's Asian financial crisis brought about a renewed consensus for developing countries, whereby the role of the state was emphasized in the context of the Millennium Development Goals, in particular poverty reduction.

From the mid-2000's, the Brazilian economy entered into another boom phase – mostly led by commodities, but also by finance and household credit, particularly for real estate – which was only mildly halted by the global economic crisis of 2008-2009 (Palma, 2012). Figure 1 summarizes Brazil's economic performance. Although the proceeds of Brazil's recent growth spurt – a pale comparison to its 'golden age' of import-substitution growth (1955-1980) – succeeded in reducing poverty, its impact on the market distribution of income remain in question, due to the shortcomings of the traditionally used data. Given the sources of this growth, it is unlikely that much of its benefits initially reached the middle and lower groups of the distribution. Indeed, the initial findings by Medeiros et al. (2015) seem to confirm that a disproportionate share of income flowed to the very summit of the distribution (the

top 1 per cent and beyond) during the period 2006-2012. It is therefore interesting and necessary to examine income concentration in Brazil throughout its tumultuous recent and past history to re-evaluate the link between income distribution and economic development.

Figure 1. Average real income and consumer price index in Brazil, 1930-2014



Source: Table B.3.

Finally, there exist few studies that track the long-run evolution of inequality in Brazil, over a time frame longer than twenty-five years. One reason for this timeframe is that it generally coincides with the availability of household survey data (for example, see Ferreira et al. (2007)). Prior to the 1980's, approximations of the distribution of income have relied upon single year estimates, coinciding with the availability of decennial Census data. Thus, the earliest studies of any empirical rigour to examine inequality in Brazil have been for the years 1960 and 1970 (see for instance, Langoni (1973) and Fishlow (1972), both of whom report an increase in net income concentration among the top percentiles over the decade). Hence, the present paper is the first attempt to present a long-run quantified history of income

concentration for Brazil, and one of the few for a country of Latin America.[14] Furthermore, the present study takes a novel stance by exclusively focusing on gross market income inequality. Most of the existing research on Brazil examines disposable income inequality, that is, the inequality of income net of direct taxation and transfers. This is a significant departure, firstly because the pre-tax distribution of income may offer different conclusions to the after-tax distribution of income, and secondly, because the latter is heavily dependent on the former, in its capacity for redistribution.[15] And also, the development path of a country can be both a consequence and a cause of the existing pre-tax distribution of income. An exploration of income tax records can thus contribute to provide a more complete picture of the actually existing state of income distribution in Brazil.[16]

As well as being informative about distributional skewness in society, studying the evolution of top income shares in general is important for other reasons. As previously highlighted, the development path of a country, as well as the means the country affords towards it, can be heavily influenced by the portion of a country's income that is concentrated in few hands (and visa-versa) since affluent groups have property rights over resources and thus can impact the country's growth trajectory. From a policy perspective, top income shares may reveal something more than just the state of inequality. Also, given the value of income captured in top income shares, these can affect more broad measures of inequality, like the Gini coefficient, at the national and global level (Atkinson, 2007). Brazil's recent 'success story' is

[14] Alvaredo (2010) is the only other study that examines the evolution of a Latin American country starting before the 1990's, covering a total of 38 years over a 72-year period. The present study, on the other hand, covers a total of 62 years over an 80-year period.

[15] Paraphrasing José Palma, it's the original share of income of the rich that really matters, as the rest of the population follows suit (see Palma, 2011).

[16] For example the finding by Fereirra et al. (2010) that inequality in Brazil remained stable during the market liberalization period of the early 1990's, contrary to other Latin American countries, just reveals the partial nature of looking at the net income distribution using survey data. A study of the original market distribution of income may throw up different conclusions, and offer new perspectives for the analysis of income inequality.

marked by a sustained fall in the recorded Gini, but uncovering top income shares may suffice to alter the final conclusion. Finally, and from an ethical point of view, social beliefs about what characterises a fair distribution of income can influence political economy responses such as redistributive taxation. And these beliefs can strongly be informed by investigations made public on income concentration in a particular society.

Recent research on the topic has found that for most countries surveyed, top income shares have followed one of two patterns since the beginning of the 20th century (when most income tax systems were founded). There is a group of 'U-shaped' countries (Anglo-Saxon countries and developing countries like Argentina, India and South Africa), characterised by very high income concentration at the beginning of the century, a large plunge in shares during the middle thirty years of the century, and a rapid rise in inequality since the 1980's reaching the levels observed at the beginning of the 20th century in the new 21st century. And there is a group of 'L-shaped' countries (continental Europe, Japan and neighbouring middle-income Asian countries), characterised by high levels of concentration early on in the century, a downward swing over the mid-century, followed by a mild rise, if not quasi-stable evolution, from the 1980's until the present (see Atkinson et al., 2011).[17] To see how Brazil compares to these evolutions is one of this paper's main research questions.

Nevertheless, the use of tax data is not without some shortcomings of its own. First, the tax-paying population strictly determines the portion of the income distribution (and thus income shares) that can be studied. In developing countries like Brazil, these may account for a relatively small number of people, especially in earlier years. Indeed the picture we get for Brazil is that for much of the century, only a small minority of the total population provided information to the tax

[17] See also the World Top Incomes Database for up-to-date country information.

authorities, as Section 2 will document. This technical detail means that for the most part, the conclusions drawn from the data are silent on the distribution of income outside of the top groups, namely within the bottom 90 per cent of the population. As mentioned, the estimates are also silent on post-tax and transfer income. They deal mostly with the distribution of taxable income, rather than national income, so the tax definition of income generally falls short of the definition ideally applied, which means that the estimates produced from the data are somewhat under-stated. Furthermore, tax data usually miss tax-exempt income, and can never capture tax evasion, by definition. Fortunately, the Brazilian tax data does capture tax-exempt and non-taxable income for a certain number of years, as shall be exposed below. In any case, the description of the underlying distribution of income provided by tax data must be seen as partial and thus complementary to equally partial alternative sources such as household surveys. Yet despite the aforementioned drawbacks of tax data, they remain the most informative source to study the extent to which the original distribution of income is concentrated, and whether this concentration accentuates or weakens over time.

This study obtains five main results. First, income in Brazil is highly concentrated, given that the top 1 per cent of the distribution accounts for about 27 per cent of total gross household income in 2013. Top income shares in Brazil are the highest observed in the whole WTID sample for recent years, as well as historically, since top shares reached higher peaks during the caotic 1980's. On the basis of these results, Brazil is more unequal than any of its developing country peers, and the United States, even after accounting for capital gains in the latter. Only the top 0.01 per cent in the U.S. can compare to its equivalent in Brasil over recent years. Moreover, these high shares appear to be a persistent feature of Brazil's development, as they have changed little since the 1970's, dampening the enthusiasm over Brazil's 'success story'.

Second, the distribution when measured from taxable income presents a markedly different picture than the distribution when measured from total income. Taxable income shares are consistently much lower than the total income shares, for which we have less data. According to gross taxable income, top income shares have maintained a constant trend since the late 1980's, with the top 1 per cent share being in the order of 11-12 per cent, more than half what shares according to total income reveal for the recent years. Historically, the gross taxable shares have fluctuated more considerably than the total income shares, with an evolution comparable to the shares of total income in a country like Argentina.

Third, the compositions of taxable incomes during the 1970's and 1980's reveal that top groups in Brazil obtained the bulk of their income from wages. At first glance this appears at odds with the pattern found in most developing countries, where it has been found that the rich are primarily capital owners. However, given the difference in taxable incomes and total incomes at the top, it is likely that the compositions are highly distorted. This not so much the case for the compositon of top incomes by gender, where it is more likely that the greater representation of women reflects real social changes between the late 1970's and the late 1990's.

Fourth, the relative tax burden of top income groups reveals the differences between the taxable income distribution and the total income distribution. The current effective tax rates paid by the upper part of the distribution are extremely low (3-4 per cent), and can be explained by the tax reliefs associated the most important sources of capital incomes – profits and dividends.

Fifth, preliminary comparisons with existing estimates of income concentration based on household surveys reveal a potential underestimation of inequality on behalf of survey-based estimates. These estimates, while close in level to the taxable income shares from tax data, are far from what the shares of total income report.

From a purely qualitative perspective, these results do not say anything new about about income distribution and tax systems, in a region cited for high inequality

and tax evasion. Nevertheless, they provide an additional lense, through which distributive questions can be examined. And the results reveal the extent to which concerns over tax evasion may be overstated, given the low incentives to evade already soft tax systems. Nevertheless, as with any study using tax data, our estimates should be taken with all the methodological caveats in mind.

The remainder of the paper is structured as follows. Section 2 offers some background on the fiscal context in Brazil, particularly from a taxation point of view. Section 3 describes the data and methods used to arrive at the results. Section 4 presents the findings surrounding top income shares over the long run, conveys some compositions of income, and places the general results in an international perspective. Section 5 discusses the measurement, interpretation and implications of the findings. Section 6 concludes with some guidelines for future research.

2. Fiscal context: development and taxation in Brazil

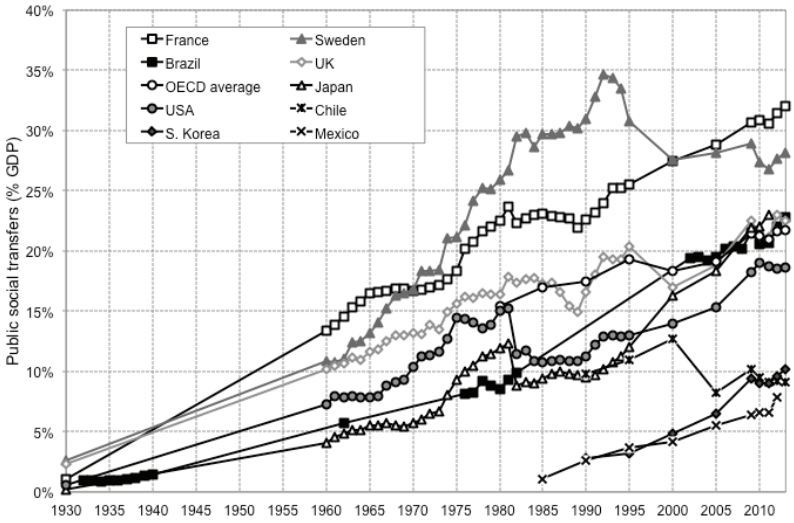
2.1 The rise of the Brazilian fiscal-social state

The interwar period in Brazil was marked by growing investment, rapid growth in industrial production and early attempts at collective planning, especially in the 1930's. Active industrialization policies did not commence until after 1945 (Baer, 2014). Brazil was in a context of late development. From the mid-1920's, there was also a notable shift in the country's public finances. This was spurred on the one hand by growing tax revenues from industrial production and by the creation of the federal income tax in December 1922, despite previous efforts by public officials to institute it, at the end of the monarchical empire in the late-19th century and at the beginning of the Republic in the early 20th century (Da Nóbrega, 2014). On the other hand, there was an expansion of public expenditures, notably the emergence of social assistance and social security spending at the federal level the same year as the

income tax came into effect. This new form of social spending added to that already undertaken in the domains of education and healthcare by all tiers of government.

Despite Brazil's chaotic political history, the country was able to develop a remarkably large fiscal-social state by comparative international standards. Figure 2 testifies this, showing Brazil to have a current level of public social expenditures comparable to the OECD average, well above its regional neighbours Chile and Mexico, and greater than that of countries like the U.S.[18] A look at some orders of magnitude surrounding Brazil's tax revenues reveals an equally impressive evolution, which have no doubt facilitated the large rise in the country's social expenditure.

Figure 2. Evolution of public social transfers in Brazil in a comparative perspective, 1930-2013



Note: public social transfers for the purposes of this comparison excludes spending on housing, as well as education, in order to maintain consistency with the measure for other countries.
Sources: Author's calculation for Brazil using data from IBGE and from the *Ministério de Fazenda.* Data for other countries is from Lindert (1992 and 1993) for 1930-1981 and from OECD SOCX for 1982-2013.

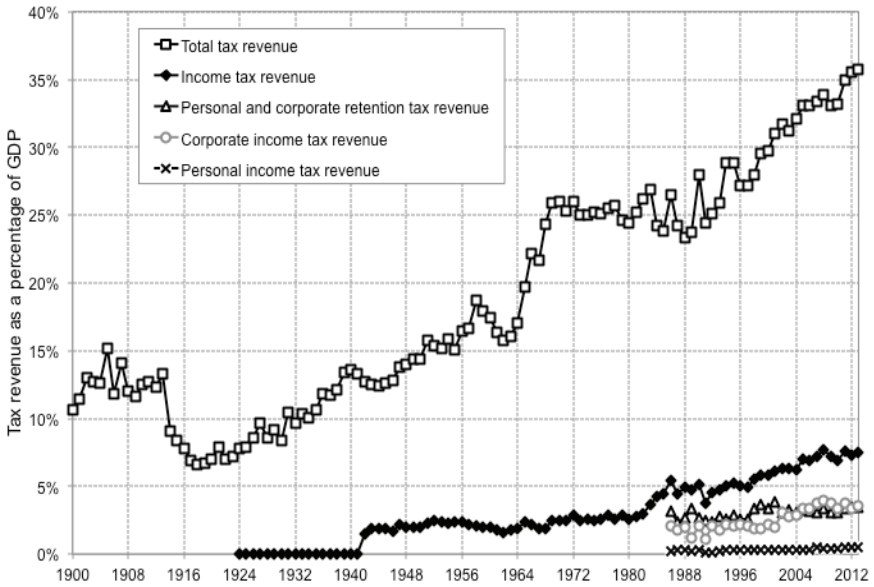
[18] In fact, one could argue that Brazil was always ahead of its time, since it committed a greater share of its economy to public social transfers than what developed countries spent in their earlier histories at similar levels of economic development, for instance, by comparing Brazil around 1975 with both Sweden or France around 1930, or Brazil in 2013 with France around 1960 (taking 1990 US dollars PPP as the reference, see The Maddison-Project at http://www.ggdc.net/maddison/maddison-project/home.htm). Including spending on education, housing and urban services and labour increases the social spending share in GDP by 5-7 percentage points for recent years (see Figure E.1 in Appendix). Brazil's total primary public spending has increased from an average of about 15 per cent of GDP between 1900 and 1945 to over 45 per cent of GDP today (see Figure E.2 in Appendix).

Figure 3 presents the quantified history of total tax revenues and total income tax revenues from the beginning of the 20th century. The possibility of decomposing total income tax revenues into its three components – personal income tax, corporate income tax, and personal and corporate retention tax – can only be done from 1986 onwards. It can be seen how Brazil's overall tax burden followed a steady upward trend after the fall around the First World War. The trend picked up again after the Second World War and strongly increased during the peak of import substitution industrialization, until it stabilized at around 25 per cent of GDP from the early 1970's. The return of democracy in the mid-to-late 1980's coincided with a further rise in the tax burden, eventually reaching 35 per cent of GDP by 2012-2013, making Brazil the country with the highest tax-to-GDP ratio in Latin America. Since its first collection in 1924, the income tax has not experienced the same remarkable evolution, its contribution to the overall tax burden being meagre to say the least, despite the steady increase in the share of the income tax from the transition back to democracy. At the same time, between 40-45 per cent of income tax revenues are accounted for by the corporate tax and another 40-45 per cent by the withholding tax, both on individuals and corporations. But the increase observed in the income tax from the late 1990's is mainly due to the rise in the corporate component. The personal income tax contributes very little to the income tax (accounting for 9 per cent of income tax revenue at present), not to mention the overall tax burden.[19] Prior to 1990, it is safe to assume that the personal income tax was equally insignificant. Brazil is thus like most other countries in Latin America, whereby it relies mostly on firms to generate most of its income tax revenues which means that

[19] These estimates are only an approximation since the withholding tax (on incomes taxed at source) covers personal income as well as corporate income. The exact disaggregation of income retention taxes between individuals and firms is not provided by official statistics. However, further details are presented below (see Figure 7).

the progressive objectives of the personal income tax remain to be exploited (Cetrangolo & Gomez-Sabaini, 2007).

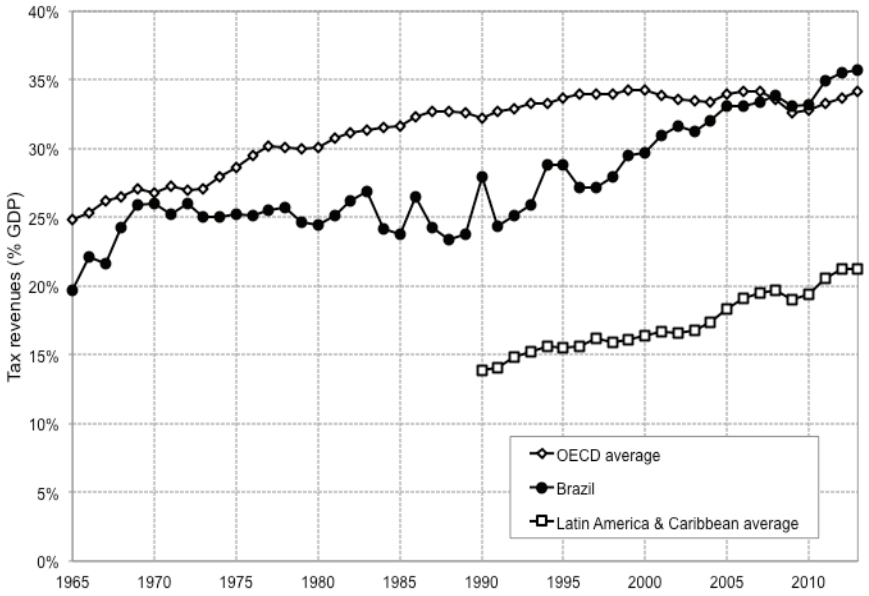
Figure 3. Evolution of total tax revenue and income tax revenue in Brazil, 1900-2013



Sources: Author's calculation using data from IBGE and from the *Ministério de Fazenda.*

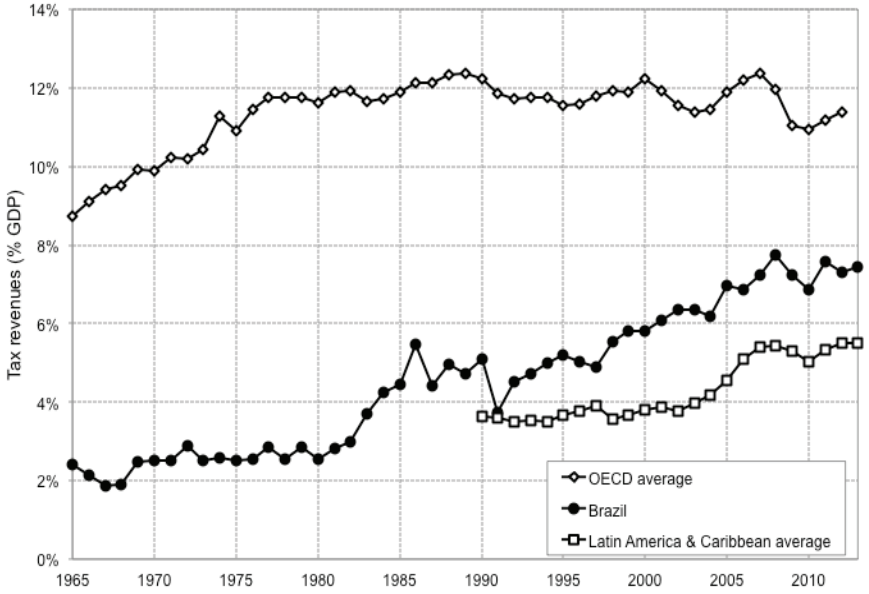
While Brazil appears to be a standout country in Latin America regarding its overall tax revenues, ranking close to the average OECD country, the opposite is true concerning its relative income tax burden. Figure 4 and Figure 5 depict these facts more clearly. The weak contribution of the Brazilian income tax to total tax revenues, as conveyed in Figure 3, is quite characteristic of Latin American countries in general, as Figure 5 coveys, despite Brazil having OECD tax-burden-levels in recent years (see Figure 4). As mentioned, it is likely that the relatively high tax collection in Brazil has facilitated the redistributive programs on the expenditure side that have caught the eyes of many observers since the 2000's.

Figure 4. Evolution of total tax revenue in Brazil in a comparative perspective, 1965-2013



Notes: Latin America average represents a selected group of 15 Latin American countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela. Chile and Mexico are also part of the OECD (34) group.
Sources: OECD tax database for OECD average and Latin America & Caribbean average; *Ministério de Fazenda* for Brazil.

Figure 5. Evolution of income tax revenue in Brazil in a comparative perspective, 1965-2013



Notes: As in Figure 4.
Sources: OECD tax database for OECD average and Latin America & Caribbean average; *Ministério de Fazenda* for Brazil.

2.2 The composition of tax revenue

If the income tax contributes so little to overall tax revenue, from which tax categories is the large tax burden sourced? Unfortunately, the answer to such a question can only focus on the years since 1990, due to data availability. However, this is in an interesting period given that it coincides with a sharp and sustained increase in the tax burden, as seen from Figure 3. The structure of tax revenue is presented in Figure 6 for the period 1990-2013. It can be seen that the relative magnitudes of the different taxes have not changed much over the 23 years.

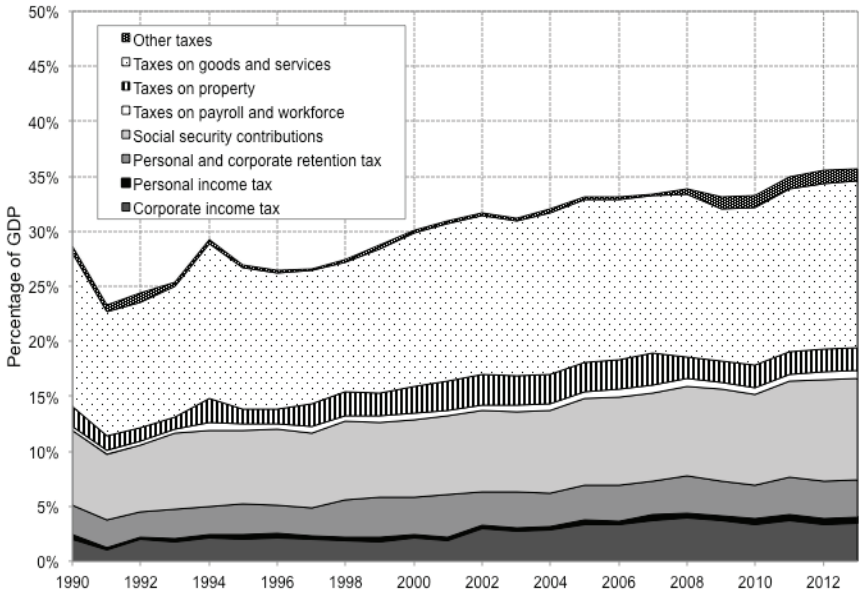
Social security contributions have increased their share in total tax revenue, but remain the second largest tax category, in terms of revenue generation (accounting for just under 10 per cent of GDP in recent years). Representative of Latin American countries is Brazil's heavy reliance on indirect taxation, particular taxes on ordinary goods and services, which on their own have made up between 14 and 15 per cent GDP since the early 2000s. This compares approximately to 12 per cent of GDP in Argentina in 2004 (Alvaredo, 2010) and to around 9 per cent of national income in Colombia in 2009 (Londoño Vélez, 2012). Value-added taxes, like in many other countries in the region, make up the majority of the revenue in this category (OECD/ECLAC/CIAT/IDB, 2015). A further popular tax in Latin America is the property tax, although its burden is not very high at around 2 per cent of GDP, much like in other countries of the region. In Brazil, this tax is made up of recurrent taxes on immovable property (around 25 per cent of the total), which are almost entirely from the tax on urban land property; estate and inheritance taxes (around 5 per cent), taxes on financial and capital transactions (around 40 per cent), and other recurrent property taxes (around 30 per cent). Although much talked about, Brazil has never instituted a recurrent tax on net wealth, on either individuals or corporations.

As was previously discussed, taxes on income and profits seem to be skewed somewhat towards corporations. However, some qualifications may be needed, given

that the withholding tax combines both the individual and corporate spheres. Figure 7 depicts the composition of this tax among identifiable sources. It can be seen that between 50 and 60 per cent of the tax comprises of labour income, which is attributable to the personal income tax. The remaining proportions are composed of income from both individuals and firms, so it is unclear as to the definitive split between the two in the income tax.

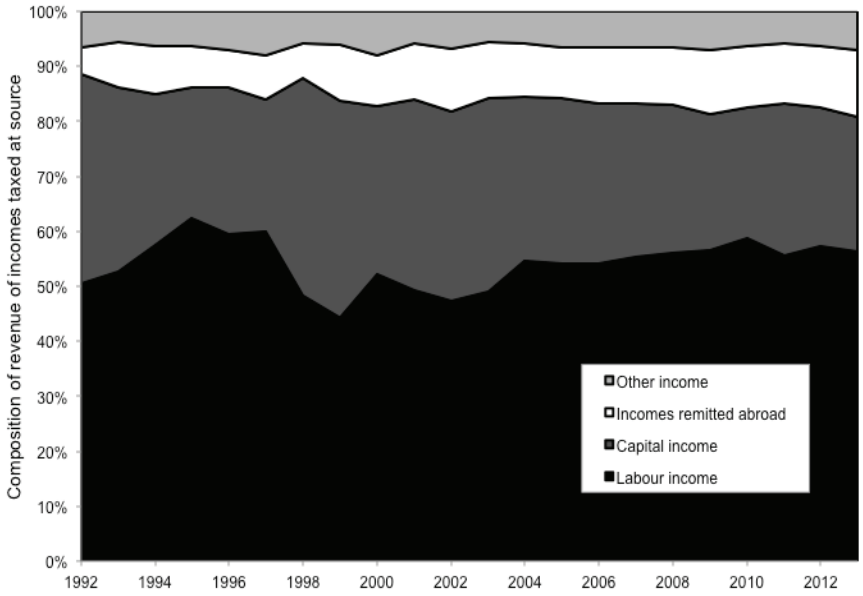
Regarding the composition of tax revenues in earlier parts of the century, official statistical publications allow us to get some idea of the relative importance of different taxes, mostly at the federal level, which has historically concentrated around 70 per cent of total tax revenues. Until the First World War, trade taxes were the principle source of revenue in Brazil, with tariffs accounting for almost 80 per cent of the federal government's principle receipts (and almost 8 per cent of GDP). The reductions in global trade flows brought about by the War lead to a drastic decline in the importance of tariffs to the Brazilian economy – during the 1920's and 1930 the share of tariffs in GDP was more than halved. During the 1940's, they lost their primary hold over the economy to consumption taxes, particularly the tax on industrial products, and to the income tax. During the 1950's and 1960's, the tax on industrial products continued to increase, reflecting Brazil's growing industrialization process, until it reached its peak in the early 1970's (representing nearly 5 per cent of GDP). From the late 1970's, it was definitively replaced by the income tax as the main source of tax revenue for the federal government (IBGE, 2006).

Figure 6. Composition of tax revenue in Brazil, 1990-2013



Source: Secretaria da Receita Federal, *Ministério da Fazenda.*

Figure 7. Composition of personal and corporate retention tax in Brazil, 1992-2013



Source: Secretaria da Receita Federal, *Ministério da Fazenda.*

2.3 The personal income tax

The distance travelled by Brazil's tax revenue over the previous 80 years is impressive to say the least. Yet it may seem puzzling that the income tax, particularly the personal income tax, has remained so stable over the period when the average real income per adult has made remarkable gains, as Figure 1 attests. However, these twin evolutions can be better understood if we take into account the tax reliefs and the large initial exempted income bracket that have characterised the personal income tax since its creation.

As mentioned above, the modern personal income tax in Brazil first came into effect in 1923, after a number of previously failed attempts dating from the mid-19th century. Between the mid-1920's to the mid-1960's, the tax payable was calculated in the following manner: gross personal revenue and deductions were divided into different income schedules, with a proportional tax levied on the gross income (after deductions) per schedule at different rates.[20] A progressive tax was then imposed on total net income, after allowances (*abatimentos*) were subtracted. In 1965, the proportional tax was abandoned by the military regime, while the schedular system was abolished in 1990, after the country had returned to democracy (Da Nóbrega, 2014).[21] Thus, the tax relief applicable during the first period included schedular deductions, primarily for expenses incurred to generate the income flow in each schedule, and allowances for social expenditures not related to expenses incurred to generate the income reported for tax. Over time these allowances have included items like interest on personal debt, life insurance premiums, personal medical expenses, educational expenses, contributions to social security funds, rent, alimony, expenses

[20] I employ the different terms 'gross revenue' and 'gross income' to best approximate their respective translated counterparts in the publications, *'rendimento bruto'* and *'renda bruta'*. The schedules represent different income categories, by which taxpayers could divide the total income they earned into its different sources on the tax form, such as capital income (interests, dividends), property income (rent), salaried work, self employment, agricultural income, etc. See Appendix A for more details.

[21] See Appendix A for details on the calculation of the income tax along its evolution.

on dependents, among other expenses. Further tax relief was granted to individuals making stock investments between the late 1960's and the early 1990's (ibid). When the schedular system was abolished in the early 1990's, the allowances remained the only deductible items possible on income tax forms.[22] In recent years, these deductions comprised mainly of expenditure on dependents (spouse, children, parents etc.), contributions to public and private social security funds, limited educational expenses for the tax filer and their dependents, medical expenses, alimony (spousal maintenance expenses), the standard discount (*desconto padrão*) for salaries and deductions for intermediate consumption of contributors receiving income from non-salaried work (*Livro Caixa*).

Moreover, since its creation, the personal income tax has not had wide coverage, with certain income sources being either exempt from the tax or taxed exclusively at source, often at lower rates (ibid). Over the years, the relative scope of non-taxable incomes increased, especially between the 1970's and 1980's. The large majority of the total income of top income groups, at least since the 1970's, has comprised of non-taxable income and incomes taxed exclusively at source, as shall be revealed below. It is no wonder then that at present, capital gains are taxed exclusively at source, while dividends and profits are non-taxable sources of income, fully exempt from the income tax.[23]

The second feature of the personal income tax partly explaining the low collected revenues are the relatively high exemption levels on the tax. Figure 8 presents the ratio between the exemption limit and the average income per tax unit.

[22] Between 1976 and 1989 a standard deduction (*desconto padrão*) of about 25 per cent also applied to gross personal revenues from salaried work (up to a pre-defined threshold), which replaced all schedular deductions and allowances for those claiming it, with certain exceptions for allowances (generally costs of rent, family care and medical/hospitalization costs). This measure was intended to promote formal employment. This discount was recovered in the tax year 1996 (after it had been repealed during the tax reforms of the early 1990's) at a rate of around 20 per cent, again up to a pre-determined threshold (Da Nóbrega, 2014).

[23] See Tables A.1 and A.2 in the Appendix for a list of the income categories taxed exclusively/definitively and those considered exempt/nontaxable in 2013.

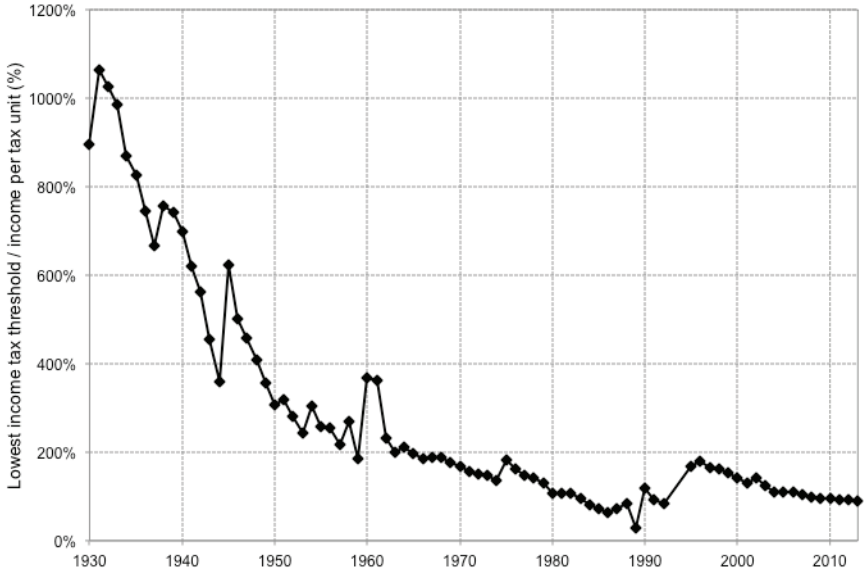
It can be seen that despite the clear downward trend, the exemption limit remains close to average incomes. Hence, the low personal income tax revenues for the early part of the century can be understood to be mainly the result of extortionately high exemption levels, where only a tiny minority paid the tax. Indeed, Figure 9 depicts that, for the first 45 years of the tax, no more than 1 per cent of the total number of potential taxpayers were a contributor. However as the exemption limit grew relatively less than average incomes, especially from the 1970's, it is likely that the tax reliefs played a more important role in determining the low collection rates since. Figure 9 also displays that the total number of tax returns as a percentage of the potential taxpaying population increased markedly since the founding of the Federal Tax Office (*Receita Federal do Brasil*) in 1968. After an initial sharp rise in the early 1970's the proportion of taxable tax units hovered around 13 per cent since the mid 1970's to the late 1990's, after which it rose to reach over 20 per cent by 2007 – a threshold it has since maintained.[24]

The marginal tax rates and associated brackets have also experienced dramatic evolutions throughout lifespan of the personal income tax. Figure 10 summarizes the quantified history of the top marginal tax rate and the basic rate after the exemption threshold. The top marginal rate rose sharply after the Second World War, reaching its peak of 65 per cent during the short term of João Goulart's left-wing government. It remained at or above 50 per cent through the twenty-year dictatorship until the late 1980's transition back to democracy, when the rate was practically halved. The current rate of 27.5 per cent has been untouched since 1997, despite the Workers

[24] The sharp spike observed over the late 1960's/early 1970's is explained by the large increase in the number of tax returns. The number increased tenfold from 1967 to 1968, and then doubled from 1968 to 1970. This can be attributed to the decline in the exempted tax threshold for salaried income, which declined by a factor of around ten between 1967 and 1968, and continued to decline for the following few years. The marked decline in the proportion of taxable tax units between income year 1974 and income year 1975 again relates to the decline in the number of tax returns. This corresponded to a modification in the tax law, whereby the exemption threshold increased between 1974 and 1975, applying to total income 1974, while applying for taxable income only from 1975 (Da Nóbrega, 2014).

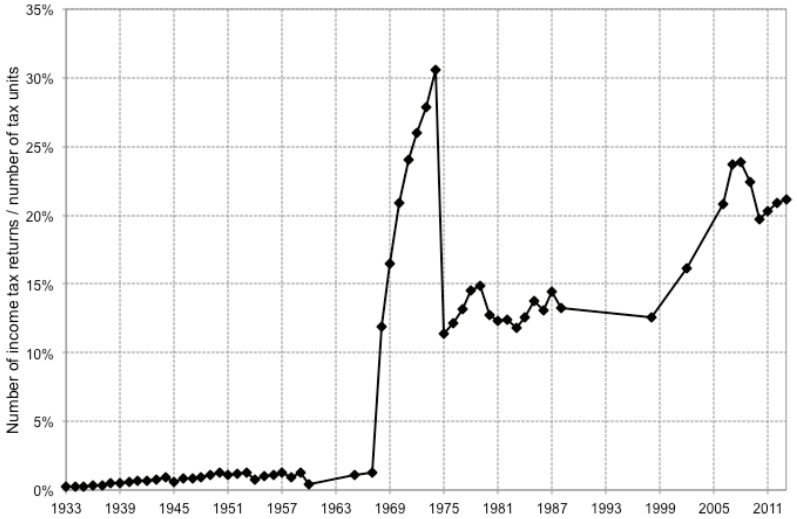
Party being in power since 2003. This development almost mirrors that in the developed countries, leading to the hypothesis that Brazil's taxation was responding to international trends rather than changes in the domestic political arena. On the other hand, the lowest marginal tax rate has experienced a continuous upward trend roughly until the recent global financial crisis of 2008-2009.

Figure 8. Exempted income tax threshold as a fraction of average income per tax unit in Brazil, 1930-2013



Source: Table B.3. Coloumn [8].

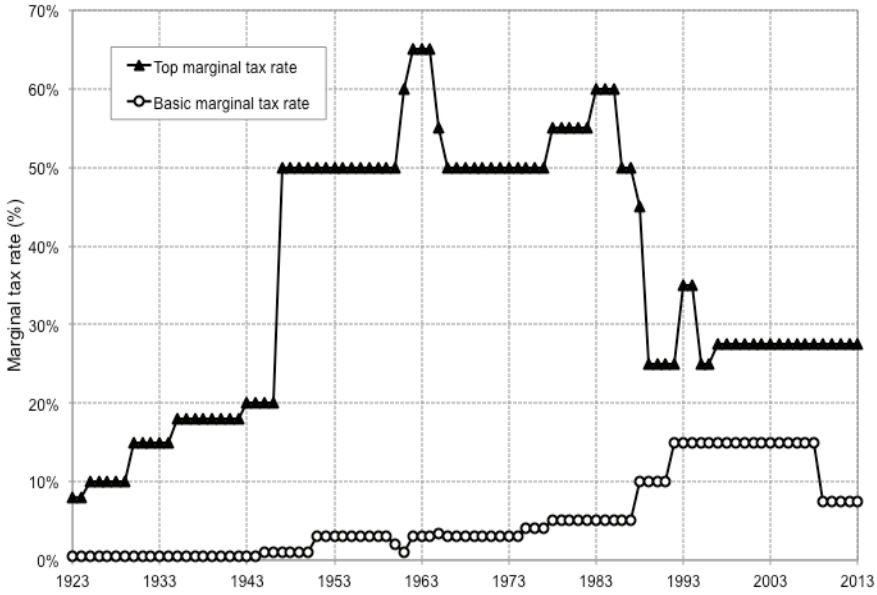
Figure 9. Proportion of taxable income tax units in Brazil, 1933-2013



Source: Table B.2. Coloumn [8].

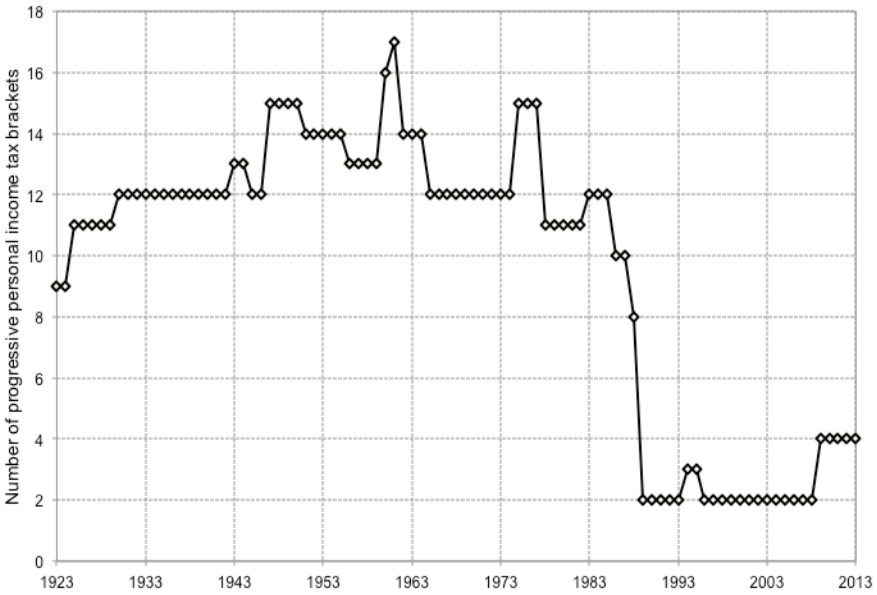
A similar narrative applies to the evolution of the number of tax brackets (Figure 11). Since the early 1990's the number of tax brackets has fluctuated between two and four ranges, compared to an average of about twelve for the previous 70 years. For much of this period there were only 10 percentage points separating the top marginal rate from the lowest rate, when only the two rates existed. The implications for the progressiveness of the personal income tax and for the pure redistributive objectives of the tax were thus extremely bleak. Since the crisis there has been a slight improvement, as two more tax brackets have been introduced, and the lowest rate has been decreased.

Figure 10. Top and basic marginal tax rates in Brazil, 1923-2013



Source: *Memória Receita Federal.*

Figure 11. Number of personal income tax brackets in Brazil,1923-2013



Source: *Memória Receita Federal.*

3. Data and methodology

3.1 Data sources, data coverage and income concepts

The complete series for the shares of income appropriated by top income groups stretches between 1933 and 2013 intermittently due to missing data for some years and to the separate series produced for shares calculated on the basis of taxable income and for shares calculated on the basis total income (taxable income, non-taxable/exempt income and incomes tax exclusively at source), the latter only available for a limited number of years. The basic data sources used in this paper to estimate top shares comprise exclusively of income tax tabulations based on the universe of tax filers, reporting by ranges of pre-tax income, the total number of tax filers and total income in each bracket over the entire period 1933-2013. Other variables in the tax returns, such as income source, gender, and the decade of birth of tax filers are available between the years 1969 and 1988, but concern taxable incomes only.

The data between 1933 and 1960 come from historical publications of Brazil's national statistics institute, the *Instituto Brasileiro de Geografía e Estatística* (IBGE). Between 1965 and 2013 the tabulations are sourced from fiscal publications of the *Receita Federal do Brasil* and its predecessors (for the years before 1968), all part the *Ministério de Fazenda,* the Brazilian Ministry of Finance. Although the personal income tax was instituted in 1922 for the income year 1923 and for the tax collection year 1924, we can only avail of data from the income year 1933 onwards. The comparability of the publications across time is generally consistent. However, a major issue is that the nature of the income bracket variable, the reported income concept and the geographical unit of analysis vary over the period of analysis.

Between 1933 and 1944, the income tabulations are not nationally representative, only covering the Federal District (the city of Rio de Janeiro) and a small number of the largest and richest states. Nationally representative data is only available from 1945 onwards (except for the year 1966 when tabulations for only two states is available). For the period prior to 1969, incomes reported are net taxable incomes, ranked by ranges of net taxable income. As mentioned in Section 2 above, this concept of income subtracts from gross taxable revenue, scheduler deductions for expenses incurred by the income earner to produce that income flow (i.e. intermediate consumption) and allowances for expenses that do not help to produce the income reported. Between 1968 and 1988 the published statistics are of greater detail, providing tabulations of different income brackets and income components (net taxable, gross taxable, non-taxable and taxed exclusively at source). The statistics also allow for a composition of income by schedular source, by gender, by nature of occupation and by decade of birth of the taxpayer. Between 1988 and 2006 there are only two available years, 1998 and 2002. Unfortunately, the tabulations for these years are not as detailed, primarily because they are used for expository purposes in analytical studies of official fiscal data produced by the Federal Tax Office, the *Receita Federal do Brasil*. The tabulations report gross taxable revenue

(prior to any deductions or allowances) ranked by gross taxable revenue. The recent 2006-2013 period is the only period where the income brackets are ranked by gross total revenue, as well as gross taxable revenue.

We proceed to harmonize the data as follows: for the years prior to 1969 we estimate shares of gross taxable income (both before and after scheduler deductions) by adding the average difference between net taxable income shares and shares of these two gross taxable income concepts for the years 1969-1972 (when top share series can be computed for the three income concepts) to the estimates of net taxable income shares prior to 1969. Similarly, results based on regional data (prior to 1945) were increased by the additive difference between national shares and regional shares for the years 1945-1950. The regional data used for this extrapolation is for the Federal District, given that its data goes back the furthest into the past and that for the overlapping years with national data, it maintained its structural parameters (the same proportion of population and net income) with respect to the country as a whole.[25] A further justification for the choice is that inequality in the Federal District (city of Rio de Janeiro) during these years appears to be the lower bound in Brazil (see Appendix Figures C.2 and C.3).

From 1974 to 1988, income tax forms asked taxpayers to provide information on their non-taxable income and any income taxed exclusively at source. Thus, for this period series based on gross total revenue (before scheduler deductions) ranked by brackets of gross taxable revenue could be calculated. Moreover, from 1978 to 1988 the publications contain tabulations that rank gross total revenue by brackets of non-taxable revenue. This is useful information as the ranking variable of non-taxable revenue turns out to more accurately capture the total income of individuals at the very top of the distribution, given that non-taxable revenues appear to be disproportionally concentrated among top groups, as compared to the total income

[25] It is thus assumed that these proportions were maintained for the years before 1945. See Appendix C.2.2.

reported by brackets of gross taxable revenue. This is the effect of the growing scope of non-taxable revenue from capital sources over time. As a result of this discrepancy in the tax laws and statistics, I proceeded to use the non-taxable-bracketed tabulations to estimate the shares of the top 1 per cent and above for the years 1978 to 1988, while resorting to the taxable-bracketed tabulations to estimate the shares of the top 10 per cent and top 5 per cent of income earners between 1974 and 1988.[26] The latter tabulations were used to approximate the shares of the top 1 per cent and above for the years before there is data available on total incomes ranked by non-taxable revenue brackets (i.e. before 1978). This is justified by the proximity between the top 1 per cent total income series, ranked by gross taxable revenue and by non-taxable revenue for the closest overlapping years until the early 1980's, when both series diverge.[27] Given that most of the revenue of the top groups is non-taxable (as evidenced by the tabulations) and in order to preserve continuity in the estimates, the final series uses the tabulations ranked by non-taxable revenue to estimate the shares of the top 1% and above from 1980 to 1987, while the ones ranked by gross taxable revenue are used to estimate these shares from 1974 to 1979.

3.2 The definition of income used

The income tax statistics for Brazil present a further challenge in appropriately defining the pre-tax incomes of individuals from information reported to tax authorities. As documented above, there are differences in the time series regarding the reported income concept that can be observed. At this stage it is necessary to emphasize that the 'ideal' definition of 'gross income' should deduct costs incurred to

[26] In the final series, estimates for 1988 were left out due to them being notable outliers, as top shares increase by over 20 percentage points. This could be due to the hyperinflation that was taking hold of the period greatly benefiting top groups in relative terms or to typographical errors made by tax filers in their returns. For instance, there are only 31 taxpayers in the highest non-taxable income bracket in 1988, compared to almost 80,000 in 1987, yet their total non-taxable income amounts to 4 per cent of GDP.

[27] See Figure in Appendix C.2.3.

obtain it. Unfortunately, the statistics only report this concept (after scheduler deductions for expenses incurred) from 1969 to 1988. Moreover, the publications provide little information about such expenses, simply noting the total value of scheduler deductions that each income source has deducted per bracket. It is likely that many costs and expenses are exaggerated by tax filers in order to reduce their tax liability more than what a true calculation of real costs would allow, as in other countries in the region (see Londoño Vélez, 2012, for the Colombia case).

Consequently, the estimates based on this gross taxable income (*renda bruta*) are judged to underestimate top income shares. Conversely, estimates calculated on the basis of the gross taxable revenue concept, before subtracting any costs incurred to generate it (*rendimento bruto*), is deemed to overestimate top shares. Therefore, the preferred series would lie somewhere in between.[28] Without access to further information, an average of the two series produced from the two gross taxable concepts between 1969 and 1988 was calculated to approximate this preferred series. In any case, taking gross taxable revenue without consideration of any deductions for expenses would increase our estimates of the top 10 per cent income share by about 3 percentage points and the top 1 per cent by about 1 percentage point, on average.[29] The difference between the gross taxable revenue series before deductions and this preferred average series is assumed to also hold for years when there is only data for gross taxable revenue (1998, 2002 and 2006-2013), and for gross total revenue for the years 1974-1987 and 2006-2013, such that a preferred average series could also be estimated for these series. The same procedure was followed in estimating the pre-1969 period, after the extrapolation from net taxable income concept to the two gross taxable income concepts was made.

[28] This is assuming that there is no tax evasion, which is in practice untenable. To account for tax evasion, it might make more sense to use the series of gross revenue. See Appendix C.2.2 for results based all the series calculated from different income concepts.

[29] See Figure C.5 in Appendix C.

To clarify, this preferred definition of income includes all income categories reported in the personal tax returns (wages and salaries, self-employment, interests, rents, business profits and dividends, agricultural income and other income), in addition to non-taxable incomes, and it is before personal income taxes and employee payroll taxes but after employers' payroll taxes and corporate income taxes. Unfortunately, the compositions of income made by income source, occupation gender and decade of birth could only be made on the basis of gross taxable revenue, before deductions for expenses, given that the definition of income after deductions was unavailable for the relevant years in the publications. The reader assessing these results must bear this in mind, although the overall compositions are unlikely to be affected to a great extent.[30]

In summary, the main empirical contribution of this paper is to have assembled a novel historical dataset on the distribution of income in Brazil, characterized by its long time horizon and its scope in accounting for taxable incomes as well as non-taxable incomes. Table 1 summarizes the main features of this database, following the concepts and the extrapolation techniques mentioned above. It can be noted that the top 5 per cent and 10 per cent are not estimated for the years 1933 to 1967. This is due to the limited coverage of the income tax, which collected returns for less than 2 per cent of the taxable tax units (see Figure 9 above) – a direct result of having an exempted income tax threshold higher than the average income per worker for the entire period (see Figure 8 above).

[30] The relative shares would probably more affected for the income categories and nature of occupation than for the genders or decades of birth, given that some categories of workers may have more important deductible expenses than others. However, a more serious concern is the absence of non-taxable income from the compositions, which would affect the relative weight of the income categories and nature of occupation to a greater extent.

Table 1. Database on income distribution at the top in Brazil, 1933-2013

Panel A: observed series

Geographical level	Income years	Income brackets	Income reported	Income groups covered
Federal District	1933 - 1950	Net taxable income	Net taxable income	Top 1 - 0.01%
States	1943, 1945 - 1950, 1966	Net taxable income	Net taxable income	Top 1 - 0.01%
Brazil	1945 - 1960, 1965, 1967	Net taxable income	Net taxable income	Top 1 - 0.01%
	1968	Net taxable income	Net taxable income	Top 10 - 0.01%
		Gross taxable revenue	Gross taxable revenue	Top 10 - 0.01%
	1969 - 1988	Gross taxable revenue	Gross taxable revenue	Top 10 - 0.01%
		Gross taxable income	Gross taxable income	Top 10 - 0.01%
	1998, 2002	Gross taxable revenue	Gross taxable revenue	Top 10 - 0.1%
	2006 - 2013	Gross taxable revenue	Gross taxable revenue	Top 10 - 0.01%
	1974 - 1987	Gross taxable revenue	Gross total revenue	Top 10 - 5%
	1974 - 1979	Gross taxable revenue	Gross total revenue	Top 1 - 0.01%
	1980 - 1987	Nontaxable revenue	Gross total revenue	Top 1 - 0.01%
	2006 - 2013	Gross total revenue	Gross total revenue	Top 10 - 0.01%

Panel B: extrapolated series

Geographical level	Income years	Income shares	Income groups
Brazil	1933 - 1960, 1965 - 1967	Gross taxable income	Top 1 - 0.01%
	1968	Gross taxable income	Top 10 - 0.01%

Notes: Federal District is the city of Rio de Janeiro; state level data is for São Paulo, Minas Gerais, Rio Grande do Sul for 1943; Rio de Janeiro, São Paulo, Minas Gerais, Rio Grande do Sul, Goiás, Pará and Maranhão for 1946-1951 and Guanbara and São Paulo for 1966. The series for 1937, 1939-1941 go as far as the top 0.05%; 1942-1944 go as far as the top 0.1%; 1954 covers the top 0.5%-0.01%; 1985-1987 go as far as the top 0.1%, while 1988 only goes as far as the top 0.5%. The extrapolated series (Panel B) are adjusted for deductions towards expenses incurred to generate the income.
Sources: database constructed by the author using tax returns.

3.3 Estimation method

Since the income tax data are in the form of grouped tabulations, and since the income intervals do not generally coincide with the percentiles of the population with which we are concerned (such as the top 1 per cent, the top 0.1 per cent, etc.), we resort to using Pareto interpolation techniques to calculate the desired shares of total income, as well as estimating the threshold and average income levels for each fractile we are interested in, as is usual in the top income literature since Kuznets (1953).[31]

[31] This assumes that the top tail of the income distribution is well fitted by a Pareto distribution. In a Pareto distribution, the probability that income x is greater than threshold y is $Pr(x > y) = 1 - F(y)$

This paper also analyses the shape of the distribution among the tax paying elite, by calculating the inverse Pareto-Lorenz coefficient β by income range, following the approach presented in Atkinson & Piketty (2007, 2010).

This estimation method relies on the underlying data, described above, which tabulates income taxpayers by ranges of income, but also on two further ingredients: the construction of an external control for the potential number of total taxpayers (i.e. tax units) based on demographic data; and the construction of an external control for total income derived from National accounts data. The purpose of the first control total is to be able to express the taxpayers in the tabulations as a proportion of the total, so that the top 1 per cent refer to the top 1 per cent of potential taxpayers, rather than the top 1 per cent of actual taxpayers. This derivation is described in Section 3.4. The purpose of the second control total, described in detail in Section 3.5, is to express the reported income of taxpayers as a proportion of total household sector income. Therefore, this paper follows the standard methodology used in the top incomes literature, which combines tax data with external sources for the reference population and total income (see Atkinson & Piketty, 2007, 2010).

3.4 Control total for population

In order to relate the number of taxpayers to an external control total, there is a need to know who is required by law to file a tax return. Unfortunately, the Brazilian legislation is unclear as to the precise nature of the income tax unit. For example, legislation was passed in 1943 that required the joint declaration of income by

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$= (c/y)^{\alpha}$, where $1 - F(y)$ is the proportion of the population whose income is greater than y, c is a constant and a is the Pareto-Lorenz coefficient. The Pareto-Lorenz coefficient a can be calculated by regressing the logarithm of the reverse cumulative distribution, $1 - F(y)$, on the logarithm of the income level y. The parameters of interest are estimated using a characteristic property of power laws, which is that the ratio of average incomes above y to y is constant and independent of y (see Piketty, 2001).

married couples (Decree 5.844 of 23/9/1943, Article 67). However, evidence from the tabulations between 1968 and 1988 suggest that married women could file a separate tax return, the proportions varying from 3% of total taxpayers in 1968 to 12% in the late 1980's. So it remains unclear as to when the obliged joint declaration was withdrawn.

I thus approximate the number of tax units (i.e. the number of individuals had everyone been required to file for tax) by the working population, defined as all residents aged 15 years and above, minus the number of married women aged 15 years and above for the period 1933-1967.[32] From 1968 to 1988 the number of married women filing a separate tax return is added to number of tax units. The 1998 tabulation decomposes the tax returns by sex, rather than by civil status, so only the proportion of total tax returns filed by women is presented (the figure being 37 per cent). To arrive at the population denominator for the more recent years, it assumed that the 1988 ratio between married women filing a separate tax return and total women filing a separate tax return (around 67 per cent) is preserved for the years 1998 and 2002 and for the period 2006-2013, such that the proportion of total tax returns filed by married women is approximated to be 25 per cent for these years. Thus, a quarter of the tax returns are added to the number of tax units over these years.

All the population estimates are sourced from tabulations of population count by age group for all decennial censuses since 1920 made by the IBGE. The annual long run series for the population was estimated on the basis of interpolating the observed growth rate between decades for each of the population units of interest.

[32] The age cut-off in the international literature on top incomes generally varies between 15 and 20 years. In a developing country like Brazil there is room to believe that a non-negligible proportion of the population have historically entered in the labour market before 20 years of age. It is also reassuring that the population aged 15 and above is commonly used by the IBGE in its official household survey (the PNAD), while an age cut-off of 10 is usually used in the decennial Census, to estimate average incomes and other various labour market characteristics of the working population.

3.5 Control total for income

The second step in the methodology is to define the income denominator. So as to be able to calculate income shares for top groups and study income concentration, we must relate the income amounts recorded in the tax statistics (i.e. the numerator of the top share) to a comparable control total for the income earning population (i.e. the denominator of the top share). This control total is essentially an estimate of total personal income (or total income of the household sector as defined in National accounts). And it would be the total personal income reported on tax returns if all tax units had been required to file a tax return.

Since only a fraction of individuals filed a tax return in Brazil, the income denominator cannot be estimated using the income tax data, but rather needs to be estimated from National accounts. Following a similar procedure to the estimates made for Colombia (Londoño Vélez, 2012), I approximate the income denominator as the sum of households' primary incomes and social benefits other than in-kind social transfers, minus: (1) employers' actual social contributions, (2) employees' and self-employed actual social contributions, (3) imputed social contributions, (4) attributed property income of insurance policyholders, (5) imputed rents for owner occupied housing, and (6) fixed capital consumption of households (assumed to be 5% of gross fixed capital formation, as in Colombia). The only years for which detailed enough data exists for this estimation are 2000 to 2011.

This procedure yields an average reference gross income of 60 per cent of GDP at current prices between 2000 and 2011, which is broadly comparable to the average reference figure for Colombia between 1993 and 2010 of 65 per cent of GDP, and similar to the control totals for income used in the case of Argentina (Alvaredo, 2010) and Spain (Alvaredo and Saez, 2009). Due to the unavailability of detailed National accounts data for the period prior to the 2000's, the control total for income was set at 60 per cent of GDP for the entire period of study. Caution here is needed since, as Atkinson (2007) points out, applying a constant fraction for the control

total, computed on recent data, may not be an appropriate approximation of the income denominator in earlier years, given the increasing importance of items such as social contributions, pension funds and public transfers.[33]

4. Top income shares in Brazil, 1933-2013

Based on the methodology outlined above, the shares of personal income accruing to top income groups are presented in the following section. Before documenting the long-run dynamics of these shares, a preview of the orders of magnitudes will be offered to place the findings into perspective. The section will also investigate the composition of taxable incomes (into the categories mentioned previously), uncover the extent to which top incomes are actually taxed, and finally, present Brazil's income concentration in an international comparative outlook.

4.1 Preview of magnitudes

To give a sense of the orders of magnitudes of top incomes in Brazil, Table 2 presents the thresholds and the average *taxable* incomes of different percentiles within the top 10 per cent of income recipients in 2013, while Table 3 presents the same information for *total* incomes (combining statistics on taxable incomes, non-taxable incomes and incomes taxed exclusively at source).[34] In 2013, there were around 125 million tax units in Brazil, with an average income of around R$ 24,500 (around US$ 14,500 in PPP terms). From Table 2 it can be seen that in order to belong to the top 10 per cent (P90) of *taxable* income recipients in 2013, a resident in Brazil needs to have a yearly income of at least R$ 34,902 (around US$ 20,600 PPP). To belong to the top

[33] The computation and sources regarding the control totals is explained in more detail in the Appendix B.1 and B.2.

[34] Readers should note that the income reported is gross revenue, given that there is no information in the statistics regarding intermediate costs in order to calculate average income levels and thresholds of fractiles after deducting these expenses.

1 per cent (P99), one needs to make at least R$ 157,127 (around US$ 92,300 PPP) per year. It can also be seen that the average yearly income of the top 0.01 per cent (P99.99) was around R$ 3.7 million (about US$ 2.2 million).

Table 2. Thresholds and average taxable incomes in top groups within the top decile, Brazil 2013

Thresholds	Income level (2014 R$)	Income level (US$, 2014 market exchange rate)	Income level (US$, 2014 PPP conversion factor)	Income groups	Number of tax units	Average income (2014 R$)	Average income (US$, 2014 market exchange rate)	Average income (US$, 2014 PPP conversion factor)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				Full Population	125,057,072	24,569	10,434	14,538
P90	34,902	14,822	20,652	Top 10-5%	6,252,854	45,942	19,511	27,185
P95	57,909	24,593	34,265	Top 5-1%	5,002,283	90,179	38,298	53,361
P99	156,127	66,304	92,383	Top 1-0.5%	625,285	197,903	84,046	117,102
P99.5	213,224	90,552	126,168	Top 0.5-0.1%	500,228	274,435	116,548	162,388
P99.9	402,287	170,844	238,040	Top 0.1-0.05%	62,529	544,446	231,217	322,157
P.99.95	1,041,113	442,143	616,043	Top 0.05-0.01%	50,023	1,224,034	519,826	724,280
P99.99	1,498,783	636,507	886,854	Top 0.01-100%	12,506	3,774,335	1,602,894	2,233,334

Note: Income assessed is gross taxable income, ranked by brackets of gross taxable income. Intermediate costs and expenses are not factored in due to a lack of information, thus the incomes reported equate to gross revenues. Amounts in US$ are computed using the average 2014 market exchange rate (US$ 1 = 2.35 R$) from the *Banco Central do Brasil* and the average 2014 PPP conversion factor (US$ 1 = 1.69 R$) from the World Bank.

If we account for *total* income (Table 3) we can observe that in order to belong to the top 10 per cent, one now needs to make a little bit more – around R$ 44,800 (around US$ 26,500 PPP). A larger threshold is observed if one wants to belong to the top 1 per cent – one now needs a yearly income of at R$ 247,653 (US$ 146,540 PPP). However, a notably larger change occurs at the very top, where, for example, the average income of the top 0.01 per cent increases about seven-fold (to around R$ 23.7 million, or approximately US$ 14 million PPP) if we account for total income, rather than just taxable income. To get a better picture of the difference each income concept makes to the thresholds, Figure 12 presents the difference for each of the percentiles at the top. A clear trend emerges whereby the higher up the distribution we go, the greater is the difference between the amounts of

total income, and those that are just taxable. This is evidence that non-taxable income and incomes taxed exclusively at source are highly concentrated among the very rich in Brazil.

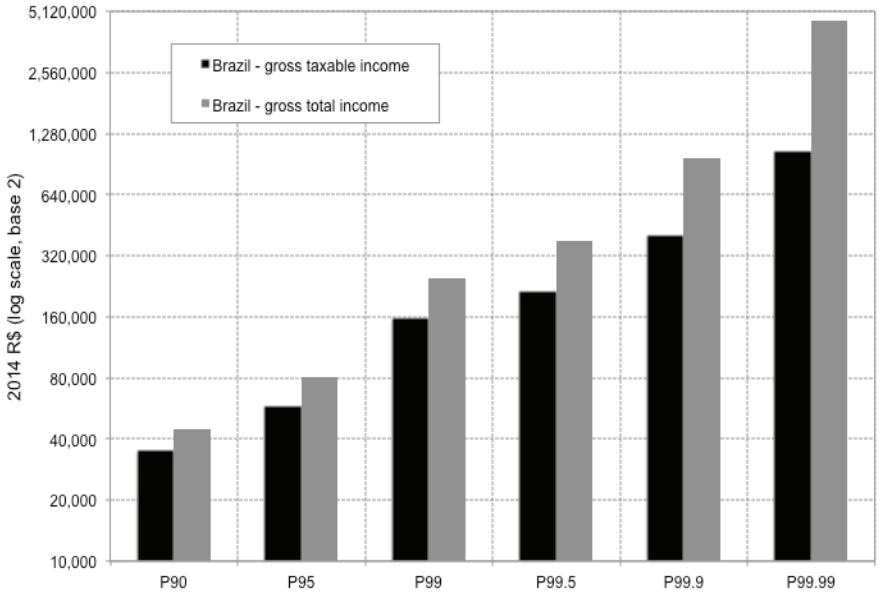
Table 3. Thresholds and average total incomes in top groups within the top decile, Brazil 2013

Thresholds	Income level (2014 R$)	Income level (US$, 2014 market exchange rate)	Income level (US$, 2014 PPP conversion factor)	Income groups	Number of tax units	Average income (2014 R$)	Average income (US$, 2014 market exchange rate)	Average income (US$, 2014 PPP conversion factor)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				Full Population	125,057,072	24,569	10,434	14,538
P90	44,885	19,062	26,559	Top 10-5%	6,252,854	59,024	25,066	34,925
P95	80,699	34,271	47,751	Top 5-1%	5,002,283	135,465	57,529	80,157
P99	247,653	105,174	146,540	Top 1-0.5%	625,285	304,466	129,302	180,158
P99.5	376,306	159,811	222,666	Top 0.5-0.1%	500,228	544,291	231,151	322,066
P99.9	963,378	409,130	570,046	Top 0.1-0.05%	62,529	1,725,490	732,785	1,021,000
P.99.95	4,591,946	1,950,119	2,717,128	Top 0.05-0.01%	50,023	5,724,228	2,430,980	3,387,117
P99.99	7,397,119	3,141,427	4,376,993	Top 0.01-100%	12,506	23,697,908	10,064,088	14,022,431

Note: Income assessed is gross total (taxable, non-taxable and taxed exclusively at source) income, ranked by brackets of gross total income. Intermediate costs and expenses are not factored in due to a lack of information, thus the incomes reported equate to gross revenues. Amounts in US$ are computed using the average 2014 market exchange rate (US$ 1 = 2.35 R$) from the *Banco Central do Brasil* and the average 2014 PPP conversion factor (US$ 1 = 1.69 R$) from the World Bank.

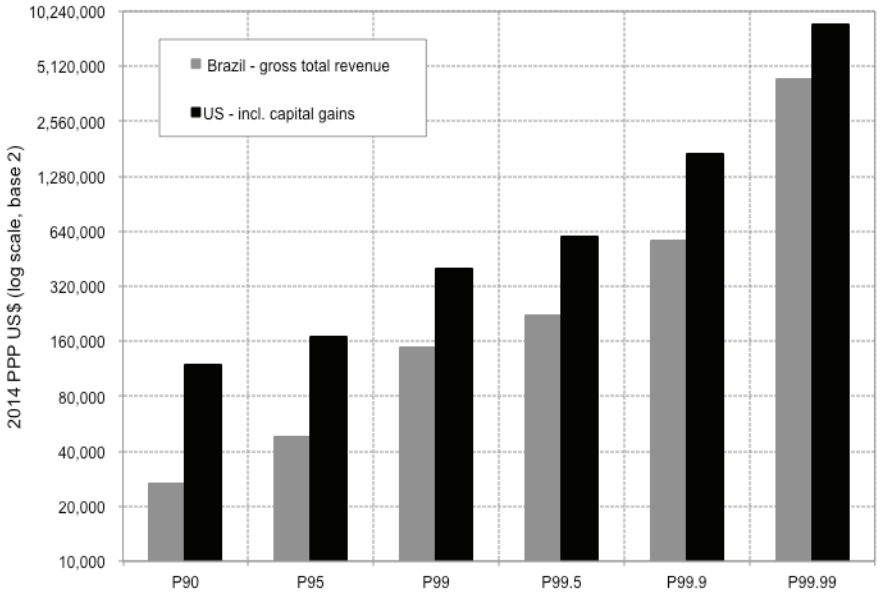
Figure 13 places Brazil's top total incomes in a comparative perspective with those of the U.S. A similar trend again emerges, whereby the difference between the income levels in the two countries is generally lower the higher up in the distribution we make the comparison. This illustrates that the elites in Brazil are pretty much as rich as the elites in the U.S. A further point that can be noticed is that there appears to be greater polarisation of incomes within the top 10 per cent in Brazil than in the U.S. (comparing P90 and P99.99 in each country). This suggests that market income in Brazil is more unequally distributed at the top than in the U.S.

Figure 12. Incomes at different percentiles in Brazil in 2013 (2014 Reais)



Notes: intermediate costs and expenses are not factored in due to a lack of information, thus the incomes reported equate to gross revenues.
Sources: Author's calculation for Brazil based on tax returns data.

Figure 13. Incomes at different percentiles in Brazil and US in 2013 (2014 PPP US$)



Notes: intermediate costs and expenses are not factored in due to a lack of information, thus the incomes reported equate to gross revenues. Estimates for Brazil include capital gains.
Sources: Author's calculation for Brazil based on tax returns data. WTID for U.S.

4.2 Long run dynamics of top income shares

Section 4.1 revealed notable differences between top *taxable* income and top *total* income, to a point where taxable income appear to be a severely underestimated representation of the true income of the very rich, at least for 2013. The following section shall present the shares of household gross income accruing to top groups over the long run in Brazil, depicting the different dynamics characterising the shares based only on the gross taxable portion of income and those based on gross total income over the period.

Figure 14 displays the income share of the top 1 per cent in Brazil from 1933 to 2013 in two series, one for gross taxable income and one for gross total income. The first point that can be noticed is the considerable difference between the levels of the two series for the period after 1974, when data for the gross total income series is available. Income inequality based on gross total income appears much larger than what estimates based on gross taxable income would suggest. Between 1974 and 1980 the share of total income accruing to the top percentile was about 12 percentage points higher, on average, than that of taxable income – in 1974 the top 1 per cent total income share was 27 per cent (27 times the average income of the population), while the taxable income share was around 14 per cent. Over the 1980's this difference increased to around 18 percentage points, with the total income share reaching 30 per cent, while the taxable income share was of about 11-12 per cent. In 2013, the top percentile total income share registered a level of 27 per cent, while accounting for only taxable income reduces this share to 11 per cent. The magnitude in this difference alone is enough to suggest that a large chunk of the income of the rich in Brazil is either taxed exclusively at source (at more favourable rates) or exempt completely from the personal income tax.

In terms of trends, the top 1 per cent taxable income share followed a U-shaped pattern between 1933 and 1972. The top 1 per cent share was halved from around 20 per cent in 1942 to 10 per cent in 1959. This was at the same time that

the top marginal tax rate more than doubled, from 20 per cent in 1946 to 50 per cent in 1947 (see Figure 10 above). Income concentration then increased as the political crisis of the early 1960's gave way to the military dictatorship of 1964, with the taxable income of the top 1 per cent growing faster than that of the rest of the population. It plateaued during the early 1970's at a level of around 17 per cent. Since then, the taxable income share of the top percentile has followed an L-shaped pattern: experiencing a notable decline during the heyday of import-substitution industrialization and rapid growth, and a quasi-stable evolution since the mid 1980's.[35] The 1970's decline in inequality can also be observed from the total income share of the top 1 per cent. However, from the 1980's both series diverge, due exclusively to the rise in inequality reported by the total income share. The widening gap could be partly explained by the fiscal incentives granted to capital incomes (which could benefit from lower rates if taxed exclusively at source) on the on hand, and the relatively high and increasing fiscal pressure on top taxable incomes on the on the other (see Figure 10 above). Since the late 1980's, there appears to have been no major alterations to the income share of the top percentile in general, despite the gaps in the series.[36] What can be clearly observed is that from at least 2006, income concentration as measured by total income has been increasing, giving the Brazilian 'success story' something of a reality check. Even if measured by taxable income, inequality experiences no significant decline, but rather a constant evolution.

A similar picture can be observed for higher points in the distribution. Figure 15 presents the evolution of the top 0.1 per cent share, while Figure 16 depicts the dynamics for the top 0.01 per cent share, according to taxable income and total income. It can be seen that the higher up in the distribution one examines, the lower the volatility in the taxable income shares (the U-shaped pattern turns more into an

[35] Readers should note that between the late 1980's and 2006, there are too few data points to be able to properly judge the dynamics of top shares.

[36] It looks to be the case that the total income share of the top percentile experienced a U-shaped pattern during this period.

L-shaped pattern for the entire period, especially for the top 0.01 per cent), and the greater the volatility in the total income shares. This possibly reflects the fact that a great proportion of the income of the top 0.1 and 0.01 per cent is made up of highly cyclical capital incomes, especially capital gains, which are more accurately captured in the total income series. As mentioned before, at present capital gains are taxed exclusively at source while dividends and profits (reflecting ownership rights over the means of production in society) are exempt from the income tax. At the same time, the total income share of the top 0.01 per cent has been around 5 per cent (Figure 16). This means that the average income of this group (around 12,500 individuals) is approximately 500 times large than the average income of the entire population. Since 2006, this group has continued to strengthen its position, while its taxable income share has remained quite stable. As was the case with the total income share of the top 1 per cent, the same shares of the top 0.1 and 0.01 per cent experienced strong gains during the chaotic years of stagnating average growth and hyperinflation over the 1980's. Thus, the rising shares over these years could simply reflect the weakened relative position of lower income groups (those within the bottom 99 per cent) with respect to higher income groups, due to the latter being able to better protect themselves against inflation.

Figure 17 presents the estimates for the top 10 per cent, being concerned with a shorter overall time-period for gross taxable income. The taxable income pattern is the same L-shaped pattern as for higher income groups, with a decline from a level of around 50 per cent in 1970 to a level of around 35 per cent the late 1980's, and relative stability over recent years. As expected, from what was mentioned above, the evolution of the total income share of the top 10 per cent appears less volatile than its counterparts higher up the distribution, and less distinct from the taxable income share. This latter observation is the result of the top 10 per cent total income share concentrating less of the capital incomes exempt from the income tax or taxed exclusively at source. Again, it seems likely that a U-shaped pattern was followed,

with current shares of almost 60 per cent being close to late-1970 levels after steadily rising over the seven-year period between 2006 and 2013.

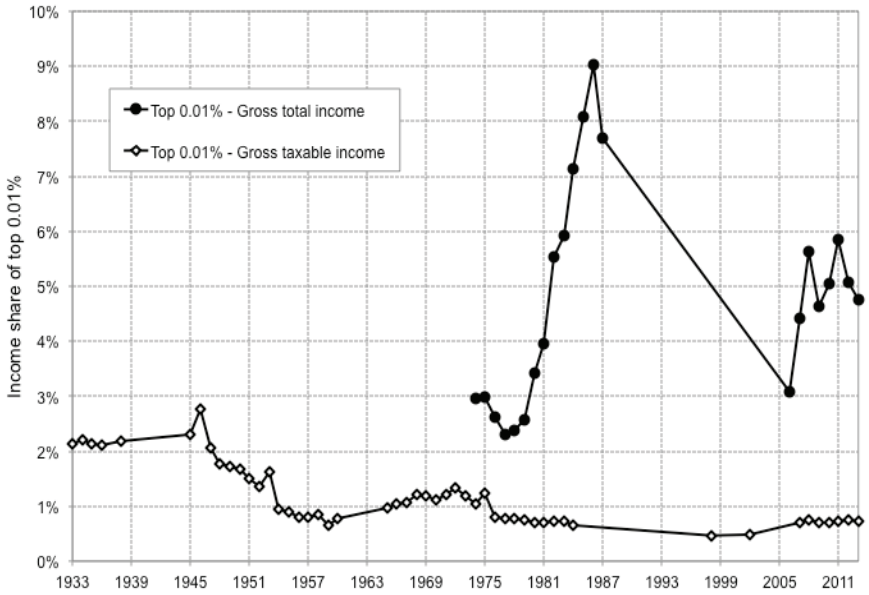
Figure 14. Top 1% income share in Brazil, 1933-2013

Sources: Table C.3 and C.4.

Figure 15. Top 0.1% income share in Brazil, 1933-2013

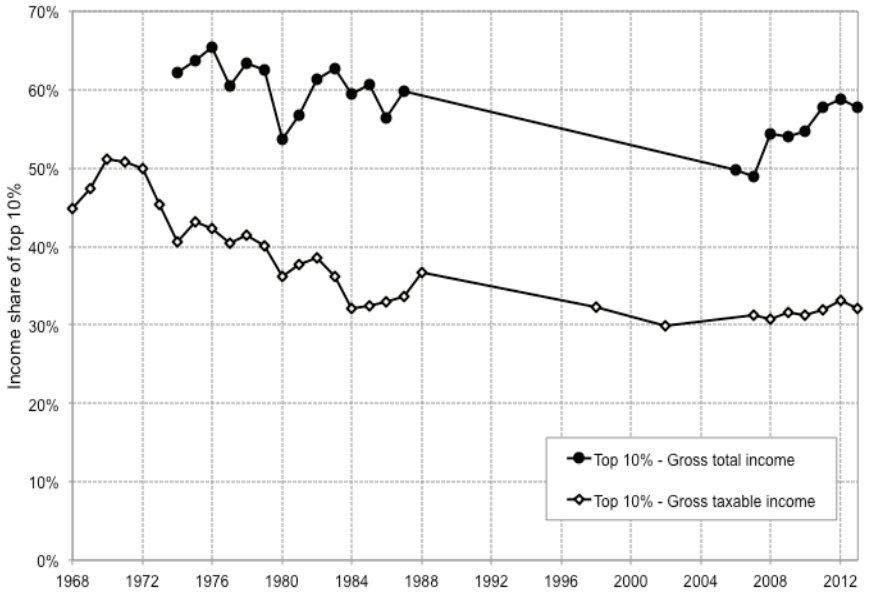
Sources: Table C.3 and C.4.

Figure 16. Top 0.01% income share in Brazil, 1933-2013



Sources: Table C.3 and C.4.

Figure 17. Top 10% income share in Brazil, 1968-2013



Sources: Table C.3 and C.4.

Given that the inequality based in gross total income presents a more complete and accurate picture of what is happening at the top of the distribution in Brazil, the following analysis of the between and within share dynamics will primarily focus on the estimates accounting for total income. Figure 18 begins by decomposing

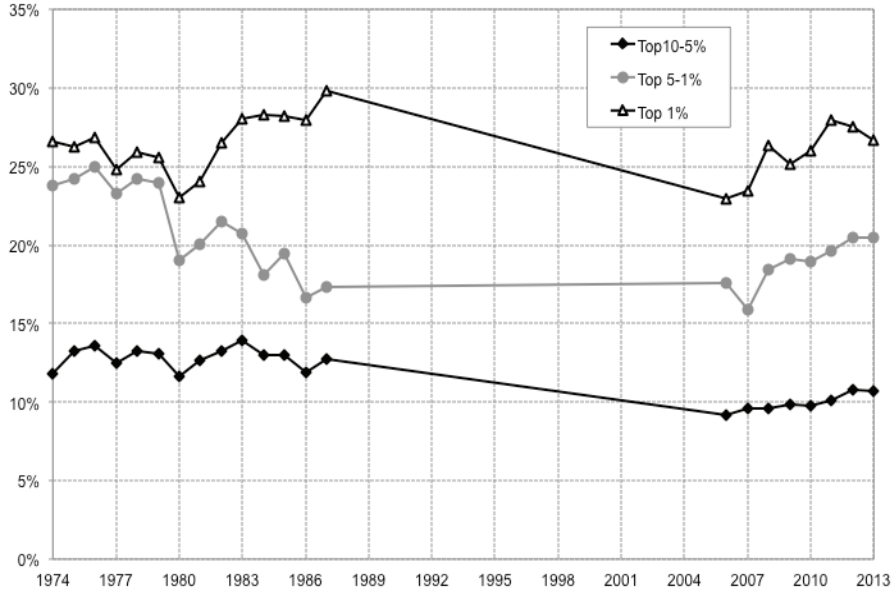
the total income share of the top decile into three separate groups: the top 10-5 per cent, the top 5-1 per cent and the top 1 per cent. It can be seen that the top 1 per cent captured the majority of the gains over the 1980's, with its share by over 5 percentage points, at the same time as the share of the top 5-1 per cent falls and the share of the top 10-5 per cent remains roughly constant. Since 2006, all groups experience gains, which are nevertheless greatest for the top 1 per cent group.

Figures 19 and 20 decompose the top 1 per cent and top 0.1 per cent into similar groups. The polarised dynamics observed from the decomposition of the top decile are brought out even more drastically for the higher groups. During the 1980's and 2000's it was the income share of the top 0.1 per cent that experienced the largest growth out of the three groups within the top 1 per cent (Figure 19). Looking within the top 0.1 per cent, it is again the ultra-rich, the top 0.01 per cent, that make disproportionate gains over similar periods. However, as with the top 0.1 per cent, they are accompanied by the greatest volatility.[37]

The estimates revealed above provide evidence of inequality within the top of the distribution in Brazil. In order to investigate this within-inequality more directly, we can examine the level and trend of the inverse Pareto-Lorenz coefficient $\beta = a/(a\text{-}1)$, where a is the standard Pareto coefficient. The inverse Pareto-Lorenz coefficient depicts the mean income above y as a multiple of y. If the income distribution at the top were precisely of Pareto form, this ratio would be independent of y. In practice the values of β are not constant, but usually lie within a fairly narrow range (Cowell, 2009). A higher value of β for any given year equates to a fatter upper tail in the distribution and thus a higher degree of income concentration.

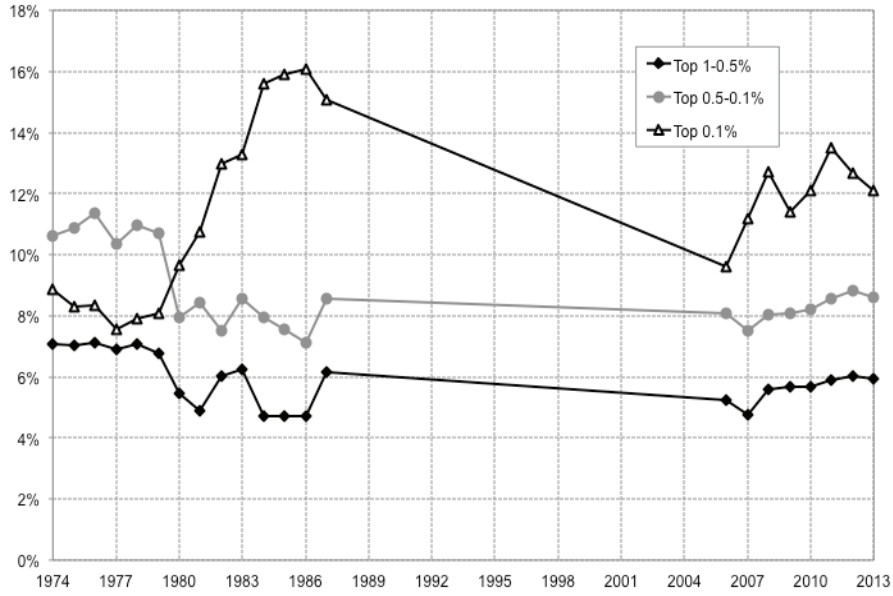
[37] The relatively lower share of the top 0.05 per cent explains why the share of the top 0.1-0.05 is higher and the share of the top 0.05-0.01 lower than the equivalent shares decomposing the top 0.1 per cent in Figure 19.

Figure 18. Top income shares between the top 10% and top 1% by gross total income in Brazil, 1974-2013



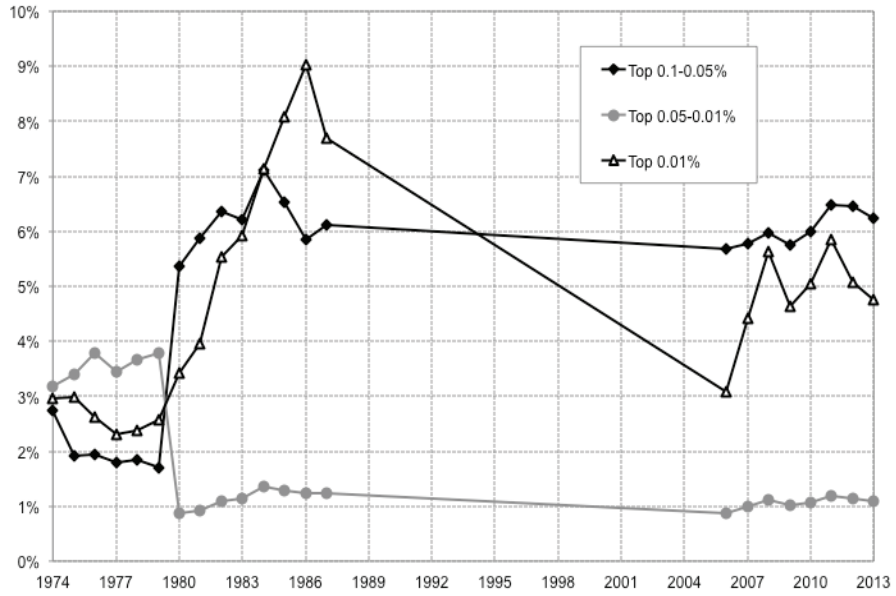
Sources: Table C.3 and C.4.

Figure 19. Top income shares between the top 1% and top 0.1% by gross total income in Brazil, 1974-2013, top 1-0.1%



Sources: Table C.3 and C.4.

Figure 20. Top income shares between the top 0.1% and top 0.01% by gross total income in Brazil, 1974-2013



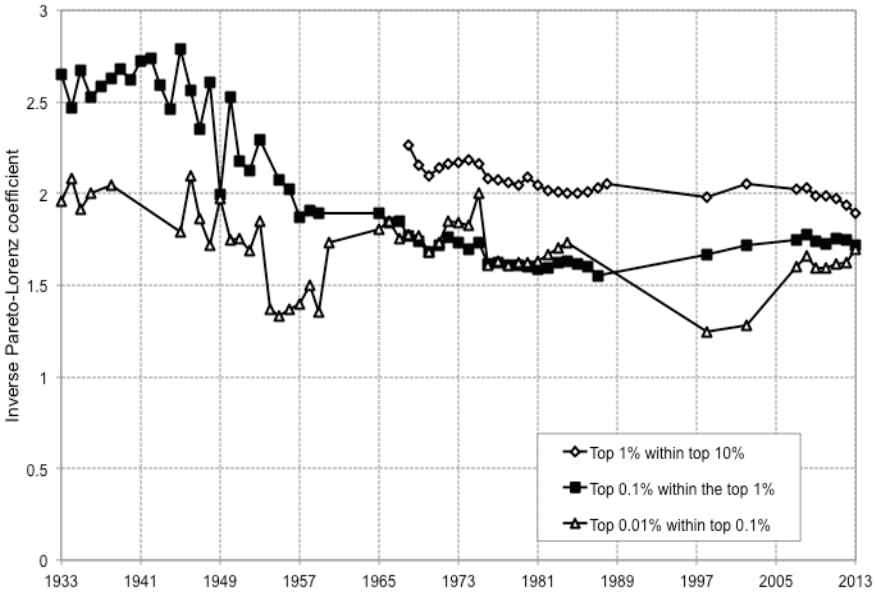
Sources: Table C.3 and C.4.

Figures 21 and 22 portray the inverted Pareto-Lorenz coefficients for the taxable and total income series, respectively. The following findings present themselves. Firstly, β coefficients for taxable income have fallen from levels above 2 at the beginning of the period to roughly 1.75 today. This is consistent with the fall in income concentration reported by taxable income shares over the long run.[38] Second, the β coefficients for gross total income depict greater concentration than those for gross taxable income (as could be deduced from Figure 12 above), and a higher degree of concentration over time with higher levels registered today than in the mid 1970's. It can be seen that today the coefficients vary between a value of 2.5 and 3, (in the late 1980's they fluctuated between a value of 3 and 4), which equates to extreme levels of concentration, consistent with the picture given by the top

[38] For example a β of 2 means that the average income above the threshold needed to belong to the top 1 per cent is twice as large as this threshold. A value of 1.75 means that the average income above the 1 per cent threshold is 1.75 times the threshold value, which equates to a fall in top income concentration.

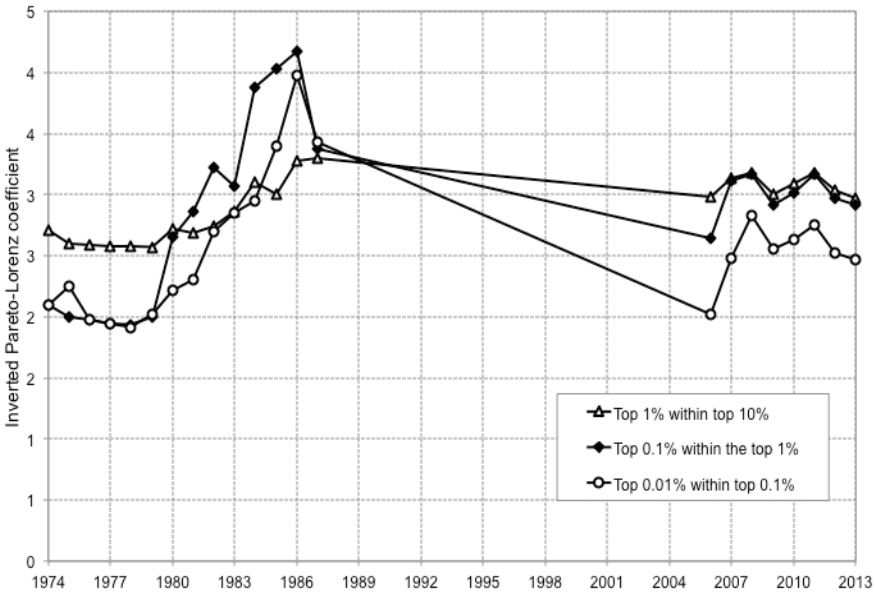
income shares. Moreover, income seems to be more concentrated greatest in the top 1 per cent within the top 10 per cent and the top 0.1 per cent within the top 1 per cent, rather than within the top 0.1 per cent, as could be concluded from Figures 18-20. Third, in using β as a summary measure of the shape of the upper part of the distribution, we must bear in mind that its value depend on the points chosen in the distribution, as Figures 21 and 22 help to convey. Nevertheless the close proximity of each of the coefficient types is reassuring that the top of the distribution in Brazil is quite well approximated by the Pareto structural form.

Figure 21. Inverted Pareto-Lorenz β coefficients for gross taxable income in Brazil, 1933-2013



Sources: Table C.7.

Figure 22. Inverted Pareto-Lorenz β coefficients for gross total income in Brazil, 1974-2013



Sources: Table C.7.

4.3 The composition of top taxable revenues

As mentioned in Section 3, the tabulated data between 1969 and 1988 could be decomposed into different components, relating to the source of revenue, the nature of the occupation, the gender and age profile of top taxable revenue individuals. An important qualification is that the data concern taxable revenues only, thus excluding incomes taxed exclusively at source and non-taxable incomes, as well as scheduler deductions for expenses incurred to obtain the income.

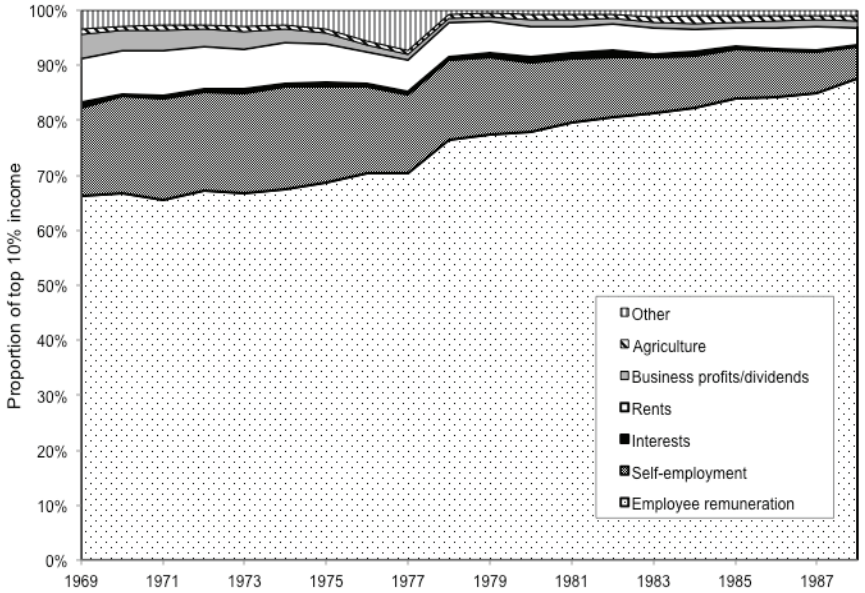
4.3.1 Revenue source

Figure 23 decomposes the taxable revenue share of the top decile into its various sources and presents their evolution from 1969 to 1988. It can be seen that the large majority of the taxable revenue of this groups comprises of employee remuneration, basically wages. Over the course of twenty years between 1969 and 1988 the importance of wages in the taxable revenue of the top 10 per cent increased – from a proportion of 66 per cent in to 88 per cent by 1988. The counterpart of this increase

was largely the fall in the importance of self-employment revenue (from 16 per cent in 1969 to 5 per cent in 1988).

The taxable revenue of the top 1 per cent offers a very similar picture (Figure 24), with slightly low shares of taxable revenue coming from employee remuneration and self-employment, and a slightly higher share coming from rents, profits and dividends. The dynamics are again very similar with the share of employee remuneration increasing at the expense of self-employment revenue over the twenty years. In order to notice considerable differences in the composition of taxable revenue one must go to the summit of the distribution and assess the revenues of the top 0.01 per cent (Figure 25). In the late 1960's there was a more divided composition of taxable revenues, with interests, rents and profits/dividends combined making up a greater share of the taxable revenue of the ultra rich than employee remuneration. However, by the mid 1980's employee remuneration came to to dominate these latter categories, with the self-employment contribution of self-employment changing little.

Figure 23. Composition of top 10% taxable revenue by source in Brazil, 1969-1988

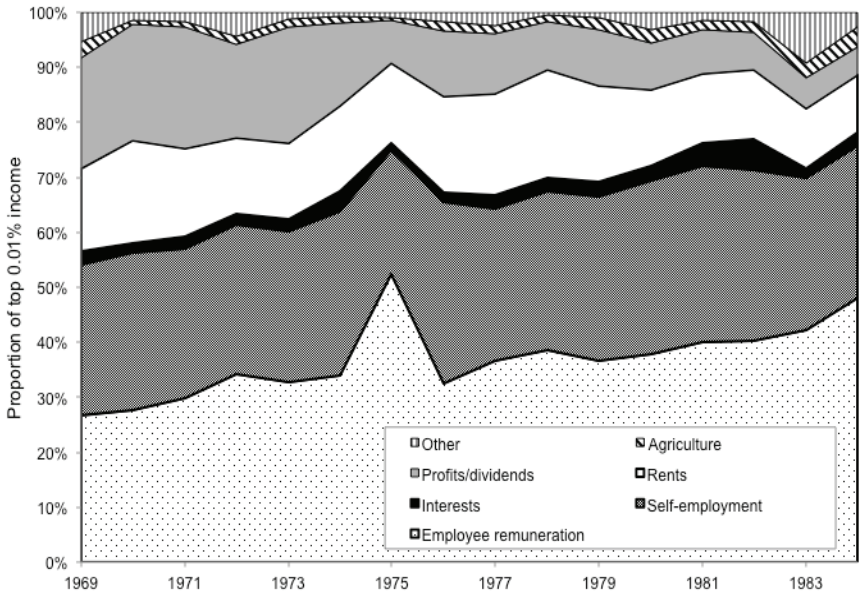


Sources: Table C.8.

Figure 24. Composition of top 1% taxable revenue by source in Brazil, 1969-1988

Sources: Table C.8.

Figure 25. Composition of top 0.01% taxable revenue by source in Brazil, 1969-1984



Notes: Estimates go up to 1984 only, since the tax statistics are not detailed enough to calculate the income share of the top 0.01% for the years 1985-1988.
Sources: Table C.8.

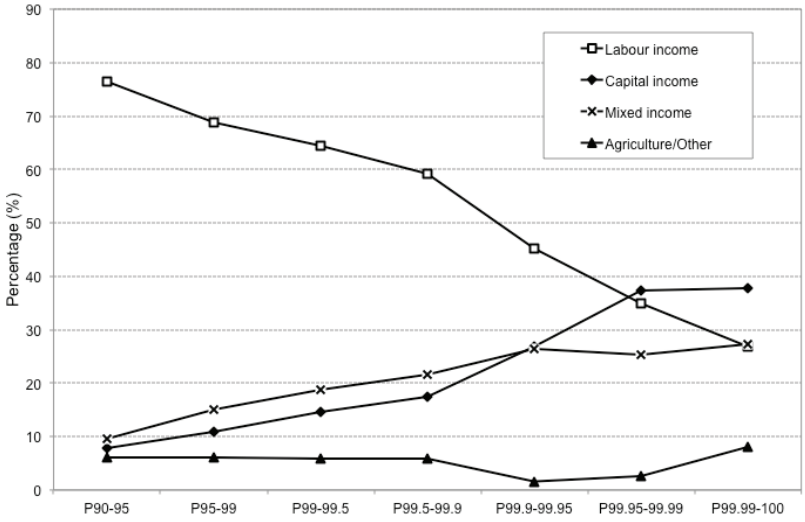
A clearer way to see the radical changes in the composition of top taxable revenues is if we aggregate the components into the broader categories of labour and

capital revenue. Figure 26 presents this type of decomposition for different fractiles within the top percentile in 1969. It can be seen that as one moves further up within the top 1 per cent, the share of labour revenue in gross taxable revenue falls. As one enters into the top 0.05 per cent, capital revenue becomes dominant in the composition of taxable revenue, while in the taxable revenue of top 0.01 per cent mixed revenue becomes as important as labour revenue. 1984 displays quite adifferent scenario for the summit of the distribution (Figure 27). We no longer see alterations in the ranking of broad revenue categories as we move up the distribution, as labour revenue maintains its overwhelming dominance over the other categories. This radical change could be due to progressive erosion of the tax base over the years, whereby an increasing portion of capital revenues could be taxed exclusively at source or be exempt from the revenue tax altogether. This would confirm that much of revenues of the very rich in Brazil are not accurately captured by the above Figures, as is becoming increasingly evident in this paper. The fact that top shares according to total revenue increased after 1980, while those according to taxable revenue continued their downward trend, lends weight to this explanation.

Figures 28 and 29 decompose top taxable revenues into broad categories of occupation from the earliest available data year, 1979, to the last available year, 1988. The notable lesson we can extract from Figure 28 is that in 1979 the large changes across the distribution come from business owners replacing private sector employees as the most representative of the very rich and the large loss in representation of public sector workers as one moves higher up in the distribution. The share of rentiers also experiences a notable rise across higher revenue thresholds, trebling between P99 and P99.99. Within 10 years, the picture is stantially distinct. Private sector employees experience no loss in representation across top groups; in fact, their relative weight in the upper thresholds is increasing in the thresholds, while the shares of business owners and rentiers is now significantly lower, even as one moves into the top 0.1 per cent. Public sector workers now dominate both of

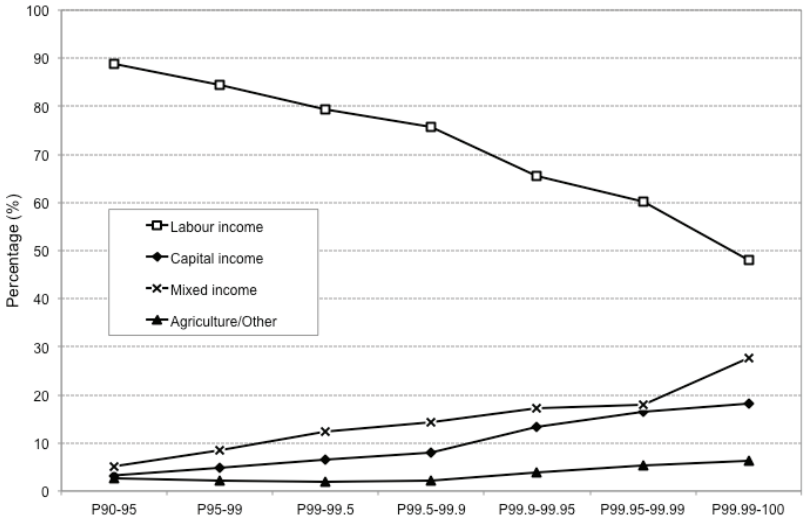
these latter occupation types. These compositions may appear to justify the explanation that it is the erosion of capital revenues from the tax base that explains the radical change in revenues of top groups during the 1980's. In any event, judging from the experience of other countries, the compositions presented here for Brazil do not seem to be accurately representative of the real sources of revenue of elite groups.

Figure 26. Composition of top taxable revenues by source in Brazil in 1969



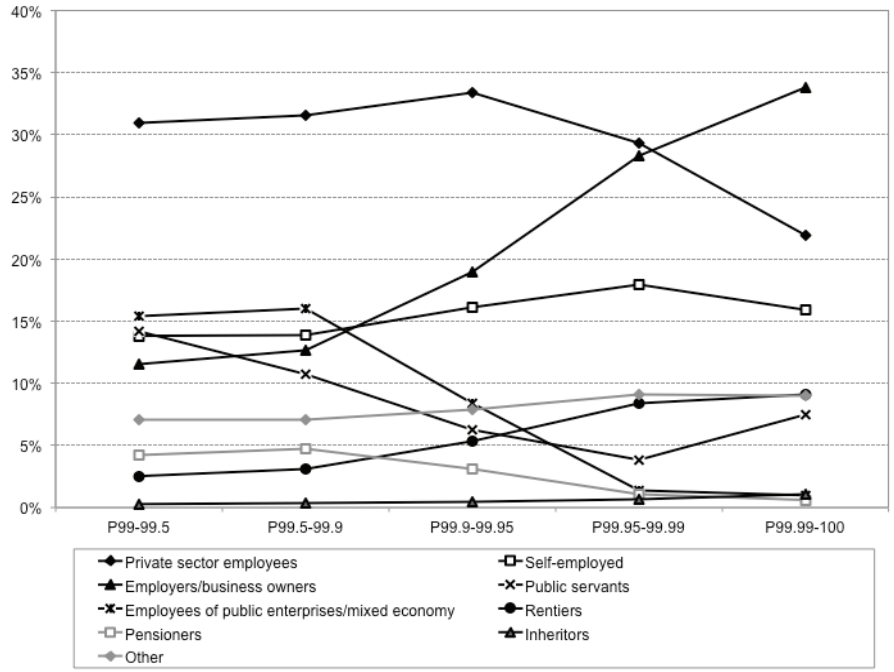
Sources: Table C.9.

Figure 27. Composition of top taxable revenues by source in Brazil in 1984



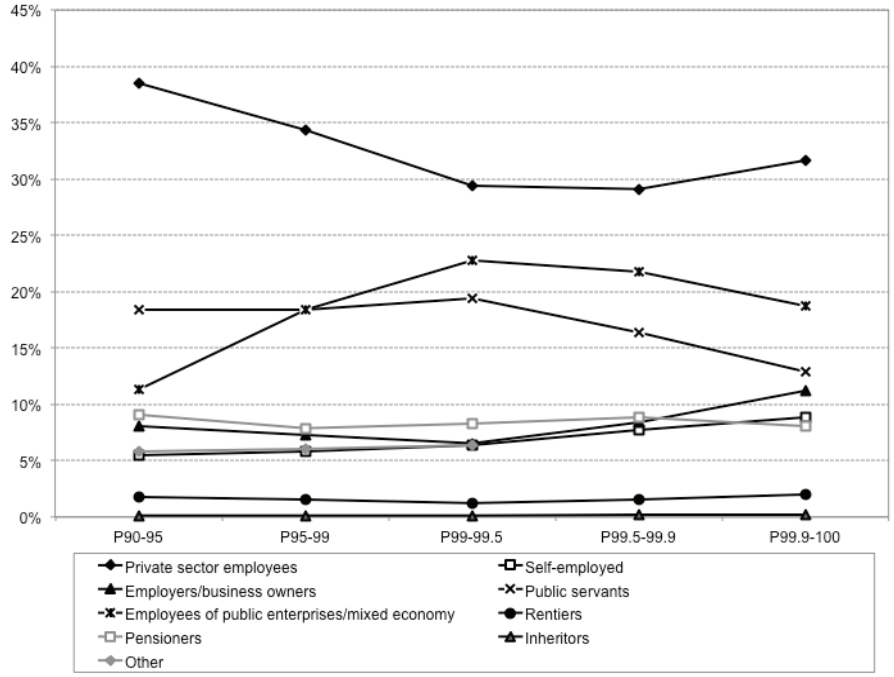
Sources: Table C.9.

Figure 28. Composition of top taxable revenues by nature of occupation in Brazil in 1979



Sources: Table C.10.

Figure 29. Composition of top taxable revenues by nature of occupation in Brazil in 1988

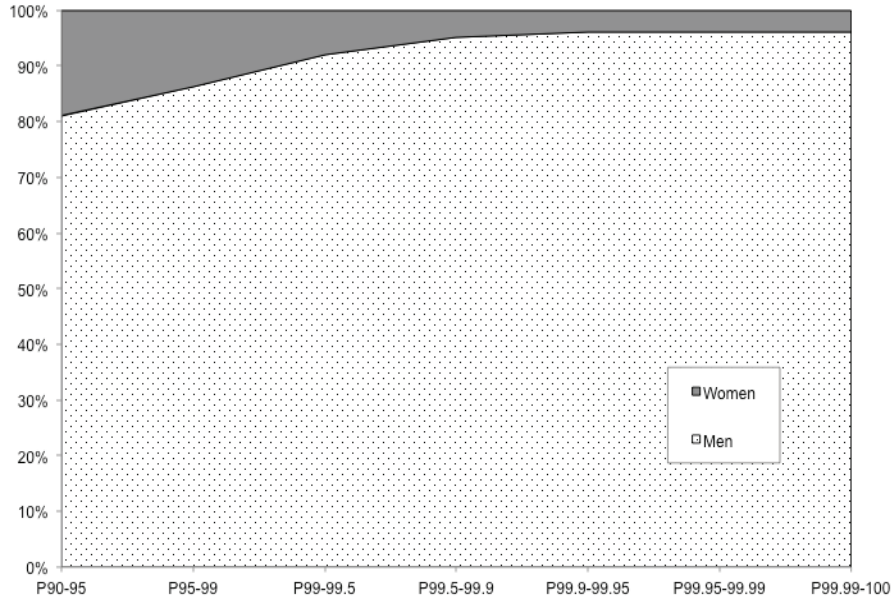


Notes: The tax statistics do not allow us to go above the top 0.1 percent in 1988.
Sources: Table C.10.

4.3.2 Gender

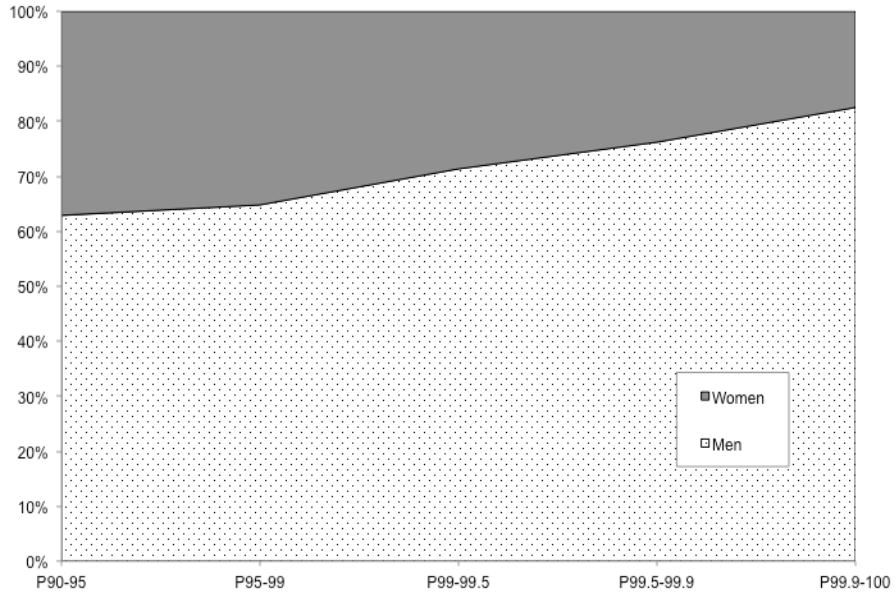
Figure 30 decomposes top taxable revenue groups by gender in 1978, while Figure 31 presents the same decomposition twenty years later, for the last data point available. In 1978 almost 20 per cent of the top 10-5 per cent taxable revenue group comprised of women, while around 80 per cent were men (Figure 30). The higher up in the distribution the smaller the representative of women, as one might expect, with the female share falling to single digits among the ultra rich. From the 0.1 per cent taxable revenue threshold, the share of women falls to about 4 per cent. Fast-forward to 1998 and we are presented with a similar trend across top taxable revenue groups (Figure 31). But while the share of men in top taxable revenue groups rises in similar fashion to twenty years back, the levels from which it does so are much lower. Among the top 10-5 per cent, the share of women has rise to 37 per cent from its 19 per cent level in 1978. This share falls steadily until it reaches a level of 18 per cent for the uppermost taxable revenue groups (top 0.1 per cent and beyond). Thus, on the basis of taxable revenue alone, one can conclude that women made notable revenue gains over the twenty-year period.

Figure 30. Composition of top taxable revenue groups by gender in Brazil in 1978



Sources: Table C.11.

Figure 31. Composition of top taxable revenue groups by gender in Brazil in 1998



Notes: The highest population group we can estimate with the 1998 tabulations is the top 0.1 percent.
Sources: Table C.11.

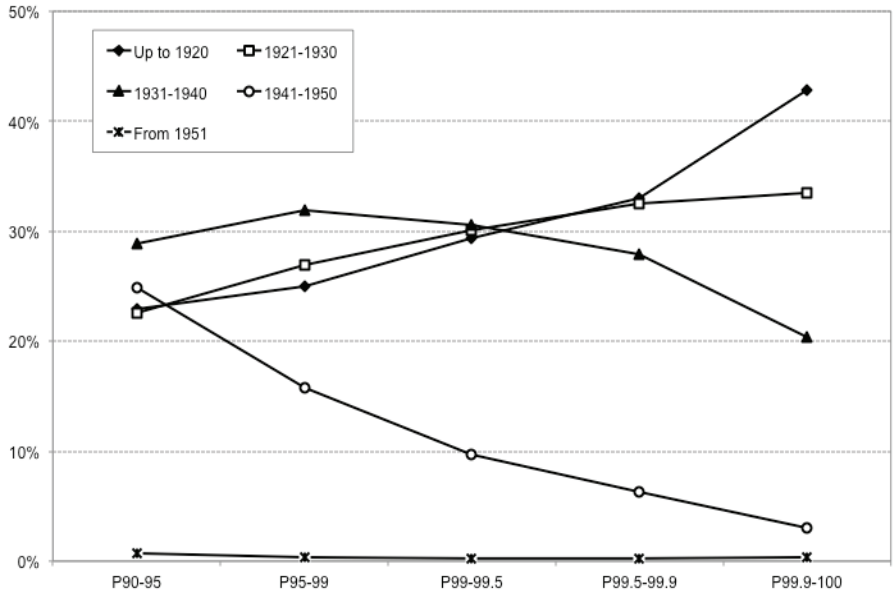
4.3.3 Generation

The final decomposition presented, concerns the relative age of top taxable revenue groups. Figures 32 and 33 present the composition of taxable revenue by year of birth of top earners for 1970 and 1988, the earliest year and last year for which data can be extracted. In 1970 (Figure 32), the top 10-1 per cent of the taxable revenue distribution were dominated individuals born between 1931 and 1940 (meaning they were between 30 and 39 years of age in 1970). As one moves into the top 1 per cent, and especially into the top 0.1 per cent, it is the older generations that dominate the representation, i.e. those born no later than 1930 (persons aged over 40). In particular, 55 per cent of the top 0.01 per cent is comprised of persons aged over 50 (or born on up to 1920), which is somewhat expected given that Brazil may not have yet had the sufficient time to develop the productive capacities of its younger generations by late 1960's.

By 1988 (Figure 33), the age profile of top taxable groups had changed quite notably. Among the top 10-0.5 per cent in the taxable revenue distribution, it was the younger generations that were most represented, those born from 1941-1950 (aged between 38 and 47), and especially those born since 1951 (aged under 38). This latter age category accounted for 52 per cent and 45 per cent of the individuals in the top 10-5 per cent and 5-1 per cent respectfully, while in 1970 (aged under 20) they made up hardly 1 per cent of the individuals, as one would expect. However their share falls dramatically to 15 per cent among individuals within the top 0.1 per cent in 1988. Yet over the course of 18 years it can be said that there was inter-generational mobility in Brazil, at least for the portion of revenue that was taxable. This can be again observed if we move higher up in the distribution. In 1970, the top 0.1 per cent and beyond was largely composed of individuals born no later than 1930 (aged 40 and above at the time). By 1988, these generations (born up to 1920 and between 1921 and 1930) provided the lowest amount of individuals to the top 0.1 and above (see Figure 33). At the very top of the distribution in 1988, we observe that the greatest representation comes from individuals born between 1941 and 1950 (aged between 38 and 47). Moreover, between 60 and 65 per cent of the ultra rich in this distribution comprise of individuals aged between 38 and 57, which coincides with an image of working professionals. This image seems consistent with earlier decompositions, which presented salaried workers in the private and public sectors as being the 'typical' rich individuals in the taxable revenue distribution.[39] This profile also seems to be consistent with those of the richest individuals usually captured in household surveys.

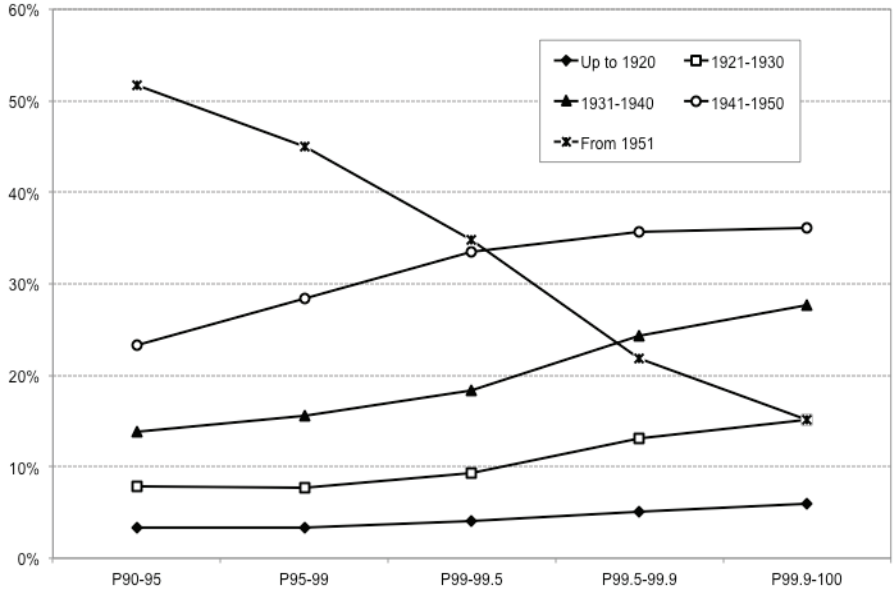
[39] It should be emphasized again, that the data do not allow us to evaluate the inter-generational mobility in the *total* income distribution, which may well present a different scenario.

Figure 32. Composition of top taxable income groups by year of birth in Brazil in 1970



Notes: being born up to 1920 corresponds to an age of 50+ in 1970; 1921-30 corresponds to being 40-49; 1931-1940 to 30-39; 1941-1950 to 20-29; and being born from 1951 corresponds to being under 20 years of age.
Sources: Table C.12.

Figure 33. Composition of top taxable income groups by year of birth in Brazil in 1988



Note: being born up to 1920 corresponds to an age of 68+ in 1988; 1921-30 corresponds to being 58-67; 1931-1940 to 48-57; 1941-1950 to 38-47; and being born from 1951 corresponds to being under 38 years of age.
Sources: Table C.12.

4.4 International comparisons

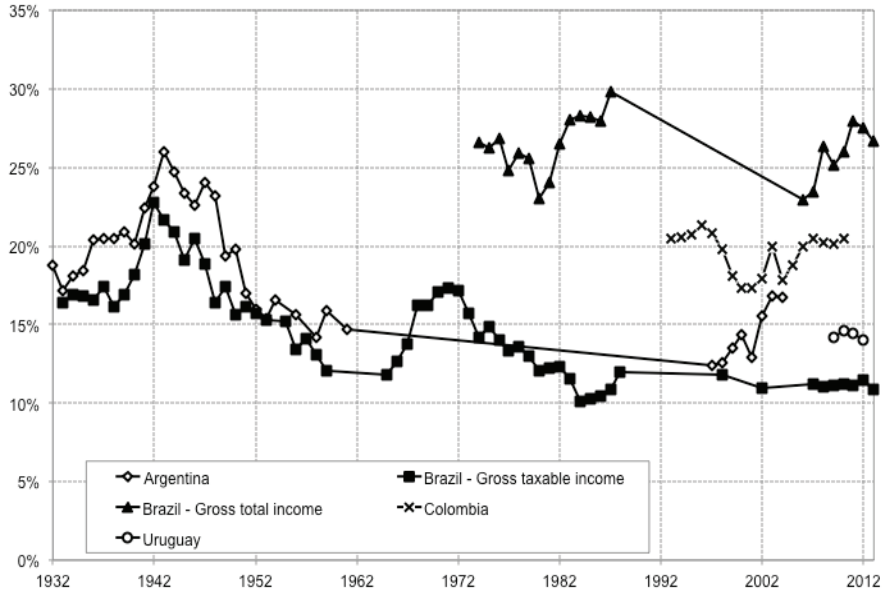
The income disparities in Brazil revealed in the previous section can be emphasized further if they are placed in an international comparative perspective. Figure 34 begins the cross-country comparison with a look at income concentration in the region of Latin America. At the time of writing, Brazil is the fourth country in this region where top income shares have been estimated using tax data, after Argentina, Colombia and Uruguay. In a region known for top ranking inequality indices, Brazil stands out for its degree of income concentration as can be observed from the relative shares of the top percentiles in Figure 34. The top percentile share of total income has been higher in Brazil than in any over its neighbours over the 2000's, the years for which we can make valid comparisons. It can be seen that the top 1 per cent in Argentina and Uruguay rank closer to the top 1 per cent taxable income series in Brazil. Colombia is closer to the overall income concentration registered in Brazil, since 2006, but while the share in Colombia appears to stay roughly constant (also the case in Uruguay between 2009 and 2012), in Brazil, the share undertakes a sharp upward trend. Brazil's current inequality appears to be even higher than that observed in Argentina during its peak in the 1940's. Although, comparative data is more scarce for the years prior to the 2000's, it is likely that Brazil's historical levels of total income concentration rank among the highest ever observed in the region, especially if the historical trend in the gross taxable series and its difference with the gross total income series are anything to go by.[40]

Figure 35 compares inequality in Brazil with that in developing countries outside of Latin America (Asian countries and South Africa). The picture confirms

[40] It can be noted that between the early 1930's and the late 1950's, the dynamics of the top percentile share in Argentina mirrored and the top percentile taxable income share in Brazil were hugely similar, with the shares in Argentina slightly higher. It should be bore in mind that the estimates for Latin American countries other than Brazil may be underestimated given that they don't account for capital gains or some parts of capital income that is not taxed. In general, comparatbility with most countries must be taken with a pinch of salt given the large absence of capital gains from the estimates. Estimates including capital gains are stated wherever possible in the comparison graphs below.

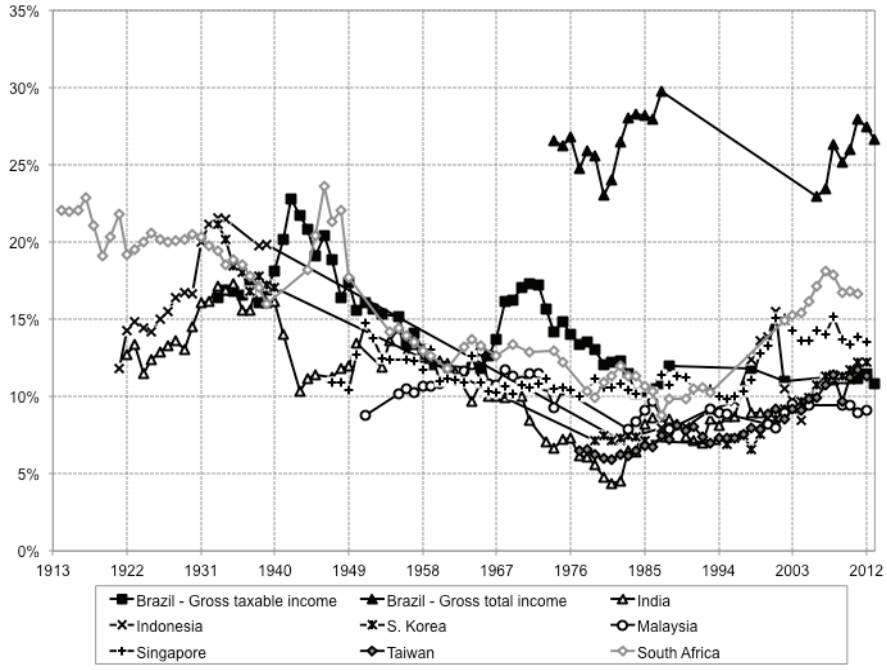
Brazil as being an extremely unequal country even among underdeveloped countries. South Africa has often been compared to Brazil for have similar levels of inequality, but tax data suggest that there is quite a margin between the two, while comparison with Asian countries confirms the inherited belief that Latin American inequality, is on another level, particularly in Brazil. The U-shaped evolution depicted in South African and Indian inequality does not appear to be followed in Brazil, even for inequality based on gross taxable income, which depicts an inverted-U-shaped pattern over the twenty or so years of the military dictatorship (1964-1985) when inequality in all the developing countries was either stable or falling.

Figure 34. Top 1% income share in Brazil and Latin American countries, 1932-2013



Sources: Table C.4 for Brazil and WTID for other countries

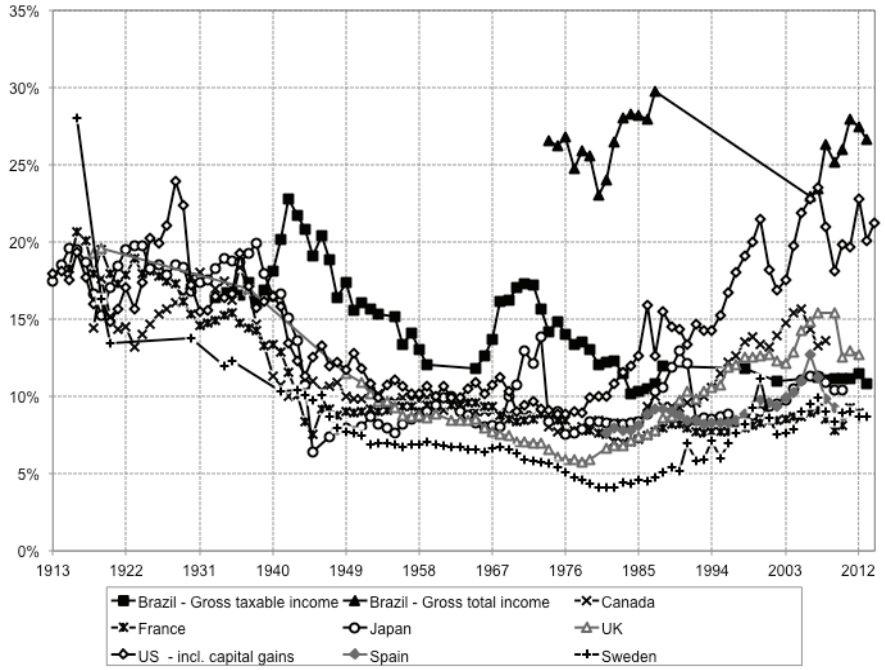
Figure 35. Top 1% income share in Brazil and developing countries outside Latin America, 1913-2013



Sources: Table C.4 for Brazil and WTID for other countries.

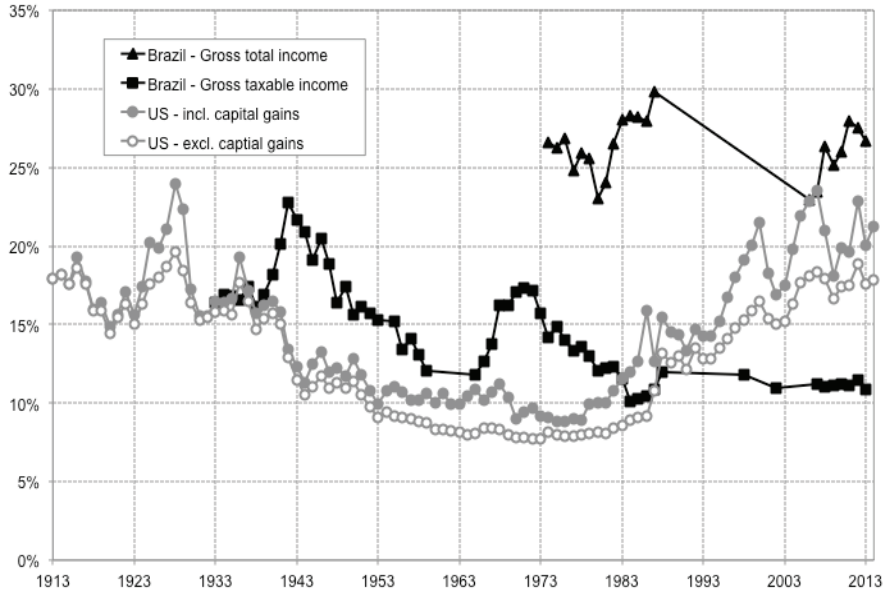
A similar picture presents itself for the top 0.01 per cent (Figure 39). The principle difference is that over the recent few years, the share of the top 0.01 per cent in the U.S. (accounting for capital gains) matched, if not slightly surpassed, that in Brazil. But again if historical standards are to be set, the 1980's in Brazil remain an unprecedented period for the concentration of income at the very summit of the distribution. The real extent of inequality in Brazil can also be seen from the similarity between taxable income top shares in Brazil and total income shares in other countries, such as Japan or Spain (outside of finance-induced boom phases) and the U.S. prior to the 1980's, given the significant portion of top incomes excluded for the income tax in Brazil. This comparison can be made at all the fractiles in the distribution, and the same conclusion is reached: Brazil is a highly unequal country even when we mainly focus on labour income.

Figure 36. Top 1% income share in Brazil and selected developed countries, 1913-2014



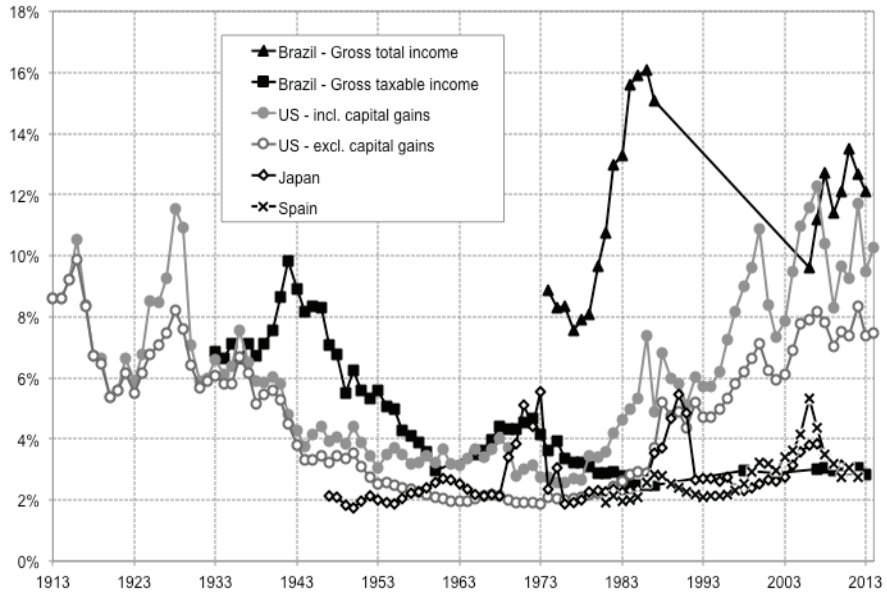
Note: Other than Brazil's total income series, capital gains are included in estimates for Canada (from 1972), Japan (from 1947), the US, Spain and Sweden. The UK and France are included for comparative purposes with Brazil's gross taxable income series.
Sources: Table C.4 and WTID.

Figure 37. Top 1% income share in Brazil and US, 1913-2014



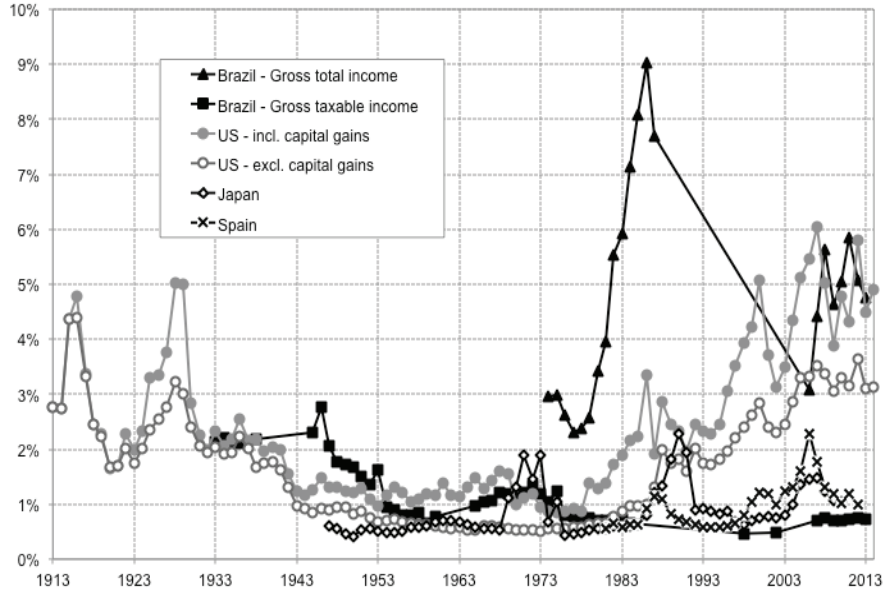
Sources: Table C.4 and WTID.

Figure 38. Top 0.1% income share in Brazil and selected countries, 1913-2014



Note: Estimates for Japan and Spain include capital gains.
Sources: Table C.4 and WTID.

Figure 39. Top 0.01% income share in Brazil and selected countries, 1913-2014

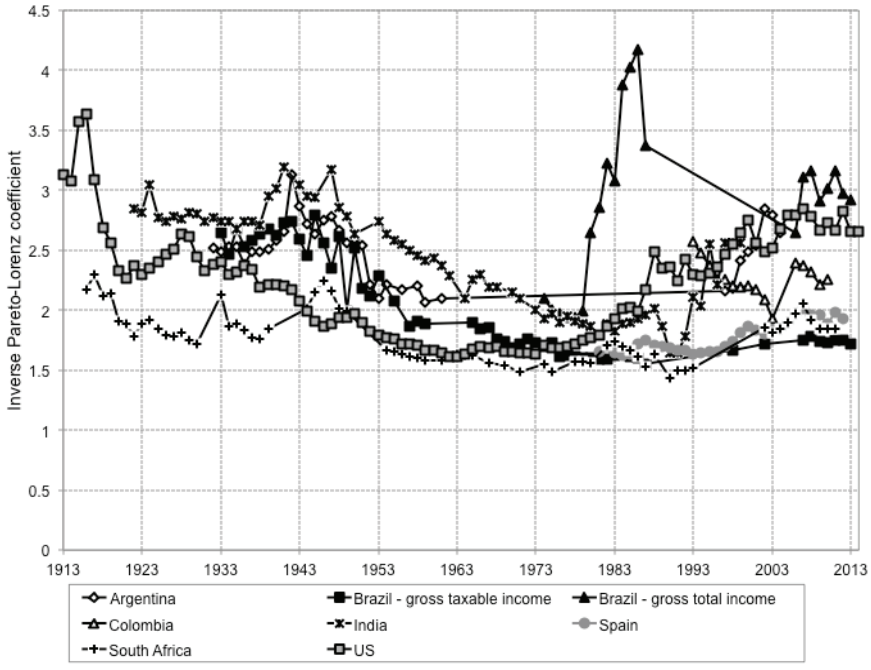


Note: Estimates for Japan and Spain include capital gains.
Sources: Table C.4 and WTID.

Finally, we can compare the fatness of the upper tail of the distributions across different countries, which describe how relatively unequal the top of the

distribution is. Figure 40 does this by placing the inverted Pareto-Lorenz coefficient in Brazil in an international comparative perspective. The inequality at the top revealed from Brazil's gross taxable distribution was comparable to that in most depicted countries for most of the last century. However, based on gross total income, Brazil is near the top of the rank. During the 1980's the upper tail in Brazil was fatter than in any other distribution in the world. Inequality within top remains highest in recent years, slightly above levels observed in the U.S. (as Figure 13 already hinted). Inequality within top groups is also of similar magnitude in Argentina (although 2004 is the latest point available at the time of writing) and to a lesser extent Colombia. Brazil is thus a world leader in income inequality, both in terms of absolute differences between top groups and the rest, and relative differences among individuals at the top.

Figure 40. Inverse Pareto-Lorenz β coefficients in Brazil and selected countries, 1913-2014



Sources: Table C.7 and WTID.

5. Discussion

5.1 Measurement issues

When estimating top income shares, the presumption is often made that the share of the rich has been accurately measured, more so than estimates from other data sources. In the results presented above, I assumed (for comparative purposes) that what was being measured was the true income share of the rich in Brazil. But there are numerous reasons why the Brazilian estimates may not precisely reflect the picture at the top. First, as was mentioned in Section 3, the estimates for Brazil are constructed on the back of various assumptions regarding the external control for the population (the appropriate age-cut off and the legal definition of the tax unit), the external control for income (the constant proportion of GDP) and the income concept captured by the estimates (the average between gross revenue before deductions and gross income after deductions). These various methodological choices were justified to the best possible extent, given the data available at the time of writing. In any case, tweaking the assumptions leads to a change in top share levels rather than underlying trends.[41]

A more prevalent concern is the degree of tax evasion, which in a developing country like Brazil would seem justified. Changes in the amount of income purposefully evading taxes can cloud the analysis of the dynamics of income concentration. These changes can be triggered by changes in tax rates or legal changes in the definition of deductions and allowances. For instance a rise in top incomes may simply reflect reduced incentives for evading taxes when tax rates are cut. This has been postulated about countries like the U.K. and the U.S., who both

[41] For example, Medeiros et al. (2015), using the same underlying tax data, take the definition of the tax unit to be individuals aged 18 and over, and a definition of income to be prior to deductions for intermediate costs. In our judgment these are less preferable choices. The former choice corrects our results downwards, while the latter choice corrects them upwards. The net result is an almost indistinguishable series from the one calculated in this paper for the period 2006-2012, with differences below 1 percentage point (see Figure 48). However, we deem our estimates to be preferable given that our income concept is more accurate.

experienced sharp reductions in their top marginal tax rates since the 1980's and a strong rise in top income shares (see Figures 36 and 43). However, in Brazil the relationship is not clear cut and sometimes contrary to expectations. Top shares of gross total income doubled from 1980 to 1983, at a time when the top tax rate rose by 5 percentage points from 55 per cent to 60 per cent, while they changed little when the top tax rate fell from 60 per cent in 1985 to 45 per cent in 1988. Also important legal changes to deductions and allowances took place during the tax reforms of the early 1990's, which abolished the scheduler system of taxation, along with all its deductions. Since 1997 the top rate has remained unchanged at 27.5 per cent and there has been no notable changes to the definition of deductions or allowances, yet top shares have been on a strong upward trend since at least 2006. There is thus very little evidence to suggest that the changes in the distribution of income in Brazil were significantly affected by shifts in tax rates or legal changes to deductions and allowances. Rather, they are more likely to reflect real economic changes.

The dynamics of top shares can also be affected by improvements in tax collection, in that such improvements may equate to stricter enforcement criteria and technology allowing the tax office to better measure (and hence tax) the incomes of the wealthy. In Brazil, there have been various stages of modernisation of the tax collection agency since the introduction of the income tax, particularly during the early 1940's and in the late 1960's. So for instance, the peak in taxable income concentration observed in the early 1940's in Brazil could have more to do with these types of improvements than with real distributional changes in income. A similar story could hold for the rise in inequality over the late 1960's, upon the initiation of the Federal Tax Office and the creation of a national identification system of taxable

persons.[42] Unfortunately, we do not dispose of the necessary data to investigate the likelihood of the inequality dynamics being due to better tax collection, such as adequate data on the wage distribution.[43] Therefore, the capacity to distinguish between statistical mirages caused by improvements in tax collection and enforcement from real distribution changes is a major limit of this study. In spite of this limitation to interpret the trends, the main qualitative finding remains valid: Brazil's levels of income concentration are among the highest ever recorded.

A further issue to consider is the impact of Brazil's shadow economy on estimates of top shares derived from tax data, which largely miss income from informal and underground activities. Accurate measures of the shadow economy are difficult to come by, but the estimates on the relative size of this sector in Brazil range from about 20 per cent of GDP to nearly 40 per cent of GDP for recent years (Filho, 2012; Schneider et al, 2010). While the tax statistics capture much self-employment income, it is likely that some portion of informal self-employment eludes taxation. However, this is unlikely to be an important source of income for the rich in Brazil, given the country's large landed wealth and the important industrial and corporate sectors. For the same reasons, wealth from illegal goods trade is not likely to pervade the Brazilian economic elite, compared to other countries in the region like Colombia. In any case, the national accounts-based estimate of the income

[42] At the same time, a new income schedule was introduced for all incomes not attributable to the other existing schedules (Da Nóbrega, 2014) This may have uncovered income previously undeclared due to the fact that it did not fit any of the existing income categories.

[43] Since wages are less subject to tax evasion than other sources of income (given the existence of certain wage related deductions, like the *desconto padrão* in Brazil) the dynamics of top wage shares can be compared to those of top income shares to uncover whether there is evidence of better tax collection. In such a scenario, one would expect wage incomes to have slower growth than other incomes (see Banerjee and Piketty, 2010 for an example of how this procedure was used in the case of India). As is evident from Section 4.3, the wage composition of income in Brazil can be uncovered for the taxable portion of income between 1969 and 1988. However, individuals are ranked by gross taxable income rather than by gross wages, which does not give a precise picture of the actual wage distribution.

control used in this paper takes into account flows of income sourced from the shadow economy.

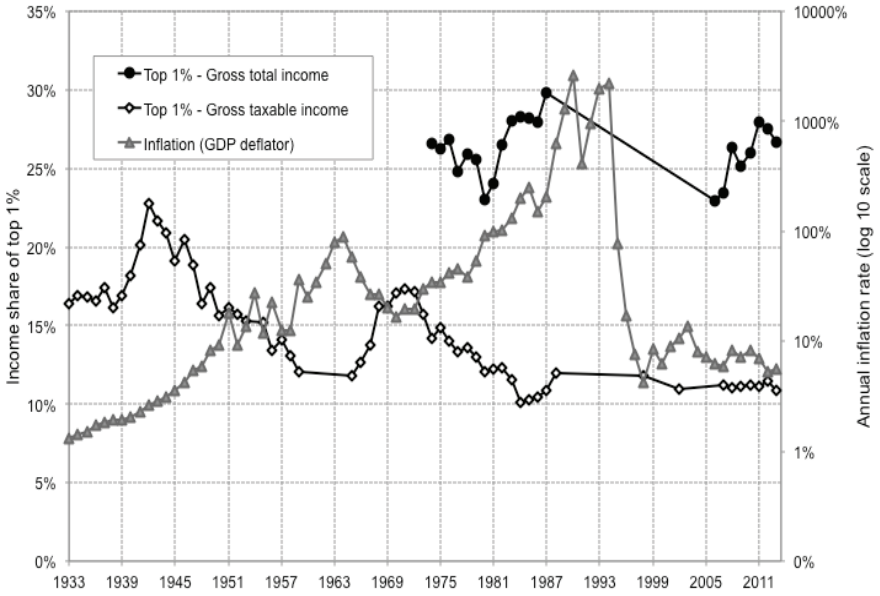
Perhaps the most important measurement issue concerns the relation of inflation to the estimated top shares. High inflationary pressures plague Brazil's history, most notably the hyperinflation that took hold of the country from the 1980's to the mid 1990's. In fact prior to this, annual inflation rates consistently over 15 per cent were not uncommon. Figure 41 shows the evolution inflation (measured indirectly using the GDP deflator) alongside the dynamics of the top percentile over the long run in Brazil. Before the Second World War relatively high inequality in Brazil seemed to coexist with low inflation. Yet from 1945 to the military *coup* of 1964 the decrease in reported inequality (of taxable income) was correlated with a strong and persistent increase in inflation (the average annual rate over the period was 24 per cent, with inflation peaking at 90 per cent by 1964). Given that the majority of top taxable incomes are in the form of wages and self-employment income (see Figures 23-25), it is likely that rising inflation had a lot to do with the falling taxable income concentration.[44] Overall, the inflation rate and the taxable income share of the top 1 per cent appear to have a relatively strong inverse relationship.

Examining the gross total income series, its relation with inflation is less clear-cut. On the one hand, the decline in total income concentration from 1974 to 1980 coexisted with high and rising prices (inflation more than doubles over the period from about 35 per cent to 90 per cent). On the other hand, the dramatic rise in total income inequality over the 1980's came when inflation was progressing at its fastest ever rate (the annual average was over 200 per cent). Although data is not available

[44] The increase observed from the mid 1980's could have been due to a growingly unequal indexation of prices and incomes to the rapidly rising inflation, which was institutionalized in Brazil from the late 1960's until the mid 1990's. Until 1979, nominal wages increased once every year, after which they increased twice a year until 1985. From 1985 to 1987 they were subject to revisions roughly every 3 months, and then every month until the mid 1990's (Saad-Filho & Mollo, 2002) It is likely that the more frequent revisions were to the benefit of higher earning individuals, who as top executives and business owners have more control over their compensation packages.

to make the evaluation, it is likely that total income concentration remained approximately at its late 1980's level until the *Plano Real* in 1994. Moreover, since 2006 inflation has remained quite stable at a relatively low average of approximately 6 per cent per year, while total income inequality has risen by 16 per cent, close to levels observed in the late 1980's.

Figure 41. Top 1% income share and inflation in Brazil, 1933-2013



Sources: Table C.4 and Table B.3.

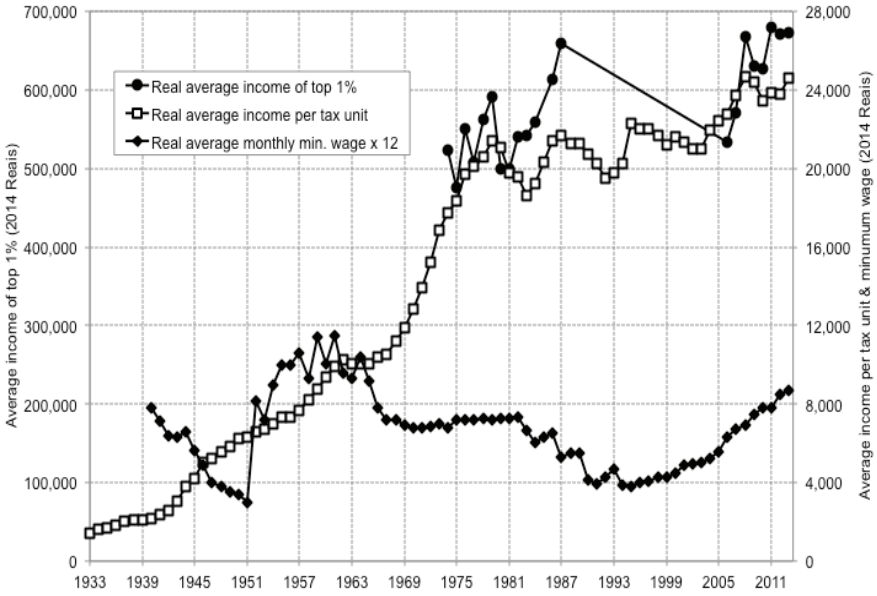
Thus, the role of inflation in explaining the dynamics of top shares (as measured by gross total income) seems to be strongest during the 1980's. A wide literature has tried to evaluate the distributional consequences of inflation, commonly known to be a regressive tax, as the capacity to protect the value of one's portfolio is generally increasing in income and wealth (Ferreira et al. 2007).[45] In a survey of poor households in 38 countries between 1970 and 2000, Easterley & Fischer (2001) show

[45] Rich individuals have larger and more diversified portfolios than the average individual, and thus can more easily transfer their wealth into assets whose real income stream are more robust to inflation. Also wage indexation is usually to be more 'perfect' for richer individuals who control their own remuneration, such as top executives and business owners.

robust evidence that the share of bottom quintile of the distribution in national income is lower and the real minimum wage also lower during periods of high inflation. In the case of Brazil, Ferreira & Litchfield (2001) find that between 1981 and 1995 higher inflation was associated to a lower income share for the poor. Coupled with the fact that between 1980 and 1990 the minimum wage lost 43 per cent of its real value, the rising top total income shares during the 1980's seem to be a product of the worsening relative position of lower groups in the distribution, as well as absolute gains in real income of top groups. Figure 42 illustrates this, comparing the average income of the top 1 per cent with the average income per tax unit and the average yearly minimum salary (average monthly minimum wage multiplied by 12). Between 1980 and 1987, while the real minimum wage fell and the average real income per tax unit stagnated, the top 1 per cent made real gains of 32 per cent. On the contrary, the 1970's decline and the recent rise are more likely explained by real economic and distributional changes, than by changes in inflation. It is also interesting to note the magnitude difference between the average income of the top 1 per cent and those of other population groups. In 2013, the average real income of the top percentile was about 27 times the average real income per tax unit, while about 77 times the average real yearly minimum salary.[46] Such magnitudes underline to a further extent the actual polarisation of income in Brazilian society.

[46] According to the 2010 Census there were approximately 44.5 million individuals aged 10 and above earning the monthly minimum wage or less, which counts for about 27 per cent of the respective population (IBGE, 2010). In the same year, the top 1 per cent comprised of roughly 1.6 million of the same population.

Figure 42. Average real income of top 1%, average real income, and real minimum wage in Brazil, 1933-2013



Note: The average income per adult is the average income of all persons aged 15 and above minus the number of married women aged 15+ not filing a separate tax return. The first legislated minimum wage was introduced at the urban state-level in 1940. It was extended to rural workers in 1963, and a nationally unified minimum wage at the federal level was introduced in 1984. Since 2000, supplementary rates could be introduced by states on top of the national rate. 1 Brazilian Real ≈ 0.59 US Dollars PPP (2014 prices).
Sources: Table B.3. and Table C.2.

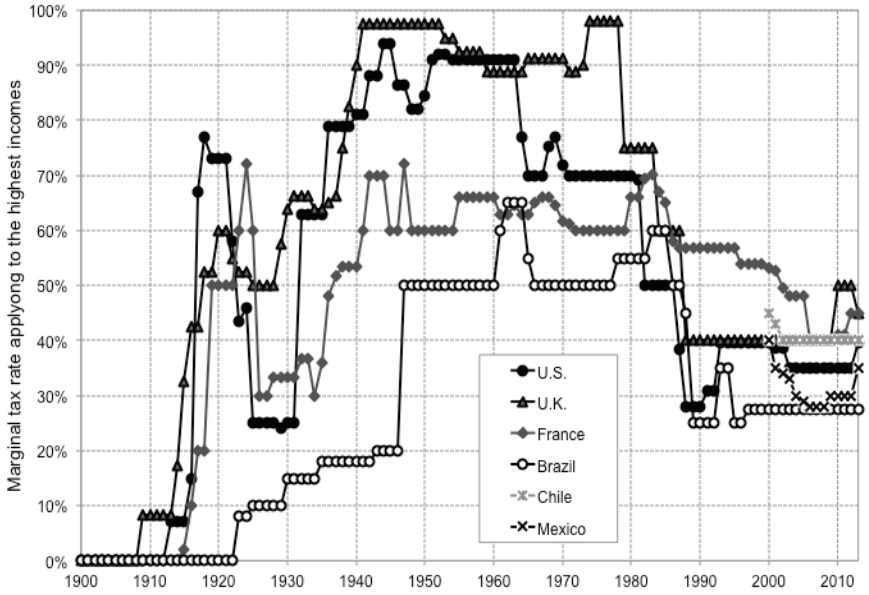
5.2 Taxation of top incomes

The large difference between top taxable income shares and top total income shares uncovered in Section 4.2, especially for recent years, implies that a large part of the incomes of the rich have been, and continue to be, untaxed. Our knowledge of the profile of the rich in other similar countries also cast doubt over the representativeness of the compositions of top taxable incomes shown in Section 4.3.[47] Coupled with the extortionately high levels of pre-tax inequality for total income revealed in Section 4.2, these findings put into question the role of taxation concerning top incomes. Income taxes can have a pure redistributive effect by discouraging the disbursement of very high gross incomes to individuals. But this

[47] In countries like Argentina and Colombia, individuals primarily living off capital income typically characterize very top income groups. See Alvaredo (2010) and Londoño Veléz (2012).

depends on the legal definition of the tax base as well as the progressivity of the tax rates, which is itself dependent on discretionary legislation on tax schedules and the tax base. The current progressivity of top marginal income tax rates was questioned in Section 2.3 due to the relatively few income tax brackets and a relatively low top rate (see Figure 10). Despite Brazil having a top marginal tax rate comparable to rich countries in the 1980's, it currently lags behind OECD countries, including two of its regional peers, Chile and Mexico (see Figure 43).

Figure 43. Top marginal income tax rates in Brazil in a comparative perspective, 1900-2013

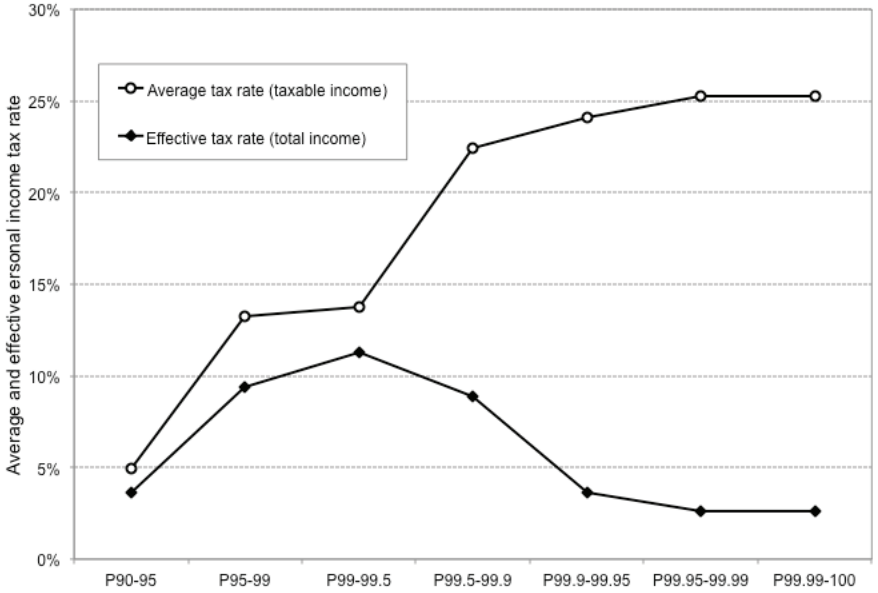


Sources: *Memória Receita Federal* for Brazil, Piketty (2014) for U.S., U.K. and France and OECD for Chile and Mexico.

As emphasized, the findings conveyed thus far, point towards a very limited definition of the tax base in Brazil, which can feed back into the effective progressiveness of the overall tax system. Figure 44 illustrates this by plotting the average income tax rate, on the portion of legally taxable income, and the effective income tax rate, on total income, for top income groups in Brazil in 2013. A very clear result emerges: the income tax schedule is regressive when the total income of top groups is considered. It can be seen that the average tax rate is progressive across

top groups, with richer individuals paying a higher fraction of their taxable income to the state (the average tax rate curve is positive sloping throughout the top of the distribution). However, when total income is considered as the denominator, progressivity falls beyond the top 0.5 per cent (the effective tax rate curve begins to have a negative slope above the percentile P99-99.5), since richer individuals pay a smaller fraction of their income. Moreover, it can be seen that the effective rate is extremely weak, being about 3 per cent for the top 0.01 per cent; while at the same time their average rate on their taxable income is in the range of 25 per cent.

Figure 44. Average and effective income tax rates for top groups in Brazil, 2013



Note: the average tax rate is calculated by dividing total net personal income tax liability (tax paid + tax due - tax refundable) by taxable income after legal deductions. The effective tax rate is calculated by dividing the same tax liability by total income (taxable income, non-taxable income and incomes taxed excl. at source), after deductions. Social contributions are excluded from the calculation due to the absence of data.
Sources: Table D.1.

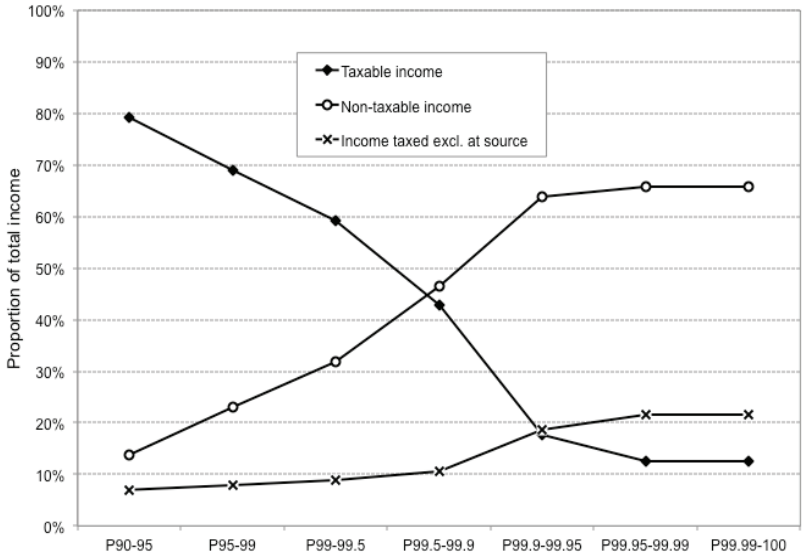
The extremely low tax burden for the ultra rich can explain why they account for such a large share of household sector income, as well as the highly limited redistributive capacity of the income tax in Brazil. Explaining the low effective tax liability is the inferred hypothesis that this paper has come to reveal, namely the large share of the income of the rich in Brazil that is not subject to the income tax.

Figure 45 helps to validate this hypothesis by depicting the extent of income subject to the income tax in Brazil in 2013. The pattern is consistent with what has been previously exposed – the taxable portion of income of individuals declines as one moves up the distribution. It can be seen that this decline is quite drastic. 80 per cent of the total income of the top 10-5 per cent of income recipients (P90-95) comprises of taxable income, that is income subject to the income tax. This proportion drops to 43 per cent for the top 0.5-0.01 per cent, before falling further to reach an extremely low level of 13 per cent for the top 0.01 per cent in the distribution. The counterpart to this decline is evidently the rise of income not subject to the income tax across the distribution, namely non-taxable or exempt income and income taxed exclusively at source. For the ultra rich, it can be observed that the majority of their income is not subject to the tax (above 60 per cent for individuals above the top 0.1 per cent in the distribution). This can be largely explained by the fact that profits and dividends are exempt from the income tax. The share of income taxed exclusively at source also rises with income, with the income of the top 0.01 per cent concentrating three times more incomes taxed at source than approximately the top 10-1 per cent. This can be explained by the fact that currently in Brazil capital gains are taxed exclusively at source.

One may think these tax trends to be a recent phenomenon in Brazil, especially since the tax reforms of the market liberalization period of the 1990's. However, on the basis of historical data available, this seems to be an erroneous conclusion. In fact, well before the Washington Consensus, Brazil had an extremely similar pattern of top incomes being subject the income tax as the one it has today. Figure 46 presents the case for 1983, when Brazil was still under military dictatorship. It be clearly seen that the share of taxable income in the total income of individuals across top groups in 1983 was almost identical to what it is 30 years later. Around 70 per cent of the income of the top 10-5 per cent was subject to the income tax. This share falls sharply over the upper parts of the distribution, accounting for

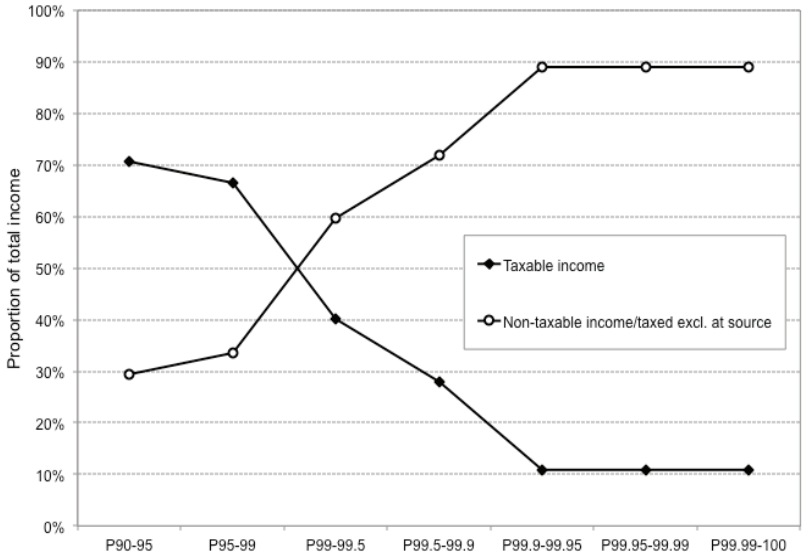
roughly one-tenth of the income of individuals within the top 0.1 per cent. Unfortunately, the data does not allow for a separation of non-taxable income from income taxed exclusively at source, whose combined share of total income reaches 90 per cent for those within the top 0.1 per cent of the distribution.

Figure 45. Taxable income across top groups in Brazil, 2013



Sources: Table D.2.

Figure 46. Taxable income across top groups in Brazil, 1983



Sources: Table D.2.

5.3 Comparing tax data and household surveys

All previous studies on the extent of income inequality and its relation to economic growth in Brazil (with the exception of this paper and Medeiros et al. 2015) have relied exclusively on household survey data, either to approximate the income share of different fractiles (deciles, quintiles, etc.) or the level of overall inequality captured in indices (Gini, Theil, etc.). Recent pursuits in the top incomes literature have ventured into the comparison between tax data and household survey data, in order to address the differences in their respective capacities to accurately approximate the distribution of income. This development has become an upmost priority in many regions, but none more so than in Latin America, where the use of surveys is probably most widespread (see Alvaredo, 2011; Londoño Vélez, 2012 and Burdín et al. 2014, for comparisons made in Argentina, Colombia and Uruguay respectively). Alongside comparisons made in developed regions (Burkhauser et al., 2012 for the U.S. for instance) the general consensus is that household surveys either completely miss information on the top of the distribution or severely under-report it when captured. The former may arise for a number of reasons, the most common being: random exclusion due to random sampling, deliberate exclusion (ex-post) due to minimize the bias in the estimates caused by extreme observations, and un-response by the rich (given that there is nothing at risk by refusing to cooperate). Under reporting even when the rich are captured in the surveys arise mainly because they may feel more uncomfortable with disclosing their income and wealth on a questionnaire (than on a tax form) or, even when they are willing to accurately disclose their income streams, the nature of their portfolios may be such that the total extent of their income is difficult to measure. Additional differences between household surveys and tax data may arise in their units of observation (households or individuals), in their definition of income (market income, gross income, net-after-tax income, etc.) and their population and income coverage.

These differences make it crucial to understand the degree to which tax data can say something about an aspect of income inequality that is not generally well captured in surveys, namely the summit of the distribution. This is even more important when changes in the inequality measured by surveys can be impacted by changes in top income shares as measured by tax data (Atkinson, 2007). Therefore, to fully evaluate income concentration in Brazil, the usefulness of survey data to study top income shares and the degree to which tax data can complement household surveys in approximating the overall distribution of income should be assessed. This requires us to avail of survey micro-data so as to be able to extract an equivalent distribution for the comparison with tax data.[48] Unfortunately, the necessary survey statistics to make such an assessment were not readily accessible to us at the time of writing.[49] Thus, the comparisons made in this Section are preliminary, and concern time series comparisons between our estimates using tax data and existing series using survey-related data.

Figure 47 presents different estimates for the income share of the top 10 per cent, including our estimates based on tax returns for gross total income and gross taxable income. It is apparent that the distribution of income and its dynamics in Brazil varies considerably according to the nature of the data used for the estimations, even for the top decile, whose income characteristics should be better represented in surveys than higher income groups.[50] For recent years, income concentration seemed to be declining since the early 2000's according to the widely cited household per capita income measure derived from Brazil's principle household survey, the *Pesquisa Nacional por Amostra de Domicílios* (PNAD), by the IBGE. On the contrary, tax data show a mildly increasing trend for taxable income and a

[48] Specifically, this means taking gross individual income from all sources, of all persons aged 15 and above.

[49] This will be a pursuit of future research.

[50] It should be borne in mind that the comparisons presented in Figures 47 and 48 do not relate to the same income concepts or population. See the notes to the two Figures.

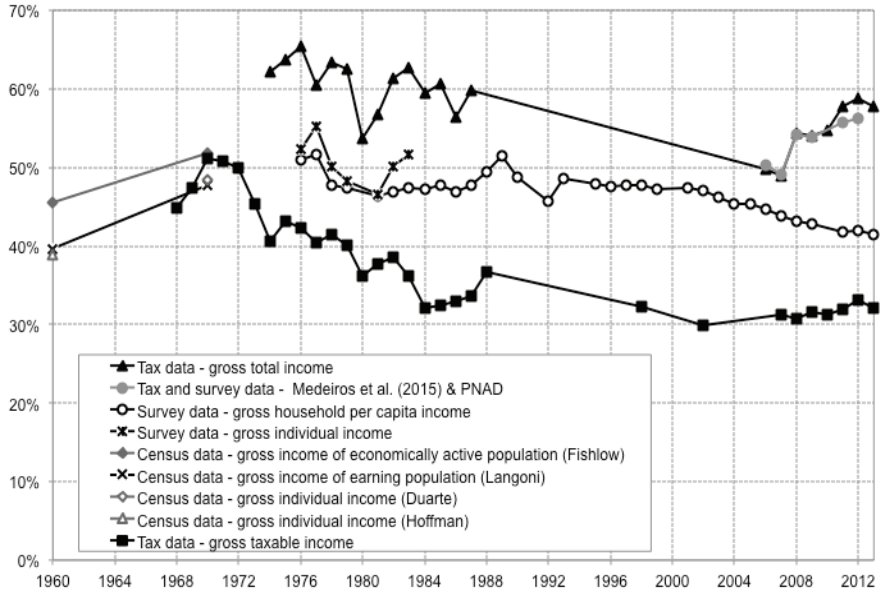
strongly increasing trend for total income. The difference in magnitudes between survey data estimates and tax data estimates (based on total income) is also stark and increasing due to the diverging trends, implying that using household surveys presents a highly distorted picture of the distribution.[51] Estimates made by Medeiros *et al.* (2015) from tax data on total income concentration begin at the top 5 per cent (due to their tabulations being less detailed), but they can be combined with survey data to approximate the an income share for the top 10 per cent. It can be seen that the resulting series is very similar to our estimates, with the exception of the last few years, where our series depicts a greater rise in inequality.

During the 1970's and 1980's, estimates from survey data continued to lie between the two tax-based estimates, although survey-based estimates on gross individual income appear to better approximate the short-run trends followed by tax-based estimates. Figure 47, also presents the most well known estimates made from Demographic Censuses 1960 and 1970, by independent researchers, as yearly household surveys were only carried out from 1976. These estimates, based on different populations, all show levels of concentration roughly similar to our taxed-based estimates for taxable income. The estimates by Langoni (1973) have received the most serious attention, since he had access to more detailed income tabulations in both censuses, as opposed to the other researchers who could only rely on summary tabulations based on smaller samples (Bacha & Taylor 1980).[52]

[51] The fact that tax data estimates based on taxable income are lower than the survey based estimate should not come as surprise, given that the latter includes capital income (although to a somewhat limited extent), remuneration in-kind, and transfer income, which are absent from the former.

[52] The 1960 sample used by Langoni comprised of almost 300,000 individuals, which equates to approximately 1.3 per cent of the active national population. This is roughly comparable to the number of taxpayers we have for adjacent years. However, his estimates generally suffer from a major source of underestimation, since he does not make any extrapolation into the open income bracket, basing his choice on the fact that he was working with individual census data. However, for these years the IBGE assumed that all individuals with incomes above the open-ended bracket were earned exactly Cr$ 1 above this threshold. Therefore, Langoni implicitly treats the open income bracket as if it were closed, leading to an underestimation of the shares (Bacha & Taylor, 1980). The other authors, meanwhile, used the Pareto function to extrapolate income into the open bracket.

Figure 47. Comparison of top 10% income share in Brazil by data source, 1960-2013



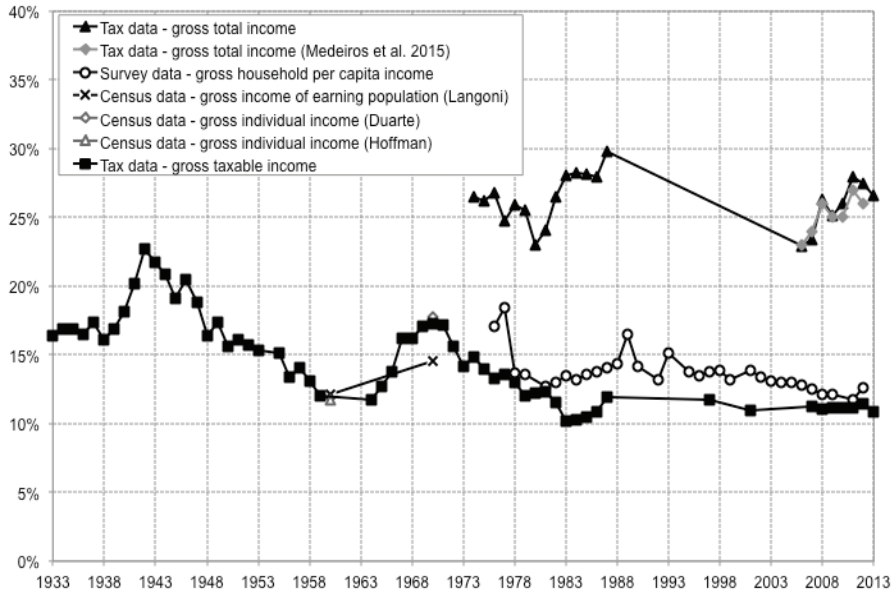
Notes: survey data income includes remuneration in-kind and transfer income, and excludes imputed rents and production for own-consumption. The individual income series estimates concern individuals aged 10 years and above. Census data income is total gross monetary income including transfers, and excluding in-kind remuneration, production for own consumption and imputed rent. The 'income earning population' is the 'economically active population' excluding individuals receiving zero income. The age cut-off in Census data is 10 years of age. Fishlow's 1970 estimates are based on preliminary results of the Demographic Census 1970. The tax and survey data combination, takes the top 5 per cent shares estimated by Medeiros *et al.* (2015) from tax data, and the top 10-5 per cent from household survey data, using total income of individuals aged 18 and over for the former and household per capita income for the latter. The tax-based estimates are based on the methodology described in Section 3.

Sources: author's calculation for tax data estimates; survey-based estimates from IPEA (http://www.ipeadata.gov.br/) and CEPAL (1986) for the individual income series; census-based estimates from Fishlow (1972), Langoni (1973), Duarte (1971) and Hoffman (1971).

Figure 48 displays similar comparisons but for the top percentile. The first difference that can be noticed with respect to Figure 47 is that survey-based estimates are much more prone to underestimate the actual share of the rich. This can be observed from the proximity between the shares derived from survey data and those derived from tax data on gross taxable income (as opposed to the larger difference between them depicted in Figure 47). Overall, it seems that surveys (whether yearly household surveys or decennial censuses) strongly underestimate the

true magnitude of top income shares, as well as misrepresenting their long-run dynamics. At least this is the picture from this preliminary comparison.

Figure 48. Comparison of top 1% income share in Brazil by data source, 1933-2013



Notes: survey data income includes remuneration in-kind and transfer income, and excludes imputed rents and production for own-consumption. Census data income is total gross monetary income including transfers, and excluding in-kind remuneration, production for own consumption and imputed rent. The 'income earning population' is the 'economically active population' excluding individuals receiving zero income. The age cut-off in Census data is 10 years of age. Estimates by Medeiros et al. (2015) are based on gross total income of individuals aged 18 and over without correction for deductions for expenses incurred to obtain the income. The tax data estimates are based on the methodology described in Section 3.
Sources: author's calculation for tax data estimates; survey-based estimates from IPEA (http://www.ipeadata.gov.br/); census-based estimates from Langoni (1973), Duarte (1971) and Hoffman (1971).

A more thorough comparison is made by Medeiros *et al.* (2015), who had access to survey micro-data to be able to construct equivalent distributions to those from their tax data. Specifically, the authors construct survey distributions based on individual income from all sources of persons aged 18 years and above, following the choices they made to build their tax-based estimates. They consistently find that between 2008 and 2012, survey-based estimates considerably underestimate the average income and the concentration at the top of the distribution. Interestingly, they also find that surveys consistently give lower values for the average income of

the complete distribution (not just that of top groups).[53] Table D.3 in the Appendix illustrates this, presenting their estimates for the thresholds and average income of different top groups, according to different data sources. In all cases, the survey-based values for the top 5 per cent are closer to those from tax data than the corresponding values for the top 1 per cent and top 0.1 per cent. This is consistent with the pictures obtained from Figures 47 and 48. Moreover, since our methods and estimates are similar to those by Medeiros *et al.* (2015) for recent years (see Figure 48), it is likely that a more meticulous comparison with survey micro-data would yield similar conclusions than those reached by the authors.[54]

5.4 Distribution and development: some implications of income concentration in Brazil

> There is a danger in simple analogies; in arguing that because an unequal income distribution in Western Europe in the past led to accumulation of savings and financing of basic capital formation, the preservation or accentuation of present income inequalities in the underdeveloped countries is necessary to secure the same result – Simon Kuznets (1955, p. 26).

In light of the magnitude and dynamics of Brazil's top income shares portrayed in the previous sections, an interesting next step is to examine their utility to the economy as a whole. In this section, we describe some broad implications that Brazil's income concentration has for its development policy. In the spirit of Kuznets

[53] Further research needs to be done on the relation between surveys, tax data and national accounts, in order to judge whether this discrepancy is a result of an underestimation by surveys, or an overestimation by tax data.

[54] In our case, survey based estimates would need to reflect our choice of tax units (persons aged 15 years and above minus the number of married women aged 15 and above not filing a tax form separating) and individual income from all sources (adjusted to account for expenses incurred to obtain the income).

(1955), and in the context of Brazil, we can ask whether a high concentration of income necessarily favours investment in productive capacities. The resulting picture is that income concentration is at the root of a paradox of investment in Brazil.

Figure 49 presents the ratio between total investment and the income share of the top 10 per cent in Brazil compared to the same ratio in other emerging and developing countries countries.[55] It can be seen that the rich in Brazil invest relatively little of their income share (either directly through private investment of indirectly through providing tax revenues for public investment) compared to their Asian counterparts. Despite South Korea and Brazil sharing similar levels of GDP per capita in 1980, the rich in South Korea invested three times more of their income than the rich in Brazil. Over the course of 30 years, the ratio in both countries decreased, as the income share of the rich rose, in the case of South Korea, or was maintained, as in the case of Brazil. The difference is that by 2010, South Korea progressed to become a high-income OECD country, while Brazil stagnated around middle-income levels, still burdened by high poverty levels. The Figure also presents ratios for China and India, both of whom had similar growth rates in the early 2000's to those of Brazil and South Korea during the 1970's. However, it appears that elites in both countries prefer to forgoe a higher share of income for greater economy-wide investment, which hints at the different way in which economic and political institutions are organised in these countries. It is no wonder then that Brazil has been far more reliant on Foreign Direct Investment (FDI) since 1990 than China, India or Korea (Palma, 2012).[56] Thus, the paradox of total investment in Brazil can be explained by the severe concentration of income, given that top income groups in

[55] This ratio is useful since it is reasonable to assume, without concrete evidence on the distribution of savings and investment, that the large majority of investment (particularly private investment) in underdeveloped countries is sourced from within the top 10 per cent of the income distribution. Readers should bear in mind that this is an approximation.

[56] Palma (2012) notes that these developments in Brazil seem to contradict one of the few historical legitimacies of capitalism, which is that 'the legitimacy of a small elite to appropriate such a large proportion of the social product rests on the capacity of this elite to develop society's productive forces' (p. 30).

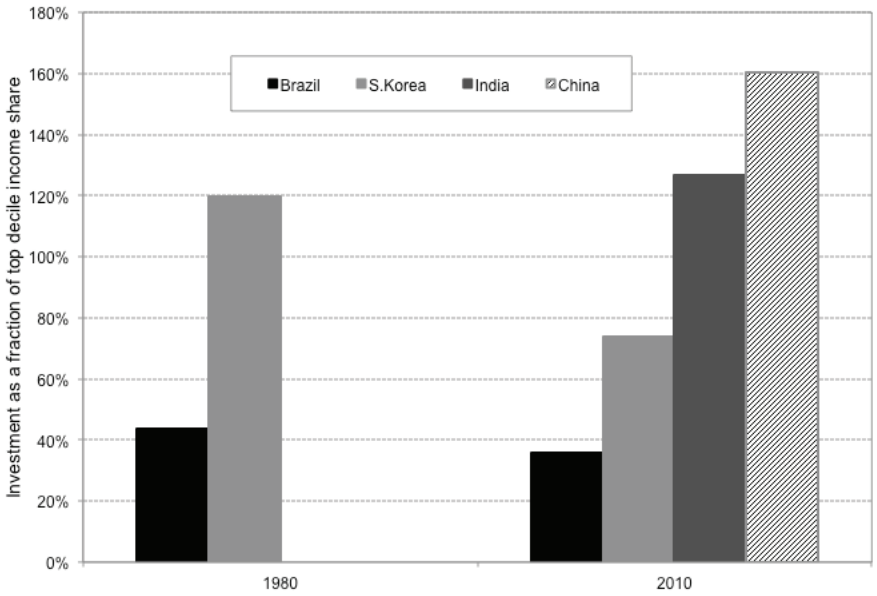
Brazil obtain twice as much of the income share than their relative Asian counterparts with half the investment.

From the paradox of total investment, we move to the paradox of public investment. The paradox is depicted in Figure 50. While Brazil has come to have developed-country levels of tax revenue, its levels of public investment have remained modest in comparison, especially since the 1980's. Part of the squeeze on investment comes from the country's debt service, whose interest payments make up over a fifth of the central governments yearly expenses (WDI, 2015). But a large share can be explained by the country's huge public expenditures, as conveyed in Figure 51. These expenditures, similar to OECD levels, are in principle intended for redistributive purposes as well as to support aggregate demand in the economy. It is interesting to observe that the majority of the expenditure, and its marked increase over time, is due to the large share of social assistance and social security transfers. Thus, one could interpret these dynamics as having their origin in the nature of Brazil's income distribution: high levels of income concentration have the result of implicitly 'ear-marking' a large share of public revenues into social spending, instead of into fixed capital formation, to which private wealthy individuals contribute relatively little despite them concentrating a relatively high share of household income. This can have the impact of accentuating concentration levels even further, if what is redistributed is merely cash rather than productive opportunities in the form of capital formation in public infrastructure, education and innovation.

While the rich in Brazil may not be investing directly in the economy as much as their shares of household income would indicate, the results revealed in Section 5.2 imply that, by having an extremely low effective tax burden, elites also escape investing indirectly in the economy via direct taxation. The implication is that if top income groups are not willingly investing enough in the domestic economy, either directly or indirectly, then the government should take on more responsibility by

increasing the tax liability of the rich.[57] This could have the effect of either generating more public revenues for investment purposes, or easing a concentration of income by incentivizing elites to invest in the economy.

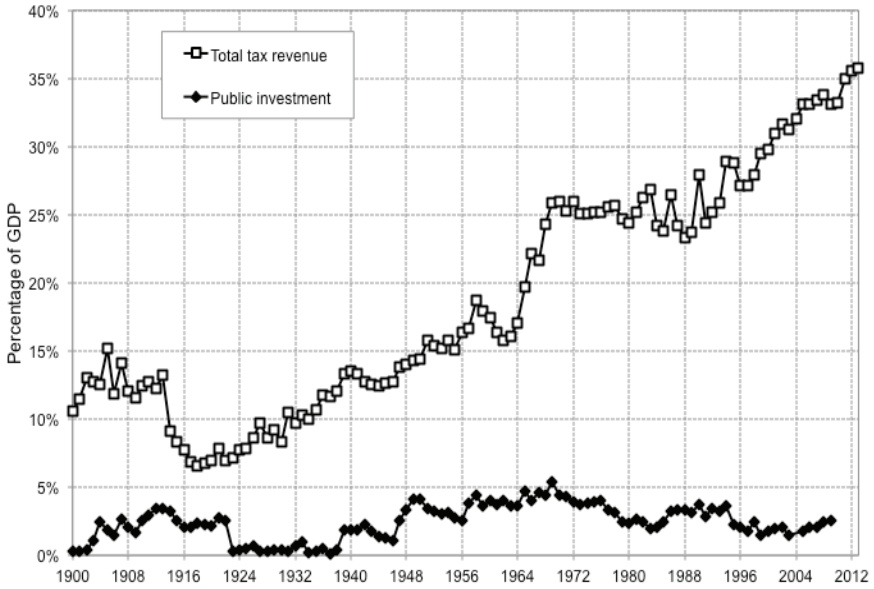
Figure 49. Total investment as a propotion of the income share of the top 10% in Brazil and selected countries, 1980 and 2010



Notes: Top decile share estimates for Brazil and Korea are based on tax data, while estimates for India and China are based on household surveys. Investment is measured by the total value of the gross fixed capital formation and changes in inventories and acquisitions less disposals of valuables for a unit or sector.
Sources: Top income shares: author's calculations for Brazil based on tax returns data; the WTID for Korea, WDI (World Bank) for China and India. Investment: IBGE for Brazil, IMF World Economic Outlook Database for Korea, China and India.

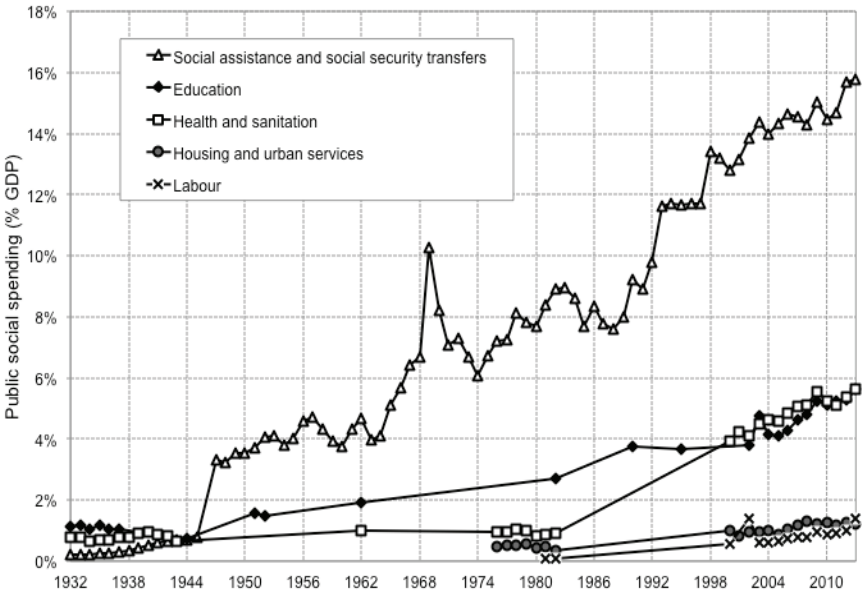
[57] In the case of Brazil this could either be done by increasing top tax rates on the rich or by eliminating many of the tax reliefs which are to their benefit, such as profits and dividends.

Figure 50. Total tax revenue and public investment in Brazil, 1900-2013



Sources: IBGE.

Figure 51. Evolution of public social spending components in Brazil, 1932-2013



Source: author's calculations using public expenditure data from the IBGE's *Anuário Estatístico do Brasil,* various years.

6. Concluding remarks

This study has shed light on the state of income distribution in Brazil by focusing on concentration at the top. It is the first to use tax data to analyse distributional matters in the country over the long-run. The results of the investigation confirm that Brazil remains one of the world's most unequal societies, with levels of concentration, based on tax records, unseen anywhere else, and top income recipients possessing average income levels comparable to those in the richest societies. Thus, while the consenses was set over Brazil's recent inequality decline, a key compenent of its 'success story', estimates based tax statistics reveal a more ominous horizon. Since at least 2006 income concentration has been increasing, almost reaching the peak of the late 1980's, when focusing the analysis on total income, rather than solely taxable income, which reveals a more stable evolution of inequality.

The discrepancy between taxable income shares and total income shares is a major finding of this study. The substantial difference between the two is evident from comparing their historical levels, but it is also revealed from the composition of top taxable incomes into its various sources. While the the study is limited in what it contributes towards interpretations of the long run dynamics of income shares, it does present the taxation of top incomes as a crucial step in understanding both the differences between the taxable and total income shares and the levels reached by the latter in Brazil. Moreover, the study uncovered some potential implications that top income shares have for the type of development a country follows. The interactions between top incomes, their relative tax burden and the investment dynamics of a country is worthy of future consideration.

Above, all this paper seeks to open the black box of Brazilian income distribution, in order to get a sense of some orders of magnitude and early economic implications, as well as encouraging future research avenues. Improvements could begin by revising our own methodological choices, so that they are based on the

firmest justifications, wherever possible. We also identify four further areas of research, channelled directly through this study, that could be pursued. First, a more detailed comparison between the estimates of tax data and the estimates of equivalent distributions in household surveys since the late 1970's is due, in order to thoroughly assess the relative capacities of each data source in capturing the 'true' distribution of income. The preliminary comparison made in this paper, certainly hints that surveys are prone to underestimate inequality in Brazil. Linked to this, is the necessity to carry out a cross-examination between the incomes in surveys, those in tax data and the income flows registered in national accounts.

Second, this study focused exclusively on the pre-tax distribution of income, citing explanations in taxation policy for the difference between taxable income shares and total income shares. Further work could look to estimate the after-tax distribution of income. This would allow for greater evaluation of the effectiveness of the Brazilian tax system.

Third, regional inequality in Brazil could be assessed using the statistics in tax records. This study availed of data for numerous Brazilian states, as well as the first Federal District (the city of Rio de Janeiro). How inequality developed across states as the country undertook rapid development from the 1930's could give more insights into interpretating the national trends.

Finally, future work could examine in greater detail the role of inflation in the determination of top income shares, as well as other social, political or economic deteminants. This study briefly dwelled upon Brazil's inflationary past, attaching importance to its effects for the distribution of income. But we know relatively little about the ways in which distributive conflicts can channel into being the source and/or the consequence of rising inflation and hyperinflation in particular scenarios. What we are coming to know with greater certainty is that Brazil's late-development has not freed itself from the shackles of a highly distorted distribution of income.

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Appendices

A. Calculation of the income tax in Brazil, 1924-2013

This section draws extensively from Da Nóbrega (2014).

The Federal Income Tax was created in Brazil in December 1922, for its first collection on incomes earned in 1923. This came after numerous previous efforts by public officials to institute the tax at the end of the monarchical empire in the late-19th century and at the beginning of the Republic in the early 20th century. The following section describes how the tax applied to incomes from 1924 to the present.[58]

1924-1925

Tax = progressive schedule over the net taxable income ('rendimento líquido') from each income category.

Net taxable income ('rendimento liquido') = taxable/gross income ('rendimento tributável'/ 'rendimento bruto') – deductions of each category of income.

Categories of income:

Category 1 – Income from business or any other industrial venture, excluding agriculture;

Category 2 – Income from capital and securities;

Category 3 – Public and private wages, financial aid, fees, bonuses, subsidies, pensions and any form of contractual remuneration;

[58] All specific dates mentioned below relate to tax years, that is to say, the year in which the tax revenue was collected, and not the year in which the income was earned.

Category 4 – Income from non-commercial sources and any income not sourced from the above categories.

1926-1960

The main feature if this period was that the income tax was made up of a schedular tax and a complementary tax.

Schedular tax = a percentage applied to the net taxable income of each income schedule ('cédula'), higher for capital income than labour income. Income is net of the deductions applicable to each schedule, e.g. commissions paid for brokerage in the case of receiving remuneration from financial investments or part of salaried remuneration given to a charitable fund.

Taxable income was classified in schedules (*cédulas*):

Cédula A: Business and industry;

Cédula B: Movable capital;

Cédula C: Salaries, dole money, fees, bonuses and pensions;

Cédula D: Non-commercial activity

Cédula E: Immovable capital;

Cédula F: Capital in the form of public debt/shares;

Cédula G: Agriculture and other extractive industries related to livestock and crops.

Example where the schedular tax is 900$:

Schedule	*Gross revenue (rendimento bruto)*	*Deduction*	*Net taxable income (rendimento liquido)*	*%*	*Schedular tax*
B	11,000 (interest)	1,000 (commission)	10,000	5	500
C	44,000 (salary)	4,000 (charitable donation)	40,000	1	400
Total	**55,000**	**5,000**	**50,000**	**-**	**900**

Complementary tax = a progressive tax schedule applied over net taxable income ('renda líquida').

'Renda líquida' = 'rendimento líquido' – 'abatimento' (allowances) – scheduler tax.

Total income tax = schedular tax + complementary tax.

Between 1948 and 1975 there was a discount that was applicable to those who paid the tax in full upon declaring their income.

1961-1964

As per above, except that total income tax payable = (scheduler tax + complementary tax) – tax paid or deducted at source.

1965-1967

In November 1964 the schedular income tax was abolished.

Total income tax payable = complementary tax – tax paid or deducted at source.

An additional cédula is added (Cédula H) for all types of income not attributed to the other cédulas.

Summary of taxable income:

Rendimento líquido = Rendimento bruto cedular - dedução cedular.

Renda bruta = Sum of rendimentos líquidos.

Renda líquida = Renda bruta – abatimentos.

Progressive income tax (complementary) = progressive schedule applied over renda líquida.

Payable income tax = progressive income tax – tax paid or deducted at source.

1968-1975

In 1972, a law was passed that granted fiscal incentives to persons making stock investments.

Tax payable/refundable = progressive income tax – tax paid/deducted at source – reduction for stock investments.

1976-1977

In 1976 the **simplified tax return** ('Modelo Simplificado Opcional') was introduced. The simplified return allowed for a **standard discount** ('desconto padrao') of 25% applying to incomes from cédula C, which substituted all deductions, including those previously applied to other cédulas. This measure was intended to promote employment. The final tax, net of tax paid/deduced at source, was corrected to compensate for inflation. It was also possible to reduce net tax payable at source, as a fiscal incentive, for contributors who received dividends and other bonuses in the base year from a publically traded corporation and which are included in cédula F. The incentive was optional.

Summary of taxable income:

Renda bruta = Rendimento bruto cedular – dedução cedular if the declaration is complete or **Renda bruta** = (declared income from cédula C – desconto padrão) + income from the other cédulas if the declaration is simplified.

Renda líquida = Renda bruta – abatimentos.

Tax due = Progressive schedule applied over renda líquida.

Net tax due ('Imposto líquido devido') = Imposto devido – reduçao/investimento.

Total payable/refundable tax = Imposto líquido devido – tax deducted at source – correction for inflation – dividends/bonus reduction.

1978-1980

From 1978 contributors could opt to have 25% of the profit from the sale of their shares added to their net tax payable ('impost líquido devido'). From 1980, 25% of the profit from the sale of a house could also be added as the net tax payable of a contributor.

Total payable income tax = Imposto líquido devido + tax on the profit from the sale of shares + tax on the profit from the sale of property (from 1980) – tax deducted at source – correction for inflation – dividends/bonus reduction.

1981-1986

Anticipated obligatory tax collection was introduced in this period, commonly know as '**carnê-leão**'. From 1981, the standard discount ('desconto padrão'), which was exclusively a feature of the simplified model, was included in the complete declaration.

Summary of taxable income in the complete declaration:

Renda bruta = Total rendimento bruto cedular – total dedução cedular or desconto padrão.

Renda líquida = Renda bruta – abatimentos or renda bruta – abatimentos permitted in the desconto padrão.

Tax = Progressive schedule applied over renda líquida.

Net tax due ('Imposto líquido devido') = Imposto devido – reduçao/investimento.

Total tax = Net tax + tax on the profit from the sale of shares + tax on the profit from the sale of property (from 1980)

Tax payable/refundable = Total tax – tax deducted at source corrected for inflation – 'carnê-leão' corrected for inflation.

Summary of taxable income in the simplified declaration:

Renda bruta = Income from cédula C – desconto padrão + income from other cédulas.

Renda líquida = Renda bruta – abatimentos permitted in the desconto padrão.

Tax = Progressive schedule applied over renda líquida.

Net tax due ('Imposto líquido devido') = Tax due – reduçao/investimento.

Tax payable/refundable = Net tax – tax deducted at source, corrected for inflation.

1987-1989

Due to the slowdown in inflation, the corrections applied to the tax deduction at source and the 'carnê-leão' were removed. On the tax file of 1987 any increase in exposed (risky) assets was subject to a rate of 3% added, in the filling of the complete declaration, to the net tax. On the tax file of 1989, a value of 15% of the net gain made in forward markets was include in the total tax take in the complete declaration.

Summary of taxable income in the complete declaration:

Renda bruta = Total rendimento bruto cedular – total dedução cedular desconto padrão.

Renda líquida = Renda bruta – abatimentos or renda bruta – abatimentos permitted in the desconto padrão.

Tax = Progressive schedule applied over renda líquida.

Net tax due ('Imposto líquido devido') = Imposto devido – reduçao/investimento.

Total tax = Net tax + tax on the profit from the sale of shares + tax on the profit from the sale of property + exposed assets (from 1987) + tax on operations in forward markets (from 1989).

Tax payable/refundable = Total tax – tax deducted at source – 'carnê-leão'.

Summary of taxable income in the simplified declaration:

Renda bruta = Income from cédula C – desconto padrão + income from other cédulas.

Renda líquida = Renda bruta – abatimentos permitted in the desconto padrão.

Tax = Progressive schedule applied over renda líquida.

Net tax due ('Imposto líquido devido') = Tax due – reduçao/investimento.

Tax payable/refundable = Net tax – tax deducted at source.

1990

The declaration statement for the year 1989, corresponding to the base year of 1988, was the last with taxable income and deductions ranked in cédulas, from A to H, a

division present since 1926. All legal provisions that authorize schedular deductions or rebates from gross income of the taxpayer for purposes of this tax were repealed.[59] From January 1 1989, the income tax changed from being due annually to being due monthly. It was based on gross income, without any deductions. The progressive tax schedule, passed from nine classes of gross income with rates from 10% to 45% in 1989 to three classes of gross income with rates from 10% to 25% in 1990. The declaration was made in two models: *'Declaração de Informações'*, where there was no calculation of the tax payable and the *'Declaração de Ajuste'*, which was more complex, and which required each contributor to fill twelve monthly assessments of income (*'Roteiros de Apuração Mensal'*) each year.

Summary of taxable income in the *Declaração de Ajuste:*

**Monthly tax balance in NCz$** = Tax payable in NCz$ according to the monthly assessments – payment made in NCz$.

Balance of each month in BTN = Tax balance of each month in NCz$ / monthly conversion rate (NCz$).

Adjustment result = Sum of monthly balances in BTN.

Tax payable = Adjustment result + tax calculated from rural activity – annual tax paid abroad.

Balance payable/refundable = Tax payable – reduction for encouraging culture (in the form of contributions or donations).

This complex tax reform did not give the expected results, so the exercise only lasted one tax year.

[59] '1982 a 1992 - O lançamento por homologação e o sistema de bases correntes', in *80 Anos De Imposto De Renda No Brasil 1922-2002, Um Enfoque Da Pessoa Física,* Pesquisa e texto do Auditor Fiscal da Receita Federal Cristóvão Barcelos da Nóbrega e propriedade da Secretaria da Receita Federal do Brasil.

1991-1992

In 1991, a law was passed returning the income tax calculation to an annual declaration system. Deductions from taxable income were allowed again in this new setup, which included expenditures not linked to the perception of income, previously called 'abatimentos'.

Summary of tax payable:

Tax base = Taxable income – deductions.

Tax due = applied schedule over the tax base + tax on rural activity (exclusively for the tax year 1992).

Tax balance payable = Tax due – tax deducted at source - carnê-leão and monthly allowance – tax paid abroad – TRD payment (exclusively for the tax year 1992).

Final balance payable/refundable (exclusively for the tax year 1991) = Tax balance payable + tax on rural activity + tax on capital gains + tax on equities.

1993

In 1993 two models were used: the **complete model** and the **optional model.**

Summary of the tax paid in the complete declaration:

Tax base = Taxable income – deductions.

Tax = Applied schedule over the tax base.

Tax due = Tax – incentives for promoting culture.

Tax payable/refundable = Tax due – tax deducted at source - carnê-leão - monthly allowance – tax paid abroad.

Summary of the tax paid in the optional declaration:

The calculation was the same as in the complete declaration, but the tax was not assessed in the declaration. If the taxpayer did not calculate the part independently, the tax payable or refundable could only be known after the electronic processing.

1994-2002

The main objective of the legislation surrounding personal income tax during these years was to ensure stability. The little legislation that was passed entailed minimal changes to the tax calculation. The simplified declaration, which was available until 1989, was re-introduced under different conditions in 1996.

Summary of the tax paid in the complete declaration:

Tax base = Taxable income – deductions.

Tax = Applied schedule over the tax base.

Tax due = Tax – incentive deduction (promoting culture, audio-visual activity and the statute of children and adolescence).

Tax payable/refundable = Tax due – tax deducted at source - carnê-leão - monthly allowance – tax paid abroad.

Summary of the tax paid in the simplified declaration (from 1996):

Tax base = Taxable income – simplified discount.

Tax due = Applied schedule over the tax base.

Tax payable/refundable = Tax due – tax paid abroad (until 2000) – tax deducted at source - carnê-leão - monthly allowance.

2003-2013

Between 2003 and 2013 the *declarações de ajuste anual tradicional* and *simplificada* were maintained. Concerning the latter the legislation specificed that all legal deductions were replaced by the simplified discount of 20% on taxable revenues up to certain limits which varied each year.

Summary of the tax caulculation in the *declaração de ajuste anual:*

Sum of taxable revenues (from firms, individuals, from abroad and from rural activity) – deductions = **Taxable base.**

Progressive schedule applied over the taxable base = **Tax due.**

Tax due – incentive deductions (child and adolescent estatue, culture, audiovisual activity, limited to 6% of the tax)) = **Tax due I.**

From tax year 2007: Tax due I – social security contributions by employers = Tax **due II.** Tax due II + tax due from revenues received in an accumulated fashion = **Total tax due.**

Total tax due – tax deducted at source – carnê-leão – complementary tax – tax paid abroad – tax withheld from revenues received in an accumulated fashion = **tax payable/refundable.**

Summary of the tax calculation in the *declaração de ajuste anual simplificada:*

Taxable revenues – simplified discount = **Tax base.**

Progressive schedule applied over the tax base = **Tax due.**

From 2007 : Tax due + tax due from revenues received in an accumulated fashion = **Total tax due.**

Total tax due – tax deducted at source – carnê-leão – complementary tax – tax paid abroad – tax withheld from revenues received cumutatively = **Tax payable/refundable.**

Table A.1. Incomes subject to exclusive/definitive taxation, 2013

	R$ billion
13th salary	67.15
Income from financial Applications	45.14
Capital gains on assets or royalties	38.05
Other income received by the Holder	0.00
Incomes received cumulatively	10.92
Net gains on equities	4.14
Other income received by dependents	0.00
Capital gains on assets bought in a foreign currency	0.58
13th salary received by dependents	0.16
Participation in profits or results	19.39
Others	13.23
Interest on own capital	8.55
Total value of excl. taxed income	**207.36**

Notes : These categories of income have been more or less the same since the late 1990's. In the years for which we have data prior to 1998, there is little or no available information to date on the nature of incomes taxed exclusively/definitevly.
Source : Table 19, *Grandes Números IRPF 2014*, Receita Federal

Table A.2. Exempted income and nontaxable incomes, 2013

	R$ billion
Study and research grant	2.26
Capital insurance policies or annuity paid for death ...	3.75
Other exempt and non-taxable of dependents	0.00
Indemnities for employment contract termination and FGTS	23.21
Gain on sale of assets and rights of small value ...	44.13
Profits and dividends received by the holder and by dependents	231.30
Exempted part of income corresponding to rural activities	33.05
Exempted part of retirement income of those 65 years / more	42.93

Pension, retirement / retirement for serious illness ...	33.55
Income from savings accounts and mortgage notes	20.69
Income of partners from a micro enterprise or small-scalled business	55.99
Property transfers - gift and inheritance	51.41
Other	58.12
Income tax previous calendar years compensated in current calendar year	0.06
75% of income from salaried work	0.60
Incorporation of reserves into the Capital / Bonuses in the form of shares	15.94
Benefits ind. and exp refund. Recv. Volunteer Fifa Subsidiary Fifa Brazil or Brazilian Organized Committee (LOC)	0.00
Scholarships and research characterized as donation received by medical residents	0.74
Liquid gains oper. c / gold, financial asset, the disposals carried out by the vlr. stipulated w / AC in each month	0.05
Liquid gains oper. merc. the sight of shares traded on the stock exchanges alien. made up vlr. stipulated w / AC	0.33
Recovery of losses in equity	0.29
Gross income, up to the max. 40%, the provision of serv. due to the transp. passengers	0.72
Gross income, up to the max. 60%, the provision serv. due to the transp. charge	0.00
Refund of Income tax from previous calendar years	1.61
Property transfer - sharecropping and dissolution of the conjugal society and pcs. home	8.03
Gross income, up to the max. 90%, the provision serv. due to the transp. charge	3.40
Total examepted income and nontaxable income:	**632.17**

Notes : These categories of income have been more or less the same since the late 1990's. In the years for which we have data prior to 1998, there is little or no available information to date on the nature of incomes conisdered exempt or non-taxable.
Source : Table 20, *Grandes Números IRPF 2014*, Receita Federal

B. Data sources

B.1. Tax statistics

Between 1933 and 1960, the sources of the tabulated income data for Brazil are taken from published tabulations from the *Anuário Estatístico do Brasil* (henceforth AEB) of the Instituto Brasileiro de Geografía e Estatística (IBGE). Since 1965 the data is sourced mostly from the *Anuário Econômico Fiscal* (AEF) and the *Imposto de Renda Pessoa Física* (IRPF), two publications of the *Receita Federal do Brasil* and its predecessors, all of which form part of the *Ministério de Fazenda,* the Brazilian Ministry of Finance. The data for 1998 and 2002 comes from economic studies of the income tax by the *Receita Federal.* Data for 2006 is taken from the study by Medeiros *et al.* (2015), while from 2007 the data comes from *Grandes Números IRPF*

Ano Calendário 2007-2013, a series of yearly tax reports from the *Receita Federal*. These sources, as well as the regions they correspond to in each year, are presented in Table 1. Although the income tax was first levied in Brazil on incomes of 1923, we can only avail of data from 1933.

Table B.1. Sources of the income tax data in Brazil, 1933-2013

Income year	Region	Source
1933	Federal District	AEB 1941/1945, p. 496-497, Table I.B.2.d.β
1934	Federal District	AEB 1946, p. 488-489, Table I.B.2.d.β
1935	Federal District	AEB 1946, p. 488-489, Table I.B.2.d.β
1936	Federal District	AEB 1946, p. 488-489, Table I.B.2.d.β
1937	Federal District	AEB 1946, p. 488-489, Table I.B.2.d.β
1938	Federal District	AEB 1946, p. 488-489, Table I.B.2.d.β
1939	Federal District	AEB 1946, p. 488-489, Table I.B.2.d.β
1940	Federal District	AEB 1946, p. 488-489, Table I.B.2.d.β
1941	Federal District	AEB 1946, p. 488-489, Table I.B.2.d.β
1942	Federal District	AEB 1946, p. 488-489, Table I.B.2.d.β
1943	Federal District	AEB 1946, p. 488-489, Table I.B.2.d.β
1944	Federal District	AEB 1946, p. 488-489, Table I.B.2.d.β
1945	Brazil, Federal District	AEB 1948, p. 489-490, Tables II.10.b & c
1946	Brazil, Federal District	AEB 1949, p. 570-571, 573, Tables II.10.b, c & e
1947	Brazil,Federal District	AEB 1949, p. 570-571, 573, Tables II.10.b, c & e
1948	Brazil, Federal District	AEB 1950, p. 496-498, Tables II.8.b & c
1949	Brazil, Federal District	AEB 1951, p. 506-508, Tables II.8.b & c
1950	Brazil, Federal District	AEB 1952, p. 514, 516-517, Tables II.8.b & c
1951	Brazil	AEB 1953, p. 444, Table II. 6 c
1952	Brazil	AEB 1954, p. 482, Table II.6.c
1953	Brazil	AEB 1955, p. 531, Table II.5.e
1954	Brazil	AEB 1956, p. 405, Table II.F.2.b
1955	Brazil	AEB 1957, p. 453, Table II.C.3.e.βγ
1956	Brazil	AEB 1958, p. 451, Table II.C.3.e.βγ
1957	Brazil	AEB 1959, p. 437, Table II.B.3.e.βγ
1958	Brazil	AEB 1960, p. 378, Table II.G.2.c

1959	Brazil	AEB 1961, p. 424, Table II.G.2.c
1960	Brazil	AEB 1962, p. 341, Table II.G.2.a
1961	N.a	N.a
1962	N.a	N.a
1963	N.a	N.a
1964	N.a	N.a
1965	Brazil	Boletin Estadistico N 28, Abril 1968. Departamento do IR. Divisao do IR. Servicio de Controle e Estatistica,. Tabla 33
1966	States of Guanbara & São Paulo	Boletin Estadistico do Departamento do IR - MF - numeros 31 (julho/68) e 32 9agosto/68), Tabela 24
1967	Brazil	Imposto sobre a Renda e Proventos de qualquer natureza 1968. Centro de Informacoes Economico-Fiscais, Tabla 35
1968	Brazil	AEF 1970, p. 110-116, 6.3.45 - 6.3.50
1969	Brazil	AEF 1971, p. 162-166, 167, 178, 179, 8.2.2.6-13, 8.2.2.14, 8.2.2.36
1970	Brazil	AEF 1972, p. 99, 122, 142-145, 8.2.1.2, 8.2.1.55-62
1971	Brazil	AEF 1973, p. 153-158, 201-204, 8.2.1.2, 8.2.1.55-62
1972	Brazil	AEF 1974, p. 138-148, 220-226, 8.2.1.2, 8.2.1.55-62
1973	Brazil	AEF 1975, p. 141-146, 196-203, 8.2.1.2, 8.2.1.52-59
1974	Brazil	AEF 1976, p. 132, 220-227, 8.2.1.2, 8.2.1.70-77
1975	Brazil	AEF 1977, p. 170, 185, 301-308, 8.2.1.2, 8.2.1.14, 8.2.128-134
1976	Brazil	AEF 1978, p. 192, 206, 321-328, 8.2.2, 8.2.1.14, 8.2.128-134
1977	Brazil	AEF 1979, p. 472, 485, 615-618
1978	Brazil	IRPF 1979, p. 23, 205
1979	Brazil	IRPF 1980, p. 23, 179
1980	Brazil	IRPF 1981, p. 21, 209
1981	Brazil	IRPF 1982, p. 21, 217, 226, 235
1982	Brazil	IRPF 1983, p. 21, 217, 226, 235
1983	Brazil	IRPF 1984, p. 21, 217, 226, 235
1984	Brazil	IRPF 1985, p. 23, 251, 260, 269
1985	Brazil	IRPF 1986, p. 165, 393, 402, 411
1986	Brazil	IRPF 1987, p. 161, 391, 400, 409
1987	Brazil	IRPF 1988, p. 157, 385, 394, 403
1988	Brazil	IRPF 1989, p. 158, 338, 344, 350
1989	N.a	N.a
1990	N.a	N.a
1991	N.a	N.a
1992	N.a	N.a
1993	N.a	N.a
1994	N.a	N.a
1995	N.a	N.a
1996	N.a	N.a
1997	N.a	N.a

1998	Brazil	*Análise Econômica da DIRPF 1999*. Secretaria da Receita Federal, Ministério de Fazenda, Brasilía - Agosto 2000, p. 11, Quadro 05
1999	N.a	N.a
2000	N.a	N.a
2001	N.a	N.a
2002	Brazil	*O Imposto de Renda das Pessoas Físicas no Brasil*, Estudios Tributários 14, Receita Federal, Brasília - Dezembro 2004, p.5, Table 03
2003	N.a	N.a
2004	N.a	N.a
2005	N.a	N.a
2006	Brazil	Medeiros *et al.* (2015), Appendix II, p. 33-34.
2007	Brazil	*Grandes Números IRPF 2008*, Receita Federal, Table 7 & Table 9
2008	Brazil	*Grandes Números IRPF 2009*, Receita Federal, Table 7 & Table 9
2009	Brazil	*Grandes Números IRPF 2010*, Receita Federal, Table 7 & Table 9
2010	Brazil	*Grandes Números IRPF 2011*, Receita Federal, Table 7 & Table 9
2011	Brazil	*Grandes Números IRPF 2012*, Receita Federal, Table 7 & Table 9
2012	Brazil	*Grandes Números IRPF 2013*, Receita Federal, Table 7 & Table 9
2013	Brazil	*Grandes Números IRPF 2014*, Receita Federal, Table 7 & Table 9

Note: 'N.a' means 'not available'.

B.2. Control total for population

Given the ambiguities in the income tax legislation with respect to the nature of the tax unit, we assume that the income tax is largely based on married couples. However, we make adjustments for years with data on the numbers of married women filing separate tax returns. Thus, we compute total tax units as all individuals in the resident population aged 15 and over, minus the number of married women aged 15 and over that do not file a separate tax return for the years in which this can be observed. The sources of population estimates for Brazil are mainly drawn from AEB 2013, which presents estimates from censuses carried out in 1940,

1950, 1960, 1970, 1980, 1991, 1996, 2000 and 2010. Outside of the census years, our estimates are constructed by linearly interpolating the average yearly population growth rates observed between the decades to the unobserved years. Between 1934 and 1940 we assume that the average yearly growth rate observed between 1940 and 1950 was maintained. The Federal District's population estimates are sourced from AEB 1941/45 and AEB 1951, which include estimtates for the region's population in the census years 1940 and 1950. Outside of these years we relied on linear extraoplations and interpolations of the observed ratio between the total population of the Federal District and the total population of the whole country. We assume that these ratios also apply to the total number of tax units. Table B.2 reports all of these estimates.

Table B.2. Reference totals for population in Brazil and the Federal District, 1933-2014

	Brazil								Federal District		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Year	Total population ('000s)	Adult population 15+ ('000s)	Married women 15+ ('000s)	Married women 15+ filing separately ('000s)	Tax units ('000s)	# Tax returns ('000s)	[4]/[6] (%)	[6]/[5] (%)	Total population ('000s)	Tax units ('000s)	# Tax returns ('000s)
1930	32,395	18,465	4,535		13,930						
1931	33,178	18,911	4,645		14,267						
1932	33,980	19,369	4,757		14,611						
1933	34,802	19,837	4,872		14,965	31		0.2	1,462	629	11
1934	35,643	20,317	4,990		15,327	35		0.2	1,497	644	12
1935	36,505	20,808	5,111		15,697	42		0.3	1,533	659	14
1936	37,388	21,311	5,234		16,077	47		0.3	1,570	675	16
1937	38,292	21,826	5,361		16,465	57		0.3	1,608	692	20
1938	39,217	22,354	5,490		16,863	79		0.5	1,647	708	27
1939	40,166	22,894	5,623		17,271	93		0.5	1,687	725	32
1940	41,236	23,505	6,332		17,173	105		0.6	1,764	735	36
1941	42,307	24,115	6,496		17,619	112		0.6	1,810	754	38
1942	43,406	24,741	6,665		18,076	128		0.7	1,857	773	44
1943	44,533	25,384	6,838		18,545	134		0.7	1,905	793	46
1944	45,689	26,043	7,016		19,027	175		0.9	1,955	814	60
1945	46,876	26,719	7,198		19,521	118		0.6	2,005	835	41
1946	48,093	27,413	7,385		20,028	171		0.9	2,057	857	59
1947	49,342	28,125	7,577		20,548	172		0.8	2,111	879	58
1948	50,623	28,855	7,773		21,082	201		1.0	2,166	902	66
1949	51,938	29,604	7,975		21,629	236		1.1	2,222	925	88

1950	51,944	29,608	7,976		21,632	275		1.3	2,377	990	90
1951	53,603	30,554	8,231		22,323	249		1.1			
1952	55,315	31,530	8,494		23,036	277		1.2			
1953	57,081	32,536	8,765		23,771	309		1.3			
1954	58,904	33,575	9,045		24,530	192		0.8			
1955	60,785	34,648	9,334		25,314	262		1.0			
1956	62,727	35,754	9,632		26,122	288		1.1			
1957	64,730	36,896	9,940		26,956	340		1.3			
1958	66,797	38,074	10,257		27,817	264		0.9			
1959	68,930	39,290	10,585		28,705	358		1.2			
1960	70,191	40,009	10,778		29,231	116		0.4			
1961	72,278	41,198	11,099		30,100						
1962	74,426	42,423	11,428		30,994						
1963	76,638	43,683	11,768		31,915						
1964	78,915	44,982	12,118		32,864						
1965	81,261	46,319	12,478		33,841	371		1.1			
1966	83,676	47,695	12,849		34,846						
1967	86,163	49,113	13,231		35,882	458		1.3			
1968	88,724	50,573	13,624	112	37,060	4,403	2.5	11.9			
1969	91,361	52,076	14,029	178	38,225	6,288	2.8	16.4			
1970	93,139	53,089	14,302	231	39,018	8,151	2.8	20.9			
1971	95,490	54,429	14,663	265	40,032	9,612	2.8	24.0			
1972	97,901	55,804	15,033	255	41,025	10,651	2.4	26.0			
1973	100,372	57,212	15,413	354	42,154	11,738	3.0	27.8			
1974	102,906	58,657	15,802	489	43,344	13,238	3.7	30.5			
1975	105,504	60,137	16,201	201	44,137	5,021	4.0	11.4			
1976	108,167	61,655	16,610	252	45,298	5,503	4.6	12.1			
1977	110,898	63,212	17,029	319	46,502	6,130	5.2	13.2			
1978	113,698	64,808	17,459	416	47,765	6,917	6.0	14.5			
1979	116,568	66,444	17,900	519	49,063	7,310	7.1	14.9			
1980	119,003	72,592	18,273	551	54,870	7,005	7.9	12.8			
1981	121,321	74,006	18,630	585	55,961	6,895	8.5	12.3			
1982	123,685	75,448	18,992	634	57,090	7,099	8.9	12.4			
1983	126,095	76,918	19,363	655	58,211	6,852	9.6	11.8			
1984	128,552	78,416	19,740	715	59,392	7,456	9.6	12.6			
1985	131,056	79,944	20,124	830	60,649	8,335	10.0	13.7			
1986	133,610	81,502	20,516	857	61,842	8,110	10.6	13.1			
1987	136,213	83,090	20,916	1,026	63,199	9,147	11.2	14.5			
1988	138,867	84,709	21,324	1,005	64,390	8,548	11.8	13.3			
1989	141,572	86,359	21,739		66,551						
1990	144,330	93,815	22,163		68,784						
1991	146,825	95,437	22,546		71,091						
1992	148,533	96,546	22,808		73,477						
1993	150,260	97,669	23,073		75,942						
1994	152,008	98,805	23,342		78,490						
1995	153,775	99,954	23,613		81,123						
1996	157,070	106,808	24,119		83,845						
1997	159,616	108,539	24,510		86,659						
1998	162,203	110,298	24,907	2,764	88,155	11,056	25.0	12.5			

1999	164,832	112,086	25,311		90,298			
2000	169,799	115,463	26,074		92,493			
2001	171,704	120,193	26,366		94,742			
2002	173,631	121,542	26,662	3,991	98,871	15,966	25.0	16.1
2003	175,579	122,905	26,961		100,026			
2004	177,549	124,284	27,264		101,195			
2005	179,541	125,679	27,569		102,378			
2006	181,556	127,089	27,879	5,438	104,648	21,752	25.0	20.8
2007	183,593	128,515	28,192	6,306	106,629	25,225	25.0	23.7
2008	185,652	129,957	28,508	6,443	107,892	25,772	25.0	23.9
2009	187,736	131,415	28,828	6,096	108,683	24,384	25.0	22.4
2010	190,756	144,824	29,292	5,991	121,523	23,963	25.0	19.7
2011	192,436	146,099	29,550	6,225	122,774	24,898	25.0	20.3
2012	194,029	147,309	29,794	6,468	123,983	25,874	25.0	20.9
2013	195,547	148,461	30,027	6,624	125,057	26,494	25.0	21.2
2014	197,075	149,621	30,262		126,558			

Notes: The Federal District is the city of Rio de Janeiro.

Sources: population estimates for Brazil for census years are taken from AEB 2013, Table 2.1.1.1. Married women aged 15+ are taken from footnote 10 to Table 2.1.1.1, except for the 1950 estimates, which is taken from AEB 1955, p. 29. The number of tax returns for Brazil prior to 1945 is estimated from the average ratio observed between the number of Federal District tax returns and the number of tax returns in Brazil between 1945 and 1950. Population estimates for the Federal District for census years are taken AEB 1941/45, p. 24 and AEB 1951, p. 24.

B.3. Control total for income

The control total for income can be arrived at using one of two different procedures. One can begin from the income reported in tax statistics and add the incomes of tax units not covered in the statistics, or one can obtain an estimate of total personal income directly from national accounts (Atkinson, 2007). Given the limited coverage of the personal income tax in Brazil, this study follows the first approach. A benefit of using the national accounts procedure is that the resulting estimates are likely to be more comparable with those of other countries.

Using the System of National accounts of the IBGE, we estimated total personal income for the years 2000-2011 as follows:

Control total for income =

[1] Balance of households' primary incomes

+ [2] Social benefits other than in-kind social transfers

– [3] Employers' actual social contributions

– [4] Employees' and self-employed actual social contributions

– [5] Imputed social contributions

– [6] Attributed property income of insurance policyholders

– [7] Imputed rents for owner occupied housing

– [8] Fixed capital consumption of households.[60]

Brazilian national accounts do not present information for fixed capital consumption of households. As a result, we have taken 5 per cent of gross values, as in Colombia (Londoño Vélez, 2012). This procedure yields an average reference income for the years 2000-2011 of 60 per cent of GDP. Due to the unavailability of detailed National accounts data for the period prior to the 2000's and given the long timespan of our data, we decided to set the control total for income at 60 per cent of GDP for the entire period 1933-2013. Table B.3 presents the income control estimates used for Brazil.

For the years in we only have income tax data for the Federal District the income control total was calculated using the share of total net taxable income after allowances and deductions (*renda liquida*) of the Federal District in total net taxable income of Brazil for the years 1945-1950, and share of total income tax revenue of the Federal District in total income tax revenue of Brazil for the years 1933-1944. The total household income for the Federal District was then calculated by multiplying these shares by the total hosuehold income of Brazil. We thus assume that the relationship between the total household income of the Federal District and that of Brazil is apporximately proportional to the relationship between the total net taxable incomes of the two regions, or where this is not available to the relationship between

[60] Variables [1]-[6] are sourced from the *Contas Econômicas Integradas* (CEI), while variable [7] is taken from *Tabelas de Recursos e Usos* (TRU), from the IBGE's System of National accounts (reference 2000 and 2010).

total income tax revenue of the regions, which seems to be a close proxy for net taxable income. Table B.4 displays the income control estimates for the Federal District.

Table B.3. Reference totals for income and inflation in Brazil, 1930-2014

	Income									Inflation (GDP deflator)	
Year	[1] Total income (th. million current Reais)	[2] Total income (th. million 2014 Reais)	[3] GDP (th. million 2014 Reais)	[4] Total income /GDP (%)	[5] Income per tax unit (2014 Reais)	[6] Income per adult (2014 Reais)	[7] Exempted income tax threshold (2014 Reais)	[8] [7]/[5] (%)	[9] Average monthly min. wage x 12 (2014 Reais)	[10] CPI (2014 base)	[11] Inflation rate (%)
1930	6E-15	23	38	60.0	1,658	1,251	14,829	894		0.0	1.4
1931	5E-15	20	33	60.0	1,376	1,038	14,636	1,064		0.0	1.3
1932	5E-15	21	34	60.0	1,406	1,061	14,445	1,027		0.0	1.3
1933	6E-15	22	36	60.0	1,445	1,090	14,259	987		0.0	1.3
1934	6E-15	25	41	60.0	1,620	1,222	14,060	868		0.0	1.4
1935	7E-15	26	44	60.0	1,674	1,263	13,852	827		0.0	1.5
1936	8E-15	29	49	60.0	1,831	1,381	13,619	744		0.0	1.7
1937	9E-15	33	55	60.0	2,010	1,516	13,373	665		0.0	1.8
1938	1E-14	35	58	60.0	2,079	1,569	15,743	757		0.0	1.9
1939	1E-14	36	60	60.0	2,078	1,567	15,443	743		0.0	1.9
1940	1E-14	37	62	60.0	2,169	1,584	15,131	698	7,810	0.0	2.1
1941	1E-14	42	70	60.0	2,390	1,746	14,797	619	7,116	0.0	2.3
1942	1E-14	46	77	60.0	2,567	1,875	14,421	562	6,390	0.0	2.6
1943	2E-14	57	95	60.0	3,077	2,248	14,023	456	6,309	0.0	2.8
1944	2E-14	72	120	60.0	3,773	2,757	13,596	360	6,611	0.0	3.1
1945	3E-14	82	137	60.0	4,207	3,073	26,252	624	5,642	0.0	3.6
1946	3E-14	101	168	60.0	5,033	3,677	25,191	501	4,877	0.0	4.2
1947	4E-14	107	178	60.0	5,204	3,802	23,898	459	3,975	0.0	5.4
1948	5E-14	117	195	60.0	5,539	4,047	22,566	407	3,814	0.0	5.9
1949	5E-14	126	210	60.0	5,828	4,258	20,837	358	3,552	0.0	8.3
1950	6E-14	135	224	60.0	6,219	4,543	19,081	307	3,400	0.0	9.2
1951	8E-14	141	235	60.0	6,315	4,614	20,196	320	3,012	0.0	18.1
1952	9E-14	152	253	60.0	6,577	4,806	18,478	281	8,117	0.0	9.3
1953	1E-13	159	265	60.0	6,694	4,891	16,237	243	7,172	0.0	13.8
1954	1E-13	171	286	60.0	6,989	5,106	21,292	305	8,977	0.0	27.1
1955	2E-13	186	310	60.0	7,358	5,376	19,044	259	10,009	0.0	11.8
1956	2E-13	192	320	60.0	7,343	5,365	18,640	254	10,011	0.0	22.6
1957	3E-13	207	344	60.0	7,664	5,599	16,540	216	10,606	0.0	12.7
1958	3E-13	229	381	60.0	8,226	6,010	22,073	268	9,340	0.0	12.4
1959	5E-13	251	419	60.0	8,751	6,394	16,242	186	11,418	0.0	35.9
1960	7E-13	275	458	60.0	9,403	6,870	34,539	367	10,029	0.0	25.4
1961	1E-12	298	497	60.0	9,910	7,240	35,898	362	11,514	0.0	34.7
1962	2E-12	318	530	60.0	10,268	7,502	23,916	233	9,593	0.0	50.1
1963	3E-12	320	534	60.0	10,033	7,330	20,109	200	9,275	0.0	78.4

1964	6E-12	330	551	60.0	10,055	7,346	21,178	211	10,403	0.0	89.9
1965	9E-12	340	567	60.0	10,046	7,339	19,921	198	9,198	0.0	58.2
1966	1E-11	363	605	60.0	10,412	7,607	19,263	185	7,782	0.0	37.9
1967	2E-11	378	630	60.0	10,539	7,700	19,787	188	7,226	0.0	26.5
1968	3E-11	415	692	60.0	11,204	8,211	21,031	188	7,232	0.0	26.7
1969	3E-11	454	757	60.0	11,890	8,728	21,013	177	6,930	0.0	20.1
1970	4E-11	501	835	60.0	12,844	9,439	21,663	169	6,820	0.0	16.4
1971	6E-11	558	930	60.0	13,937	10,250	21,772	156	6,819	0.0	19.4
1972	8E-11	624	1,041	60.0	15,219	11,188	22,818	150	6,846	0.0	19.9
1973	1E-10	711	1,186	60.0	16,878	12,435	24,788	147	6,985	0.0	29.6
1974	2E-10	769	1,282	60.0	17,753	13,119	23,924	135	6,824	0.0	34.6
1975	2E-10	809	1,349	60.0	18,339	13,460	33,421	182	7,172	0.0	33.9
1976	4E-10	892	1,487	60.0	19,703	14,475	31,953	162	7,172	0.0	41.2
1977	5E-10	937	1,561	60.0	20,139	14,815	29,614	147	7,219	0.0	45.4
1978	8E-10	983	1,639	60.0	20,585	15,172	29,447	143	7,236	0.0	38.2
1979	1E-09	1,049	1,749	60.0	21,390	15,795	27,640	129	7,200	0.0	54.4
1980	3E-09	1,157	1,928	60.0	21,078	15,932	22,499	107	7,283	0.0	90.4
1981	5E-09	1,107	1,845	60.0	19,781	14,958	21,357	108	7,257	0.0	100.6
1982	1E-08	1,116	1,861	60.0	19,554	14,796	20,715	106	7,355	0.0	101.0
1983	2E-08	1,084	1,806	60.0	18,615	14,087	17,897	96	6,642	0.0	131.5
1984	8E-08	1,142	1,904	60.0	19,232	14,566	15,421	80	6,067	0.0	201.7
1985	3E-07	1,232	2,053	60.0	20,314	15,411	14,525	71	6,293	0.0	248.5
1986	8E-07	1,325	2,208	60.0	21,422	16,254	13,616	64	6,513	0.0	149.1
1987	2E-06	1,372	2,287	60.0	21,709	16,512	15,569	72	5,328	0.0	206.1
1988	2E-05	1,371	2,285	60.0	21,293	16,186	17,538	82	5,515	0.0	628.0
1989	3E-04	1,414	2,357	60.0	21,252	16,377	6,034	28	5,515	0.0	1,304.5
1990	7E-03	1,424	2,373	60.0	20,699	15,176	24,554	119	4,140	0.0	2,595.6
1991	4E-02	1,438	2,397	60.0	20,233	15,072	18,712	92	3,926	0.0	416.7
1992	4E-01	1,431	2,384	60.0	19,470	14,818	16,232	83	4,243	0.0	969.0
1993	8	1,501	2,502	60.0	19,765	15,368			4,680	0.6	1,996.2
1994	210	1,589	2,648	60.0	20,243	16,081			3,836	13.2	2,240.2
1995	423	1,809	3,015	60.0	22,297	18,096	37,610	169	3,834	23.4	77.5
1996	506	1,847	3,079	60.0	22,034	17,297	39,402	179	3,999	27.4	17.1
1997	563	1,911	3,184	60.0	22,047	17,603	36,619	166	4,101	29.5	7.6
1998	588	1,912	3,187	60.0	21,688	17,334	35,143	162	4,266	30.7	4.2
1999	639	1,916	3,194	60.0	21,223	17,098	32,390	153	4,305	33.3	8.5
2000	708	1,998	3,331	60.0	21,607	17,308	30,499	141	4,452	35.4	6.2
2001	781	2,024	3,374	60.0	21,365	16,841	27,981	131	4,857	38.6	9.0
2002	887	2,077	3,462	60.0	21,008	17,089	29,740	142	4,981	42.7	10.6
2003	1,020	2,101	3,502	60.0	21,008	17,098	26,157	125	5,016	48.5	13.7
2004	1,165	2,222	3,704	60.0	21,959	17,880	24,219	110	5,202	52.4	8.0
2005	1,288	2,293	3,821	60.0	22,394	18,242	24,856	111	5,565	56.2	7.2
2006	1,422	2,382	3,970	60.0	22,764	18,744	25,121	110	6,347	59.7	6.2
2007	1,597	2,527	4,211	60.0	23,695	19,660	24,943	105	6,730	63.2	5.9
2008	1,819	2,658	4,430	60.0	24,636	20,453	24,067	98	6,937	68.4	8.3
2009	1,944	2,649	4,415	60.0	24,373	20,157	23,462	96	7,438	73.4	7.2
2010	2,262	2,849	4,749	60.0	23,446	19,674	22,659	97	7,833	79.4	8.2
2011	2,486	2,926	4,877	60.0	23,834	20,029	22,130	93	7,840	84.9	7.0
2012	2,635	2,946	4,910	60.0	23,762	19,999	21,962	92	8,501	89.5	5.3

2013	2,903	3,073	5,121	60.0	24,569	20,696	21,730	88	8,710	94.5	5.6
2014	3,164	3,164	5,273	60.0	25,001	21,147			8,796	100.0	5.8

Notes: The Federal District is the city of Rio de Janeiro. Income per adult is the average income of all individuals aged 15 and over.
Sources: GDP: 1907-1946 from IBGE National accounts (SCN51), 1947-2012 from IBGE National accounts (SCN52); 2013 from AEB 2013, Tabela 7.5.1.2; 2014 is estimated from growth rate observed between 2012 and 2013. GDP deflator 1947-2012: IBGE. Prior to 1947 and post-2012 the deflator was estimated from the percentage change in the inflation rate from Global Financial Data. Exempted income tax thresholds: *Memória Receita Federal*. Real minimum wage: the *Instituto de Pesquisa Econômica Aplicada* (IPEA).

Table B.4. Reference totals for income in the Federal District of Brazil, 1933-1950

Year	[1] Income tax revenue Federal District/income tax revenue Brazil (%)	[2] Source	[3] Total net income of Federal District/total net income of Brazil (%)	[4] Source	[5] Total income (million current Reais)	[6] Total income (million 2014 Reais)
1933	41	AEB 1938, p. 358			2.28E-12	8,948
1934	40	AEB 1938, p. 358			2.55E-12	9,845
1935	39	AEB 1938, p. 358			2.67E-12	10,183
1936	38	Average of 1936 and 1938			2.97E-12	11,126
1937	39	AEB 1939-40, p. 521			3.50E-12	12,888
1938	40	AEB 1941-45, p. 485			3.90E-12	14,055
1939	41	AEB 1946, p. 475			4.19E-12	14,841
1940	40	AEB 1946, p. 475			4.25E-12	14,752
1941	42	AEB 1946, p. 475			5.25E-12	17,799
1942	38	AEB 1946, p. 475			5.33E-12	17,600
1943	36	AEB 1946, p. 475			6.32E-12	20,314
1944	34	AEB 1948, p. 478			7.85E-12	24,460
1945	36	AEB 1948, p. 478	35	AEB 1948, p.489-490	9.78E-12	29,409
1946	32	AEB 1949, p. 560, II. 7 b)	34	AEB 1949, p.570, 573	1.12E-11	32,440
1947	33	AEB 1950, p. 490-91, II. 5 b)	33	AEB 1949, p.570, 573	1.27E-11	34,760
1948	34	AEB 1951, p. 500-1, II. 5. b)	33	AEB 1950, p.496, 498	1.52E-11	39,220
1949	34	AEB 1952, p. 508-9, II. 5 b)	36	AEB 1951, p.506, 508	1.82E-11	43,384
1950	33	AEB 1953, p. 437, II. 3. b)	32	AEB 1952, p. 514, 517	2.03E-11	44,299

Notes: The Federal District is the city of Rio de Janeiro. Total income in the Federal District is arrived at by multiplying total income in Brazil (column [1] in Table B.3) by column [3] between 1945 and 1950, and by column [1] between 1933 and 1944.

C. Estimating top income shares

C.1. Pareto interpolation

Given that the income ranges in the tabulated income tax statistics do not generally coincide with the population groups with which we are concerned (such as the top 1 per cent, top 0.1 per cent, etc.), we follow the Pareto interpolation technique, as is common in the top incomes literature, to approximate top shares. This technique relies on the well known empirical regularity that the top tail of the income distribution is very closely approximated by a Pareto distribution. A Pareto distribution has a cumulative distribution function of the form $1 - F(y) = (c/y)^a$, c $>$ 0, $a > 1$, where c and a are given parameters, a being the Pareto parameter of the distribution. The corresponding density function is given by $f(y) = (ac)^a/y^{1+a}$. The parameters of interest are estimated using a characteristic property of power laws, which is that the ratio of average income $y^*(y)$ of individuals with income above a given threshold y to y is exactly proportional to y:

$$y^*(y) = (\int_{z>y} zf(z)dz)/(\int_{z>y} f(z)dz) = (\int_{z>y} dz/z^a)/(\int_{z>y} dz/z^{1+a}) = a/(a-1)y$$

From this it can be deduced that $y^*(y)/y = a/(a-1)$, which means that the ratio $y^*(y)/y$ does not depend on the income threshold y. The inverted Pareto-Lorenz coefficient, β, is given by $\beta = a/(a-1)$. Therefore, $y^*(y)/y = \beta$. The inverted Pareto-Lorenz coefficient is thus related to the shape of the distribution, such that a higher β equates to a fatter upper tail of the distribution, implying higher top income shares and consequently higher income inequality. All average incomes, income thresholds and income shares are calculated via this Pareto interpolation. Income shares for intermediate fractiles (top 10-5 per cent, top 5-1 per cent, etc.) are obtained by subtracting the different shares from each other.

C.2. Estimation procedure

Given the variation in income concepts and the geographical unit of analysis presented in Panel A of Table 1, a process of data harmonization was followed in order to arrive at estimates for the country as a whole and for desired income definition. This section describes how the taxable income share series for Brazil, detailed in Panel B of Table 1, as well as the total income share series, were constructed.

C.1.1. The definitions of income

For the years 1933 to 1988 in the tax statistics, the different income concepts are related as follows:

Gross taxable revenue

– Schedular deductions (mostly for costs incurred to obtain the revenue)[61]

= *Gross taxable income*

– Allowances (for certain social expenditures)

= *Net taxable income*

For the years 1998, 2002, and 2006-2013 in the tax statistics, the income concepts are related as follows:

Gross taxable revenue

– Regular deductions[62]

[61] Each schedule of income could avail of legal deductions. But not all are related to costs incurred to generate the income reported for tax. For example, a deduction was offered during the schedular system for a any portion of revenue made from salaried employment donated to a registered charity (Da Nóbrega, 2014).

[62] These deductions comprise of expenditures on dependents (spouse, children, parents etc.), contributions to public and private social security funds, limited education expenses for the tax filer and their dependents, medical expenses, alimony (spousal maintenance expenses, the standard

= *Net taxable income*

For the years 1974-1988 and 2006-2013, the tax statistics include information on total revenues. They are related to the previous taxable revenues as follows:

Gross total revenue

– non-taxable revenue

– revenue taxed exclusively/definitively at source

= *Gross taxable revenue*

The preferred definition used in this paper approximates the 'true' gross income made by individuals by taking the average of the income shares of gross taxable revenue and of gross taxable income. The latter, in principle, is the desired definition of income for the purpose of out calculation. However, due to the likelihood of individuals overestimating their intermediate costs in order to minimize their tax liability, and to the fact that not all scheduler deductions applied to such costs.

C.1.2. Gross taxable income series

Figure C.1 illustrates the observed data points for the taxable income shares, taking the top 1 per cent as an example.[63] The top income share series for each of the three income concepts for Brazil over the entire period of study are estimated in the following manner: for the years prior to 1969, we estimate shares of gross taxable revenue and income by adding the average difference between shares of net taxable income and shares of gross taxable revenue and gross taxable income, respectively,

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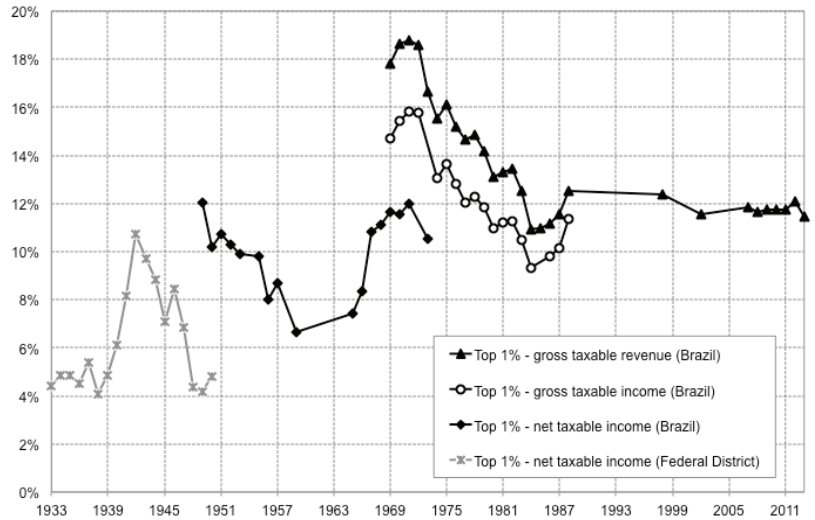
discount (*desconto padrão*) for salaries and deductions for intermediate consumption of contributors receiving income from non-salaried work (*Livro Caixa*).

[63] The same procedure was used for all the other population groups.

for the years 1969-1972 (when top share series can be computed for the three income concepts) to the estimates of net taxable income shares prior to 1969.

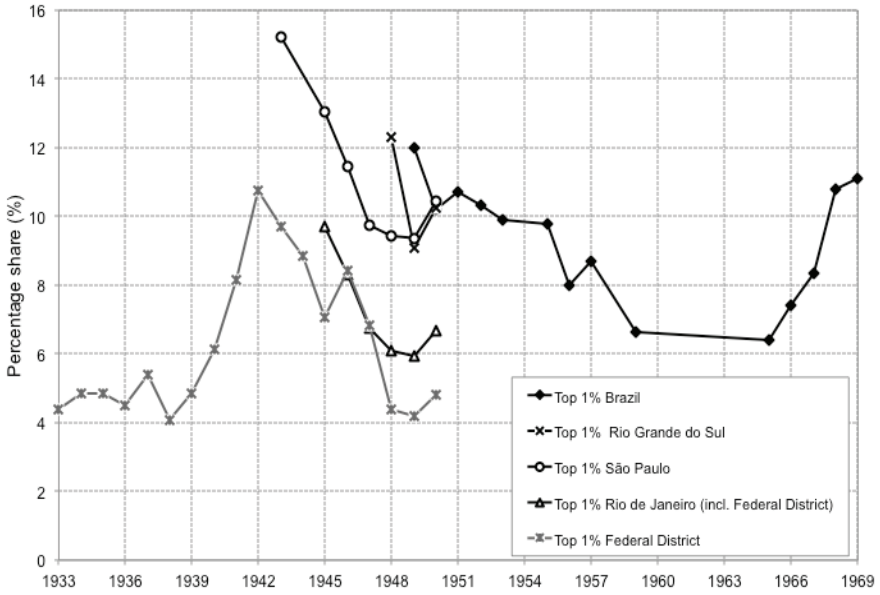
Similarly, results based on regional data (prior to 1945) were increased by the additive difference between national shares and regional shares for the years 1945-1950. The regional data used for this extrapolation is for the Federal District, given that its data goes back the furthest into the past and that, for the overlapping years with national data, it maintained its structural parameters (the same proportion of population and net income) with respect to the country as a whole (see Tables B.2 and B.4). It is thus assumed that these proportions were maintained for the years before 1945. Moreover, it is reassuring that inequality in the Federal District (city of Rio de Janeiro) during these years appears to be a lower bound in Brazil, as Figures C.2 and C.3 show. Figure C.4 depicts the results of the extrapolation procedure. In order to arrive at our preferred series (accounting for 'true' costs incurred) we take the average of the two gross series. The results of this manipulation are revealed in Figure C.5. For the years after 1988, when there is only data on gross taxable revenue, we take the difference between the share of gross taxable revenue and the our preferred series share for 1988 and apply it to the later years.

Figure C.1. Top 1% shares of different income concepts in Brazil and the Federal District (observed data), 1933-2013



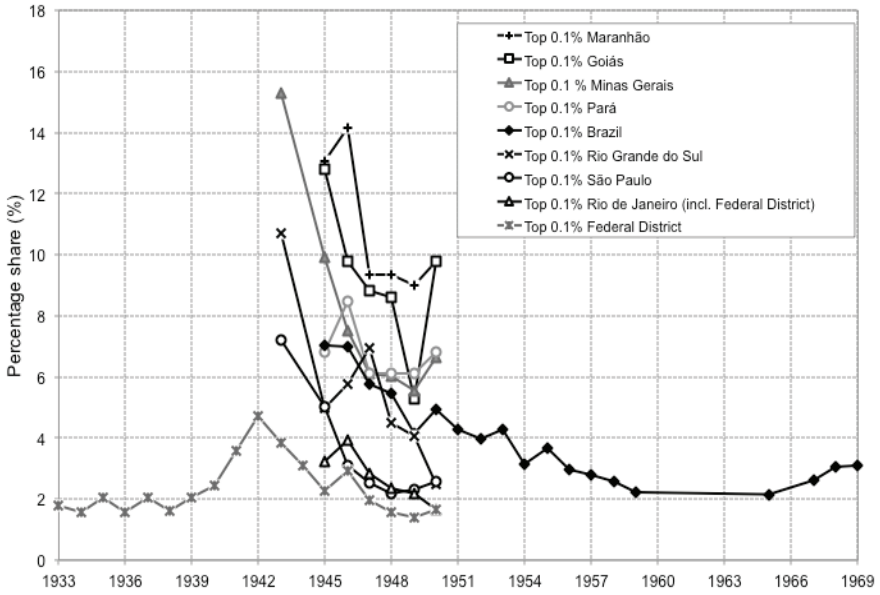
Sources: author's calculations from tax returns data.

Figure C.2. Top 1% net taxable income share in Brazil and selected states, 1933-1969



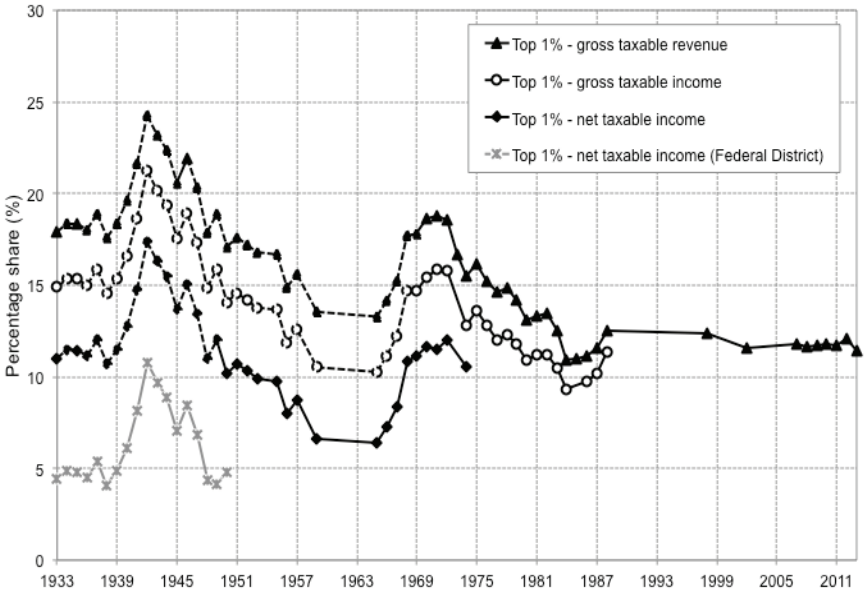
Note: The states displayed are those for which the income tax coverage allowed the estimation of the top 1 per cent share.
Sources: author's calculations from tax returns data in AEB, various years.

Figure C.3. Top 0.1% net taxable income share in Brazil and selected states, 1933-1969



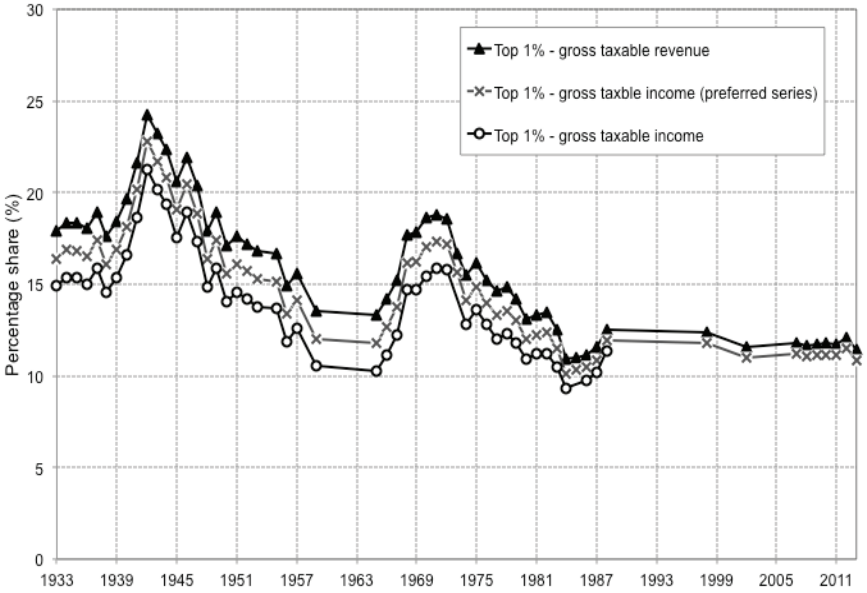
Note: The seven states displayed and the Federal District cover all five regions of Brazil (North, Northeast, Central-West, Souteast and South) such there is at least one state per region.
Sources: author's calculations from tax returns data in AEB, various years.

Figure C.4. Top 1% shares of different income concepts in Brazil and the Federal District (observed and extrapolated data), 1933-2013



Note: the dotted lines represent the extrapolated estimates. Solid lines represent the estimates based on observed data.
Sources: author's calculations from tax returns data.

Figure C.5. Top 1% shares of different gross income concepts in Brazil, 1933-2013



Note: the preferred series for gross taxable income is the final series presented throughout the paper.
Sources: author's calculations from tax returns data.

C.1.3. Gross total income series

From 1974 to 1988, income tax forms asked taxpayers to provide information on their non-taxable income and any income taxed exclusively at source. Thus, for this period, series based on gross total revenue ranked by brackets of gross taxable revenue could be calculated. Moreover, from 1978 to 1988 the publications contain tabulations that rank gross total revenue by brackets of non-taxable revenue, as displayed in Table 1. This is useful information as the ranking variable of non-taxable income turns out to more accurately capture the total income of individuals at the very top of the distribution, given that non-taxable incomes appear to be disproportionally concentrated among top groups, as compared to the total income reported by brackets of gross taxable revenue. This is the effect of the growing scope of non-taxable income from capital sources over time. As a result of this discrepancy in the tax laws and statistics, we proceed to use the non-taxable-bracketed tabulations to estimate the shares of the top 1 per cent and above for the years 1978 to 1988, while resorting to the taxable-bracketed tabulations to estimate the shares of the top 10 per cent and top 5 per cent of income earners between 1974 and 1988.

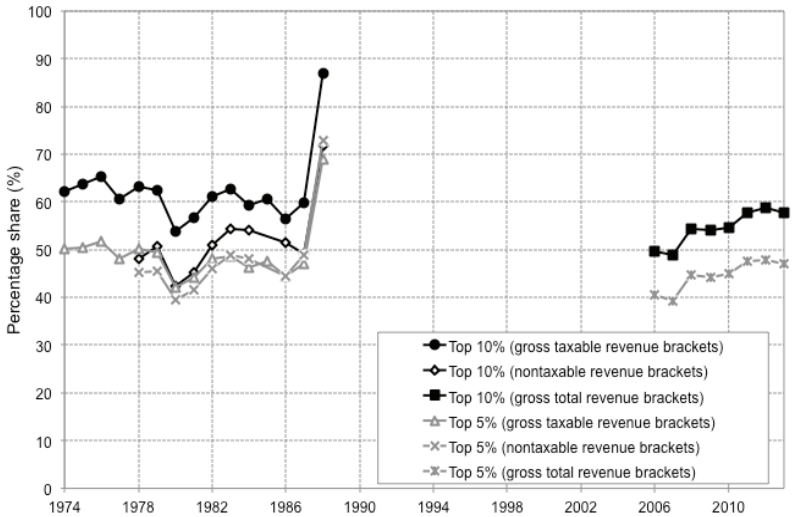
Figures C.4 and C.5 justify these choices, presenting the top 10, 5 and 1 per cent total income shares according to different ranking variables.[64] For the top 10 per cent, it can be seen that the shares ranked by gross taxable revenue brackets are higher than those ranked by non-taxable revenue, as a lower fraction of the incomes of the top 10 per cent are non-taxable, as is hinted by Figure 37. This difference falls for the top 5 per cent share, again consistent with the rising share of non-taxable incomes for this group (see Figure C.6) For the top 1 per cent the tabulations with gross taxable revenue brackets are used to approximate the shares of the top 1 per cent and above for the years before there is data available on total incomes ranked

[64] The series presented account for intermediate costs incurred by individuals. They are arrived at by applying the same difference between the gross taxable revenue series and the preferred average series (see Figure C.3) to the gross total revenue series computed.

by non-taxable revenue brackets (i.e. before 1978). This is justified by the proximity between the top 1 per cent total income series, ranked by gross taxable revenue and by non-taxable revenue for the closest overlapping years until the early 1980's, when both series diverge (see Figure C.7). Given that most of the income of the top groups is non-taxable (as evidenced by the tabulations) and in order to preserve continuity in the estimates, the final series uses the tabulations ranked by non-taxable revenue to estimate the shares of the top 1% and above from 1980 to 1987, while the ones ranked by gross taxable revenue are used to estimate these shares from 1974 to 1979.

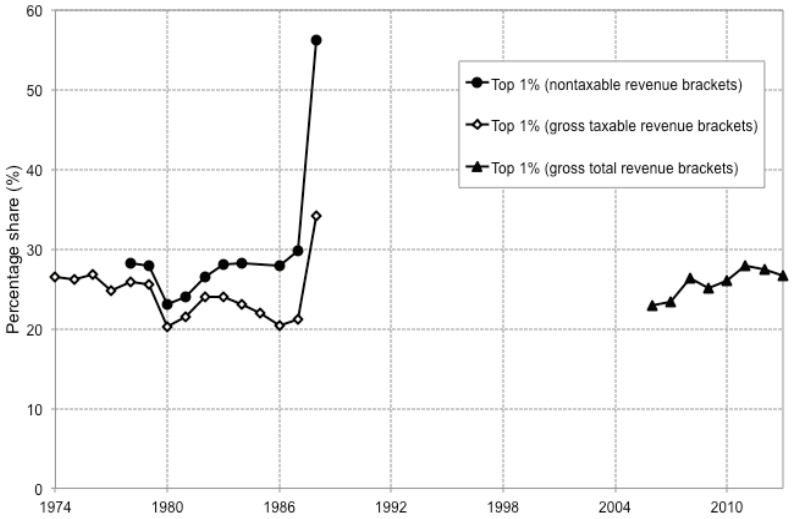
In the final series, estimates for 1988 were left out due to them being notable outliers, as seen from Figures C.6 and C.7. This could be due to the hyperinflation that was taking hold of the period greatly benefiting top groups in relative terms or to typographical errors made by tax filers in their returns. For instance, there are only 31 taxpayers in the highest non-taxable income bracket in 1988, compared to almost 80,000 in 1987, yet their total non-taxable income amounts to 4 per cent of GDP. We make no extrapolation of the total income series over the years before 1974 due to the fact that we know very little about the dynamics of nontaxble incomes and incomes taxed exclusively/definitively at source for earlier years.

Figure C.6. Top 10% and 5% gross total income share in Brazil, 1974-2013



Note: the series are of gross total income, ranked by different bracket variables. They thus account for intermediate costs incurred by individuals and deductible from gross total revenue. See text for an explanation of the calculation.
Sources: authors' calculations based on tax returns data.

Figure C.7. Top 1% gross total income share in Brazil, 1974-2013



Note: the series are of gross total income, ranked by different bracket variables. They thus account for intermediate costs incurred by individuals and deductible from gross total revenue. See text for an explanation of the calculation.
Sources: authors' calculations based on tax returns data.

Table C.1. Income thresholds of top groups in Brazil, 1969-2013

Year	P90	P95	P99	P99.5	P99.9	P.99.95	P99.99
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Panel A. Gross taxable income (2014 Reais)							
1969	16,303	38,650	112,726	162,165	329,839	845,326	1,151,814
1970	27,619	46,074	131,005	185,964	371,735	904,062	1,184,181
1971	26,380	49,082	142,831	202,987	404,321	1,028,070	1,374,145
1972	28,209	52,399	153,192	217,047	434,074	1,161,254	1,644,021
1973	28,099	52,608	154,506	218,551	433,025	1,100,381	1,524,611
1974	26,605	52,036	154,333	217,361	425,896	1,034,569	1,384,294
1975		57,522	163,494	230,438	441,994	1,053,455	1,451,267
1976	31,992	61,556	172,886	242,392	454,631	1,057,327	1,419,572
1977	32,950	61,587	171,366	239,495	441,894	1,019,619	1,366,980
1978	35,371	64,469	177,800	248,580	459,076	1,063,029	1,417,919
1979	36,376	65,616	177,846	248,200	452,075	1,041,774	1,392,870
1980	30,361	57,777	161,831	224,205	409,754	945,308	1,247,741
1981	30,385	57,465	157,943	215,642	385,057	890,918	1,175,948
1982	30,721	58,362	159,092	214,945	380,978	892,837	1,184,220
1983	25,841	52,700	141,045	189,230	338,491	831,942	1,111,883
1984	25,019	48,295	126,740	169,384	304,458	752,762	1,004,378
1985	27,440	50,529	135,296	180,531	320,623	774,965	1,024,974
1986	26,635	54,496	143,603	194,188	346,711	847,974	1,114,720
1987	29,259	55,355	152,482	204,970	362,993	837,963	1,090,451
1988	27,212	58,498	161,320	221,841	391,816	847,510	1,069,076
1989							
1990							
1991							
1992							
1993							
1994							
1995							
1996							
1997							
1998		50,270	148,645	209,830	411,660	1,010,487	1,324,128
1999							
2000							
2001							
2002	14,208	43,158	129,809	187,460	373,241	948,680	1,256,250
2003							

2004							
2005							
2006							
2007	31,120	52,562	153,180	215,501	415,943	1,096,474	1,590,774
2008	31,936	53,938	156,398	220,222	427,402	1,139,210	1,680,710
2009	32,831	55,205	159,935	222,947	427,441	1,111,151	1,600,860
2010	30,738	52,692	153,348	213,082	412,443	1,073,419	1,539,612
2011	32,096	54,767	156,985	217,762	419,499	1,105,034	1,597,718
2012	34,534	57,645	159,762	218,593	421,767	1,132,374	1,635,067
2013	34,902	57,909	156,127	213,224	402,287	1,041,113	1,498,783
Panel B. Gross total income (2014 Reais)							
1974	31,746	56,125	206,955	291,411	745,219	1,643,194	2,220,068
1975		59,925	195,629	298,034	644,377	1,903,562	2,437,189
1976		71,773	233,995	360,480	730,097	2,188,735	2,694,121
1977		69,059	221,038	339,495	666,125	1,887,948	2,333,941
1978	41,660	72,243	232,557	357,740	695,612	2,278,331	2,735,212
1979	42,654	74,616	230,146	346,365	664,553	2,501,078	3,019,005
1980	13,428	62,247	142,177	226,348	610,241	3,202,039	5,101,200
1981	42,130	64,043	144,088	219,272	610,282	3,223,428	5,157,467
1982	44,615	65,672	151,477	231,192	641,858	3,620,021	5,990,147
1983		64,104	151,772	228,701	680,453	3,645,958	6,043,195
1984		61,937	158,152	243,205	796,548	4,348,629	7,248,592
1985	45,308	65,899					
1986		61,371	135,471	216,093	680,107	4,337,048	7,575,443
1987		65,990	166,378	259,257	743,837	4,422,127	7,562,662
1988		85,142	214,091	341,814	1,140,973	7,298,011	14,777,047
1989							
1990							
1991							
1992							
1993							
1994							
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1996							
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2001							
2002							
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2004							
2005							

2006	35,553	64,888	203,685	312,600	845,159	3,506,861	5,382,066
2007	38,656	70,677	226,344	343,768	866,182	4,088,049	6,588,444
2008	40,045	73,717	235,706	356,989	907,439	4,634,979	7,673,702
2009	40,947	75,146	238,489	359,612	887,703	4,250,484	6,898,390
2010	38,873	71,333	230,211	351,428	879,437	4,301,740	7,021,332
2011	40,688	74,967	240,641	366,607	943,479	4,778,107	7,865,716
2012	43,588	78,717	246,100	374,615	960,215	4,623,790	7,479,470
2013	44,885	80,699	247,653	376,306	963,378	4,591,946	7,397,119

Notes: Intermediate costs and expenses are not factored in due to a lack of information, thus the incomes reported equate to gross revenues. 1 US Dollar ≈ 2.35 Brazilian Reais in 2014.
Source: Author's calculation using tax returns data.

Table C.2. Average total income of top groups in Brazil, 1969-2013

Year	Top 10%	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Panel A. Gross taxable income (2014 Reais)							
1969	59,999	91,437	210,807	286,556	564,684	1,517,347	2,054,493
1970	70,353	106,199	238,330	320,897	611,113	1,535,290	2,048,734
1971	75,685	115,306	261,479	353,253	682,760	1,791,715	2,391,347
1972	81,199	123,852	283,184	384,913	764,667	2,188,975	3,012,620
1973	81,284	124,021	281,156	379,857	736,691	1,994,821	2,712,829
1974	78,184	122,647	276,053	370,381	701,062	1,786,893	2,392,775
1975	83,838	132,102	295,587	398,698	781,848	2,489,016	3,758,948
1976	91,142	137,542	299,756	396,959	721,402	1,790,468	2,372,025
1977	90,754	136,262	294,744	388,487	701,969	1,751,794	2,338,572
1978	95,003	141,820	305,544	402,296	723,595	1,812,379	2,413,033
1979	95,601	142,085	303,272	398,073	713,066	1,821,212	2,453,612
1980	85,335	127,991	275,601	360,221	645,710	1,636,557	2,200,830
1981	83,533	124,616	263,148	340,679	607,785	1,550,863	2,091,138
1982	84,393	125,547	262,606	338,644	607,461	1,577,145	2,139,231
1983	75,403	112,340	233,664	302,635	557,168	1,480,774	2,012,358
1984	68,610	101,387	210,147	272,364	503,335	1,333,465	1,808,749
1985	72,350	107,247	220,968	287,688	523,248	1,391,268	1,902,646
1986	77,279	115,289	237,511	310,281	565,292	1,400,660	1,841,265
1987	80,053	119,640	248,458	322,476	567,047	1,351,482	1,758,700
1988	84,760	127,292	265,493	341,646	589,253	1,274,571	1,607,785
1989							
1990							
1991							
1992							
1993							
1994							
1995							
1996							
1997							
1998	70,067	118,291	266,082	356,760	674,844	1,656,513	2,170,671
1999							
2000							
2001							
2002	68,954	104,223	240,792	324,237	627,434	1,594,769	2,111,807
2003							

2004							
2005							
2006							
2007	82,159	124,142	281,150	383,279	752,086	2,423,144	3,551,987
2008	84,420	127,509	289,022	395,187	790,096	2,636,025	3,914,715
2009	85,499	128,591	287,430	388,751	763,164	2,444,668	3,584,722
2010	81,337	122,410	277,092	369,437	728,729	2,342,492	3,426,568
2011	83,777	125,672	279,460	376,663	751,035	2,451,477	3,602,356
2012	87,209	129,635	288,347	380,377	770,301	2,517,625	3,702,199
2013	87,315	128,687	282,718	367,532	739,920	2,499,185	3,774,335
			Panel B. Gross total income (2014 Reais)				
1974	122,212	196,406	523,704	761,973	1,721,598	3,238,137	4,591,979
1975	101,850	183,099	475,025	692,149	1,492,449	3,851,161	5,573,387
1976	124,603	214,791	550,799	805,221	1,699,273	3,884,248	5,364,681
1977	120,503	199,827	508,666	728,602	1,526,786	3,513,996	4,950,400
1978	140,525	221,078	561,793	811,504	1,687,058	4,060,311	5,646,917
1979	148,313	233,418	590,558	860,736	1,831,410	4,801,957	6,881,589
1980	119,600	184,609	499,635	756,141	2,045,591	9,213,314	14,447,639
1981	121,683	187,357	500,095	789,019	2,180,761	10,012,732	16,020,317
1982	128,804	200,255	539,985	827,511	2,579,774	13,240,421	21,909,281
1983	118,747	192,931	542,293	836,611	2,511,022	13,454,385	22,300,712
1984	118,447	188,080	558,971	925,229	3,030,317	16,543,534	27,575,895
1985	129,402	200,705					
1986	120,085	200,508	613,054	1,012,572	3,480,890	22,197,662	38,772,255
1987	124,342	213,336	659,906	1,042,898	3,293,551	19,580,234	33,485,848
1988	161,371	294,788	1,206,990	2,063,760	7,568,991	53,703,080	96,971,095
1989							
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2005							

2006	120,118	193,138	533,178	818,282	2,212,343	9,179,784	14,088,443
2007	124,023	196,792	571,161	904,713	2,695,253	13,124,812	21,152,408
2008	143,015	232,308	667,965	1,047,102	3,192,624	17,000,362	28,145,914
2009	140,667	226,941	630,590	971,673	2,832,043	14,103,992	22,890,296
2010	136,684	221,733	626,461	974,550	2,890,807	14,672,919	23,949,249
2011	145,418	236,682	680,261	1,069,252	3,254,295	17,012,353	28,005,722
2012	148,310	239,175	670,880	1,043,148	3,062,473	15,103,518	24,431,538
2013	150,933	242,843	672,354	1,040,243	3,024,048	14,711,068	23,697,908

Notes: Intermediate costs and expenses are not factored in due to a lack of information, thus the incomes reported equate to gross revenues. 1 US Dollar ≈ 2.35 Brazilian Reais in 2014.
Source: Author's calculation using tax returns data.

Table C.2.1. Average total income between top groups in Brazil, 1969-2013

Year	Top 10-5%	Top 5-1%	Top 1-0.5%	Top 0.5-0.1%	Top 0.1-0.05%	Top 0.05-0.01%
	[8]	[9]	[10]	[11]	[12]	[13]
Panel A. Gross taxable income (2014 Reais)						
1969	28,562	61,595	135,057	217,024	458,832	980,202
1970	34,506	73,167	155,763	248,343	508,427	1,021,846
1971	36,064	78,763	169,705	270,876	559,543	1,192,083
1972	38,546	84,019	181,455	289,975	606,410	1,365,330
1973	38,547	84,737	182,456	290,649	596,899	1,276,812
1974	33,721	84,296	181,725	287,711	580,414	1,181,011
1975	35,574	91,230	192,476	302,911	592,163	1,219,085
1976	44,741	96,989	202,553	315,848	602,616	1,208,911
1977	45,247	96,641	201,001	310,116	585,321	1,165,015
1978	48,185	100,889	208,793	321,971	602,619	1,211,725
1979	49,117	101,788	208,470	319,325	589,939	1,188,812
1980	42,678	91,089	190,981	288,849	535,616	1,072,284
1981	42,449	89,984	185,617	273,903	502,998	1,010,588
1982	43,239	91,282	186,568	271,440	499,719	1,015,058
1983	38,466	82,009	164,694	239,001	454,545	949,189
1984	35,832	74,197	147,930	214,622	411,098	858,181
1985	37,452	78,817	154,247	228,798	426,801	879,889
1986	39,268	84,734	164,741	246,528	472,473	960,056
1987	40,465	87,436	174,441	261,333	479,887	944,264
1988	42,229	92,742	189,341	279,744	513,106	941,357
1989						
1990						
1991						

1992						
1993						
1994						
1995						
1996						
1997						
1998	21,843	81,344	175,403	277,239	565,769	1,142,355
1999						
2000						
2001						
2002	33,686	70,081	157,348	248,437	519,952	1,077,732
2003						
2004						
2005						
2006						
2007	40,176	84,889	179,020	291,078	566,413	1,294,300
2008	41,332	87,131	182,857	296,460	584,993	1,357,335
2009	42,406	88,881	186,110	295,148	576,330	1,304,615
2010	40,263	83,739	184,746	279,614	549,421	1,258,417
2011	41,882	87,226	182,256	283,070	562,097	1,300,598
2012	44,783	89,957	196,316	282,896	576,154	1,333,051
2013	45,942	90,179	197,903	274,435	544,446	1,224,034
Panel B. Gross total income (2014 Reais)						
1974	48,017	114,582	285,435	522,067	1,553,093	1,884,294
1975	20,601	110,118	257,901	492,073	1,230,370	2,128,936
1976	34,415	130,788	296,376	581,709	1,456,498	2,403,814
1977	41,180	122,617	288,731	529,056	1,305,984	2,077,592
1978	59,973	135,899	312,082	592,615	1,423,363	2,473,705
1979	63,209	144,133	320,381	618,067	1,501,349	2,722,325
1980	54,591	120,116	243,129	433,779	1,249,178	3,978,989
1981	56,009	122,110	211,171	441,084	1,310,542	4,005,146
1982	57,354	127,500	252,459	389,445	1,395,257	4,571,560
1983	44,563	124,415	247,975	418,009	1,295,092	4,608,057
1984	48,814	120,698	192,712	398,957	1,528,848	5,511,173
1985	58,100	135,795				
1986	39,662	137,630	213,536	395,493	1,401,249	5,623,069
1987	35,349	148,462	276,914	480,235	1,483,919	5,674,620
1988	27,954	184,115	350,220	687,452	2,442,981	10,435,067
1989						
1990						
1991						
1992						
1993						

1994						
1995						
1996						
1997						
1998						
1999						
2000						
2001						
2002						
2003						
2004						
2005						
2006	47,099	108,127	248,075	469,767	1,438,183	4,271,125
2007	51,254	103,200	237,610	457,078	1,536,413	5,097,217
2008	53,722	123,394	288,827	510,722	1,658,431	5,854,811
2009	54,393	126,028	289,507	506,580	1,579,604	5,317,688
2010	51,635	120,552	278,372	495,485	1,581,684	5,396,588
2011	54,154	125,788	291,270	522,991	1,725,622	6,018,983
2012	57,444	131,249	298,611	538,317	1,724,580	5,775,498
2013	59,024	135,465	304,466	544,291	1,725,490	5,724,228

Notes: Intermediate costs and expenses are not factored in due to a lack of information, thus the incomes reported equate to gross revenues. 1 US Dollar ≈ 2.35 Brazilian Reais in 2014.
Source: Author's calculation using tax returns data.

Table C.3. Top taxable income shares in Brazil, 1933-2013 (%)

Year	Top 10%	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%
1933			16.41	13.10	6.88	4.68	2.13
1934			16.87	12.18	6.64	4.74	2.20
1935			16.84	12.86	7.12	4.75	2.14
1936			16.52	12.44	6.64	4.41	2.11
1937			17.40	13.32	7.14	4.83	
1938			16.10	13.65	6.71	4.72	2.17
1939			16.88	13.36	7.14	4.86	
1940			18.13	14.48	7.54	5.10	
1941			20.14	15.62	8.66	5.97	
1942			22.76	19.25	9.81		
1943			21.70	17.44	8.92		
1944			20.86	16.52	8.18		
1945			19.07	16.36	8.35	6.03	2.31
1946			20.43	14.76	8.31	5.24	2.77
1947			18.84	13.11	7.08	4.28	2.06
1948			16.37	12.76	6.77	4.00	1.78
1949			17.40	12.45	5.49	3.83	1.71
1950			15.59	13.70	6.26	4.38	1.68
1951			16.10	12.57	5.59	4.20	1.50
1952			15.69	12.18	5.31	3.94	1.36
1953			15.29	11.99	5.60	3.65	1.62
1954				11.06	5.06	3.51	0.94
1955			15.17	11.22	4.99	3.36	0.89
1956			13.39	9.58	4.29	2.94	0.80
1957			14.09	9.02	4.11	2.78	0.79
1958			13.06	8.95	3.90	2.75	0.84
1959			12.04	8.55	3.56	2.35	0.65
1960					2.96	2.08	0.79
1961							
1962							
1963							
1964							
1965			11.78	8.65	3.49	2.39	0.97
1966			12.67	9.01	3.63	2.47	1.05
1967			13.73	9.86	3.96	2.67	1.06
1968	44.83	35.62	16.19	11.04	4.40	2.96	1.20

1969	47.33	35.89	16.25	11.04	4.33	2.90	1.18
1970	51.07	38.41	17.04	11.45	4.34	2.86	1.10
1971	50.82	38.46	17.30	11.72	4.53	3.00	1.20
1972	49.92	37.84	17.19	11.72	4.66	3.15	1.34
1973	45.30	34.72	15.67	10.65	4.15	2.77	1.19
1974	40.67	31.59	14.15	9.58	3.64	2.39	1.03
1975	43.14	33.19	14.88	10.05	3.94	2.72	1.25
1976	42.35	32.00	14.01	9.29	3.37	2.18	0.81
1977	40.40	30.34	13.33	8.86	3.22	2.09	0.78
1978	41.44	30.96	13.57	8.99	3.24	2.11	0.78
1979	40.14	29.88	13.01	8.60	3.10	2.00	0.75
1980	36.19	27.26	12.02	7.94	2.86	1.83	0.69
1981	37.72	28.29	12.25	8.01	2.88	1.84	0.70
1982	38.62	28.82	12.34	8.03	2.91	1.87	0.73
1983	36.23	27.08	11.52	7.52	2.79	1.82	0.72
1984	32.09	23.84	10.14	6.63	2.47	1.62	0.66
1985	32.51	24.26	10.31	6.73	2.48		
1986	32.93	24.68	10.47	6.82	2.48		
1987	33.68	25.32	10.86	7.03	2.47		
1988	36.75	27.91	11.95	7.72			
1989							
1990							
1991							
1992							
1993							
1994							
1995							
1996							
1997							
1998	32.26	25.40	11.78	7.94	2.95	0.65	0.47
1999							
2000							
2001							
2002	29.85	22.92	10.96	7.46	2.87	0.66	0.47
2003							
2004							
2005							
2006							
2007	31.24	24.01	11.24	7.71	3.01	0.91	0.71
2008	30.72	23.61	11.06	7.61	3.03	0.95	0.76

2009	31.58	24.15	11.14	7.58	2.96	0.89	0.70
2010	31.20	23.88	11.17	7.49	2.94	0.88	0.69
2011	31.85	24.28	11.14	7.55	3.00	0.92	0.72
2012	33.19	25.04	11.48	7.61	3.07	0.94	0.74
2013	32.04	23.96	10.86	7.09	2.84	0.90	0.73

Notes: estimates account for intermediate costs and expenses.

Table C.4. Top total income shares in Brazil, 1974-2013 (%)

Year	Top 10%	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%
1974	62.11	50.30	26.55	19.47	8.87	6.15	2.96
1975	63.69	50.43	26.22	19.18	8.31	6.39	2.99
1976	65.34	51.75	26.80	19.69	8.34	6.39	2.61
1977	60.55	48.07	24.79	17.89	7.56	5.76	2.31
1978	63.37	50.12	25.92	18.86	7.90	6.05	2.37
1979	62.56	49.48	25.55	18.77	8.06	6.35	2.58
1980	53.74	42.07	23.04	17.60	9.66	4.29	3.42
1981	56.75	44.14	24.05	19.17	10.75	4.88	3.96
1982	61.26	48.00	26.48	20.46	12.97	6.61	5.53
1983	62.71	48.75	28.07	21.81	13.27	7.07	5.92
1984	59.41	46.39	28.28	23.59	15.62	8.50	7.14
1985	60.66	47.66	28.19	23.46	15.91	9.37	8.08
1986	56.46	44.58	27.94	23.20	16.10	10.25	9.02
1987	59.81	47.09	29.77	23.63	15.06	8.93	7.70
1988	87.05	68.93	56.29	48.28	35.52	25.20	22.82
1989							
1990							
1991							
1992							
1993							
1994							
1995							
1996							
1997							
1998							
1999							
2000							
2001							
2002							
2003							
2004							
2005							
2006	49.73	40.55	22.96	17.72	9.62	3.94	3.08
2007	48.85	39.30	23.44	18.68	11.19	5.41	4.42
2008	54.35	44.74	26.34	20.76	12.72	6.74	5.64
2009	54.10	44.22	25.15	19.48	11.41	5.65	4.64

2010	54.69	44.95	25.99	20.33	12.12	6.12	5.05
2011	57.73	47.58	27.97	22.09	13.51	7.03	5.85
2012	58.78	47.98	27.50	21.49	12.67	6.21	5.08
2013	57.80	47.07	26.64	20.71	12.09	5.85	4.76

Notes: estimates account for intermediate costs and expenses.

Table C.4.1 Top total income (between) shares in Brazil, 1974-2013 (%)

Year	Top 10-5%	Top 5-1%	Top 1-0.5%	Top 0.5-0.1%	Top 0.1-0.05%	Top 0.05-0.01%
1974	11.81	23.75	7.08	10.60	2.73	3.19
1975	13.25	24.22	7.03	10.88	1.92	3.40
1976	13.59	24.95	7.11	11.35	1.95	3.79
1977	12.48	23.28	6.89	10.34	1.80	3.45
1978	13.24	24.21	7.06	10.96	1.85	3.67
1979	13.08	23.93	6.78	10.71	1.71	3.78
1980	11.66	19.03	5.45	7.93	5.37	0.87
1981	12.61	20.09	4.88	8.42	5.87	0.92
1982	13.26	21.52	6.02	7.49	6.36	1.08
1983	13.96	20.68	6.26	8.54	6.20	1.15
1984	13.02	18.11	4.70	7.97	7.12	1.35
1985	13.00	19.47	4.73	7.55	6.54	1.29
1986	11.88	16.64	4.73	7.11	5.84	1.23
1987	12.72	17.32	6.15	8.57	6.13	1.23
1988						
1989						
1990						
1991						
1992						
1993						
1994						
1995						
1996						
1997						
1998						
1999						
2000						
2001						
2002						

2003						
2004						
2005						
2006	9.18	17.60	5.24	8.10	5.68	0.86
2007	9.56	15.86	4.76	7.49	5.78	0.99
2008	9.61	18.40	5.59	8.04	5.98	1.10
2009	9.88	19.07	5.67	8.07	5.76	1.01
2010	9.73	18.96	5.67	8.21	6.00	1.07
2011	10.14	19.62	5.88	8.58	6.48	1.18
2012	10.80	20.48	6.01	8.82	6.46	1.13
2013	10.73	20.44	5.93	8.62	6.25	1.08

Notes: estimates account for intermediate costs and expenses.

Table C.5. Top total income shares (ranked by gross taxable revenue brackets) in Brazil, 1974-1988 (%)

Year	Top 10%	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%
1974	62.11	50.30	26.55	19.47	8.87	6.15	2.96
1975	63.69	50.43	26.22	19.18	8.31	6.39	2.99
1976	65.34	51.75	26.80	19.69	8.34	6.39	2.61
1977	60.55	48.07	24.79	17.89	7.56	5.76	2.31
1978	63.37	50.12	25.92	18.86	7.90	6.05	2.37
1979	62.56	49.48	25.55	18.77	8.06	6.35	2.58
1980	53.74	42.07	20.29	13.49	5.99	4.49	1.63
1981	56.75	44.14	21.45	14.31	6.59	4.93	1.73
1982	61.26	48.00	23.99	16.14	7.89	5.97	2.29
1983	62.71	48.75	24.03	16.10	7.82	5.71	2.10
1984	59.41	46.39	23.01	15.43	7.46	5.26	1.90
1985	60.66	47.66	22.04	16.59	7.23	5.62	2.10
1986	56.46	44.58	20.42	15.49	7.02	2.73	2.11
1987	59.81	47.09	21.14	15.61	6.92	2.87	2.27
1988	87.05	68.93	34.16	23.99	12.97	5.37	4.18

Notes: estimates account for intermediate costs and expenses.
Sources: author's calculations based on tax returns data.

Table C.6. Top total income shares (ranked by gross total revenue brackets) in Brazil, 1974-1988 (%)

Year	Top 10%	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%
1974							
1975							
1976							
1977							
1978	48.10	45.38	28.31	23.63	15.19	7.04	5.57
1979	50.76	45.63	27.97	23.05	14.45	6.89	5.41
1980	42.26	39.40	23.04	17.60	9.66	4.29	3.42
1981	45.24	41.73	24.05	19.17	10.75	4.88	3.96
1982	50.95	46.13	26.48	20.46	12.97	6.61	5.53
1983	54.49	48.93	28.07	21.81	13.27	7.07	5.92
1984	54.04	48.17	28.28	23.59	15.62	8.50	7.14
1985							
1986	51.61	44.46	27.94	23.20	16.10	10.25	9.02
1987	49.14	48.87	29.77	23.63	15.06	8.93	7.70
1988	71.93	72.89	56.29	48.28	35.52	25.20	22.82

Notes: estimates account for intermediate costs and expenses.
Sources: author's calculations based on tax returns data.

Table C.7. Inverse Pareto-Lorenz coefficients in Brazil, 1933-2013

Year	Gross taxable income			Gross total income		
	Top 1% within top 10%	Top 0.1% within top 1%	Top 0.01% within top 0.1%	Top 1% within top 10%	Top 0.1% within top 1%	Top 0.01% within top 0.1%
1933		2.65	1.96			
1934		2.47	2.08			
1935		2.67	1.91			
1936		2.53	2.00			
1937		2.58				
1938		2.63	2.04			
1939		2.68				
1940		2.62				
1941		2.73				
1942		2.74				
1943		2.59				
1944		2.46				
1945		2.79	1.79			
1946		2.56	2.10			
1947		2.35	1.86			
1948		2.61	1.72			
1949		2.00	1.98			
1950		2.52	1.75			
1951		2.18	1.75			
1952		2.12	1.69			
1953		2.29	1.85			
1954			1.37			
1955		2.07	1.33			
1956		2.02	1.37			
1957		1.87	1.40			
1958		1.90	1.50			
1959		1.89	1.36			
1960			1.73			
1961						
1962						
1963						
1964						
1965		1.89	1.80			
1966		1.84	1.85			

1967		1.85	1.75			
1968	2.26	1.77	1.78			
1969	2.15	1.74	1.77			
1970	2.10	1.68	1.68			
1971	2.14	1.72	1.74			
1972	2.16	1.76	1.85			
1973	2.17	1.73	1.84			
1974	2.18	1.69	1.82	2.71	2.10	2.10
1975	2.16	1.73	2.00	2.59	2.00	2.25
1976	2.08	1.62	1.61	2.58	1.97	1.98
1977	2.08	1.62	1.63	2.58	1.94	1.94
1978	2.06	1.61	1.61	2.58	1.94	1.92
1979	2.04	1.61	1.63	2.57	2.00	2.02
1980	2.09	1.61	1.62	2.72	2.65	2.22
1981	2.05	1.59	1.63	2.68	2.86	2.30
1982	2.02	1.59	1.66	2.75	3.23	2.70
1983	2.01	1.62	1.70	2.86	3.07	2.85
1984	2.00	1.63	1.74	3.10	3.88	2.94
1985	2.00	1.62		3.01	4.03	3.40
1986	2.01	1.60		3.27	4.18	3.97
1987	2.03	1.55		3.30	3.38	3.43
1988	2.05					
1989						
1990						
1991						
1992						
1993						
1994						
1995						
1996						
1997						
1998	1.98	1.66	1.25			
1999						
2000						
2001						
2002	2.05	1.72	1.28			
2003						
2004						
2005						
2006				2.98	2.65	2.02

2007	2.03	1.75	1.60	3.13	3.11	2.48
2008	2.03	1.78	1.66	3.18	3.16	2.83
2009	1.99	1.74	1.59	3.01	2.91	2.56
2010	1.99	1.73	1.59	3.10	3.02	2.63
2011	1.97	1.76	1.62	3.18	3.16	2.75
2012	1.93	1.75	1.62	3.03	2.97	2.52
2013	1.89	1.72	1.69	2.97	2.92	2.47

Notes: the coefficeints of β were computed using the formula $\beta = a/(a\text{-}1)$, where $a = 1/(1+\log(\text{share}_{0.1\%}/\text{share}_{1\%}))$ for the top 0.1% in the top 1%, etc. Estimates account for intermediate costs and expenses.
Sources: author's calculations based on tax returns data.

Table C.8. Composition of top taxable incomes by income source in Brazil, 1969-1988 (%)

Year	Top 10%							Top 5%						
	Interests	Employee remuneration	Self-employment	Rents	Business profits/dividends	Agriculture	Other	Interests	Employee remuneration	Self-employment	Rents	Profits/dividens	Agriculture	Other
1969	0.9	66.1	16.2	8.2	4.3	1.1	3.3	0.9	62.9	18.3	9.2	4.9	0.9	2.9
1970	0.4	66.7	17.7	8.0	3.6	0.8	2.8	0.4	64.4	19.2	9.0	4.2	0.6	2.2
1971	0.5	65.4	18.6	8.2	3.7	0.9	2.7	0.5	63.3	19.9	9.1	4.3	0.8	2.2
1972	0.6	67.2	17.9	7.7	3.1	0.8	2.6	0.6	65.2	19.2	8.6	3.7	0.7	2.0
1973	0.6	66.7	18.3	7.5	3.1	1.0	2.8	0.6	64.7	19.8	8.4	3.7	0.9	2.1
1974	0.5	67.4	18.7	7.5	2.5	0.9	2.6	0.6	65.3	20.3	8.2	2.9	0.8	2.0
1975	0.5	68.8	17.5	7.2	2.0	0.8	3.3	0.6	66.4	19.6	8.0	2.3	0.6	2.4
1976	0.4	70.3	15.8	6.0	1.2	0.6	5.7	0.4	67.7	18.4	7.1	1.4	0.6	4.3
1977	0.6	70.3	14.3	5.8	0.9	0.7	7.4	0.7	68.4	16.6	7.0	1.1	0.7	5.5
1978	0.7	76.5	14.4	6.3	0.8	0.7	0.7	0.8	73.5	16.2	7.4	0.9	0.7	0.5
1979	0.7	77.5	14.0	5.9	0.8	0.7	0.6	0.8	74.2	15.9	6.9	0.9	0.7	0.5
1980	0.8	77.8	12.8	5.5	1.2	1.0	0.8	1.0	75.0	14.5	6.4	1.5	0.9	0.7
1981	1.0	79.5	11.7	4.9	1.2	1.0	0.8	1.1	77.3	13.0	5.7	1.4	0.9	0.6
1982	1.4	80.6	10.8	4.7	0.9	0.9	0.7	1.7	78.5	12.0	5.4	1.0	0.8	0.6
1983	0.7	81.4	10.0	4.7	0.9	1.2	1.1	0.8	79.4	11.3	5.3	1.1	1.1	1.1
1984	0.7	82.3	9.6	4.1	0.9	1.4	1.0	0.9	80.0	11.1	4.7	1.0	1.4	1.0
1985	0.7	84.1	8.8	3.3	0.9	1.4	0.9	0.8	82.0	10.2	3.8	1.0	1.4	0.9
1986	0.2	84.2	8.6	3.7	1.2	1.2	0.9	0.2	82.3	9.9	4.2	1.3	1.2	0.9
1987	0.3	85.0	7.5	4.4	1.0	0.9	0.9	0.3	83.4	8.5	5.1	1.0	0.9	0.9
1988	0.4	87.6	5.8	3.1	1.2	0.9	1.1	0.5	86.7	6.3	3.4	1.2	0.8	1.1
	Top 1%							**Top 0.5%**						
1969	1.0	56.0	22.0	11.6	7.2	0.7	1.6	1.1	52.0	23.5	12.7	8.6	0.7	1.5
1970	0.5	57.7	22.6	11.4	6.3	0.5	1.0	0.6	53.8	24.0	12.7	7.5	0.5	0.9
1971	0.6	58.0	22.4	11.2	6.4	0.6	0.9	0.7	53.9	23.6	12.4	7.8	0.6	0.8
1972	0.7	59.0	22.2	10.8	5.6	0.7	1.0	0.8	55.2	23.3	12.0	6.9	0.7	1.0
1973	0.7	58.1	23.3	10.5	5.7	0.9	0.8	0.8	54.6	24.2	11.6	7.2	1.0	0.7
1974	0.7	58.9	24.2	10.3	4.4	0.8	0.7	0.9	55.7	25.0	11.5	5.5	0.8	0.6
1975	0.8	61.5	22.5	10.4	3.6	0.6	0.6	0.9	58.9	23.1	11.5	4.4	0.6	0.6

1976	0.6	62.5	21.7	9.7	2.5	0.6	2.4	0.8	59.3	22.9	11.2	3.2	0.7	2.0
1977	1.1	64.1	18.9	9.9	1.9	0.8	3.3	1.3	61.5	19.6	11.5	2.5	0.9	2.8
1978	1.1	68.3	17.7	10.3	1.6	0.7	0.3	1.3	65.2	18.5	11.9	2.1	0.8	0.3
1979	1.2	68.7	17.5	9.7	1.7	0.9	0.3	1.4	65.4	18.3	11.3	2.3	1.0	0.3
1980	1.4	69.3	16.9	8.5	2.3	1.0	0.5	1.6	66.7	17.8	9.6	2.7	1.2	0.6
1981	1.7	72.1	15.2	7.6	2.1	0.9	0.4	2.0	69.1	16.2	8.6	2.6	1.0	0.5
1982	2.5	72.9	14.5	7.3	1.6	0.8	0.5	2.9	69.6	15.8	8.4	1.9	0.9	0.5
1983	1.0	73.5	14.1	7.3	1.6	1.3	1.3	1.1	70.2	15.3	8.4	1.9	1.4	1.6
1984	1.1	73.7	14.8	6.5	1.4	1.7	0.9	1.2	70.7	16.1	7.4	1.7	1.9	1.0
1985	1.0	76.3	13.7	5.3	1.3	1.6	0.8	1.2	73.4	15.1	6.1	1.6	1.9	0.9
1986	0.3	76.6	13.4	5.9	1.6	1.3	0.9	0.4	73.1	15.4	6.8	1.9	1.5	0.9
1987	0.5	78.7	11.0	6.9	1.1	0.9	0.9	0.5	75.8	12.5	7.9	1.2	1.0	1.0
1988	0.8	83.6	7.7	4.3	1.6	0.9	1.2	0.8	81.4	8.5	4.9	2.0	1.0	1.5

	Top 0.1%							**Top 0.05%**						
1969	1.3	41.0	26.4	15.4	13.1	1.1	1.8	2.1	29.4	26.7	15.7	19.8	2.3	4.1
1970	0.9	43.0	26.6	16.0	12.0	0.5	1.0	1.5	31.1	28.3	18.4	18.9	0.5	1.4
1971	1.0	43.2	25.9	15.5	12.8	0.7	0.9	1.7	32.3	26.9	16.4	20.4	0.8	1.6
1972	1.1	45.1	25.3	14.7	11.3	0.9	1.5	1.9	35.1	26.2	14.4	17.3	1.3	3.8
1973	1.2	44.7	25.7	14.3	12.2	1.2	0.7	2.0	32.9	27.1	14.5	20.9	1.5	1.1
1974	1.5	47.6	26.2	14.3	8.9	1.0	0.6	3.1	34.9	29.6	15.8	14.7	1.2	0.7
1975	1.2	52.5	24.1	14.2	6.6	0.7	0.6	1.5	49.0	24.0	15.3	8.6	0.8	0.9
1976	1.1	50.0	26.0	14.6	5.7	0.9	1.7	1.7	34.5	31.6	17.9	11.1	1.5	1.7
1977	1.7	52.6	21.9	15.4	4.7	1.2	2.4	2.3	38.4	26.4	19.0	9.8	1.6	2.5
1978	1.7	54.9	21.6	16.3	4.1	1.1	0.3	2.4	40.7	27.4	19.8	8.0	1.3	0.5
1979	1.9	55.1	21.6	15.2	4.4	1.5	0.4	2.5	39.5	27.9	18.1	9.0	2.1	0.8
1980	1.9	56.9	21.5	12.5	4.5	1.7	1.1	2.4	41.9	29.0	14.3	7.6	2.3	2.5
1981	2.8	58.6	20.5	11.6	4.4	1.4	0.8	3.8	44.2	28.5	13.2	7.1	1.8	1.3
1982	3.9	58.5	20.4	11.4	3.5	1.4	1.0	5.2	44.5	27.8	12.8	6.2	1.9	1.6
1983	1.4	59.6	19.1	11.2	3.4	2.1	3.4	1.6	46.8	24.7	11.5	5.2	2.6	7.6
1984	1.6	61.9	19.2	9.9	3.0	2.8	1.6	2.2	52.0	24.5	10.6	4.8	3.4	2.5
1985	1.7	63.7	19.5	8.4	2.6	2.8	1.4	2.5	52.2	26.9	9.1	4.0	3.5	1.8
1986	0.6	62.6	21.0	9.1	3.2	2.1	1.5	0.6	60.3	22.2	9.4	3.6	2.3	1.6
1987	0.8	65.5	17.0	11.3	2.1	1.5	1.9	0.9	60.8	18.9	12.7	2.7	1.7	2.4
1988	0.8	78.2	9.5	5.7	2.7	1.2	1.9							

	Top 0.01%						
1969	2.3	26.8	27.4	15.2	20.2	2.8	5.4
1970	1.8	27.7	28.6	18.6	21.2	0.5	1.6
1971	2.1	29.9	27.2	16.1	22.2	0.8	1.8
1972	2.1	34.3	27.1	13.7	17.1	1.4	4.4
1973	2.0	32.7	27.6	14.0	21.2	1.4	1.1

1974	3.8	33.9	29.9	15.5	15.1	1.1	0.8
1975	1.3	52.4	22.5	14.5	7.7	0.6	1.0
1976	1.7	32.4	33.0	17.6	12.0	1.6	1.7
1977	2.4	36.6	27.6	18.6	10.8	1.6	2.3
1978	2.6	38.5	28.9	19.6	8.7	1.2	0.5
1979	2.7	36.6	30.0	17.5	10.2	2.1	1.0
1980	2.6	37.8	31.6	13.9	8.5	2.4	3.2
1981	4.1	40.0	32.0	12.8	7.8	1.8	1.4
1982	5.5	40.2	31.2	12.5	6.9	2.0	1.7
1983	1.6	42.2	27.8	11.0	5.6	2.6	9.3
1984	2.5	48.0	27.7	10.4	5.3	3.5	2.7
1985	2.9	47.2	31.0	9.0	4.5	3.6	1.8
1986							
1987							
1988							

Notes: The table reads as follows. In 1969, the taxable income of the top 10% group (100%) can be decomposed into interests (0.9%), employee remuneration (66.1%), self-employment (16.2%), etc.
Sources: author's calculations using tax returns data.

Table C.9. Composition of top taxable incomes by income source in Brazil, 1969-1988
(%)

Year	Top 10-5%							Top 5-1%						
	Interests	Employee remuneration	Self-employment	Rents	Business profits/dividends	Agriculture	Other	Interests	Employee remuneration	Self-employment	Rents	Business profits/dividends	Agriculture	Other
1969	0.8	76.4	9.5	4.8	2.2	1.7	4.5	0.8	68.8	15.1	7.2	3.0	1.0	4.1
1970	0.3	74.0	13.2	4.8	1.8	1.2	4.8	0.3	69.8	16.4	7.0	2.6	0.7	3.2
1971	0.5	73.2	13.9	4.8	1.7	1.3	4.7	0.5	67.8	17.8	7.3	2.5	0.9	3.3
1972	0.5	73.5	13.9	4.7	1.4	1.2	4.7	0.5	70.4	16.6	6.8	2.1	0.8	2.9
1973	0.5	73.2	13.7	4.8	1.3	1.3	5.3	0.5	70.1	16.9	6.7	2.0	0.9	3.1
1974	0.4	75.0	13.0	4.7	1.0	1.1	4.8	0.4	70.6	17.1	6.5	1.6	0.8	3.0
1975	0.4	77.5	9.6	4.1	0.7	1.2	6.6	0.4	70.4	17.3	6.1	1.2	0.7	3.8
1976	0.2	78.3	7.9	2.7	0.3	0.7	9.8	0.3	71.8	15.9	5.0	0.6	0.6	5.8
1977	0.3	75.9	7.5	2.3	0.2	0.8	13.0	0.4	71.7	14.8	4.8	0.5	0.7	7.1
1978	0.3	86.3	8.7	2.6	0.2	0.8	1.0	0.5	77.5	15.0	5.2	0.4	0.7	0.7
1979	0.3	87.6	8.0	2.6	0.2	0.7	0.8	0.5	78.5	14.7	4.7	0.4	0.6	0.6
1980	0.4	86.5	7.6	2.8	0.4	1.2	1.2	0.7	79.4	12.7	4.7	0.9	0.9	0.8
1981	0.5	86.1	7.8	2.7	0.4	1.4	1.2	0.7	81.2	11.4	4.2	0.8	0.9	0.8
1982	0.7	86.8	7.2	2.7	0.5	1.2	1.1	1.1	82.6	10.2	4.0	0.7	0.7	0.7
1983	0.4	87.3	6.3	2.8	0.5	1.5	1.2	0.6	83.6	9.2	3.9	0.7	1.0	1.0
1984	0.4	89.0	5.1	2.3	0.6	1.5	1.2	0.7	84.5	8.5	3.4	0.7	1.2	1.0
1985	0.4	90.3	4.6	1.9	0.6	1.4	0.9	0.6	85.9	7.8	2.8	0.8	1.2	1.0
1986	0.1	89.6	5.0	2.2	1.0	1.3	0.9	0.2	86.4	7.4	3.1	1.1	1.0	0.9
1987	0.1	89.9	4.6	2.6	0.9	1.1	0.9	0.3	86.7	6.7	3.7	1.0	0.8	0.9
1988	0.1	90.2	4.3	2.4	1.0	1.1	0.9	0.3	88.9	5.4	2.8	1.0	0.7	1.0
	Top 1-0.5%							**Top 0.5-0.1%**						
1969	0.9	64.4	18.8	9.3	4.3	0.6	1.8	0.9	59.2	21.6	10.9	5.7	0.5	1.2
1970	0.4	65.8	19.8	8.8	3.6	0.5	1.2	0.4	60.3	22.3	10.7	4.8	0.4	0.9
1971	0.4	66.4	19.8	8.5	3.3	0.6	1.1	0.5	60.7	22.2	10.5	4.7	0.6	0.8
1972	0.5	67.1	19.8	8.2	2.8	0.6	0.9	0.5	61.9	22.0	10.2	4.0	0.6	0.6
1973	0.5	65.6	21.4	8.0	2.8	0.7	1.0	0.6	60.9	23.2	10.0	4.0	0.8	0.7
1974	0.4	65.3	22.4	7.9	2.3	0.6	1.0	0.5	60.6	24.3	9.8	3.4	0.7	0.6
1975	0.6	66.9	21.2	8.0	2.0	0.6	0.8	0.7	63.0	22.4	9.8	3.0	0.6	0.5

1976	0.4	68.8	19.3	6.9	1.0	0.5	3.1	0.6	64.6	21.1	9.3	1.8	0.6	2.2
1977	0.6	69.3	17.7	6.8	0.8	0.6	4.2	1.0	66.5	18.3	9.3	1.3	0.7	3.1
1978	0.7	74.5	16.0	7.2	0.6	0.6	0.3	1.0	71.0	16.7	9.4	1.0	0.7	0.2
1979	0.8	75.0	16.0	6.6	0.6	0.6	0.3	1.2	71.4	16.4	9.1	1.0	0.7	0.2
1980	1.1	74.4	15.4	6.6	1.4	0.8	0.4	1.4	72.1	15.6	7.9	1.8	0.8	0.3
1981	1.2	77.6	13.2	5.7	1.2	0.7	0.4	1.6	74.9	13.8	7.0	1.6	0.8	0.3
1982	1.8	79.0	12.1	5.4	0.9	0.6	0.3	2.3	75.8	13.2	6.7	1.1	0.7	0.3
1983	0.8	79.6	11.9	5.3	0.8	0.9	0.6	0.9	76.3	13.2	6.8	1.1	1.1	0.6
1984	0.9	79.3	12.4	4.8	0.8	1.2	0.7	0.9	75.8	14.2	6.0	1.0	1.4	0.6
1985	0.8	81.9	11.0	3.9	0.8	1.1	0.6	0.9	78.9	12.6	4.8	1.0	1.3	0.6
1986	0.3	83.1	9.7	4.2	1.1	1.0	0.7	0.3	79.1	12.1	5.6	1.1	1.2	0.7
1987	0.4	84.2	8.3	5.1	0.8	0.7	0.6	0.4	81.4	10.0	6.1	0.8	0.8	0.6
1988	0.7	87.6	6.2	3.2	0.9	0.7	0.8	0.8	83.0	7.9	4.4	1.7	0.9	1.2
	Top 0.1-0.05%							**Top 0.05-0.01%**						
1969	1.0	45.2	26.3	15.2	10.7	0.6	1.0	1.6	34.8	25.3	16.9	18.9	1.2	1.4
1970	0.7	47.0	26.0	15.2	9.7	0.5	0.9	1.0	37.8	27.7	17.9	14.2	0.6	1.0
1971	0.7	47.0	25.6	15.1	10.1	0.7	0.7	1.1	37.1	26.2	17.0	16.8	0.8	1.0
1972	0.8	49.1	25.0	14.8	8.9	0.8	0.7	1.6	36.8	24.4	16.0	17.7	1.3	2.3
1973	0.9	49.1	25.2	14.2	8.9	1.1	0.6	2.0	33.4	25.9	15.7	20.2	1.8	0.9
1974	0.9	51.9	25.1	13.9	6.9	0.9	0.5	1.7	37.0	28.9	16.3	13.9	1.5	0.7
1975	1.0	54.2	24.2	13.7	5.7	0.7	0.5	1.9	38.3	28.7	17.9	11.4	1.3	0.5
1976	0.9	55.1	24.2	13.5	3.9	0.8	1.7	1.6	38.6	28.8	18.6	9.3	1.5	1.7
1977	1.5	57.4	20.4	14.2	3.0	1.0	2.4	2.1	42.0	23.9	19.9	7.8	1.7	2.7
1978	1.5	59.8	19.7	15.1	2.7	1.0	0.3	1.9	45.0	24.5	20.1	6.6	1.4	0.5
1979	1.6	60.5	19.3	14.1	2.8	1.3	0.3	2.1	45.6	23.8	19.4	6.5	2.2	0.5
1980	1.7	62.0	19.0	11.8	3.4	1.5	0.6	2.0	50.2	23.6	15.2	5.7	2.2	1.1
1981	2.4	63.6	17.7	11.0	3.5	1.3	0.6	3.3	52.9	21.4	14.0	5.7	1.8	0.9
1982	3.5	63.4	17.8	10.9	2.5	1.2	0.7	4.5	53.3	20.6	13.5	4.9	1.8	1.3
1983	1.3	64.2	17.0	11.0	2.7	1.9	1.9	1.6	56.6	18.1	12.6	4.6	2.5	4.0
1984	1.4	65.5	17.3	9.6	2.3	2.6	1.3	1.7	60.2	17.9	11.0	3.9	3.2	2.1
1985	1.4	67.9	16.8	8.1	2.1	2.5	1.3	1.6	62.8	18.1	9.4	3.0	3.2	1.9
1986	0.6	63.3	20.6	8.9	3.1	2.1	1.4	0.6	60.3	22.2	9.4	3.6	2.3	1.6
1987	0.7	67.0	16.4	10.9	2.0	1.4	1.7	0.9	60.8	18.9	12.7	2.7	1.7	2.4
1988	0.8	78.2	9.5	5.7	2.7	1.2	1.9							

Sources: author's calculations from tax returns data.

Table C.10. Composition of top taxable incomes by nature of occupation in Brazil, 1979 and 1988 (%)

Fractiles	Private sector employees	Self-employed	Employers/ business owners	Public servants	Employees of public enterprises/mixed economy	Rentiers	Pensioners	Inheritors	Other
1979									
P90-95	34.3	11.9	9.5	14.2	9.1	1.9	7.9	0.2	11.1
P95-99	31.6	14.0	11.2	14.9	11.5	2.2	5.9	0.3	8.6
P99-99.5	30.9	13.8	11.5	14.2	15.4	2.5	4.3	0.3	7.1
P99.5-99.9	31.6	13.9	12.7	10.7	16.0	3.1	4.7	0.3	7.0
P99.9-99.95	33.4	16.1	19.0	6.3	8.4	5.3	3.2	0.5	7.9
P99.95-99.99	29.3	17.9	28.3	3.8	1.3	8.4	1.1	0.7	9.1
P99.99-100	21.9	16.0	33.8	7.5	1.0	9.2	0.6	1.1	9.0
1988									
P90-95	38.5	5.4	8.1	18.4	11.3	1.8	9.1	0.1	7.3
P95-99	34.3	5.8	7.3	18.4	18.4	1.6	7.9	0.1	6.2
P99-99.5	29.4	6.3	6.5	19.4	22.8	1.2	8.3	0.1	5.8
P99.5-99.9	29.1	7.7	8.4	16.4	21.8	1.5	8.9	0.2	6.1
P99.9-99.95	31.7	8.8	11.3	12.9	18.7	2.0	8.1	0.2	6.3
P99.95-99.99									
P99.99-100									

Notes: The table reads as follows. In 1979, the taxable income of the first half of the top percentile (P99-99.5) can be decomposed into private sector employees (30.9%), self-employees (13.8%), etc.
Sources: author's calculations using tax returns data.

Table C.11. Composition of top taxable incomes by gender in Brazil, 1974-1988 and 1998 (%)

Year	Men	Women	Estates	Men	Women	Estates	Men	Women	Estates
	Top 10-5%			**Top 5-1%**			**Top 1-0.5%**		
1974	84.32	15.43	0.29	88.27	11.43	0.29	93.62	6.08	0.32
1975	82.42	16.98	0.47	87.53	12.12	0.37	92.99	6.61	0.40
1976	81.72	17.86	0.38	87.13	12.50	0.37	92.38	7.23	0.39
1977	81.48	18.22	0.33	86.85	12.79	0.34	92.32	7.28	0.40
1978	80.84	18.85	0.31	86.03	13.60	0.37	91.69	7.93	0.41
1979	80.03	19.69	0.32	85.02	14.65	0.33	91.39	8.21	0.38
1980	77.52	22.20	0.27	83.86	15.82	0.30	91.25	8.41	0.33
1981	76.44	23.32	0.24	83.09	16.63	0.28	90.60	9.07	0.30
1982	75.00	24.13	0.84	81.67	17.58	0.76	89.35	9.96	0.69
1983	73.47	26.13	0.37	80.96	18.66	0.40	89.18	10.39	0.41
1984	74.41	25.34	0.25	81.12	18.64	0.25	89.54	10.20	0.25
1985	73.99	24.46	1.55	78.40	20.25	1.34	87.40	11.41	1.22
1986	71.52	23.89	4.55	76.20	19.22	4.57	84.79	11.50	3.74
1987	71.77	27.22	1.01	76.05	23.01	0.94	84.50	14.64	0.85
1988	70.93	28.65	0.39	77.16	22.59	0.28	82.60	17.13	0.24
1998	62.92	37.08		64.88	35.12		71.44	28.56	
	Top 0.5-0.1%			**Top 0.1-0.05%**			**Top 0.05-0.01%**		
1974	95.33	4.29	0.35	95.87	3.64	0.50	95.00	4.32	0.68
1975	95.19	4.37	0.44	95.75	3.67	0.58	94.30	4.78	0.92
1976	95.18	4.39	0.43	95.63	3.74	0.63	94.47	4.46	1.02
1977	95.01	4.57	0.41	95.47	3.90	0.63	93.60	5.20	1.20
1978	94.62	4.96	0.42	95.35	3.94	0.71	93.66	5.21	1.14
1979	94.63	4.96	0.43	95.39	3.96	0.66	93.91	5.12	0.98
1980	94.36	5.30	0.34	95.64	3.81	0.56	94.46	4.65	0.87
1981	93.98	5.72	0.30	95.50	3.98	0.51	95.04	4.12	0.81
1982	92.98	6.35	0.67	94.83	4.32	0.87	94.42	4.41	1.17
1983	92.76	6.82	0.44	94.61	4.66	0.73	94.17	4.64	1.19
1984	92.75	6.95	0.28	94.98	4.54	0.48	94.92	4.40	0.68
1985	90.94	7.85	1.21	93.63	4.94	1.43	93.71	4.78	1.54
1986	89.84	7.09	3.07	92.90	4.51	2.61	92.99	4.42	2.58
1987	88.94	10.17	0.89	93.11	5.87	1.02	93.03	5.92	1.05
1988	89.53	10.22	0.26	93.01	6.69	0.29			
1998	76.19	23.81		82.48	17.52				
	Top 0.01%								

1974	94.82	4.32	0.86
1975	93.36	5.88	0.76
1976	94.17	4.76	1.08
1977	93.30	5.41	1.29
1978	93.12	5.78	1.11
1979	93.02	5.82	1.16
1980	93.64	5.47	0.90
1981	93.75	5.38	0.87
1982	93.11	5.25	1.64
1983	93.95	5.05	1.00
1984	93.74	5.39	0.87
1985	92.38	5.63	1.98
1986	92.99	4.42	2.58
1987	93.03	5.92	1.05
1988			
1998			

Notes: The table reads as follows. In 1998, 82.48% of the the taxable income of the top 0.01% was sourced from men, while 17.52% came from women, etc. Estates are individuals deceased over the year. In order to calculate Figure 30, the estates were distributed among men and women according to their shares in the income.
Sources: author's calculations using tax returns data.

Table C.12. Composition of top taxable incomes by decade of birth in Brazil, 1970-1988 (%)

Year	From 1920	1921-1930	1931-1940	1941-1950	From 1951	From 1920	1921-1930	1931-1940	1941-1950	From 1951
	Top 10-5%					**Top 5-1%**				
1970	22.9	22.6	28.9	24.9	0.8	25.0	26.9	31.9	15.8	0.3
1971	21.8	21.9	28.3	26.7	1.4	23.2	25.8	31.6	18.8	0.5
1972	18.2	21.1	27.9	28.5	4.2	19.3	24.8	31.4	21.9	2.6
1973	16.9	20.2	27.0	30.1	5.8	17.5	23.5	31.1	25.0	2.9
1974	15.4	19.4	26.5	30.9	7.7	15.9	22.3	30.4	27.8	3.7
1975	14.7	18.3	24.9	31.4	10.7	14.4	21.1	29.8	30.0	4.8
1976	13.2	17.3	23.8	31.6	14.1	13.2	19.9	29.0	31.6	6.4
1977	13.1	16.6	23.2	30.9	16.2	13.3	18.7	27.6	32.5	7.9
1978	11.3	15.6	22.5	30.7	19.9	11.1	17.7	26.9	33.6	10.8
1979	10.0	14.7	21.9	30.3	23.2	9.6	16.4	26.0	34.3	13.7
1980	8.9	13.1	19.4	29.0	29.6	8.8	15.2	24.2	33.7	18.1
1981	8.4	13.0	18.9	27.7	32.0	7.6	14.1	22.9	33.6	21.8
1982	7.6	12.4	18.3	27.0	34.7	6.7	13.2	21.7	33.3	25.2
1983	7.1	12.3	17.6	25.8	37.2	5.9	12.5	20.9	32.9	27.9
1984	6.2	11.6	16.6	25.3	40.5	5.1	11.4	19.8	32.4	31.2
1985										
1986	4.2	9.5	15.3	25.0	45.9	4.0	9.3	18.1	31.2	37.3
1987	3.6	8.2	14.2	24.1	50.0	3.7	8.3	16.6	29.8	41.7
1988	3.4	7.8	13.8	23.3	51.7	3.4	7.7	15.6	28.4	45.0
	Top 1-0.5%					**Top 0.5-0.1%**				
1970	29.4	30.1	30.5	9.7	0.3	33.0	32.5	27.9	6.3	0.3
1971	26.7	29.0	31.1	12.7	0.5	30.5	31.5	29.0	8.6	0.5
1972	22.2	28.0	31.6	15.7	2.4	25.5	30.8	30.4	10.9	2.4
1973	20.2	26.8	31.6	19.1	2.3	22.8	29.7	31.5	13.8	2.1
1974	17.9	25.4	31.7	22.7	2.3	20.6	28.5	32.1	16.9	2.0
1975	16.6	24.4	31.3	25.4	2.3	19.3	27.9	32.0	19.0	1.9
1976	15.4	23.1	30.6	28.3	2.8	18.2	26.9	31.6	21.5	1.9
1977	14.7	21.3	30.6	30.7	2.7	18.0	26.3	31.1	23.5	1.1
1978	12.2	20.3	30.0	33.5	4.0	15.1	25.2	31.6	26.6	1.6
1979	10.9	19.2	29.1	35.2	5.7	13.8	24.4	31.6	28.1	2.1
1980	10.0	18.5	27.5	35.8	8.2	11.8	22.2	30.9	31.5	3.7
1981	8.4	17.0	26.8	37.0	10.8	10.3	21.2	30.3	33.1	5.2
1982	7.6	16.0	26.0	37.2	13.2	9.3	20.2	29.9	33.8	6.9
1983	6.6	15.0	25.7	37.1	15.6	8.2	19.2	29.5	34.1	9.1

1984	5.9	14.3	24.8	36.8	18.3	7.0	17.5	28.2	35.1	12.3
1985										
1986	5.2	12.1	21.9	36.0	24.8	5.9	15.4	26.8	35.8	16.3
1987	4.7	11.3	20.9	35.6	27.5	5.3	13.5	24.7	36.3	20.2
1988	4.1	9.3	18.4	33.5	34.7	5.1	13.1	24.3	35.7	21.8

	Top 0.1-0.05%					Top 0.05-0.01%				
1970	40.03	34.28	22.19	3.21	0.29	44.83	34.28	18.31	2.26	0.34
1971	37.3	33.99	23.53	4.72	0.46	42.98	32.89	19.31	4.22	0.61
1972	31.61	34.62	24.78	5.71	3.26	38.27	31	19.09	6.34	5.3
1973	29.43	34.15	26.6	6.98	2.85	36.5	33.1	20.13	5.44	4.81
1974	26.58	33.47	28.71	8.77	2.48	33.93	34.35	21.74	5.84	4.14
1975	24.8	32.73	29.69	10.56	2.22	34.24	34.51	21.83	5.81	3.61
1976	23.53	31.75	30.03	12.64	2.05	32.48	34.26	23.48	6.79	3.02
1977	24.45	31.24	29.91	13.8	0.62	33.22	34.25	24.25	7.63	0.61
1978	22.07	32.01	30.6	14.55	0.79	29.89	34.27	26.28	8.76	0.74
1979	19.96	30.85	31.16	16.99	1.04	26.84	33.67	27.98	10.77	0.77
1980	17.1	29.74	31.58	19.97	1.62	21.66	32.38	30.28	14.38	1.28
1981	15.22	28.59	32.01	22.02	2.18	19.26	31.05	31.11	17.01	1.56
1982	14.22	27.9	31.96	23.06	2.85	17.41	29.23	31.68	19.52	2.16
1983	12.01	25.85	31.52	25.94	4.66	14.09	26.96	31.87	23.47	3.61
1984	10.25	23.07	31.52	28.89	6.29	12.04	24.9	32.34	26.04	4.69
1985										
1986	8.74	20.42	30.96	31.12	8.75	9.31	21.18	31.4	30.13	7.99
1987	8.2	18.75	31.56	31.78	9.71	9.47	20.5	32.56	29.44	8.03
1988	6	15.08	27.73	36.08	15.1					

	Top 0.01%				
1970	54.7	29.4	13.1	2.4	0.4
1971	47.2	29.5	15.8	6.6	1.0
1972	37.4	29.2	20.9	7.8	4.7
1973	37.6	30.0	21.8	6.3	4.3
1974	37.9	32.3	20.7	5.1	3.9
1975	35.2	30.7	21.8	8.2	4.1
1976	34.4	32.7	23.5	6.3	3.1
1977	38.3	32.7	21.8	6.8	0.5
1978	35.1	32.3	23.9	8.0	0.7
1979	32.5	33.4	23.5	9.8	0.8
1980	28.0	32.4	25.9	12.7	1.0
1981	26.1	32.5	26.7	13.7	1.0
1982	23.7	31.5	27.7	15.0	2.2
1983	17.8	28.6	31.3	19.3	3.0

1984	16.9	28.8	30.5	20.1	3.8
1985					
1986					
1987					
1988					

Notes: The table reads as follows. In 1970, 22.9% of the the taxable income of the top 10-5% was sourced from individuals born up to 1920 (aged 50+), 22.6% came from individuals born between 1921 and 1930 (aged 40-49), etc.
Sources: author's calculations using tax returns data.

D. Discussion

D.1.1. Taxation of top incomes

Table D.1. Average and effective income tax rates for top groups in Brazil, 2013 (%)

Fractiles	Average tax rate - taxable income (before deductions)	Average tax rate - taxable income (after deductions)	Effective tax rate - total income (before deductions)	Effective tax rate - total income (after deductions
P90-95	3.63	4.93	2.87	3.66
P95-99	10.91	13.24	8.08	9.41
P99-99.5	12.86	13.77	9.86	11.29
P99.5-99.9	18.57	22.39	8.12	8.86
P99.9-99.95	20.10	24.11	3.53	3.67
P99.95-99.99	20.38	25.29	2.56	2.62
P99.99-100	20.38	25.29	2.56	2.62

Notes: The tax rates are for the personal income tax, excluding social seciruty contributions. The table reads as follows. In 2013, the top 0.01% (P99.99-100) were subject to an average tax rate (on the taxable protion of their income) of 20.38 % before deductions (25.29% after deductions), while they faced an effective tax rate (on their total income) of 2.56% before deductions (2.62% after deductions), etc.
Sources: author's calculations using tax returns data.

Table D.2. Taxable and nontaxble income across top income groups in Brazil, 1983 and 2013 (%)

Fractiles	Taxable income	Non-taxable income/taxed excl. at source	
	1983		
P90-95	70.71	29.29	
P95-99	66.53	33.47	
P99-99.5	40.20	59.80	
P99.5-99.9	27.99	72.01	
P99.9-99.95	10.88	89.12	
P99.95-99.99	10.88	89.12	
P99.99-100	10.88	89.12	
Fractiles	Taxable income	Non-taxable income	Income taxed excl. at source
	2013		
P90-95	79.23	13.77	7.00
P95-99	69.09	22.97	7.94
P99-99.5	59.26	31.89	8.86
P99.5-99.9	42.90	46.57	10.53
P99.9-99.95	17.56	63.79	18.65
P99.95-99.99	12.55	65.80	21.65
P99.99-100	12.55	65.80	21.65

Notes: The table reads as follows. In 2013, the 12.55% of income of the top 0.01% (P99.99-100) was subject to the income tax, 65.80% was exempt from the income tax, and 21.65% was taxed exclusively at source, etc.
Sources: author's calculations using tax returns data.

D.1.2. Comparing tax data and household surveys

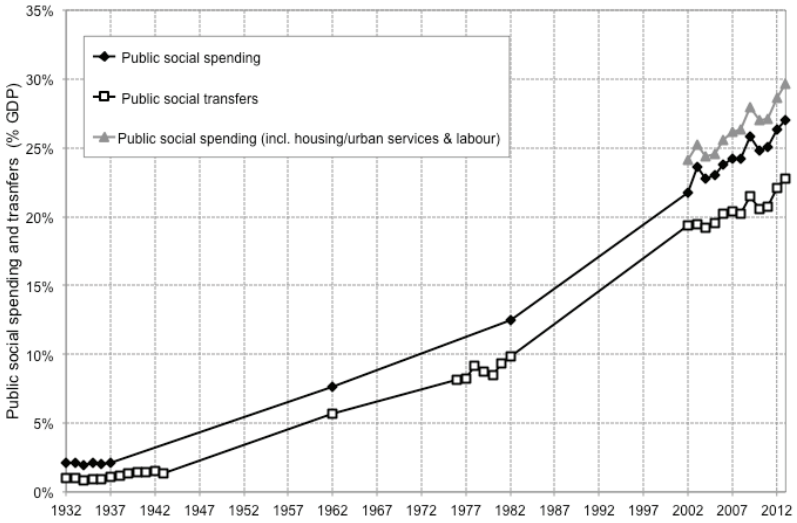
Table D.3. Comparison of incomes in tax data and surveys in Brazil, 2008-2012

	Brazil	Top 5%		Top 1%		Top 0.1%	
Source	Average income (current R$)	Thresholds (current R$)	Average income (current R$)	Thresholds (current R$)	Average income (current R$)	Thresholds (current R$)	Average income (current R$)
Tax data 2008	15,100	38,600	140,300	141,200	403,600	630,900	1,804,100
Survey data (POF) 2008/2009	12,400	45,000	95,900	124,200	203,700	288,100	466,600
Tax data 2010	18,100	46,700	164,600	168,700	464,500	732,500	1,960,500
Census data 2010	13,600	46,700	109,800	127,000	263,200	380,000	911,400
Tax data 2012	20,400	57,600	197,700	203,100	552,900	871,700	2,373,500
Survey data (PNAD) 2012	15,100	48,000	99,700	120,000	214,700	300,000	613,500

Notes: the Pesquisa de Orçamentos Familiares (POF) is a houshold survey by the IBGE, like its counterpart the PNAD. However the POF collects information on more income concepts over a longer reference period. Thus, it is deemed a better source to capture capital income, social assistance transfers and other 'unearned income'.
Source: Medeiros *et al.* (2015), Table 3.

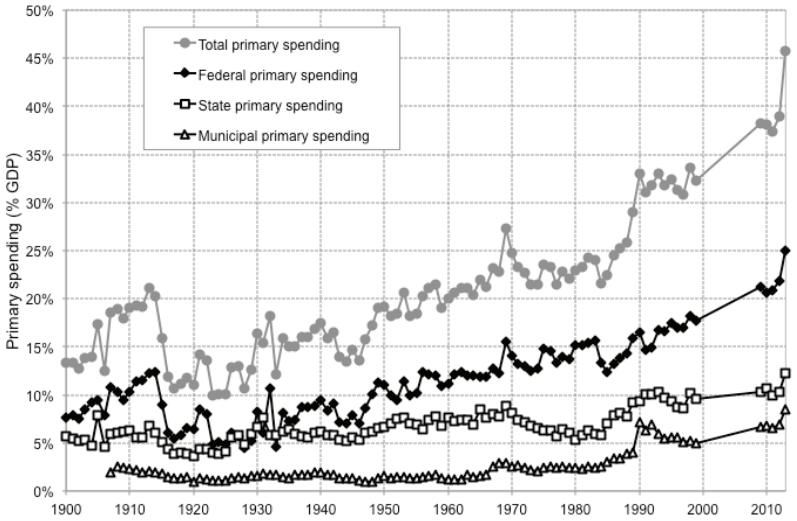
E. Fiscal context

Figure E.1. Evolution of public social spending and transfers in Brazil 1932-2013



Sources: Author's calculation for Brazil using data from IBGE and from the *Ministério de Fazenda.*

Figure E.2. Evolution of public primary spending in Brazil, 1900-2012



Sources: Author's calculation for Brazil using data from IBGE and from the *Ministério de Fazenda.*