The Measure of Disorder: Population, State-Building and Rebellion in Old Regime France, 1661-1789

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Abstract

It has been hypothesized that population growth had a key destabilizing effect on early-modern societies, and on prerevolutionary France in particular. I propose to study this claim through the lens of collective violence, on the basis of a large data set of rebellions occurred in France from 1661 to 1789. Even though the monarchy put an end to large revolts, which almost disappeared until the Revolution, France continued to experience continuous small-scale unrest, which grew significantly in the decades preceding the Revolution. To assess the trends and regional distribution of rebellion, I construct population series for France and regional subdivisions, based on existing literature. I also collect data and build various indicators of family behavior, wages, production, height and state taxation for seventeenth and eighteenth century France. I argue that France experienced a period of strongly unequal growth in the second half of the eighteenth century, due to the interaction of Malthusian effects of population increase and unequal distribution of land; and that the growing burden of state indirect taxation was met with no less rising resistance. Finally, I investigate the regional distribution of rebellion, and find that no region deviated from the country-level trend, while distinctive local patterns cannot be clearly related to demographic features that would support the population pressure hypothesis.

JEL codes: J11, N33, N43.*

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The oppressed have struck in the name of justice, the privileged in the name of order, those in between in the name of fear.

Charles Tilly[1]

Introduction

The meaning of early modern collective violence

This dissertation aims to study the links between trends in rebellion, demographic change and state-building in Old Regime France, from Louis XIV's accession to personal rule to the Revolution. It is based on the premise that the population's resistance to authority in the form of collective violence is a fundamental factor in understanding the dynamics of early modern societies. As stated by Tilly (1978), "the nature of violence and the nature of the society are intimately related", and this connection was central to the political development of western countries. Expanding on the case of French *Ancien Régime*, Nicolas (2002) emphasizes that "conflict is not accidental, it is an integral part of the functioning of a society, of intergroup relations, of the active and passive exercise of power" (p. 37). As stressed by Nicolas, conflict could be solved by compromise; and if this failed, by recourse to the competent authorities, first and foremost in courts. But if that failed too, then the Clausewitzian phrase held also within the scope of civil society. As such, collective violence should not be understood as a mere outlet of anger or despair, that could not have been contained any longer. Spontaneous explosion of a feeling of injustice due to a "real or imaginary threat" is certainly a recurring pattern in early modern disturbances (ibid.). But even the most "irrational" rebellion was still a form of expression and a means of negotiation, deeply rooted in local customs, and belonging to the whole "repertoire of contention" from which the protesters could draw (Tilly, 1986). Rebels acted according to certain goals, norms and values. In his 1971 article on the moral economy of the crowd, E.P. Thompson strongly emphasized the historical agency of the common people in the case of eighteenth century English food riots. He severely warned against against "the spasmodic view of popular history" according to which rioters were merely "responding to economic elementary stimuli"(pp. 76-78). The immediate causes of rebellion were so only because they entered into a value system which defined them as outrageous. In Thompson's example, it was not enough for the price of bread to be high: it had to be considered unfair. According to Neveux et al. (1998), the requests of early modern European peasants held "Justice as supreme value", followed by tradition, honor, self-sustainment and peace (p. 252).

The Thompson critique was primarily a reaction to certain excesses of economic history at the time (namely Rostow), and it is still relevant. However, it does not dismiss the importance of external factors: the price of bread had to rise first – or at least be believed to do so, which could happen in specific contexts only. And these external factors depended on structural changes in society. Although there has certainly never been anything automatic about the outbreak and

[1] "Collective Violence in European Perspective", 1978.

coalescence of a rebellion, one expects it to be all the more likely when conditions that are conducive to put certain social groups under strain, to increase their frustration or to lift their restraint take hold. Conversely, the occurrence, intensity and motivation of rebellions provides information on the state of society and the tensions that run trough it. This is what this essay seeks to explore in the case of *Ancien Régime*.

State-building and repression in Old Regime France

Tilly (1978) stresses that the eighteenth century English legal tradition recognized the population's "right of resistance". On the contrary, in Louisquatorzian France, the widespread rebelliousness that had marked the first half of the sixteenth century was precisely what had to be stopped for good. The roots of "absolutism" lied in this requirement, for the sake of monarchical power. According to Brown (1999), the history of what he calls "domestic state violence" – exerted to suppress rebellion – can be divided into three stages, as far as the modern French monarchy is concerned. In the first one, from the end of the Wars of Religion until around 1640, the crown was still failing to dominate provincial elites, who had a key role in the management of peasant uprisings and tended to moderate the strength of state repression. Then, from 1640 to 1675, the monarchy asserted its authority, and the severity of punishment substantially increased. In particular, tax rebellion was redefined as treason, and the intendants, the king's representatives in the provinces, were given extended military and judicial power to ensure the smooth progress of tax collection, and to subject disloyal local authorities. The struggle to legitimize the state as well as tax resistance reached an apex during the Fronde.

Thereafter, the repression of the Breton Papier Timbré movement in 1675, one of the last large tax revolt of Ancien Régime, marked a turning point in the use of state domestic violence, in the sense that the concern was no more "not enough" but "too much". Although "repression was terrifying" according to Nicolas (2002, p. 256), in Brown's view, this level of violence was nothing but typical of the new standard of restoring order, and the military authorities tried to put safeguards to prevent Brittany from being completely devastated by unleashed soldiers. State authority was no more to be gained, but rather to be consolidated, while state violence was redirected abroad. European competition for resources and prestige led Louis XIV to engage France in continuous wars, and the fiscal-military state thus underwent a dramatic expansion at the expense of the peasantry, which at the same time struggled with climatic crises (Lachiver, 1991). But under the centralizing leadership of the king, a new internal order characterized by increased dependence to the state was gradually taking shape. It took the form of "themistocracy", a neologism borrowed from Andrews by Brown to describe the rule of royal judges and lawyers, whose prerogative were greatly extended at the expense of seigneurial courts. This "fourth estate" of *robins* was a driving force in shaping the centralized order and the new regulation of social relations that it implied, which helped to exempt the state from resorting to armed force for domestic affairs.

Population pressure and social destabilization

Even though large revolts were now becoming rarer and almost disappeared between from the 1710s to the 1780s, small scale rebellion remained very much alive. As it will be shown below, it reemerged with even greater strength in the second half the eighteenth century, until the

Revolution. At the same time, France was undergoing a phase of sustained demographic and economic growth, after years of repeated crises. But this apparent prosperity does not seem to have promoted social stability. On the contrary, large sections of society appear to have been frustrated or marginalized, in particular among the landless peasantry, whose misery drained into the towns and fueled a class of struggling wage-earners. The hypothesis that demographic pressure was a root cause of this process has been put forward by Goldstone (1991). Goldstone's main concern was to bring out a common framework for the early-modern wave of revolts that led to state breakdown in contexts as diverse England, Ottoman Empire, and Imperial China in the seventeenth century, and eighteenth-century France. According to him, a joint pattern is to be found in "the incapacity of agrarian economies, and of their attendant social and political institutions, to cope with pressure of sustained population increase" (p. 349). He does not mean by that a crude Malthusian scheme in which population increase would have have been faster than the growth of food supply; Goldstone sticks to the Boserupian view that in the long run, agricultural productivity responded positively to population growth. But this was neither necessarily true on the short term, nor equally true across the country. Goldstone's "Post-Malthusianism" stresses the distributional aspects of population growth: even if the "Malthusian limit" was not reached, the poorest part of the population could be harshly struggling with rising grain prices (pp. 31-32). Goldstone also holds that population increase was primarily driven by exogenous changes in mortality, such as variation in diseases; the reduction of infant and child mortality, which moved a larger part of the birth cohort into the reproductive age group, was a key factor. Lastly, the impact of population increase would have been mainly on "marginal groups", those with low economic and social capital who were struggling to access scarce resources such as land or a stable professional position (p. 33). A higher pressure on land, leading to an increase in rents, should have excluded the poorest peasants from the land market and thus prevented them from achieving self-sufficiency; then, they had no choice but to increase their hours of wage labor – if they found some. They could otherwise move to the city, but the problem would be no different, given the highly segmented structure of employment divided between skilled workers inside corporations and day laborers outside of them.

Drawing on Dupâquier (1978), Goldstone mentions five crucial trends observed in the French countryside in the second half of the eignteenth century: rising age of marriage, "indicating difficulties in accumulating the resources needed to start a family"; falling real wages; an increase in the population "floating" between countryside and cities; rising urbanization; rising unemployment (p. 252). Furthermore, the increase in taxation made necessary by the ever-growing needs of the state disproportionately burdened the small peasantry (Goldstone, 2010).

Rationale

Did these overall trends fueled a rise in rebellion? This would provide an additional evidence to Goldstone's thesis. His argument is precisely that despite its seismic suddenness, the Revolution was no random event: it was rather deeply rooted in decades of progressive destabilization of French society. This was already the stance of Le Roy Ladurie (1974): emphasizing that rural protest had not stopped in the eighteenth century, he argued that 1789 would be incomprehensible, if seen as "a thunderclap in a quiet sky" (p. 10). In this regard, it is striking that the increasing trend in rebellion was continuous in the second half of the eighteenth century. However, this does not imply that the hypothesis of population pressure is right. The question is all

the more difficult to address, as no single element can be isolated from the others. Population increase impacted nominal wages, relative prices, access to land, distribution of status in the society and urbanization. These effects interacted together, and were determinants of state capacity – in particular its extractive capacity. All of this acted on the condition and opportunities of the rural and urban masses. Even though I do not claim to give a definitive answer to the question whether the rebellion had demographic causes in this essay, I try to provide some pieces of evidence which help to disentangle the puzzle. In section 1, I present and discuss rebellion data, based on the recent work of Chambru (2019). I also gather data on the trends and regional distribution of various indicators of family behavior, wages, production, height and state taxation, which I use to build relevant indices. In particular, I construct population series for France and regional subdivisions, based on existing literature, that I use to assess the intensity of rebellion and the development of the tax burden. Then, in section 2, I rely on this material and on historical literature to provide some elements of interpretation and considerations that may offer the beginning of an answer. In particular, I argue that France experienced a period of strongly unequal growth in the second half of the eighteenth century, due to the interaction of Malthusian effects of population increase, and unequal distribution of land. I also study the features of state taxation and stress the growing resistance to rising indirect taxes. Finally, I investigate the regional distribution of rebellion, and find that no region deviated from the country-level trend, which supports the thesis of a common conjunctural mover of the propensity to rebel. However, while distinctive local patterns are to be observed, they cannot be clearly related to demographic features that would point toward the population pressure hypothesis.

1 Quantitative sources and methodology

1.1 Demographics

1.1.1 The Henry and Biraben surveys

Knowledge of pre-census French demographics is remarkably thorough, thanks to the large-scale surveys of parish and civil registers conducted by the French Institute for Demographic Studies (INED) in the second half of the twentieth century[2]. The best-known period is 1740-1829, for which Louis Henry and his team gathered birth, death and marriage certificates over a sample of ca. 400 villages and towns within present French borders. In particular, age at death could be used to reconstruct birth cohorts (using census data for deaths after 1830), and thus population increase and size (Henry and Blayo, 1975). These figures are by far more reliable than the few old regime counting attempts and improve the information provided by the first censuses conducted at the beginning of the nineteenth century by the *Statistique générale de la France* (SGF), the then new state statistical service[3]. Henry and Blayo's work was originally intended to be extended

[2]The French monarchy began to regulate the keeping of baptism and death registers by parish priests with the 1539 Ordinance of Villers-Cotterêts, then of marriage registers with the 1579 Ordinance of Blois. It was further enforced and made mandatory throughout the territory in 1667, making an exhaustive study of French population theoretically possible from this date (Séguy, 2001, p. 8). After the Revolution, registration was transferred to public officers with the 1792 law creating civil marriage.

[3]Strictly speaking, SGF was only created in 1840, but one can trace its origin back to the creation of a Statistical Office within the Interior department in 1798 (Dupâquier and Le Mée, 1988). For convenience, the work done by this administration and its subsequent avatars until 1840 is also referred to as "SGF" in the remainder of this

to the period 1670-1740 (Séguy, 2001), but no data has been published, although partial results were used to estimate rural vital statistics (Rebaudo, 1979), and later population size (Lachiver, 1991 and Chevet, 1993). Besides, to study fertility, Henry also supervised family reconstitutions in a subsample of 39 villages for the period 1670-1829 [4]. Regarding the period before 1670, a survey like Henry's would not have been possible due to the gaps in registration. However, Jean-Noël Biraben launched another survey for the sixteenth and seventeenth centuries, that included the counting of baptisms, marriages and deaths in more than 500 communes (Séguy, 1999), and whose preliminary results were among others used for population estimation by Dupâquier (1993).

1.1.2 Family behavior

To study the trends and regional variation in family behavior, I use two samples of the Henry database: the "anonymous" sample of marriages and the "nominative" sample of parents. The former was constituted over the large sample of villages and towns such as to be equivalent to a one-fifth draw at the scale of present French territory, and includes 44383 marriages contracted from 1740 to 1829. The latter is the result of extensive reconstitution work, and therefore limited to a subsample of previous villages (and villages only), but goes back to 1670 and contains more information per observation, in particular progeny. Unit of observation is also marriage, with 34812 marriages contracted from 1670 to 1819[5].

The age at marriage of the wife and husband can observed in both samples, though with the following reservation: before the law on civil marriage and divorce of 20 September 1792, which established the terms of compulsory registration[6], age was most often not reported in marriage certificates. In the nominative sample, age is not mentioned for two thirds of marriages contracted from 1670 to 1791, while ten percent display only a mention of majority or minority. Mention of majority seems to have increased over time, such that these proportions are respectively of one half and one quarter of marriages contracted between from 1740 to 1791 in the anonymous sample, but this still gives only one quarter of marriages with mention of age. Moreover, the mention of majority cannot be used without further knowledge of the adopted definition of majority, which may have varied according to the context[7]. Lastly, to focus on the setting up of young people and therefore on first marriage, individuals which are not known as formerly single have to be excluded[8]. All of this leads to an important depletion of the sample. Nevertheless, sample size remains large enough to bring out general trends, even if results in absolute values might not be representative due to selection bias. The evolution of mean age at first marriage from 1670 to 1819, obtained by fitting a generalized linear model (GAM) on the nominative

essay.

[4]Results were published separately by region in Henry (1978, 1972a,b), Houdaille (1976), and Henry and Houdaille (1973).

[5]Sampling and database building for both anonymous and nominative parts are presented in detail in Séguy (2001).

[6]*Archives parlementaires de 1787 à 1860*, Vol. 50, pp. 179-184.

[7]In particular, the proportion of minors among men or women whose majority is only mentioned is completely at odds with the proportion of minors among men or women whose age is reported, computed according to contemporary legal definitions of civil or matrimonial majority. They were probably numerous geographical and social biases in age versus majority report, but the most likely explanation appears to be the absence of a unified definition of majority in marriage certificates.

[8]This restriction matters, since the data displays a steady decline in the proportion of remarriages in the eighteenth century.

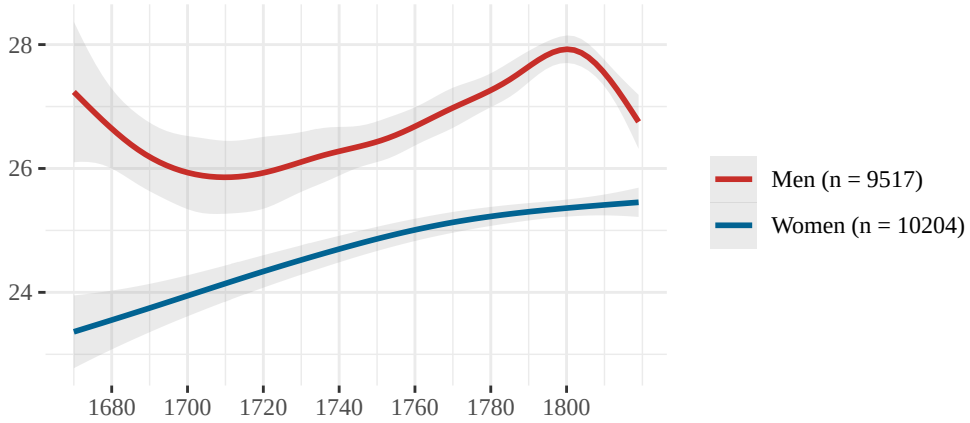

FIGURE 1: *Mean age at first marriage by year of marriage in rural France, nominative sample (1670-1819).*

Notes: Obtained by GAM fitting on the sample. 95% confidence intervals in shaded area. Individuals for which previous marital status is non-single or unknown are excluded from the sample. 15-year averages are shown in Appendix Figure B.20. See also Appendix Figure B.21 for results based on the anonymous sample.
Source: Henry survey, database in Séguy (2001).

sample, is shown with confidence intervals in Figure 1, while Appendix Figures B.20 and B.21 respectively present fifteen-year averages, and a GAM fitting based on the anonymous sample restricted to rural marriages – the nominative sample is already so. These graphs do not present any break in 1792, when mentions of age increased suddenly, which suggests that this does not distort the results. Besides, larger sample size of the anonymous sample makes it possible to study the evolution by region. I use a regional division based on that of the original survey (Appendix Map C.4), which ensures that the distribution of villages among regions is balanced enough (results in Figure 19). I also use spatial interpolation to highlight the regional variation in age at marriage over the period 1740-1789 (Appendix Maps C.5 and C.6).

The study of rural marital fertility based on the nominative sample is a complex task which was already carried out in an extensive literature[9]. Therefore, I just look at the evolution of the mean number of children per marriage without or with restrictive conditions for eligibility in the sample, respectively in Figure 12 and Appendix Figure B.22. The mean number of children per marriage without restrictive condition is an indicator of the real size of marital progeny resulting from the many constraints that limited the repetition of procreation, especially the lifetime of parents[10]. Adding restrictive conditions (first marriage for both spouses, at least one child, marriage observed at least 25 years and wife died after 49 years old) helps to capture the

[9]See footnote 4, and also Weir (1982). By definition, such studies exclude illegitimate births, but according to results based on the non-published part of the Henry survey, although these were slowly rising, they remained restricted to a few percent (Blayo, 1975b).

[10]Since deaths are recorded from 1740 to 1829 in the anonymous sample of deaths, life expectancy can be studied for the birth cohort 1740. I find that among women who had survived at least 15 years and were thus potential mothers, one quarter died before 40 years old. This proportion was most likely to be higher in the previous century, given what is known about the evolution of life expectancy before 1740 (Bideau et al., 1988, pp. 234-236).

behavior of couples who were freed from those constraints, and thereby something closer to their preferences. However, these couples may also be those with better living standards, and thus only representative of the best-off peasantry. To take into account infant and child mortality in the reproductive behavior of spouses, I also rescale the number of childbirths by the proportion of surviving children at ten years old at the country level, found in Houdaille (1984, Table 2) for the period 1690-1779 and in Bideau et al. (1988, Table 31) for the following period[11]. Finally, I use spatial interpolation to highlight the regional variation in marital fertility over the period 1670-1789 (Appendix Map C.7).

1.1.3 The impossible population reconstruction

Regarding population size, it must be stressed that in the short term, it is quite illusory to hope to do better than aforementioned estimates, mostly because a significant portion of the Henry-Biraben data has not been coded or made available – up to the time of writing, this includes Biraben series and Henry's large sample of deaths and marriages from 1670 to 1740. Even a new attempt to estimate the population increase and size from 1740 would be hampered by the lack of available data on deaths by age from 1829 until the 1850s[12]. Without deaths by age making the reconstruction of past birth cohorts possible, one may want to estimate the number of births in order to compute the population variation, using the number of marriages and marital fertility obtained from family reconstitutions. But this proves to be nearly intractable due to the under-recording of child deaths and the varying observation time of the couples, for a result that is certainly less precise than that obtained with subsequent deaths, even if Henry and Blayo (1975) also have to make assumptions on the under-recording of child deaths and on deaths abroad due to emigration, revolutionary and Napoleonic wars. New attempts of population reconstruction should also consider the fact that SGF censuses are flawed (Bonneuil, 1989), inducing inverse projection methods to yield wrong results (Bonneuil, 2017). Recent methods, such as Bonneuil and Fursa (2011), impose strong structural conditions by minimizing the distance between recorded statistics and theoretical figures obtained from consistent population equations. However, they still require knowledge of births, and for this reason are not suitable for the purpose of French population reconstruction.

1.1.4 French population size

Therefore, I construct a series of French population in the seventeenth and eighteenth centuries using various estimates of the literature based on Henry-Biraben data, presented in Appendix Figure B.23[13]. All of them are supposed to cover current frontiers, including Corsica. I do not take into account extrapolations from Dupâquier and Lepetit (1988), since he presents his 1993 figures as an improvement based on the then new Biraben results. For the post-1770 period, I use Dupâquier's 1993 figures, which are meant to correct Henry and Blayo's estimates for their underestimation of unrecorded deaths, but I keep the latter for the 1730-1770 period

[11] These figures are those of Blayo (1975a) and thus go back to 1740, but Bideau et al. hold the prerevolutionary ones as minimums, since Henry and Blayo assumed that all unrecorded deaths were under five years of age. Houdaille (1984) proposes a method to correct this.

[12] Among the numerous published SGF tables, no deaths by age appear before 1855, whereas Henry and Blayo (1975) explain that they use such SGF tables for the years 1806-1904 (p. 79).

[13] Unfortunately, these do not include Chevet (1993), since he has not published a table of his figures.

since Dupâquier's corrections seem implausibly spiky. Remaining estimates are not all credibly compatible with each other. In particular, Dupâquier's 1993 figures for the seventeenth century are clearly too high as compared to Lachiver's: joining even his lowest estimates with Lachiver's, France would have lost one million inhabitants from 1675 to 1680. While there certainly appears to have been a downward trend in births in theses years and a mortality peak in 1676 (Rebaudo, 1979, pp. 594-598), this is not comparable with subsequent demographic crises, in which France lost 1.7 and 0.8 million inhabitants respectively in the years 1691-1696 and 1709-1714, according to Lachiver's figures. Unfortunately, Lachiver does not specify his calculations, whose results are rather in line with Henry and Blayo's 1975 backward projection for the years 1690-1730 (Table 15)[14]. Despite the clear lack of information about the years 1720-1740, Lachiver's series leastwise appears to be consistent with Henry's. Dupâquier himself seemed to trust it more than his owns, obtained by merely applying arbitrary birth rates (4.0, 4.2 and 4.4 percent) to Biraben series of baptisms[15]. The discrepancy could lie there, as the highest birth rate chosen by Dupâquier (implying his low population estimates) may still be too low. Indeed, putting together Lachiver and Biraben figures, respectively for population and baptisms, one finds that the birth rate would have decreased from 4.5 to 4.2 percent from 1680 to 1720 (Dupâquier, 1993), such that 4.5 percent is not an implausible figure for the previous period[16]. Another possibility is that Biraben baptisms might also be overestimated. Whatever the case, the least bad option seems to recaculate Dupâquier's series with a birth rate of 4.5 percent (or to keep 4.4 percent and to adjust the number of baptisms down by 2 percent, which is equivalent). With this adjustment, the 1675-1680 population loss is reduced to the "reasonable" amount of 0.4 million. Finally, I interpolate the obtained synthesis by smoothing spline to build a yearly population series for the seventeenth and eighteenth centuries, as shown in Figure 2.

1.1.5 Population by region, by *généralité* and by *département*

The need to make do with existing, albeit imperfect figures, is all the more true at the local level. At first glance, the wide territorial coverage of Henry data gives hope for knowledge of the evolution of the population at the scale of small territorial units. However, the number of villages in the sample and the difficulty of taking internal migration into account only make division into large regions possible[17]. Although the Henry survey was designed with a division into ten big regions (Appendix Map C.4), and vital statistics estimated by region (Blayo, 1975c), Henry and Blayo (1975) did finally not estimate population size by region. Yet, Lachiver (1991) did it for the period 1685-1715, albeit according to another regional division, shown in Appendix Map

[14]Henry and Blayo presumed that the 1720s must have been a time of catch-up after the 1710s trough, and the 1730s a period of "standard" growth, which appears to be consistent with available statistics of baptisms and deaths in this period (Rebaudo, 1979, p. 598).

[15]In his last published work on the topic, he considers Lachiver's series to be "perfectly compatible" with Henry's 1740 minimal estimate of 24.6 millions, right after roughly quoting his 1993 low estimates for the seventeenth century – without mentioning their obvious incompatibility with Lachiver's series (Dupâquier, 1998, pp. 447-449).

[16]This is consistent with a declining birth rate in the long run, a trend also observed after 1740: 4 percent on average in the years 1740-1769, 3.8 percent in 1770-1799, 3.2 percent in 1800-1829 (Henry and Blayo, 1975, Table 22). Despite a time lag of one century, these well-established figures may have influenced Dupâquier's choice of hypotheses between 4 and 4.4 percent. For comparison, 4.5 percent was the birth rate for Africa as a whole around 1980 (*World Populations Prospects 2019*), while the English rate would very rarely have exceeded 4 percent from 1541 to 1871 (Wrigley and Schofield, 1981) – with all due caution regarding these figures.

[17]The mention of birthplace in marriage certificates is most of the time too imprecise to be used, when not absent. This led to focus on matrimonial migrations rather than migrations (Houdaille and Bonneuil, 1992).

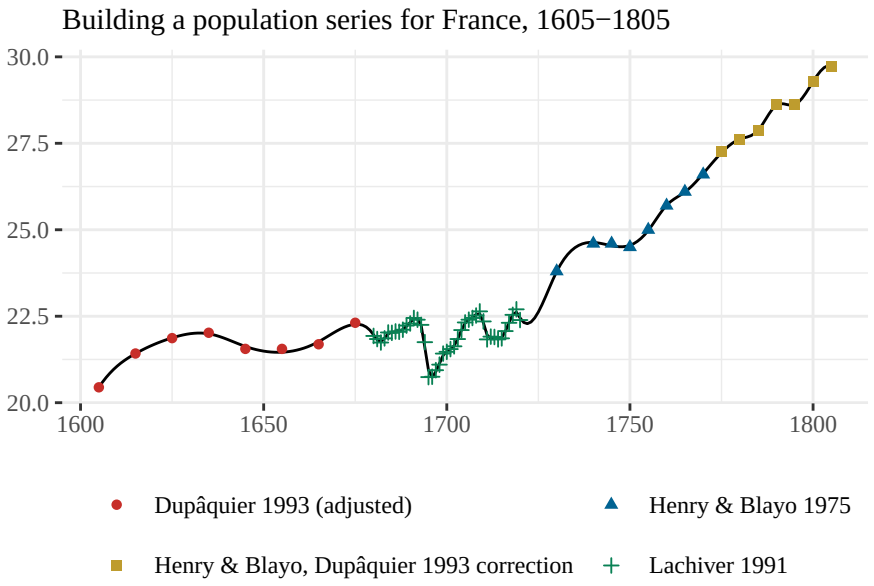

FIGURE 2: *Population (million inhabitants) within present French metropolitan frontiers (including Corsica), from selected sources.*

Notes: Dupâquier's figures for the period 1605-1675 are adjusted for a birth rate of 4.5 percent. Black line is a smoothing spline interpolation of the retained synthesis.

C.8. In addition, there are 18th century estimates for *généralités* (the old regime fiscal districts), although not always reliable[18]. Dupâquier and Lepetit (1988) choose to retain the figures of Vauban for 1700, though with some corrections, and those computed by Reinhard, based on Des Pommelles, for the 1780s. Although they are most likely to be wrong in absolute terms, these estimates give an approximation of the relative population growth of *généralités*. I combine them with the population series of Figure 2 to construct a population series by *généralité* from 1660 to 1789[19]. Appendix Map C.9 shows the correct population growth rates by *généralité*.

I also combine Lachiver's grand-regional estimates with the series of Figure 2 for whole France, population growth by *généralité* and population estimates for departments at the time of their creation (1790), to construct population series by *département*[20]. Although postrevolutionary

[18]Dainville (1952) reports those of Orry, Messance, and Necker for the respective years 1745, 1763 and 1783, plus the "count of intendants" used by Vauban in his 1707 tax reform proposal, *Projet d'une dixme royale*. To this must be added Des Pommelles' 1789 *Tableau de la population de toutes les provinces de France*, whose birth and marriages statistics were used in 1965 by Reinhard to estimate the population by *généralité* (Corvisier, 1973).

[19]I linearly interpolate the share of each *généralité* in the French population between 1699 and 1783 and extrapolate the trend after 1783, and I keep the shares constant from 1660 to 1699. *Généralité* of Nancy and Corsica were not French in 1700, and Vauban's figure for the *généralité* of Valenciennes is extremely underestimated, so I assume that they experienced the same population growth rate as the *généralités* of Metz, Provence and Lille, respectively. Like Dupâquier, I bring the Southwest into one for population growth (Auch et Pau, Bordeaux et Bayonne, and Montauban), because of multiple territorial redistributions. I rescale the population series for France without Nice and Savoy using the SGF census of 1861.

[20]Population estimates by département in 1790 are taken from Langlois (1976), who carries out an in-depth

creations, departments have indeed the useful characteristic of being regular in size and shape; they are therefore suitable for gridding the territory. First, I use department shares in the French population of 1790 and subsequent SGF censuses to reconstruct department shares within present frontiers, with departments of 1918[21]. I aggregate the obtained shares to Lachiver regions, which are based on departments. According to these calculations, the regional shares varied mildly between 1715 and 1790, although non insignificantly (Appendix Figure B.24). Indeed, combined with the French population series, this gives regional population series (Appendix Figure B.25) that reflect known changes in regional distribution in the eighteenth century, especially stronger population growth in the north and east[22]. Then, to account for changes in the population distribution within regions, I map the relative population growth rates of *généralités* to departments, to finally obtain population series by department from 1660 to 1790[23].

To check the consistency of both series, by *généralité* and by department, I compare them by focusing on the few *généralités* that can be decomposed nearly exactly into departments. These are just as prone to error as the others, since a wrong department share in one Lachiver region biases the shares of the other departments, by construction. The results, presented in Table 1, appear to be satisfactory for six *généralités* out of seven; the exception is Provence, whose departmental estimates fail to account for the population stagnation suggested by the figures by *généralité*. For the other, the differences seem to be explained mainly by those between the census of 1790 and Reinhard's estimates for the 1780s. This evidence, while encouraging, is nevertheless obviously too weak to assess the quality of the estimation by department. As the map of generalities does not exactly overlap with that of the departments, and moreover as the estimates by *généralité* themselves are of uncertain accuracy, it is *a priori* largely a guess and should not be considered as more than that. In the next section, I compute rebellion indices by department, by *généralité* and by Lachiver region to cope with possible biases due to population estimation.

criticism of the first official departmental count (which had some posterity among historians due to its presence in the *Archives parlementaires*), and proposes a correction and estimates for the missing departments. Although the first SGF census in 1801 might be more accurate, it is not suitable for reflecting the old regime population distribution, given the many upheavals of the revolutionary decade whose demographic effects were definitely not evenly distributed on the territory, such as emigration, wars abroad, and civil war (Dupâquier and Goy, 1988). Estimating the huge casualties of War in the Vendée, both military and civilian, remains highly problematic (Martin, 1991).

[21]There were a few new *départements* due to territorial gain (Vaucluse in 1793, Alpes-Maritimes, Savoie, and Haute-Savoie in 1860) and internal redistribution (Tarn-et-Garonne in 1808). One has to take into account amputated neighbors, using the first available censuses with corresponding shares: Bouches-du-Rhône for Vaucluse, Aveyron, Haute-Garonne, Gers, Lot and Lot-et-Garonne for Tarn-et-Garonne, Var for Alpes-Maritimes. To match modern maps, I also rescale Meurthe and Moselle to the post-1918 Meurthe-et-Moselle/Moselle divide, but I keep the (too small) Territoire de Belfort inside Haut-Rhin, as it was before 1871. All changes of administrative units are reported at the communal level in Motte et al. (2003).

[22]Based on the number of marriages and baptisms in the Henry survey (Dupâquier and Lepetit, 1988, pp. 78-81).

[23]By backward projection, *généralité* growth rates provide fictitious population estimates for departments in 1699, and thereby the share of each department within its Lachiver region in 1699. Then, I linearly interpolate the intra-regional department shares from 1699 to 1790 and keep them constant from 1660 to 1699. Combined with population series for Lachiver regions, department shares within regions give population series by department from 1660 to 1790. Assigning the relative growth of *généralités* to departments is an acceptable approximation, inasmuch as most departments have all or most of their territory included in a single *généralité* (department boundaries were partially based on those of old regime provinces). In my setting, there are 32 *généralités* and 89 departments.

TABLE 1: *POPULATION ESTIMATES BY GÉNÉRALITÉ AND BY DÉPARTEMENT*

Territorial unit		**Year**	**Population (thous.)**	
Généralité	**Department codes**		**(1)**	**(2)**
Alsace	67, 68	1699	263	287
		1790	676	697
Bretagne	22, 29, 35, 44, 56	1699	1778	1881
		1790	2586	2320
Dauphiné	05, 26, 38	1699	584	609
		1790	678	781
Franche-Comté	25, 39, 70	1699	365	400
		1790	733	753
Lyonnais	42, 69	1699	390	332
		1790	727	620
Lorraine*	54, 55, 57, 88	1699	643	665
		1790	1232	1193
Provence	04, 13, 83**	1699	705	543
		1790	715	781

Notes: Population estimates for *généralités* that overlap subsequent departments: column (1) is estimated by *généralité*, and column (2) by department (see text for methods and sources).

* Lorraine brings together the *généralités* of Metz and Nancy. See text.

** Half of Vaucluse (84) and one fifth of Alpes-maritimes (06) were added to account for territorial changes.

1.2 Rebellion data

Rebellion data encompasses 8528 violent disturbances that took place from 1661 to 1789 within present French borders. Events were collected in administrative, judicial, police and military archives by a team of historians and summarized by Nicolas (2002). Rebellion is defined as "unchannelled collective violence, beyond the scope of negotiation", "spontaneous or premeditated" (ibid., p. 38). The gathering covered all events which involved at least four persons not belonging to the same family, with no minimum time duration, and aimed at being as exhaustive as possible. Disturbances were classified into 72 categories, grouped into 13 general types, such as resistance to state taxation, resistance to state authority, antiseigneurial actions or food riots. In particular, reported information includes the date and location of events, and for about half of them estimates of the number of participants. Based on this material, a database was built up by Chambru (2019) to study the effect of weather shocks on rebellion. I rely on that database in this essay.

1.2.1 Concern about representativeness

Despite all efforts to be exhaustive, the presence and qualification of an event in the data set heavily depends on its contemporary accounts, and on the preservation of the archives. Both are obviously quite variable. As such, the set of rebellions should be regarded as a sample, and its representativeness questioned. According to Nicolas, one can be fairly confident in the time, date and type of each event[24]. Yet, this does not preclude temporal or geographical bias in the recording of rebellions. In particular, one expects the likelihood of archival retention to decrease with distance in time. Moreover, the record of those events by various authorities might increase with the process of development of the administrative state. Unfortunately, it is impossible to prove otherwise, and if that were indeed the case, it could not be accounted for without arbitrary assumptions about the alleged bias.

However, several elements point towards a reasonably balanced collection of events. A first clue is given by the indication of the number of participants, which can be taken as a proxy for the quality of recording. While the proportion of rebellions with unreported size (size defined as the number of participants) certainly seems to have slightly decreased over time, from around 0.6 in the 1660s to around 0.55 in the second half of the eighteenth century, this decline is too faint to make respective evolutions of rebellion with reported and unreported size diverge (Appendix Figure B.26). It is true that quality of information within the sample and presence in the sample are not equivalent, but this is consistent with results in the next sections, according to which once population growth is taken into account, some types of rebellion do not exhibit any increasing trend (Figure 6). Furthermore, if the memory of some rebellions was lost, it should be mostly the case for small-scale ones, and thus a larger proportion of big events should be observed in the farther past. Figure 3 shows that while the average number of participants by rebellion in the sample indeed exhibits a decreasing trend, this is not the case for the median number, which increased from the 1660s to the 1700s. I also find that the proportion of rebellions with at most 10 participants was as high in the years 1660-1689 as a century later, while the proportion with more than 500 participants declined over the long run (Appendix Figure B.27); and that the mean size of events with less than 500 participants is not decreasing from 1660 to 1700, but increasing. All of this suggests that the decrease in observed mean rebellion size is driven by an effective decline in very large-scale rebellions under the reign of Louis XIV, which is consistent with historical knowledge[25]; and that small-scale rebellion is not under-reported for this period as compared to the next one.

Lastly, government history of France from 1661 to 1789 is anything but that of a transition from seignorial nothingness to modern state bureaucracy. Very generally speaking, the institutions of the French monarchy were already well entrenched when Louis XIV came to full power in 1661, including those which were likely to play a key role in the recording of rebellions, especially the organization of courts between local and royal justice, *Maréchaussée* (royal police force) and *intendants* (local administrators with justice, police and finance assignments). If the reign of the Sun King was undoubtedly characterized by an increase in the authority of the State and a strengthening of control of the territories (especially through the *intendants*, who were

[24] "Ultimately, we have at our disposal a very large corpus of events dated with acceptable precision, located exactly... and sufficiently explicit in their motivations and course." (Nicolas, 2002, p. 21).

[25] The last large revolts were the Lustucrus in 1662, the Revolt of the papier timbré in 1675 and the Tard-avisés in 1707 – and nothing then until the Revolution (Bercé, 1989).

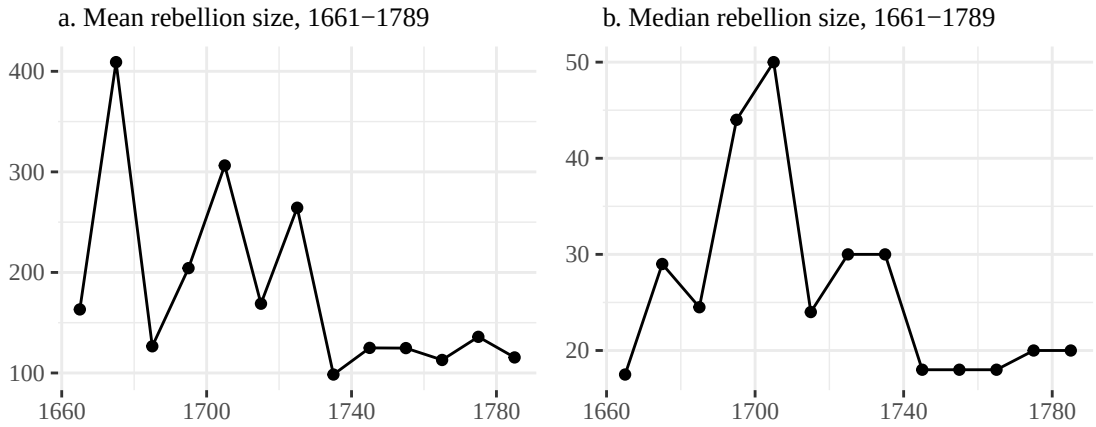

FIGURE 3: *Mean and median number of participants per event, 1661-1789*

Notes: Subsample of 3724 events for which the information is available. Figures are computed over ten-year spans. *Source:* Chambru (2019) and Nicolas (2002).

fixed to a *generalité* from 1688), these changes took place rather quickly. According to Bercé (1974), "after 1661, a justice which purported to be exact and terrorist was implemented" (p. 52), and the road to absolutism was roughly completed by 1680[26]. Regarding rebellion, the main concern was certainly to put an end to the large-scale revolts that had marked the previous era, rather than to track the small-scale disturbances. Nevertheless, small gatherings were very soon considered criminal. This can be noticed in the Criminal Ordinance of 1670, a major stage in Louis-Quatorzian state building, which laid the foundations of modern French criminal law and remained in force until the Revolution. At the time, reform of the justice system appeared to be all the more necessary, as it had failed to cope with the "dramatic expansion of crime and rebellion" that had peaked during the Fronde (Boulanger, 2000). The ordinance includes "rebellion to commands emanating from us or our officers, ..., unlawful assemblies, sedition, popular emotions" in the jurisdiction of royal judicial officers[27]. What was meant by "unlawful assembly" was quite arbitrary, yet subsequent laws mention extremely low numbers of people, from three to five (Nicolas, 2002, p. 32). This is consistent with the aforesaid relative stability of the proportion of small events over the whole time span – except for the period 1690-1719, the "years of hardship" (Lachiver, 1991) in which rebellion peaked.

For all these reasons, it seems acceptable to consider the sample as reasonably balanced over time. The issue is more difficult to tackle for the geographical dimension, but it also appears reasonable to think that the large regional variability observed in the following sections is due more to the well-known specificity of the old regime's many territories than to variation in recording, taking into account the level of centralization already in place (e.g. *généralités* or the

[26] It is roughly from 1660 to 1680 that "communal powers were dismantled, their military, judicial and fiscal prerogatives systematically thwarted and revoked, and their freedoms and privileges wiped out, irreversibly" (Bercé, 1974, p. 117).

[27] *Ordonnance criminelle du mois d'août 1670*, title 1, article 11. "Popular emotions" stands for *émotions populaires*, which expresses the idea that the people is *set in motion*. Given its generic use at the time, I use it indiscriminately as a synonym for rebellion, like Nicolas and Chambru.

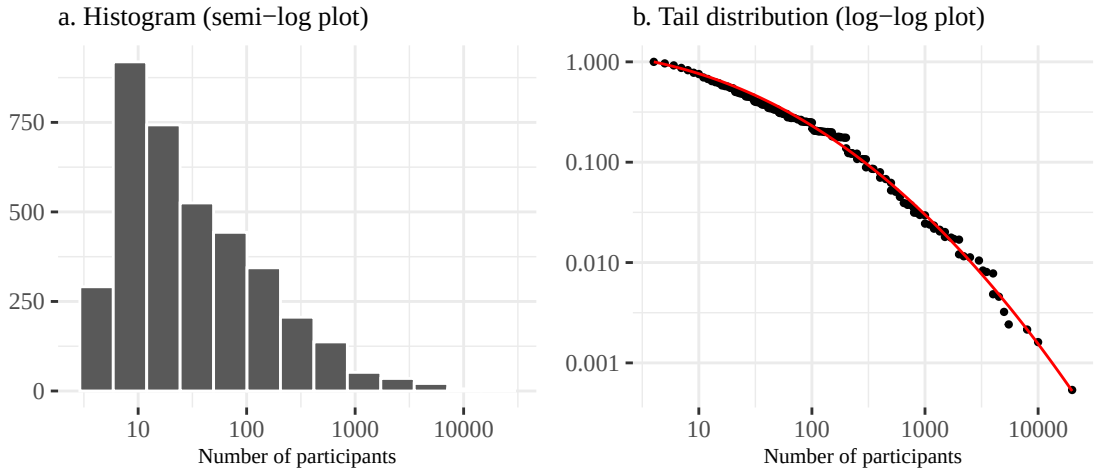

FIGURE 4: *Distribution of rebellion size, 1661-1789.*

Note: Subsample of 3724 rebellions for which a number of participants is indicated. Red curve of chart b. is a discrete log-normal distribution fit ($\mu = 2.2$, $\sigma = 2.3$). Distribution fitting is performed with R package *poweRlaw* (see C. S. Gillespie, 2014).
Source: Chambru (2019) and Nicolas (2002).

organization of royal justice) and the various local institutions that could account for popular emotion[28].

1.2.2 Rebellion indices

On the basis of previous findings, I compute rebellion indices over the sample. A rebellion index is basically an annual measure of rebellion (see below) divided by the population of the geographical unit concerned for the year in question; annual rebellion indices can then be averaged over a longer period of time. As very different events are brought together, the meaning of such an indicator is surely not obvious, and indices by category of rebellion are definitely necessary. Nevertheless, I take as a basic premise that a global rebellion index do provide information about the state of society, even at a high level of aggregation; and that its variations in time and space reflect true social changes and local contrasts, if they are carefully interpreted.

Now, should events be weighted by their size, or simply put on an equal footing? On a practical level, weighting by the number of participants implies either dropping 66 percent of observations, or additional assumptions on rebellions with missing size. Neither of these possibilities is completely theoretically satisfactory; to avoid the depletion of the sample, I replace missing sizes by the median over the whole sample, 20. Anyhow, this value in itself does not change much, as compared to the size of the few large scale rebellions, which goes up to 20000

[28] Obviously, this holds only for territories that were part of France for the whole period. This basically excludes Franche-Comté (officially annexed in 1678), part of Alsace (1697), Lorraine (1766), Corsica (1769), Nice and Savoy (1860). However, the number of rebellions in those regions does not appear to be significantly unbalanced over time, as compared to the other regions. The only exception might be Corsica, which records no rebellion before the uprising against Genoa in 1729.

participants (for the Tard-avisés in 1707 and the movement of Lyon butchers in 1714). If the rebellion index is proportional to the number of participants, then one event might be enough to hide all the others (for example, the Rhône department appears as the most rebellious in Appendix Figure C.15 chiefly because of the butchers movement)[29]. Moreover, the indication of the number of participants is often based on vague accounts, possibly distorted for reasons peculiar to the actors involved and to the layout of particular interests at the time (Nicolas, 2002, p. 21). Besides, there are good reasons to consider events irrespective of their "size" measured by the number of participants[30]. As remarked by Nicolas, a few determined individuals could have as much effect as large crowd, especially when attacking or sacking (eg. a tax office) – explaining the aforementioned severity of the law against small gatherings[31]. It is also likely that authorities feared the snowball effect, in the sense that a large rebellion is chiefly the coalescence of a small one. In this regard, I observe that the tail distribution of the number of participants is approximately log-normal (Figure 4). Log-normal distributions are the asymptotic result of multiplicative random processes, such as the repeated application of a random growth rate. This suggests a very simple model of rebellion formation, in which, for a specified period of time, each participant brings with him or her a variable number of new ones. From this perspective, the germs of disorder were to be found in the slightest disturbance, which it was better to nip in the bud. All of this supports the view that the event itself matters at least as much as its alleged size, and thereby that non size-weighted rebellion indices are meaningful. In this way, the global rebellion index for France is shown in Figure 5 with a locally estimated scatterplot smoothing (LOESS), while rebellion indices by category, by Lachiver region, by *généralité* and by department are respectively presented in Figure 6, Appendix Figure 18, Map 3 and Appendix Map C.13. However, as a robustness check, I also compute size-weighted rebellion indices (Appendix Figures B.28 and B.29 and Maps C.14 and C.15).

1.3 Economic time series

1.3.1 Wages and production

To get an overview of the evolution of economic conditions, I gather various time series on wages, prices and state finances in the seventeenth and eighteenth centuries. In particular, I rely on the recent work of Ridolfi (2019), who built new wage and price series for France from 1250 to 1860. Figure 7 shows the evolution of real wages for an agricultural laborer, a building laborer and a building craftsman for France outside the Paris region from 1660 to 1790, according to Ridolfi's results, while Appendix Figure B.30 present Ridolfi's and Allen 2001's estimates for Paris. Real wage is computed in the form of welfare ratio, which is the wage of a male worker divided by the cost of a barebones consumption bundle for a couple with two children[32]. Although such series can obviously not give a complete picture of the diversity of wage labor in its various local

[29]It is still possible to make the rebellion index concave in the number of participants, though at the risk of complete arbitrariness.

[30]Ideally, size should also take into account the time duration of each event, but I do not dispose of this variable.

[31]Chambru (2019) even mentions an ordinance published by the intendant of Picardy in 1709, which forbade "gatherings larger than two after the sunset", on pain of imprisonment – and galleys if offenders were armed (p 21). It should be noted that according to the results below, the "terrible year" 1709 was a secular peak in rebellion, which should have prompted the authorities to tighten repression.

[32]Ridolfi uses the same bundle as Allen, but evaluates the cost with his own price series. A description of this bundle can be found in both papers.

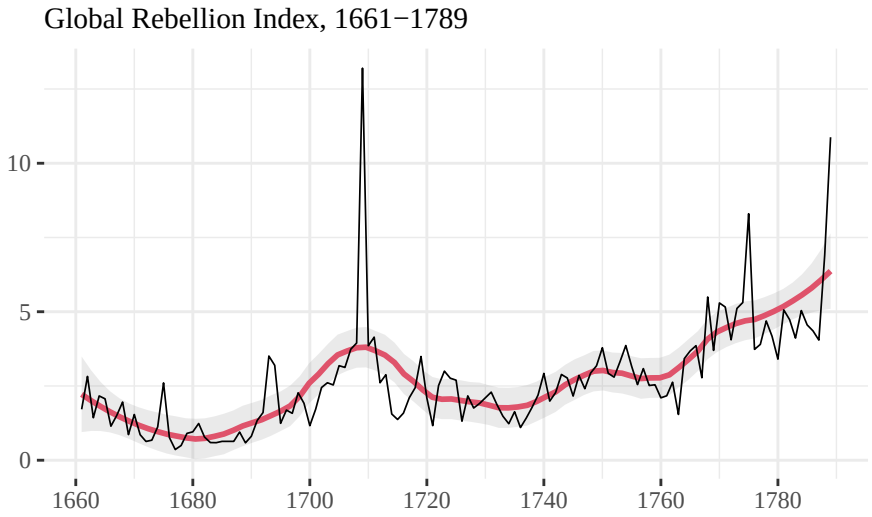

FIGURE 5: *Annual number of émotions populaires recorded within present French borders per million inhabitants.*

Note: Red curve is the LOESS of the annual series (span = 0.3), with 95% confidence interval in shaded area.
Sources: Chambru (2019), based on Nicolas (2002), and Figure 2 for population.

contexts, they help to assess the major trends in the evolution of nominal and real wages[33].

As a useful means of comparison with other nominal data, I use Ridolfi's wage series to compute a nominal wage index for France – keeping in mind that nominal does not mean strictly monetary, since Ridolfi also takes into account the share of in-kind payments. I take the nominal wage of an agricultural laborer as the index for the primary sector, and I compute an index for the secondary sector based on the wages of building workers[34]. The global nominal wage index is a weighted average of the sectoral wage indices, with varying weights equal to the estimated share of each sector in the physical product for the year in question[35].

[33]The series are based on observations covering nearly all regions in each time period (Ridolfi, 2019, p. 593). Although the spatial distribution of observations is not strictly balanced, the resulting series appear to be robust to regional variations and there is no clear-cut regional divergence from the aggregated series (ibid., *Online Appendix*). The only exception is the Paris region, which is treated separately by Ridolfi because of its distinctively higher wages.

[34]I apply a weighting for skilled versus unskilled of 1/3 and 2/3, and a weighting for Paris region versus France outside the Paris region of 1/4 and 3/4. Although highly approximate, this weighting is undoubtedly a better option than a simple average, which would overly distort the index toward the significantly higher nominal wages of skilled and Parisian. Missing years in the Parisian series are inferred from the corresponding non-Parisian series (skilled for skilled, unskilled for unskilled), by assuming that that the non-trend component of the growth rate is the same for both variables. Denoting x_t the French wage and y_t the Parisian wage; for $t \in [\![1, T-1]\!]$ the set of missing years, y_t is given by $\frac{y_t}{y_{t-1}} = \frac{x_t}{x_{t-1}} \left(\frac{y_T}{y_0} \frac{x_0}{x_T}\right)^{\frac{1}{T}}$.

[35]Weighting between sectors is based on Morrisson (2007), who defends the view that sectoral shares were roughly the same on the eve of the Revolution and in 1820, due to the collapse of foreign trade between both dates. Based on this assumption, he reckons that the share of agriculture in the physical product (agriculture plus industry/handicrafts) decreased from 71 to 61 percent between 1715 and 1788. As the rise of industry was most probably not linear, I use urbanization as a proxy, with urbanization figures for France from Dupâquier and Lepetit (1988, pp. 86-87). I infer the annual growth of the share of the secondary sector from that of the share

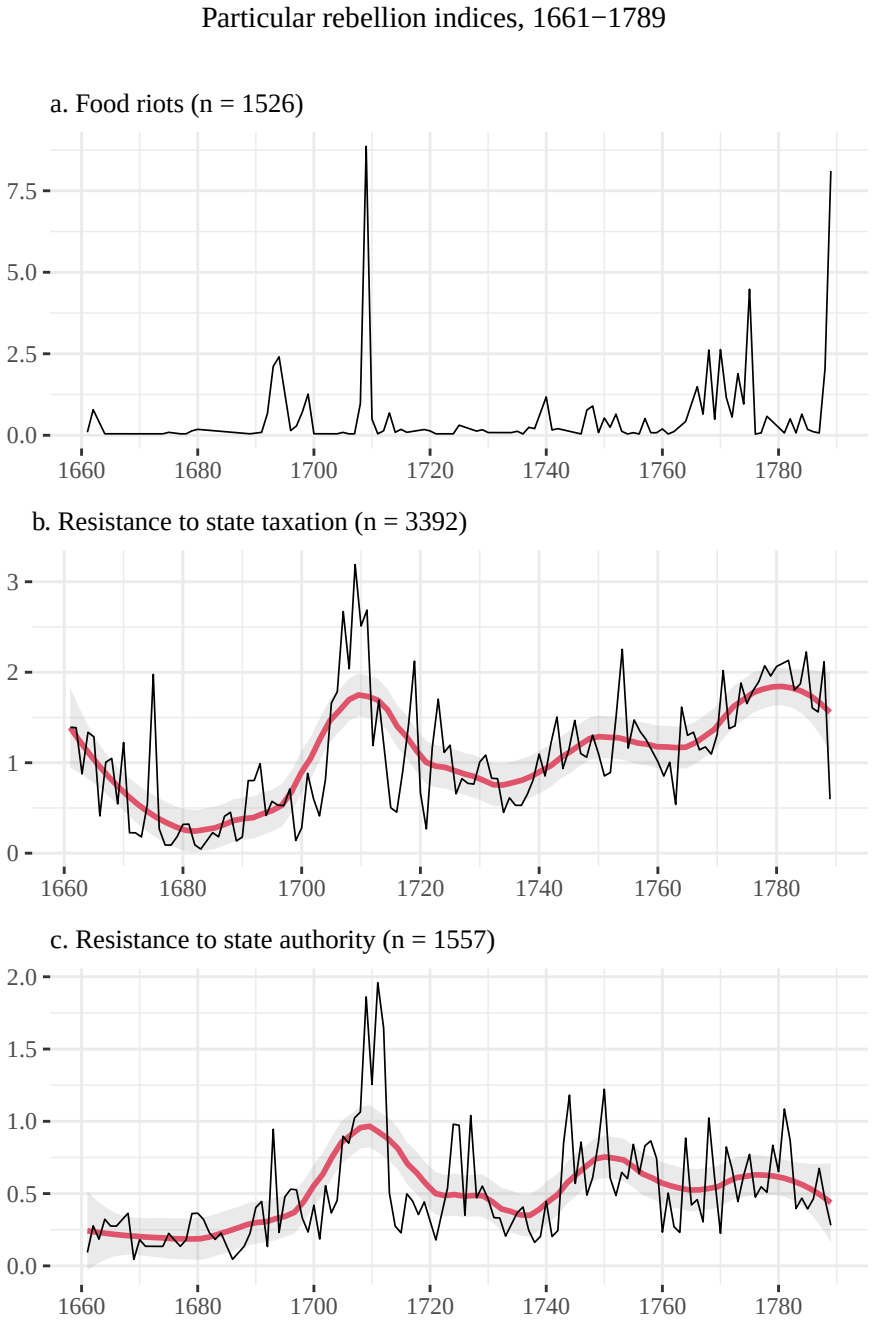

FIGURE 6: *Annual number of émotions populaires recorded within present French borders per million inhabitants, by type.*

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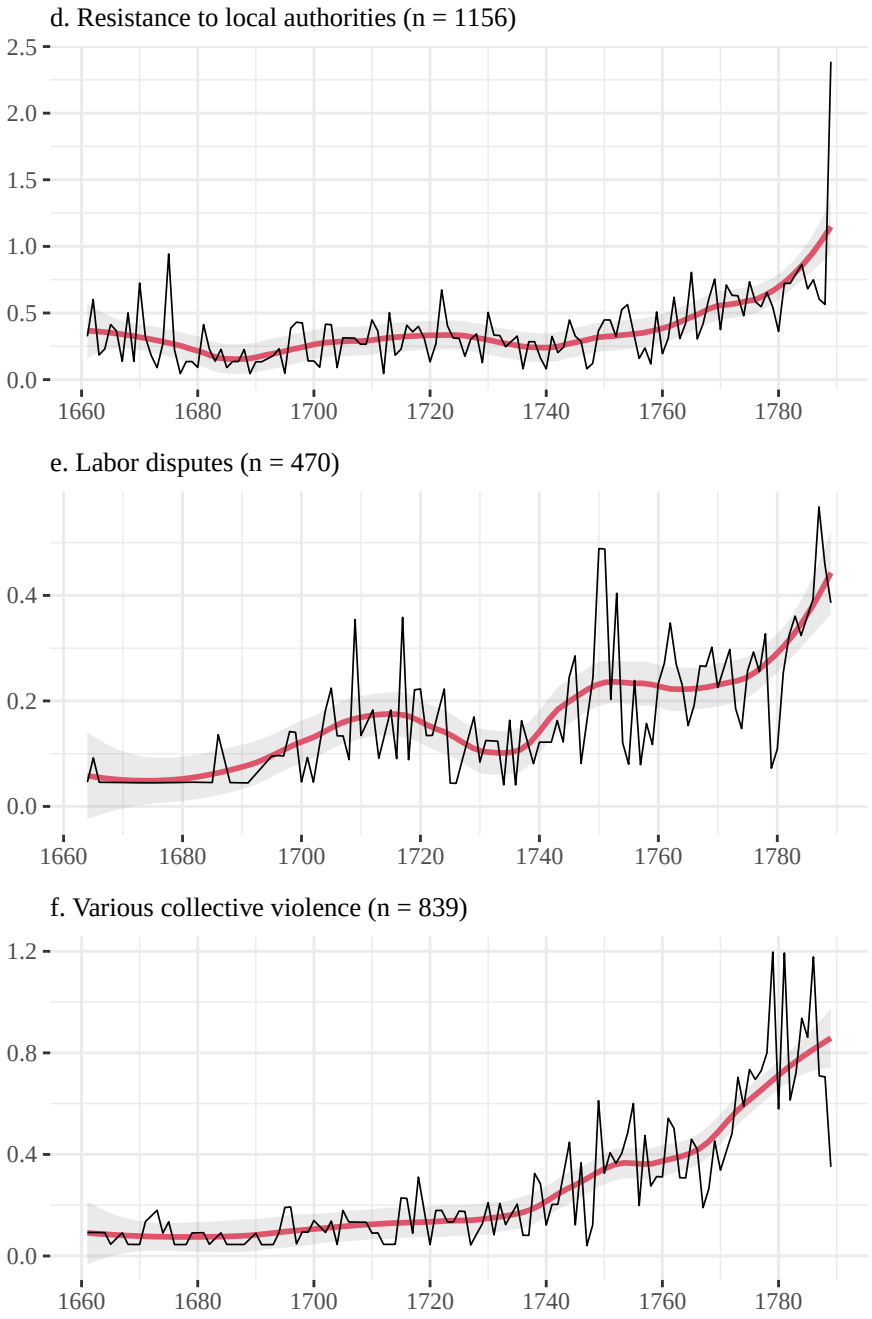

CONTINUED FIGURE 6: *Annual number of émotions populaires recorded within present French borders per million inhabitants, by type.*

Note: Red curve is the LOESS of the annual series (span = 0.3), with 95% confidence interval in shaded area.
Sources: Chambru (2019), based on Nicolas (2002), and Figure 2 for population.

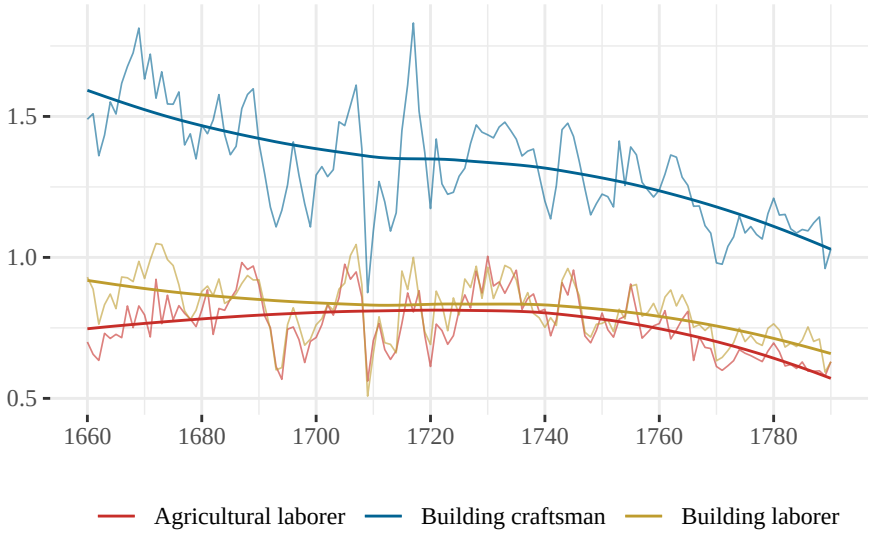

FIGURE 7: *Evolution of welfare ratios in France outside the Paris region, 1660-1790.*

Notes: Annual series smoothed by LOESS (span = 1). Welfare ratio is the wage of a male worker divided by the cost of a barebones consumption bundle for a couple with two children. See Appendix Figure B.30 for the Paris region.
Source: Ridolfi (2019).

Such an index has certain shortcomings. In particular, the building sector may not be representative of the whole industry. According to various studies summarized by Morsa, building workers were at most 6 percent of all industrial workers and craftsmen in Caen in the 1750s, 18 percent in Bordeaux and 23 percent in Toulouse about 1780; they were 12 percent in Lyon in 1789[36]. Besides, Morsa claims that building workers were among the best paid. But as he seems to refer more to craftsmen than to basic laborers, this does not challenge the use of both series for building workers. This is all the more so since the wage of a building laborer does not appear to be significantly higher than that of an agricultural laborer (Figure 7), which is consistent with Ridolfi (2016)'s findings that building laborers could move to agriculture to make ends meet. Morsa also stresses the size of income gaps between worker of different sectors: for example, in Lyon at the end of the eighteenth century, the average rent of a tailor was 1.7 times that of a shoemaker, and this ratio was 2.3 for a building worker (ibid., p. 754). Once again, the last figure presumably only holds for a craftsman, and these differences may well be explained by different skill levels. Nevertheless, it is also very likely that the "secondary sector" was extremely diverse. Rota and Weisdorf (2019) have recently pointed out the flaws of comparisons based on building workers. These are mainly due to a high sensitivity of this sector to economic fluctuations and to seasonality; it should however be noted that Ridolfi takes it into account. Another issue is the

of urban population using the same procedure as in footnote 34 for wages, and I consider that the share of the secondary sector grew like urbanization before 1715.

[36]Morsa (1987, Table 1). The three first figures are maximums, based on textile, woodwork and ironwork as other industries; indeed, a significant part of the population of Caen, Bordeaux and Toulouse is recorded as "various", among which some may practice other industrial work.

varying number of days worked, which is not accounted for by the wage index[37]. As pointed out by Morsa, urban underemployment was a recurring reality and stable employment the exception rather than the rule, and according to Rota and Weisdorf (2019), this was all the more the case in the building sector. The possibility that the adjustment variable was more working days than daily wages is also put forward by Schubert (2008) to question the relevance of daily wage as a proxy for welfare in eighteenth century France, which leads him to move to height measurement (see section 1.4). For all these reasons, a nominal wage index of this kind has to be considered with due caution, and to be used in parallel with the nominal wage of an agricultural laborer alone, since the latter concerns a large part of the population[38]. But it provides an informative synthesis of the evolution of nominal wages from 1660 to 1789, which is suitable for comparisons with other monetary indicators.

In particular, as the index does not include wage labor in the service sector (chiefly domestic workers), it can be compared with the physical product, which consists of agriculture, industry and handicrafts. Estimates of the French nominal gross physical product (GPP) since 1660 are to be found in Marczewski (1961, Table 1). These are based on various contemporary estimates, and were discussed by Daudin (2005, ch. 1). Although such figures are to be taken lightly and their very meaning raises questions[39], they give rough orders of magnitude for the development of production in nominal terms from 1660 to 1790. I interpolate the whole series of nominal GPP by assuming that the non-trend component of the annual growth rate is the same as for the wage index multiplied by my estimates of population within contemporary frontiers[40]. Due to the high variability of the wage series, the result is overly spiky and has to be smoothed, but the nominal wage index helps to capture the distribution of inflation over the century. The evolution of nominal wage index and nominal GPP per capita is shown in Figure 11.

1.3.2 State revenue

By definition, the crown's revenue is the key variable for studying the burden resulting from state taxation. Therefore, I gather various estimates of the royal revenue to get a series with as many observations as possible from 1600 to 1789. I rely mostly on Guéry (1978), and also on Riley (1987), Mathon de La Cour (1788) and White (1989). Following Guéry, and in line with an usual presentation of state revenue in contemporary accounts, net revenue is distinguished from gross revenue, which includes the cost of tax collection and miscellaneous charges. The partly privatized system of tax collection allowed the multiple intermediaries to take a significant share in the process (and this was not limited to the *Fermes*). Gross revenue is therefore the relevant variable to look at to study the evolution of the tax burden, but I also keep Guéry's series for net revenue, which has greater temporal depth. I deflate the nominal series using the silver

[37] Allen's and Ridolfi's assumption for the calculation of welfare ratios is 250 days worked in a year. See Ridolfi (2016) for a study of working time in France over the long run.

[38] Between one third and one half of the active population (excluding nobles, clergy and bourgeois) in the second half of the eighteenth century, according to Ridolfi (2019, p. 594) on the basis of Morrisson and Snyder (2000).

[39] Even without discussing the relevance of macroeconomic indicators for preindustrial economies, neither Marczewski nor Daudin mention the territorial coverage of these figures. As Marczewski rely on contemporary estimates and compares them to government expenditures, I presume that they account for the economy within contemporary borders.

[40] This is the same procedure as that described in footnote 34 for wages. I do not take into account Marczewki's figure for 1751-1755 which seems implausibly low. The series of population in contemporary frontiers is an approximation based on the series by *généralité*.

content of the livre (Wailly, 1857), the new series of bread price and consumer price index for France outside the Paris region of Ridolfi (2019), his wage series for an agricultural laborer, and the series of wage index and nominal GPP from previous section. I use an estimation of population in contemporary frontiers (based on the series by *généralité* of section 1.1.5) as denominator. This provides a comprehensive assessment of the evolution of the state revenue per capita in the old regime, presented in Figure 8. As there was no standardized accounting but only individual reports with various conventions, it is sometimes uneasy to know which items of the accounts should be included, especially in case of non-transparent financial arrangements or intertemporal advances. Some figures, although presumably based on the same sources, diverge between authors; this explains why gross and net revenue appear to be almost equal for some years, although this was most probably not the case. I also attempt to track the composition of state revenue from 1758 to 1787, based on Mathon de La Cour's accounts (Figure 15).

It should be noted that dividing state revenue by the whole population within contemporary frontiers is nothing but a convenient solution, and one should not be misled by the meaning of state revenue per capita. Indeed, the distribution of state taxes was very uneven across the country. According to Necker (1784), the annual fiscal contribution to the crown in 1784 ranged from 4 livres tournois per capita in Corsica to 64 in the généralité of Paris (see Map 1). This was due to the many indirect tax exemptions from which peripheral provinces benefited, and to the unequal distribution of the burden of direct taxation between généralités (see section 2.2.1). On top of that, even the distribution of direct taxation within a généralité was arbitrary and unequal. In most of the country, the main direct tax was "personal" (*taille personnelle*), and thus levied according to a register (the *rôle*) drawn up on the basis of external signs of wealth by local collectors who were themselves *taillables*, which led to all sorts of abuse (M. Marion, 1914, ch. 1). And even in the *pays d'états* where the taille was based on land (*taille réelle*), ensuring a minimum degree of objectivity, the preliminary distribution of the burden between districts, and then between parishes, was the result of local political arrangements – not to mention the exemption of "noble" land, which implied that it was possible to hold taxable and non-taxable land at the same time (Touzery, 1994, Annexe 4). This is just one example of the strong heterogeneity which lies behind an aggregated indicator like the fiscal contribution per capita at the country level. Therefore, from the perspective of the taxpayer, it should not be regarded as anything other than an average, while the very notion of "average taxpayer" varied a little with each territorial extension. However, from the point of view of the state, the fiscal contribution per capita is a meaningful indicator, since it measures how much the crown could extract from its subjects across the whole country. And leaving aside regional disparities, the tax base was homogeneous in a way, since becoming wealthier was almost synonymous with obtaining exemptions on behalf of prestige, just as towns most often benefited from numerous exemptions (Gelabert, 1995). This made the overall tax system regressive, and carried the tax burden over the mass of peasantry – which itself, although certainly not homogeneous, mainly consisted of day laborers and small farmers with comparable incomes[41]. If state revenue is to be related to a population, this should be the one, which helps to make sense of the concept of state revenue per capita.

[41] For example, in 1788, the income of a typical household of agricultural day laborers was 160 livres, 250 for small scale farmers, 300 for mixed workers (agriculture and industry) and 880 for large scale farmers (Morrisson and Snyder, 2000, Table 3). These groups accounted for 36 percent, 19 percent, 6 percent and 8 percent of the whole population, respectively.

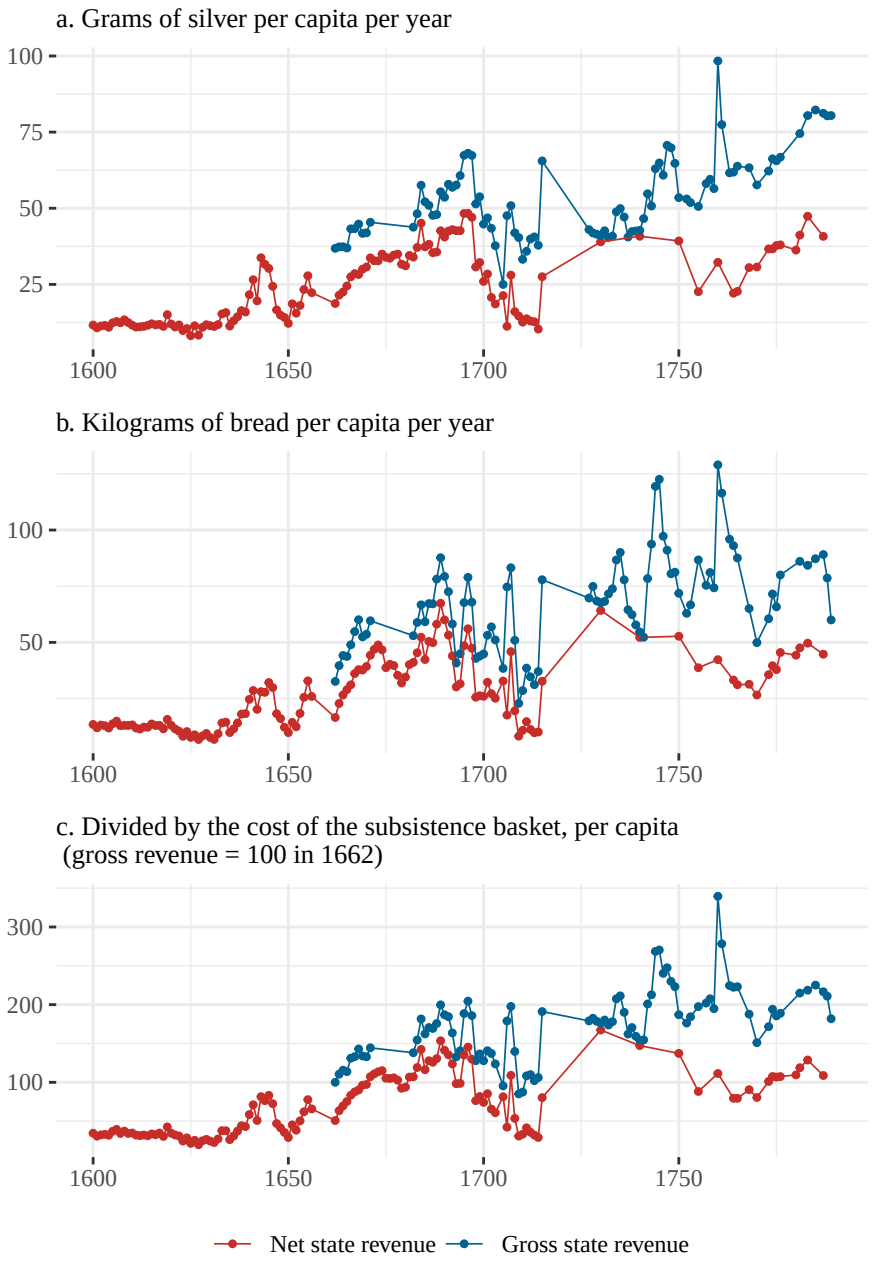

FIGURE 8: *Revenue of the French monarchy per capita with various deflators, 1600-1789.*

Notes: Net revenue is the revenue available for the King's expenses, i.e. net of the cost of tax collection and miscellaneous charges. Chart c. is obtained by dividing state revenues per capita by the cost of a consumption bundle "intended to apply to an adult male" and supposed to "mark a line between respectability and destitution" (Allen, 2001, pp. 425-426).

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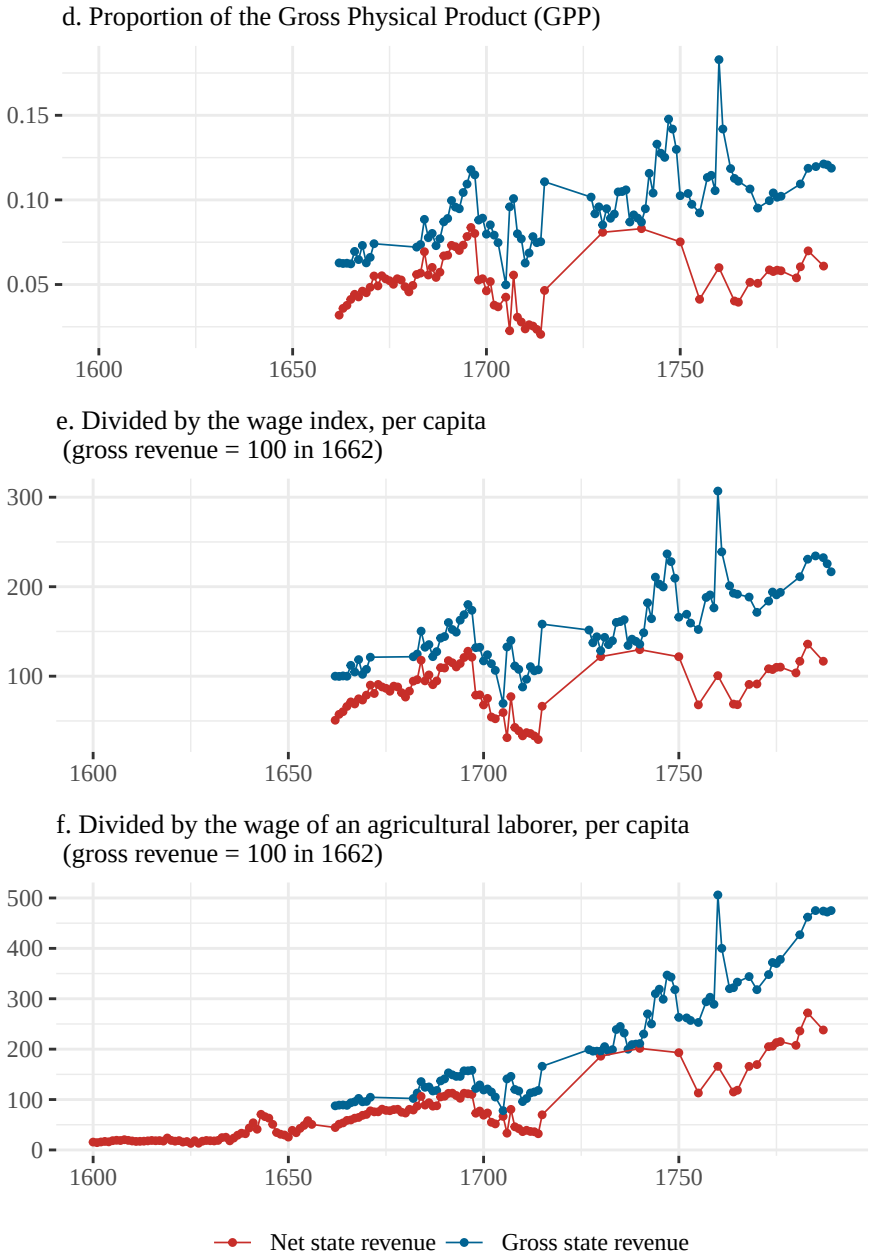


CONTINUED FIGURE 8: *Revenue of the French monarchy per capita with various deflators, 1600-1789.*

Sources: Monetary revenues are taken from Guéry (1978), Riley (1987), Mathon de La Cour (1788) and White (1989). Wages, bread price and consumer price index are from Ridolfi (2019), GPP is based on Marczewski (1961), and Wailly (1857) series of the *livre tournois* silver value is found in Allen (2001) database. The wage index is constructed using urbanization data summarized in Dupâquier and Lepetit (1988, pp. 86-87), and assumptions on sector shares made by Morrisson (2007) (see section 1.3.1). Population series is based on Figure 2, accounting for territorial changes.

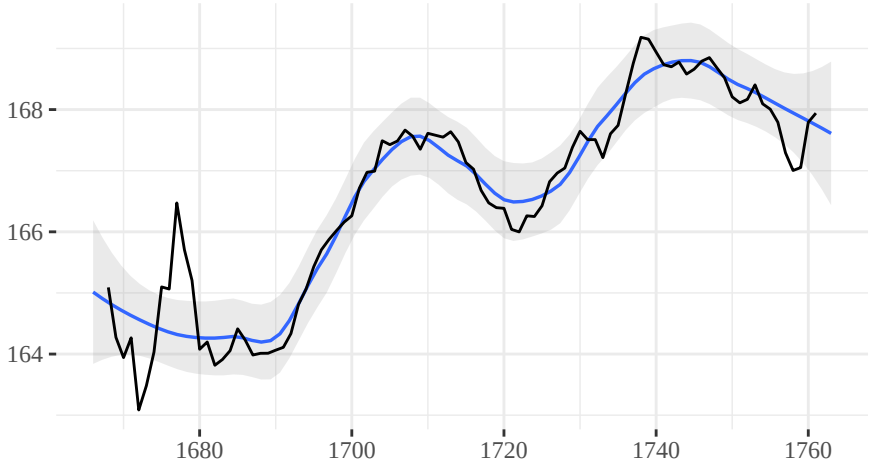


FIGURE 9: *Height of adult French soldiers, 1666-1763 (cm, standardized for Île-de-France).*

Notes: $N = 15695$. The black line is a five-year moving average of the results, while the blue curve is a LOESS with span = 0.4 and 95% confidence intervals in shaded area. The results are the coefficients for year dummy variables in the truncated regression of height, estimated by maximum likelihood with R package *truncreg* (Croissant and Zeileis, 2018). Following Komlos (2003a), the point of truncation is set to 61.75 F.i., minimum age in the sample to 23, and dummy variables are added for grenadiers (see footnote 45 for the readjustment implied) and for the province of birth, with Île-de-France as reference level. Database available in Uni Tübingen *Data hub "Heights and Biological Standard of Living"*.

1.4 Anthropometric data

Finally, I draw on the work of Komlos (2003a) to study the trends and regional variation in the height of French men from the 1660s to the 1760s. In an under- or malnourished population, human height is directly correlated with the nutritional level: as such, it provides a powerful indicator of standard of living, complementary to income[42] (Komlos, 1995). Komlos' sample for Old Regime France consists of 38700 observations, extracted from military archives, of soldiers enlisted from 1671 to 1786 and coming from all provinces[43]. The study of height over conscripts has to cope with truncation, since a minimum height was required to enlist. In this regard, I closely replicate Komlos' methodology, except that I perform the maximum likelihood procedure for truncated regression instead of truncated Ordinary Least Squares. As pointed out by Komlos (2003b), truncated regression has the advantage over truncated OLS of making statistical inference possible (confidence intervals and significance levels), and of estimating the standard deviation of the non-truncated population, whereas truncated OLS needs an assumption on standard deviation to get the non-truncated means[44].

First, I replicate the overall trend in the height of adult French men (at least 23 year sold to

[42]In his study of the nineteenth century French fertility transition, Weir (1993) has argued that variation in height could reflect exogenous change in diseases and parental investment in their own children (as measured by the pure effect of literacy), even more than food consumption per capita. Nevertheless, his Table 2 indicates that the trend in height closely followed that of real GDP per capita in France from 1800 to 1960.

[43]See Komlos (2003a) for a detailed presentation and discussion of the sample.

[44]It seems that the use of truncated OLS for the analysis of the Old Regime sample of soldiers in Komlos (ibid.) was mostly software-dependent.

exclude individuals whose growth might not be completed, as in Komlos); the model is exactly the same as Komlos'. I get the same curve, presented in Figure 9, though scaled differently than in Komlos' Figure 2. The height of adult men of the Paris region would have been above 164 cm in the 1670s and about 169 cm around 1740, while Komlos respectively found less than 162 cm and 168 cm. This is due to his assumption of a standard deviation equal to 6.86 cm (p. 164), a value observed in modern populations, whereas the standard deviation estimated by truncated regression is 5.39 cm[45]. A lower standard deviation implies that the overall adult male population was closer to the sample of soldiers. Thereby, truncated regression suggests that the variation in height was less considerable than indicated by Komlos' results: French adult men gained about 3.5 cm between 1690 and 1710 instead of 5, and they lost around about 1.5 cm between 1743 and 1763, instead of 2. Obviously, such variations remain large and the overall trend and cycles are unchanged.

To further investigate the regional variation, I run the truncated regression of height on the province of provenance. As some provinces have few observations (minimum sample size is 58 in Foix and in Roussillon), I use the whole sample, controlling for age and for the decade of birth, and I bring the contiguous provinces of Foix and Roussillon together. Results are presented in Appendix Table A.3; Appendix Map C.21 suggests that they are consistent with Komlos' findings, based on the adult sample only (Komlos' Map 1). Then, I try to disentangle the time variation by region. In particular, one would like to know where the height decrease observed at the country level from the birth cohort 1750 took place, as this corresponds to a time of rising rebellion (Figure 5). For this purpose, I use Komlos' grouping of province into eight great regions, which ensures a satisfactory sample size by region and decade even when restricting to adults. I control for the decade of birth and add dummy interactions between regions and birth after 1750. Results are presented in Table 2 and in Appendix Map C.22.

2 Interpreting disorder

2.1 Unequal growth

In this section, I explore the trends in production and welfare in seventeenth and eighteenth century France. I argue that growth was strongly unequal, and that population increase combined with unequal distribution of land may have worsen the situation of the poor peasantry in the years 1740-1789.

[45] I also use a slightly different method for the readjustment of heights implied by controlling for grenadiers, these elite troops who were significantly taller than other soldiers. If grenadiers are controlled for and if one assumes that tall men were diverted from normal troops to join grenadiers, estimates have to be adjusted upwards to describe the overall population. This is done by Komlos after OLS estimation, by adding the difference in average height between grenadiers and non-grenadiers times the share of grenadiers in the adult sample. For truncated regression, this adjustment has to be done before estimation, since the maximum likelihood procedure directly gives non-truncated means. However, this should have no effect on the difference in results, and readjustment itself have little effect: without any readjustment, height is only reduced by a few millimeters (from ca. 164 cm in the 1770s to ca. 168.5 cm about 1740). I do not readjust in the truncated regressions by province and by region.

TABLE 2: *TRUNCATED REGRESSION OF HEIGHT IN THE MILITARY, 1660-1763*

Dependent variable is height (French inches).

Explanatory variable	**coef. (s.e.)**	***p*-value**	**Explanatory variable**	**coef. (s.e.)**	***p*-value**
Intercept (Midnorth)	62.167*** (0.140)	0.001	*Birthyear* $\geq$ *1750 (Midnorth)*	0.209 (0.239)	0.382
Southwest	-0.098 (0.110)	0.370	*Birthyear* $\geq$ *1750* $\times$ *Southwest*	-0.740 (0.498)	0.138
Southeast	0.220* (0.100)	0.027	*Birthyear* $\geq$ *1750* $\times$ *Southeast*	-0.821* (0.443)	0.064
Center	-0.661*** (0.139)	0.001	*Birthyear* $\geq$ *1750* $\times$ *Center*	0.085 (0.628)	0.892
West Center	-0.292*** (0.100)	0.003	*Birthyear* $\geq$ *1750* $\times$ *West Center*	-0.471 (0.404)	0.243
East Center	0.099 (0.108)	0.359	*Birthyear* $\geq$ *1750* $\times$ *East Center*	-1.125*** (0.410)	0.006
North	0.436*** (0.097)	0.001	*Birthyear* $\geq$ *1750* $\times$ *North*	-0.746** (0.324)	0.021
East	0.566*** (0.091)	0.001	*Birthyear* $\geq$ *1750* $\times$ *East*	-1.091*** (0.299)	0.001

Log-likelihood: -21736 on 25 df.
$N = 15298$

Notes: Standard errors in parentheses. *** , ** , and * refer to the 1%, 5%, and 10% level of significance, respectively. This is a unique model, the presentation in two columns being only for convenience.

Truncated regression with Gaussian assumption, estimated by Maximum Likelihood with R package *truncreg* (Croissant and Zeileis, 2018). Following Komlos (2003a), the point of truncation is set to 61.75 F.i., minimum age in the sample to 23, and a dummy variable is added for grenadiers (without readjusting levels). Regression is performed controlling for the birth decade from 1660 to 1739, such that the reference level is 1740-1749. The range of birthyear in the sample is 1660-1763. Regions are regions of birth and their distribution is Komlos' (see Figure 9). It should be noted that though *p*-values are displayed, they only measure if the region is significantly different from the reference level (Midnorth).

Database available in Uni Tübingen *Data hub "Heights and Biological Standard of Living"*.

2.1.1 Did the French economy grow?

How did production evolve in France from 1660 to 1789? The measurement of agricultural productivity growth in the eighteenth century has been the subject of fierce debate between the proponents of take-off (Toutain and the work of ISEA) and those of stagnation (Morineau, 1971)[46]. Morrisson (2007) has argued for a synthesis solution in which agricultural production would have grown at an annual growth rate of 0.5 percent from 1715 to 1788, on the basis of which he gets a rate of 0.7 percent for real GDP; both figures are higher than the average annual population growth over the period, which lied between 0.3 and 0.34 percent[47]. As such, real GDP per capita would have increased by 35 percent between 1715 and the Revolution. This increase was drawn up by the rise of manufacture suggested by the work of ISEA, even more by the rise of the commercial sector – and within this sector, by international trade (Daudin, 2005). However, far less optimistic estimates of the growth of agricultural production were given by Hoffman (1996) on the basis of microeconomic measurement of agricultural TFP growth. According to him, the range of the annual growth rate of food supply would have been 0.15 to 0.33 percent in the eighteenth century (ibid., Table 4.10). Even though he considers the true value to be closer to the high estimate, this still implies that the growth of food production would not have exceeded population growth in the eighteenth century. On top of that, agricultural productivity growth would have been extremely heterogeneous across regions: the Paris basin was clearly standing ahead, but stagnation was observed in numerous regions such as Normandy or the West (ibid., p. 132).

To defend his choice of estimate for agricultural growth, Morrisson remarks that stagnating food production per capita does not seem compatible with numerous signs of increasing welfare in the eighteenth century, such as decreasing child mortality or disappearance of deadly subsistence crises. Yet, there is no definitive answer to the preindustrial decrease in mortality: other factors independent of food supply may have been decisive, such as advances in hygiene and medicine, progressive immunization of population, climatic cooling preventing epidemics despite its negative impact on agricultural production (Perrenoud, 1989). It is also worth noting that rebellion data suggests an upsurge in food riots in the 1760s, until the Flour War of 1775, not to mention the peak before the Revolution (Figure 6a). The size-weighted rebellion index also indicates a rise in food rioting from the 1730s to the 1770s that went beyond the peak of 1710 (Appendix Figure B.29a). And yet, Chevet (1993) has shown that France did not experience any deadly subsistence crisis after that of 1709-1710, consistently with Morrison's stance.

2.1.2 Moderate shortage and the return of food riots

How to explain the return of food rioting despite the fact that subsistence crises were much less brutal? Of course, it would be simplistic to postulate a simple relationship between both. As shown by Chevet (ibid.), the crisis of 1693-94 war far more deadly than that of 1709-1710, and yet rebellion in general and food riots in particular peaked during the latter, not the former (Figures 5, 6a, B.28 and B.29a). It is likely that excessive stress on the population reduced rebellious initiative, simply because people had to focus on their own situation. It has also been underlined that the gradual "modernization" of agricultural markets in the second half of the eighteenth

[46] See Daudin (2005) for a sum up of this debate (pp. 24-26).

[47] 0.3 percent is the figure retained by Morrison, based on Dupâquier (1993)'s ten-year averaging of the population series of Lachiver (1991), while Lachiver's figure for 1715 gives 0.34 percent.

century, be it of private or state initiative, had encountered harsh resistance (Nicolas, 2002, pp. 378-388). But these food riots would not have happened if their participants had experienced food abundance. It therefore seems that their breeding ground was that of "moderate shortage", in a context of stagnant agricultural productivity growth. Improved transportation, growing integration of grain markets and increased state management of grain distribution may have helped to moderate the impact of shortages due to weather shocks. This is consistent with the findings of Weir (1989), that the effect of wheat prices on mortality decreased from the seventeenth to the eighteenth century, to become insignificant in northern France by the mid-eighteenth century.

All of this is compatible with a stagnation of food supply in the long run, leading to a rise of the relative price of food that would have fostered food riots in case of bad harvests – even though the latter was no more deadly as in the past. In particular, I show in Figure 10 that in the long run, the price of bread, as recently estimated by Ridolfi (2019), grew similarly to nominal Gross Physical Product (GPP) per capita. Unless there was no growth in real manufacturing output per capita, which is contrary to historical evidence (Morrisson, 2007), it means that the relative price of bread must have increased – relatively to manufactured objects, but also probably to superior food. If the per capita production of inferior food remained constant, while its price evolved like nominal GPP per capita, then its share in nominal GPP per capita remained also constant, and thereby also the share of others goods. If the per capita production of superior food and manufactured objects increased – as it is commonly acknowledged – their price must have increased less than nominal GPP per capita, and thus than the price of inferior food. Besides, all of this is consistent with Morrisson (ibid.)'s stance that the share of agriculture in real GPP slightly decreased in the eighteenth century. This is also consistent with accounts of eighteenth century growth such as Daudin (2005) that mainly emphasize sectors such as manufacture and even more international trade, which were likely to benefit only to a small part of the population[48].

2.1.3 Unequal land and fertility

Even if the French eighteenth century may have experienced growth, it was thus most likely to be highly unequal, benefiting to urban manufacture and trade elites, and to the large-scale farmers that extended the area of their exploitations and introduced modern techniques. The strategies of the Chartier family studied by Moriceau and Postel-Vinay (1992) a good example of that. Despite their plethoric progeny, these wealthy *laboureurs* managed establish their children with an aggressive attitude in the leasing market, thanks to the connections they maintained with owners. The reproductive exuberance of the Chartier, stressed by the authors and typical of wealthy farmers at the time, is striking: it means that establishment of children, inheritance and dowries were no obstacle for them. This was certainly not the case for the mass of French peasantry. The trends in the number of children, presented in Figure 12 and Appendix Figure B.22, indicate that even taking into account the decline in child mortality, rural fertility declined from the 1760s. This suggests that the diffusion of popular birth control had a careful echo among a peasantry concerned about reducing its "useful progeny" – as measured by the number of surviving children at ten years old in my Figures. Was lack of land a key factor? Strikingly,

[48]See Rosenthal (2007)'s review of Daudin's book: international trade accounted at most for 5 percent of the economy (probably less), and its indirect effects on the overall economy remain uncertain.

rural birth control is known to have been observed first in Upper Normandy (Blum, 1989). This region was very specific in every way. It was one of the most densely populated rural regions (see Appendix maps C.10, C.11 and C.12)[49], but also a breadbasket for the Paris region[50]. For this reason, added to stagnant agricultural productivity growth (see above), its food supply was under stress; unsurprisingly, it was also a hotbed of large-size food riots (see Appendix Maps C.14 and C.16). All the ingredients for a land-seeking peasantry strongly incited to reduce its progeny were thus present.

Of course, the wealthy Chartier also prevented some of their children to marry – clergy was a good way out –, and other were successful enough in getting royal charges to leave agriculture, while conversely a small part experienced social downgrading. But all in all, the result was a "territorial expansion", and this was necessarily at the expense of poorer peasants who had neither the capital nor the social networks to compete – and should thus have been forced to increase their share of wage labor, which was already high. Even though the Chartier case was typical of the Paris basin, such behaviors were widespread and commented. In his 1765 article "Population" in the Encyclopédie , Damilaville denounces the "new lords" wanting to "own immense land", and who thus became "the sole owners of their parishes, expelling all the inhabitants, buying their small possessions at a high price, and seizing all [their] land"; he remarks that "newly acquired land, however large it may be, is never enough, it is soon depopulated", and concludes that this was the cause of the multiplication of beggars which emptied the countryside to fill up the towns (vol. XIII, p. 101). In his study of a Burgundian village, Saint-Jacob (1948) concludes with a regrouping of properties at the end of the old regime, driven by the acquisitions of wealthy merchant-plowmen (p. 51). Moreover, the very low self-sufficiency of the largest part of the peasantry is well documented. Studying the tax roll of 1735 in the Normand village of Bretteville, Hoffman (1996) concludes that given land ownership, yields and taxes, at least 97 percent of work should have taken place outside the family farm to meet the household's needs (p. 39). And in other parts of France, the proportion of peasants that owned the five to ten hectares that were necessary to sustain a family – even in the fertile Paris basin – was astonishingly low: for example, in northern-Paris Goincourt in 1717, 94 over 98 families owned less than five hectares (ibid., pp. 36-37). According to Morrisson and Snyder, 2000, Table 3, day laborers and mixed workers (in the agriculture and in the industry), who were by definition not self-sufficient, respectively accounted for 36 and 6 percent of the whole population in 1788, and put together were 70 percent of the peasantry. The unequal burden of land tax added to that: every increase in the *taille* decreased the value of land hold by peasants, while this was not the case for privileged owners benefiting tax exemptions[51] (Hoffman, 1986).

2.1.4 Nominal inequality rose...

The development of this class of land-needing and thus wage-seeking peasants may then have explained the decline in wages, which had already been observed by Labrousse (1932) and is

[49]These maps describe the end of the period, but according to my population series, population increase in the généralité of Rouen was only of 15 percent between 1699 and 1783, half as much as for the whole of France (30 percent). As such, Upper Normandy was even more densely populated in 1699 than in 1783, relatively to the rest of France: in a sense, it was already "full" when other regions were not. See Map C.9 for population growth.

[50]This was still the case in the nineteenth century (Bourguinat, 2001).

[51]This directly holds in regions of *taille réelle*, and indirectly (but still) in regions of *taille personnelle*, since land ownership was obviously a key factor in the assessment of the tax payer's capacity.

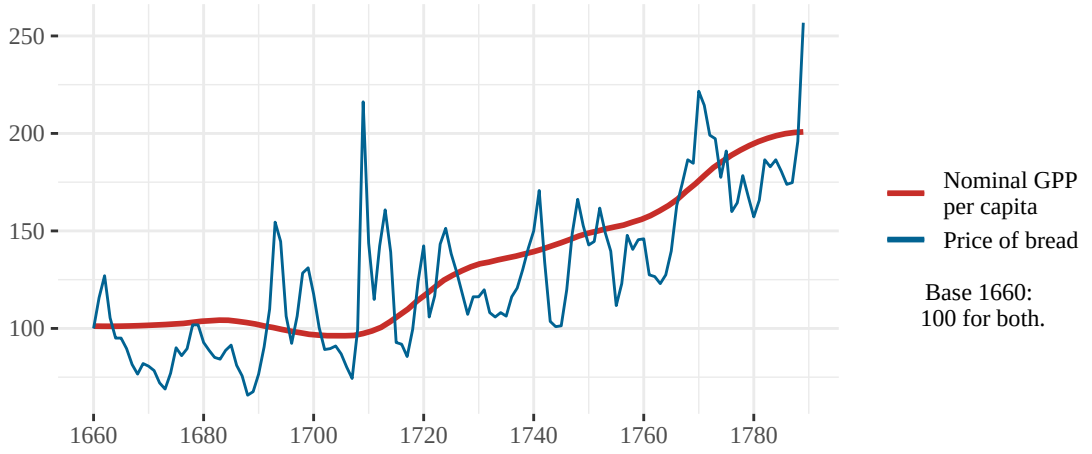


FIGURE 10: *Price of bread and nominal gross physical product (GPP) per capita, 1660-1789.*

Sources: Price of bread is Ridolfi's (2019), and accounts for France outside Paris. Nominal GPP per capita is based on Marczewski (1961) and on the population series of Figure 2, accounting for territorial changes, and smoothed by LOESS (span = 0.3). See section 1.3.1 for more details.

confirmed by Ridolfi (2019) figures. Figure 11 shows that the nominal wage did not kept up with nominal GPP per capita in the second half of the eighteenth century. And this holds while GPP excludes services, and thus may have grown less than GDP; if wages in the service sector stagnated like those in agriculture and industry (for which the wage index of Figure 11 accounts), then the gap was even worse. Wages in the service sectors were chiefly those of domestic servants and nurses, and accounts suggest that the use of those services was trickling down in the small bourgeoisie in the eighteenth century, in particular thanks to lower prices (Grenier et al., 1988, p. 484 and Hoffman et al., 2002). This is consistent with an increased supply of unskilled labor in services. Besides, a rise in nominal income inequality could also be observed in tax data based on *capitation*: Morrisson and Snyder (2000, Table 2) find an increase in the share of the top decile between 1748-59 and 1760-90. A rise in unemployment among day laborers probably added to that in the last decades before the Revolution (see footnote 55) – accompanied by a rise in labor disputes, as shown in Figure 6e.

2.1.5 ...and real inequality did worse.

Now, the situation becomes even worse when considering real wages, since as explained above, the relative price of inferior goods increased. Hoffman et al. (2002) have suggested that changes in relative prices were crucial for the rise of inequality in early modern societies. According to their Figure 2B, the cost of living of top income groups decreased relative to the cost of living in the bottom forty percent in the long run in France (1500-1900), and while the period 1650-1750 was characterized by a reversal of the trend – which could be linked to the demographic crisis that characterized most of this period, as explained below – the decrease started again around

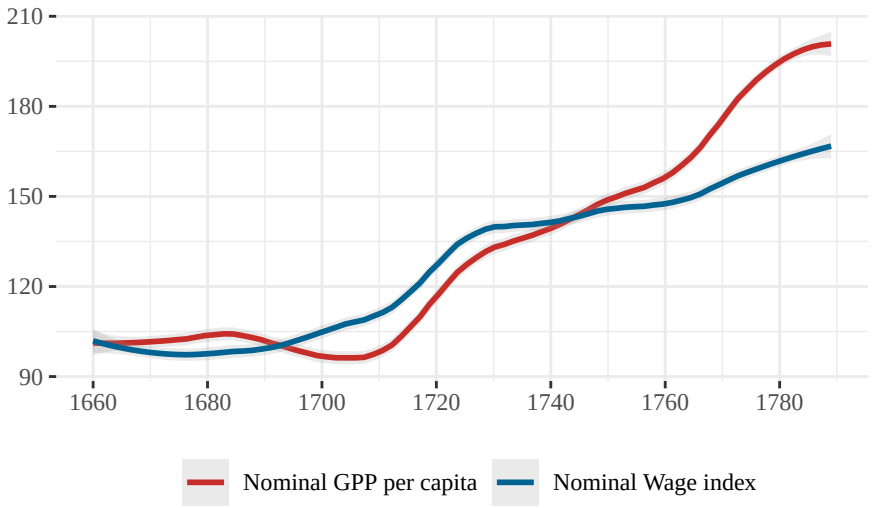


FIGURE 11: *Nominal wage index and nominal gross physical product (GPP) per capita, 1660-1789 (base 1660 = 100 for both).*

Notes: LOESS based on annual series, with 95% confidence interval in shaded area. (span = 0.3).
Sources: Nominal wage index is based on Ridolfi (2019), using urbanization data summarized in Dupâquier and Lepetit (1988, pp. 86-87), and assumptions on sector shares made by Morrisson (2007). Nominal GPP per capita is based on Marczewski (1961) and on the population series of Figure 2, accounting for territorial changes. See text for more details.

1750. Nominal wages were already lagging behind nominal growth of production: rising prices for basic commodities led to a stagnation or even a decline in real wages. This is confirmed by Ridolfi (2019)'s new series of welfare ratios (Figure 7 and Appendix Figure B.30). This is also consistent with the trends in height suggested by Komlos (2003a)'s data: Figure 9 indicates that the height of adult French men increased for those born in the 1690-1710 period, a moment of "respite" between two major subsistence crises (1693-94 and 1709-10); then it decreased again until about 1720, the ending moment of the "years of hardship" described by Lachiver (1991) – and according to his population figures, the moment from which population started to increase again (Figure 2). Then, heights increased again, consistently with demographic recovery, but only until 1740: from this date and at least to the 1760s, they seem to have decreased. The sample does not allow further conclusions, but according to Schubert (2008)'s study of another sample of militiamen and soldiers from the region of Orléans, the decline in height may locally have started even sooner (without recovery in the period 1720-1740), and have gone on after 1760, with a slight increase in the 1770s, then fully compensated by decrease in the 1780s and then (at best) stagnation in the period 1780-1800, if one joins these estimates with those of Weir (1993) (Schubert's Table 6.14). While Weir's Table 2 indicates that the trend in height closely followed that of real GDP per capita in nineteenth century France, this was not the case in the eighteenth century, if Morrisson (2007)'s account of GDP is right.

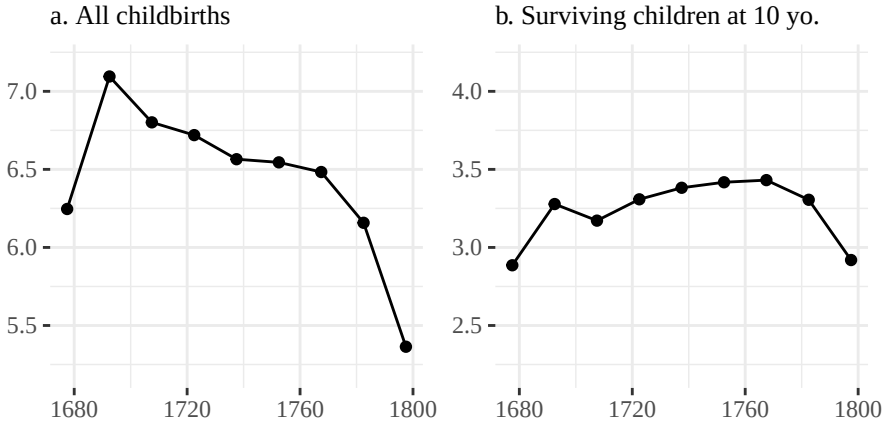


FIGURE 12: *Mean number of children per marriage in rural France by marriage year, with restrictive conditions: first marriage for both spouses, at least one child, marriage observed at least 25 years and wife died after 49 yo.*

Notes: 15-year averages. N = 3903. Individuals for which previous marital status is non-single or unknown are excluded from the sample. Minimal sample size is 134 (1670-1685). Chart b. is obtained by multiplying the number of children of each marriage in the sample by the proportion of surviving children at 10 yo. in the birth cohort of the year of marriage, taken from Houdaille (1984, Table 2) for 1705, 1735, 1765 and from Bideau et al. (1988, Table 31) for 1805, 1815 and 1825 (see text), linearly interpolated between those years and kept constant before 1705.
Source: Henry survey, database in Séguy (2001).

2.1.6 The short Malthusian period: 1740-1790

Then, what was so specific to the French economy in the second half of the eighteenth century? I argue that exogenous increase in population combined with an unequal distribution of land had Malthusian effects on the income of a fair bottom half of the population. It should first be noted that the French demographic-economic system was not Malthusian in the sense of a self-regulated population. As first shown by Weir (1984) and then confirmed by Chevet (1993), an increase in mortality due to a subsistence crisis did not induce a lagged increase in fertility, thus invalidating the thesis of "homeostasis" brought forward by Dupâquier (1988). Furthermore, the trend in fertility does not display any rise, and declined at the end of the period (Figure 12)[52]. Population increase in France seems thus to have been mainly exogenous and probably driven by changes in mortality linked to health condition and climate (see below), consistently with Goldstone's stance.

Now, did population increase have an effect on welfare? The locally estimated scatterplot smoothing (LOESS) of Figure 13 suggests that for a population lower than 24 millions inhabitants (present frontiers), the effect of population on wages was "Boserupian", in the sense that population size was positively correlated with welfare[53]. Basically, this means that in case of good

[52]In all likelihood, the rise in the number of children observed in Appendix Figure B.22 for the first part of the period is the result of decreasing mortality of spouses, that increased the duration of marriage in the sample. Restricting the sample to couples observed more than 25 years and for which the mother died after 49 years old makes this increase disappear, as shown in Figure 12.

[53]I use Ridolfi (2019)'s welfare ratio of an agricultural laborer, as it represents the largest social group. However,

harvest, the population increase induced by decreased mortality was more than compensated by the increase in agricultural production (or at least in labor demand). This corresponds to the years 1605-1720, which were characterized by small population growth, high variability in welfare and strong subsistence crises[54]. Then, when population reaches around 24.5 millions inhabitants, the relationship is reversed and becomes "Malthusian": population growth is accompanied by declining welfare. This corresponds to the years 1740-1790, of lower mortality, faster population growth and with no more deadly subsistence crises. These results can be compared with Figure 10(a) of Ridolfi (2019), who finds a Malthusian relationship over the years 1250-1609, the same over the years 1250-1789, yet locally flat roughly between 21 and 24 millions inhabitants, and finally still the same over the years 1250-1819, yet flat above ca. 24 millions inhabitants. The main reason for which he gets only a flat relation for the range of 21-24 millions inhabitants, and not the Boserupian relation observed above, is probably that he relies on the population estimates of Dupâquier and Lepetit (1988), which are underestimated for the years before 1680 according to Dupâquier (1993), and which level the high variations of Lachiver (1991)'s "years of hardship", 1680-1720 (see section 1.1.4 and Appendix Figure B.23). More interesting is the disappearance of the Malthusian relationship when adding years after 1789, interpreted by Ridolfi as "evidence of an expansion of labor demand possibly related to the growth of the state, proto-industrial sectors, and international trade" (p. 616). It could be added that the huge losses of revolutionary and Napoleonic wars also probably helped to decrease labor supply, but in any case, extending the sample until 1860 would yield the same results, since all (non-Parisian) series of Ridolfi indicate that the trend in real wages was roughly constant from 1800 to 1860, while population was steadily increasing (Henry and Blayo, 1975).

Thus considered, the period 1740-1790 appears to be a short Malthusian moment between two non-Malthusian ones. The seventeenth and beginning of the eighteenth century were characterized by a regime of high and variable mortality, which was probably the consequence of the Little Ice Age (see eg. Appleby, 1980). This strongly slowed down population growth, exacerbated its variation, and removed the Malthusian relationship with real wages that hold in the preceding centuries: the effect of weather shocks on production per capita compensated (Ridolfi's results) or even exceeded (my results) the effect of the change in labor supply on wages. Then, those demographic crises disappeared and mortality started to decrease over the long run; the years 1720-1740 were marked by fast population growth. France rebasculated in the Mathusian regime for a short period of time, until the end of the century: after the decrease in mortality, but before proto-industrialization boosts labor demand and agricultural productivity really rises[55]. In particular, the lower variability of mortality was to be observed in the fact that a bad harvest would no more make population decrease, but only real wages, through an increase in relative food prices. Furthermore, the unequal distribution of land – and probably more and more inequal over the period – enhanced the Malthusian effect of population increase on wages, since more peasants had to sell labor than what would have been needed if land had been evenly distributed.

considering skilled or unskilled building workers does not change the shape of the curve.

[54] See the annual movement of deaths from 1550 to 1790, based on both Biraben and Henry surveys, in Biraben et al. (1988, Figure 35).

[55] The excess of labor supply caused by population increase was well perceived by the revolutionaries, as highlighted by the report of the Comité de mendicité (1790-1791). "For the increase in population to ensure the happiness of a State, it must go with an increase in work, and France is not today in this proportion... The disproportion of the population of France, with the work that France provides to it, is therefore the first and essential cause of indigence." Quoted in Dupâquier and Goy (1988).

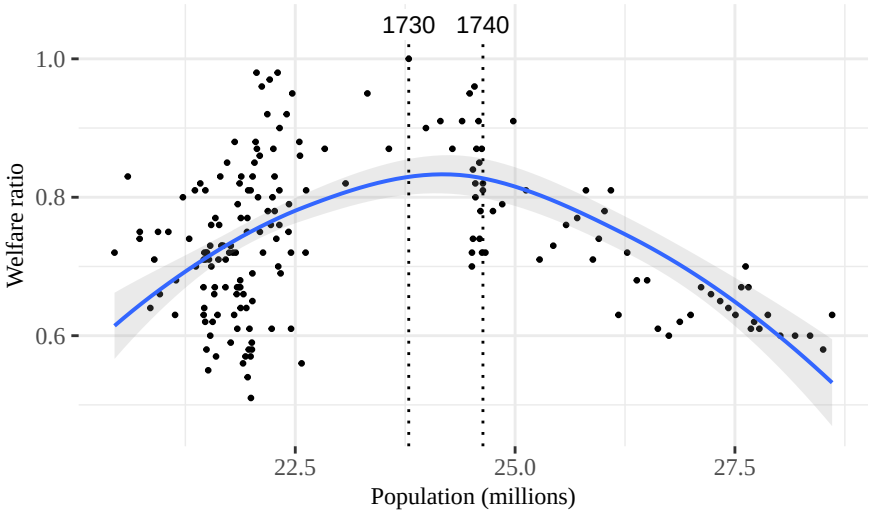


FIGURE 13: *Welfare ratio of an agricultural laborer and French population, 1605-1790.*

Notes: Blue curve is a LOESS of the welfare ratio on French population within present frontiers, with span = 1 and 95% confidence interval in shaded area. I check that replacing agricultural laborer by building laborer or building craftsman does not change the shape of the curve, which is indeed the case.
Sources: Ridolfi (2019), and Figure 2 for population.

This makes this narrative perfectly compatible with reports of land underuse in some regions (eg. Arthur Young's, or Tocqueville's): the problem was not the absolute quantity of land, but the initial capital that was needed to access it and to withstand the bad years, while sustaining rising rents and land taxes. These had particularly deleterious effects on land use according to Vauban's account (1707), and could even lead to the depopulation of the most heavily taxed parishes (Gelabert, 1995). Increased difficulty to access land is also consistent with the rise in age at marriage observed for both men in women in the eighteenth century until the Revolution (Figure 1 and Appendix Figures B.20 and B.21).

Lastly, the rise in land rents, which was shown by Labrousse (1932), was a key feature of the short Malthusian period. In Figure 14, I compare Hoffman (1996)'s estimates of land rents from the Notre-Dame sample with the nominal wage of an agricultural laborer from Ridolfi (2019). This comparison is meaningful in the sense that for the mass of poor peasants, day labor in agriculture was the alternative and/or complement to operating a rented plot of land. I find that the period 1630-1740 was characterized by a decrease in rents relatively to wages, whereas the period 1740-1790 was marked by a sharp increase. As the land rents were obtained from farms in the Paris region and thus are not necessarily representative of whole France, these results should be considered with due caution. But they are perfectly consistent with the succession of Boserupian and Malthusian stages described above[56]. As recapped by Hoffman (1996) about the eighteenth century, "only landlords had reason to be gleeful, as rents soared under the pressure

[56]This is less obvious when comparing land rents to wheat prices (Appendix Figure B.32). The increase of the period 1740-1790 is still present, but not the previous decrease. Nevertheless, such a comparison may be not relevant for the mass of poor peasants, who had to rely on other income sources.

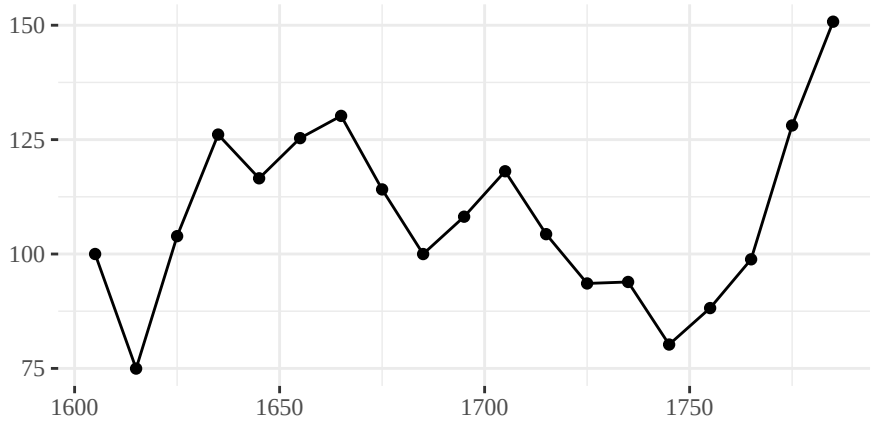


FIGURE 14: *Nominal land rent divided by the nominal wage of an agricultural laborer, 1600-1789 (base 1600-1609 = 100).*

Note: Each value is the ratio of ten-year averages.
Sources: Quality-adjusted monetary land rents come from the Notre Dame sample of Hoffman (1996, p. 90, col. 3). Nominal wage is from Ridolfi (2019).

of population" (p. 135). And according to Labrousse (1932), this extended to rich farmers who sold in the market, thanks to rising grain prices. All these elements indicate that the rise of rebellion observed in the second half of the eighteenth century (Figures 5 and B.28) took place in very specific conditions: despite some semblance of general improvement at the general level and the true enrichment of some, the largest part of the peasantry saw its situation stagnate, or even decline.

2.2 Unequal taxes

In this section, I focus on state taxation and tax rebellion. With 3336 cases, rebellions against state taxation are the most represented type in the Nicolas sample, and almost 40 percent of all events are primarily or secondarily related with state taxation. More generally, the evolution of taxation may have been a decisive factor in the trend in overall rebellion and deserves to be studied as such.

2.2.1 Geographical heterogeneity of state taxation

Assessing the evolution of the tax burden in the Old Regime is anything but straightforward. Beyond its threefoldness, between the state, landlords and municipal authorities, and the church, it is chiefly its inexhaustible local heterogeneity that makes it particularly difficult to generalize any statement about its development. This was the logical result of a process without logic, the long and erratic aggregation of different territories with their own customs and rights. As such, the institutional construction of the state was essentially of cumulative nature; as summed up by Bossenga (2010, p. 39), "a well-known feature of the Old Regime was that new practices and institutions were placed on top of existing ones, thereby allowing institutions with potentially

contradictory principles to develop simultaneously"[57]. In this respect, taxation was in the foreground; it reflected nothing more than what the claimant could have obtained from the debtor, and conversely. This is striking when one considers the unequal treatment of provinces. It was first materialized by the divide between *pays d'élections* and *pays d'états*, the latter benefiting from a much stronger fiscal autonomy than the former since they had kept their local parliaments. They were also contributing less to the state: according to the figures of fiscal contribution by généralité from Necker (1784), the annual contribution to the state in 1784 was more than 31 livres per capita in pays d'élections, while less than 17 livres per capita in pays d'états and pays conquis[58]. This was especially driven by the uneven distribution of direct taxation: according to M. Marion (1914, p. 37), Burgundy, Brittany, Languedoc, Provence and southwestern pays d'états accounted for only 6 percent of direct taxation in 1789, whereas Necker's figures suggest that they contributed to 19 percent of the total in 1784. The distribution of the *taille* drawn up in the *brevet*) was clearly sparing the most restless provinces, such as Brittany. Although they were originally supposed to remedy the defects of the taille, the *dixième* and *vingtième* could be drastically reduced through a regular payment called "subscription" (*abonnement*), like in Brittany or in Provence[59]. The burden of indirect taxation was also completely uneven. Salt-producing provinces had enough bargaining power to maintain the salt tax exemption they had obtained; southwestern provinces were exempted after having bought back their liability to the crown in the sixteenth century, following fierce jacqueries. It is worth remarking that the counterpart of tax exemption could be the existence of an equivalent tax at the provincial level: for example, Necker notes that while the king does not receive any *aides* (consumption taxes) from Brittany, the province itself "levies considerable ones of the same kind" (Necker, 1784, p. 281).

Generally speaking, a late incorporation into the kingdom helped to preserve fiscal autonomy – the pays d'élections were nothing but those in which the crown had managed to abolish the états. Conversely, indirect state taxation was concentrated in the provinces surrounding the old royal domain. This approximately concerned the northern half of the country, minus peripheral provinces of the North, West and East[60]. In this sort of extended Parisian hinterland, the privatized collection system of indirect taxes, the *Fermes*, was in force. Ultimately, taking direct and indirect taxation into account, the *généralité* of Paris was by far the main contributor, with a fiscal contribution per capita in 1784 equal to more than two times that of Lyon, almost five times that of Brittany and fifteen times that of Corsica, according to Necker's figures (see Map 1). As noticed by Necker, this was partly due to the concentration of wealth in the capital[61]; yet,

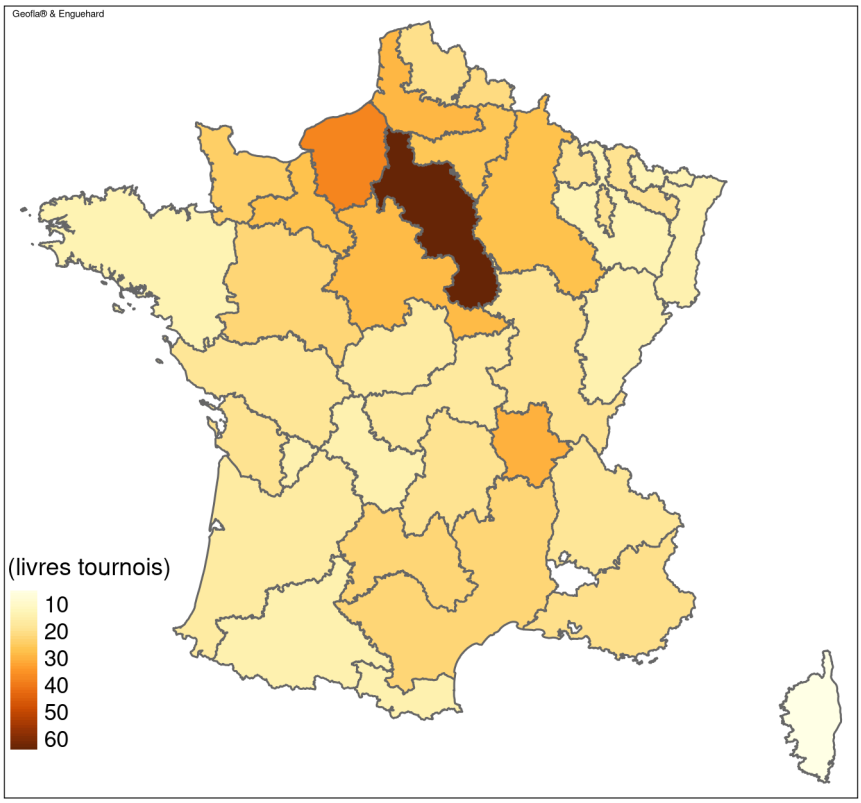
[57] One might wonder if this is specific to the French monarchy.

[58] Pays conquis were the most recent provinces, like Alsace or Corsica. The difference between pays conquis and pays d'états is not always clear-cut, some like Franche-Comté, Flandre and Artois being classified in both categories depending on authors; therefore, I bring them together in the calculation. The généralité of Auch et Pau was partly pays d'élections (Auch) and partly pays d'états (Pau); I assume that each part account for the half. Besides, it should be noted that the average of pays d'élections is driven up by the généralité of Paris. Not taking it into account reduces the annual contribution per capita of pays d'élections to 23 livres.

[59] Leastways, this was the case in 1784, according to Necker's account. Abonnement could also be used for indirect taxes.

[60] It roughly corresponds to the region of high salt tax around Paris shown in Map 2. Contemporary maps of fiscal regions can be found in Nicolas (2002, pp. 384-385).

[61] "Tant de ressources sont l'effet des grandes richesses concentrées dans la capitale; séjour, à la fois de la plus grande partie des rentiers, des hommes de finance, des ambassadeurs, des riches voyageurs, des grands propriétaires de terres, et des personnes les plus favorisées des grâces de la Cour. Il n'est pas indifférent de remarquer que le Roi tire plus de revenu de la capitale, que les trois royaumes ensemble, de Sardaigne, de Suède et de Danemark ne payent de tributs à leurs Souverains." Necker (1784, pp. 275-276).



Map 1: *Fiscal contribution to the state per capita by généralité in 1784.*

Note: The map of *généralités* is an approximation based on modern *arrondissements* (department districts).
Source: ESFDB, Richard Bonney (1994), based on Necker (1784).

the contribution of the Paris region also came from various monopolies benefiting to the king, such as posts and the royal lottery, or the excise duty of the city of Paris – this last example illustrating the absence of clear-cut difference between state revenues and seigneurial revenues.

2.2.2 State capacity under decentralized constraints

The fiscal entrenchment of the crown in its original domain of Île-de-France, highlights how far the French state was from fiscal centralization, even on the eve of the Revolution. It draws a fiscal portrait of France in concentric circles, in which fiscal capacity decreased with distance to Paris. All in all, state taxation was not that far the seigneurial rights in which it originated. All the trouble of the seventeenth century was precisely that provincial elites and peasantry were still sticking to the old conception that the king should *vivre du sien*, live on his own domain, which was obviously not compatible with the rise of the military state (Bercé, 1974 and Gelabert, 1995). While the monarchy was struggling to introduce "modern" universal taxes, such as the *capitation* in 1695, and then the *dixième* and *vingtième*, the provinces were still considering their ties with the crown as a special relationship with terms and conditions defined by the original

commitment to respect their privileges and customs, at the time of their annexation (Nicolas et al., 1998, p. 128). As reported by Nicolas, the deputies of Hainaut greeted Louis XV as count of Hainaut when they came to take the oath in 1715, and Louis XVI still spoke to the people of Dauphiné as dauphin of Viennois just before 1789 (ibid., p. 106). There was thus a fundamental contradiction between the aspiration to centralization and fiscal rationalization, which vividly manifested itself among the great servants of the state as early as in Vauban (1707)[62], and the absence of a unified reference to the state across the territories. The notion of a monarchical "public order", although undoubtedly in progress, was understood as a personal bond to the person of the king, not as subordination to the state. Thanks to "an insistent pedagogy, a true ideological hype", the king was held as a guarantor of justice, though misled by the clique of state servants or deceived by local authorities[63] (Nicolas et al., 1998, pp. 140-141).

After all, the problem of provincialism is only the geographical equivalent of that of order privileges, and was well perceived as such by the revolutionaries, as summed up by the phrase of Mirabeau describing France as an "aggregate of disunited peoples" and epitomized by the perfect interchangeability of *départements*. But it also points toward the absence of clear distinction of "public duties" from private claims, just as revenue of the state and revenue of the king were not that distinct[64]. This feature was rooted in the original conception of seigneurial deduction as a debt owed to the landlord. For example, contemporary jurists considered the *cens*, the symbolic fee that the owner of a land owed to the landlord in the most common form of ownership among commoners (the *censive*), as "analogous to a perpetual interest payment on a perpetual loan of capital" (Blaufarb, 2019, p. 63)[65]. The tithe itself, even though it originally had a strong community dimension (Arnoux, 2010), was in some cases "enfeoffed" (*dîmes inféodées*), meaning that it was owed to landlords (laymen or clergymen) who could alienate it (H. Marion, 1912 and Brumont, 2010).

[62]Vauban began in 1695 to write his *Projet d'une dixme royale*, which proposed to merge all direct taxes and most indirect taxes in a universal flat tax based on four different funds. See section 2.2.4.

[63]Nicolas mentions the recurring opinion that "if the king knew that, he would not let it happen" (ibid.). Valdeon Baruque notices it also in seventeenth and eighteenth century Spanish revolts, in which the rallying cry of "Long live the King" was followed by "as sole Lord" or "and may the bad government die" (ibid., p. 143). Even the Camisards, southern Protestant rebelling against the persecutions following the revocation of the Edict of Nantes by Louis XIV, did not hold him as responsible and were still calling themselves "the royal". Interestingly, this thought pattern of a fair leader misguided by the state apparatus is known to have been observed in the quite different context of twentieth century totalitarian regimes; see Kershaw (2001) and Werth (2007).

[64]However, it is worth remarking that the king was not hold as the owner of the whole domain of the crown, but only as an usufructuary. The first article of the Edict of Moulins of February 1566 stated that the domain was inalienable, except for war emergency or endowment of a younger brother of the king, the so-called *apanage*. *Apanages* usually reverted quickly to the crown, either in the absence of male descendants of the beneficiary or because he became king himself. According to Jourdan et al. (1829, p. 186), inalienability was in part a way to secure the king's revenue, especially because past alienation could then be revoked. Besides, the second article of the Edict defined the domain of the crown as "expressly incorporated" land, or land de facto ran as the former for at least ten years: this left open the possibility of additional alienable land.

[65]Even mostly symbolic, the cens was nonetheless of high significance since its payment sanctioned the "commonness" of land, and thus implied the payment of the taille (Blaufarb, 2019, p. 63). Although this is not specified by Blaufarb, this feature should logically be specific to regions of *taille réelle* – which is consistent with his reference to a contemporary commentary on Provence.

2.2.3 Qualifying the rise of the fiscal burden

According to Figure 8a, the rise of the fiscal state was not linear. A first stage of sharp increase can be identified in the period 1660-1690, while a trough can be observed from the 1690s to the 1720s, years of subsistence and then monetary crises (failure of Law's system). The case is less obvious for the second half of the eighteenth century: while deflating by the silver content of the livre gives an increase per capita, comparing with nominal GPP indicates only a slight increase, and this is even less clear when deflating by the price of bread or the consumer price index. In any case, the burden of state taxation appears to be high in the second half of the eighteenth century, equivalent to around 75 kilograms of bread per capita per year. Of course, this is nothing but an average over an unevenly taxed population (socially and geographically, see sections 1.3.2 and 2.2.1), and this also includes a small part of revenue that is not strictly equivalent to taxation, such as operation of royal woods. But this can be compared to the annual bread consumption for an adult used by Allen (2001) for his CPI: 182 kilograms. Furthermore, Figures 8e and 8f suggest that state revenue increased faster than nominal wages, and way faster than the wage of an agricultural laborer. According to Gelabert (1995), the increase in taxation was concentrated on a definite social group. It was obviously not the privileged orders, nor the urban bourgeoisie, who "succeeded in shaking off a good part of the fiscal pressure by diverting it to the rural surroundings" by obtaining similar exemptions as the nobility's (ibid.). Even the wealthiest peasantry of "merchant-farmers" managed to do so; it was also influential in the *rôle* assessments in regions of *taille personnelle*, and could buy exempted land in regions of *taille réelle*. The basic peasantry was thus suffering the most. This was emphasized by Tocqueville (1856), who stated that the taille had been multiplied "almost exclusively at the expense of peasants" to explain why "despite the progress of civilization, the condition of the French peasant was sometimes worse in the eighteenth century than it had been in the thirteenth century" (p. 132). This was also put forward in the contemporary account of Vauban (1707), who lamented that it harmed general prosperity.

2.2.4 Theory and practice of tax collection

By considering taxation only from the point of view of efficiency as early as around 1700, Vauban was a forerunner. Originally, taxation could not be reduced to the state's way of finding resources. It was at the same time a way of ranking individuals and a strong marker of social status, originating in feudal conceptions. Richelieu was still sticking to this view in his *Testament*: while taxation of the common people should be "proportionate to their strength", as for the burden of "mules", he noted that if the same "were freed from paying tribute, they would also believe themselves freed from obedience" and forget their status (*condition*) (quoted by Gelabert, 1995). Sixty years later, the approach of the state servant Vauban reflected a less haunting sense of hierarchy and higher emphasis on economic development. He was holding the people as "a valuable fund", which should be protected from "the oppression of all these harpies" (public and private collectors), and defended an universal flat tax. Vauban's animosity towards tax collectors is particularly striking[66]. It highlights that high ranked officials like him were well aware of this

[66] "Ces armées de traitants, sous-traitants, avec leurs commis de toutes espèces ; ces sangsues d'État, dont le nombre serait suffisant pour remplir les Galères, qui après mille friponneries punissables, marchent la tête levée dans Paris parés des dépouilles de leurs concitoyens, avec autant d'orgueil que s'ils avaient sauvé l'État" (Vauban, 1707, p. 183).

structural weakness of monarchical finances: the inefficiency of tax collection and the capture of a large part of the product by interested and ruthless collectors, which can be observed in the gap between gross and net state revenue in Figure 8. The incentives structure of these collectors, were they state servants (rather for direct taxation) or bidders of a *Ferme* (for most indirect taxation), was fundamentally flawed. In the words of Vauban, they were not interested in maintaining the "fund" in the long term, but only in extracting as much as possible from it in the term of their charge or lease. For Vauban, they had plunged "an infinity of people" into misery, and even "partly depopulated the kingdom". Above all, their way of doing excited popular resentment and violence against them, as illustrated by the various cases of tax collector lynching reported by Nicolas (2002). On the contrary, Vauban thought that his project would not face popular resistance (but only opposition of some privileged groups), and would be the way of levying taxes "that would excite the least voice and hatred among the peoples", since it was merely proportional to income. He took as proof that the ecclesiastical tithe, from which he drew his inspiration (hence the "royal tithe", la *dîme royale*), was the least disputed tax[67]. On the contrary, the tailles led to innumerable trials. However, direct taxation was not at the heart of the violent rebellion. The distribution of direct taxes was the main motive of only 1 percent of *émotions populaires* in the Nicolas sample. Conflicts related to the taille seem mainly to have taken place within a legal framework. This was not the case for indirect taxation.

2.2.5 Indirect taxation and the rise of contraband

The crown was well aware of the inefficiency brought by disparate tax collection; in particular, it tried to develop indirect tax collection in a public system of *Régie*, instead of the private system of Fermes. But as shown in Figure 15, this was quite late, essentially under the leadership of Necker as Director-General of the Royal Treasury (1776-1781). Furthermore, indirect taxation remained the state's main source of revenue, and its share slightly increased in the second half of the eighteenth century. To this respect, the main source of rebellion was the salt tax, the *gabelle*. More than two thirds of antifiscal rebellions in the Nicolas sample are clashes related to the smuggling of salt tax or tobacco. According to M. Marion (1914), the gabelle made half of all the Fermes revenue in 1715, and this proportion rose to almost 60 percent in 1789 (p. 17). In a sense, the monarchy did nothing more than apply the basic Ramseyian principle of taxing supply- and demand-inelastic goods. Salt was a staple for food conservation, and could be used as cash. In the regions of *grande gabelle* around Paris, the salt tax took the form of a state monopoly with a minimum annual purchase duty. Still according to Marion, the monopoly price of salt was more than seventy times the purchase price in the salt marshes (ibid.). The incentive to smuggle was thus so high that no threat of punishment could offset it, and all the more so since the severity of seventeenth century justice had become obsolete. As shown in Figure 16, the prevalence of salt-and-tobacco-related rebellions skyrocketed in the eighteenth century, while those of rebellions related to other consumption taxes (*aides*) or custom duties (*traites*) remained quite constant. Map 2 shows the concentration of these events around the borders between heavily taxed regions of *grande gabelle* and exempted regions. Whole villages lived on *faux-saunage*, the contraband of salt, and were thus prompt to unite against any representative of the Ferme who might intervene. Nicolas notes that in more than half of the cases, the population

[67] According to Arnoux (2010), the tithe was deeply rooted in village habits, in part because it had functions of insurance and redistribution.

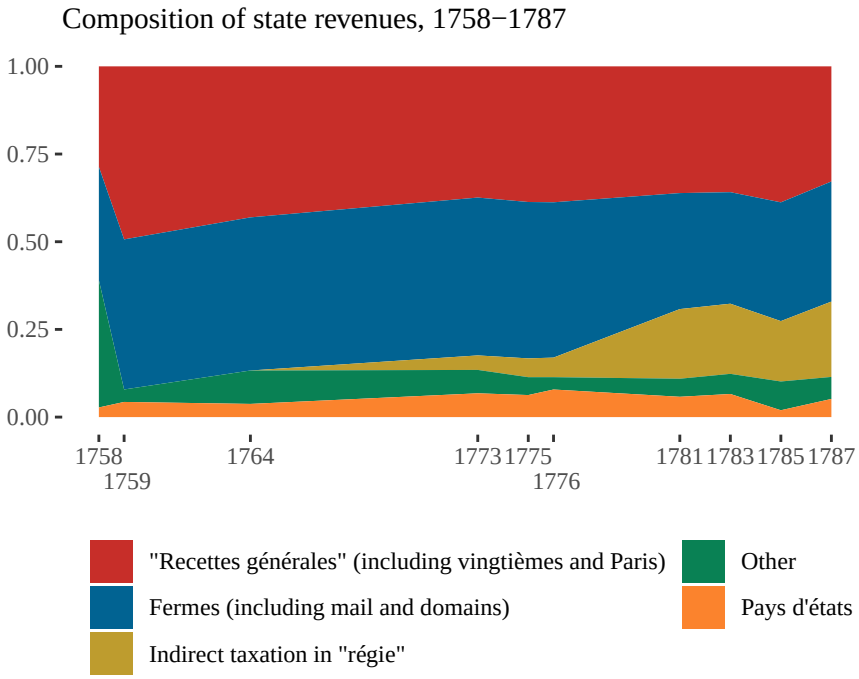


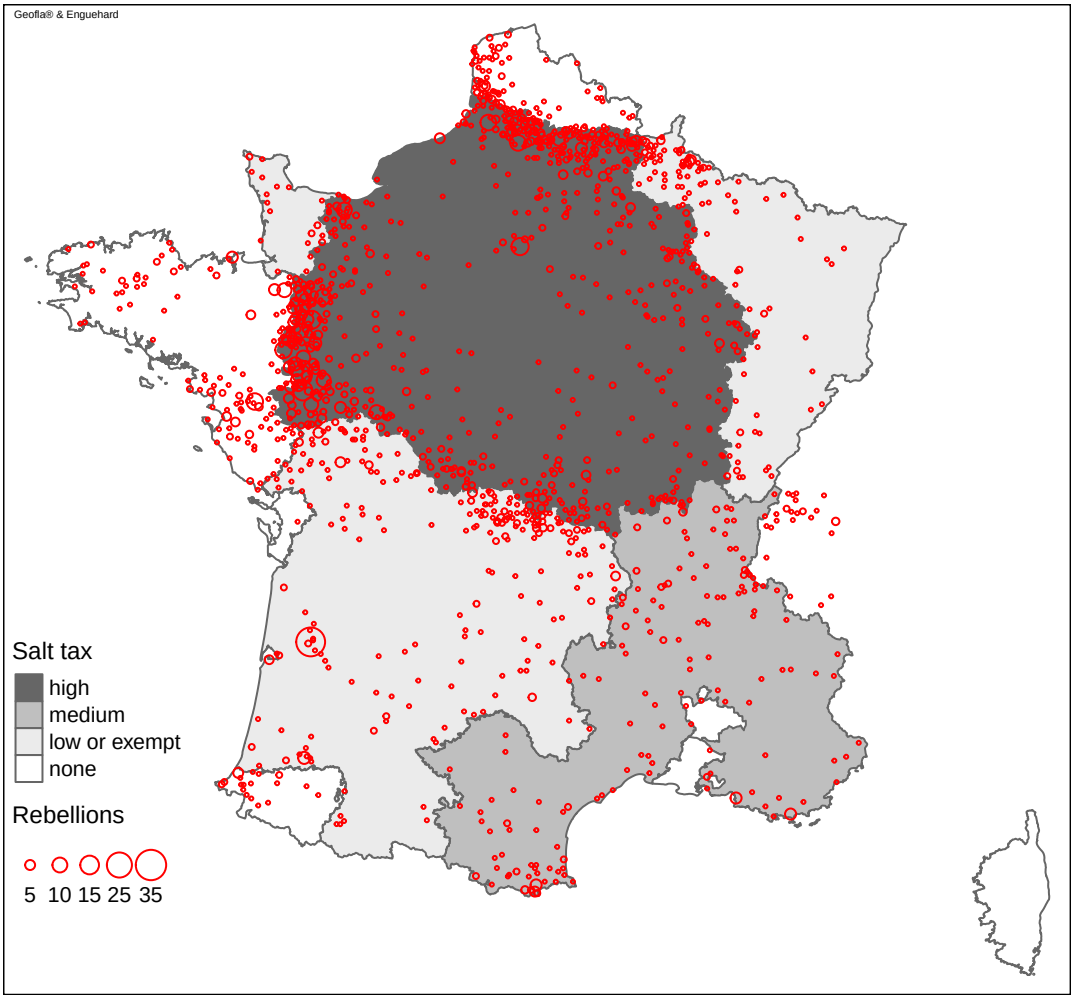
FIGURE 15: *Proportion of each revenue type in the gross revenue of the French monarchy.*

Note: Ticks indicate an existing account of finances for the considered year.
Source: Mathon de La Cour (1788).

was involved to defend smugglers, according to a "duty to rescue" (2002, p. 69 and p. 106). One has to keep in mind that the gabelle was probably the most hated tax among the Old Regime peasantry: content analysis of rural *cahiers de doléances* indicates that while taxation in general is the most mentioned topic, gabelle comes second (Goldstone, 2011) – and this despite the fact that it concerned only a part of France (see Map 2). In a way, eighteenth-century French salt smugglers were typical of the "social bandits" described by Hobsbawm (1969) : fully integrated in rural society and hold as righters of wrongs by their fellow villagers. But even if such rebellions were strongly determined by geography and local idiosyncrasy, it is striking that their evolution followed that of general welfare: Figure 16 indicates that salt-related rebellions peaked in the period of crisis 1700-1720, to decrease then until 1740. This provides additional evidence for the view that overall rebellion is informative of the state of society, independently of the irreducible specificity of each event. In hard times, smugglers may have intensified their activity, and their popular connections be more prone to push back any official attempt at putting obstacles in their way.

2.2.6 Material and normative dimensions of tax rebellion

The solidarity of villagers with tax smugglers epitomizes the complex relationship of material incentives and community-based ideology which lies at the core of rebellion in general, and tax



Map 2: *Rebellions related to salt and tobacco smuggling, and salt tax regions, 1661-1789.*

Source: Nicolas (2002), database by Chambru (2019).

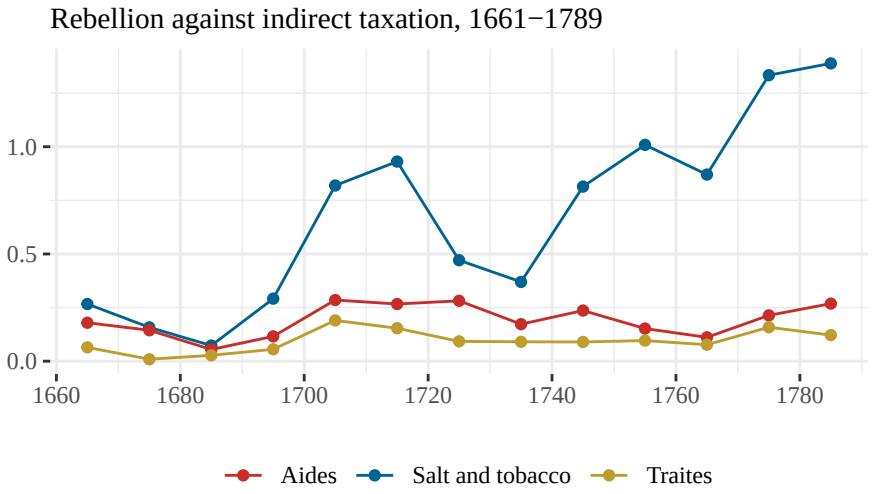


FIGURE 16: *Mean annual number of rebellions against indirect taxation per million inhabitants, 1661-1789.*

Note: Ten-year averages. *Source:* Nicolas (2002), database by Chambru (2019); Figure 2 for population.

rebellion in particular. This directly relates to the paradox of collective action brought forward by (Olson, 1965): what are the incentives to rebel, when expected individual gain may not not exceed the involved risks and free-riding is possible? Defenders of the moral economy's normative force à la Thompson (1971) have opposed the proponents of the "rational peasant" model, who hold the question of individual incentives as a true problem (Petersen, 1993). Lichbach (1994) has stressed that "selective incentives" (such as salt at a bargain price), if necessary, are not enough, and must be "tied to ideological appeals" to sustain an peasant upheaval. His focus is mainly to explain the time endurance of organized rebellions, opposed to simple banditry or spontaneous uprisings, that would necessarily degenerate precisely because of individual opportunistic behavior driven by selective incentives. In light of the case of smugglers described above, one could add that the mixture of shared ideology and community bonds could be sufficient to make even "unorganized" and spontaneous unrest successful. Common representations mattered as much as the material impact of taxation on peasant welfare. In a report to the king's council, Silhouette, the Controller-General of Finances in 1759, proposed to "cut some duties on eggs, butter and dairy, that affect the people probably even more in its opinion than in reality" (Mathon de La Cour, 1788, p. 38). On the eve of Revolution, Mathon de la Cour himself claims to have gathered state financial accounts in order to dispel the "false speculations, ridiculous projects, unfair reproaches, ill-founded whispers" and "unjust ideas" of the common people – especially on the amount royal expenses (ibid., p. iv). The symbolic dimensions of tax resistance may have mattered even more in the case of indirect taxation, as suggested by the record of rebellions. The peasants concerned were resisting to a rising intrusion of the state in their communities.

Now, the material consequences of taxation also clearly played a key role. It appears that the rising fiscal burden of the eighteenth century, the difficulties faced by a part of the peasantry described in the previous section and the rise in rebellion cannot be considered independently.

Even if tax rebellion was not the type of popular emotion which increased the most in the second half of the eighteenth century (see Figures 6b and B.29b), it was clearly stronger in the 1780s than in the 1740s, and even more when restricting to indirect taxation (Figure 16). On the other hand, a rising tax burden – an obvious fact for those whose real income stagnated – could only make things worse. And as I focus on state taxation in this essay, this does not even take into accout the debated "feudal reaction", by which landlords may have tried to resurrect old seigneurial rights and claims, at the expense of peasants, in the decades preceding the Revolution (Markoff, 1996, p. 18). However, up to this point, nothing more can be said, that these combined trends occurred concomitantly with an general propensity to rebel more in the second half of the eighteenth century.

2.3 Regional patterns

In this section, I investigate the regional distribution of émotions populaires from 1661 to 1789. I find that no region deviated from the country-level trend in rebellion, suggesting that the hypothesis of a common conjunctural mover is right. However, I also find that the prevalence of rebellion was very unevenly distributed over the territory, with distinctive hotbeds in Paris and parts of West and South. I find no clear correlation between these local patterns and demographic indicators that would support the population pressure hypothesis.

2.3.1 Regional social orders and rebellion trends

Is it possible to bring forward clear regional patterns of unrest? Regarding involvement in the Revolution, Brustein (1986) has proposed to distinguish four "regional social orders" (shown in Appendix map C.23). Peasants in the Northeast (including the Paris basin) would have been the most supportive of the Revolution because agriculture was largely commercial, most land was held in cash tenancy, and wage labor was widespread – which made laborers sensitive to a rise in wheat prices in case of crisis. Agricultural yields of northern open fields would have been higher than in the rest of the country – which seems confirmed by Hoffman (1996)'s findings, as mentioned above –, but day laborers did not benefit of them. Still according to Brustein, the third estate owned only one third of land, and a large part of this third should have been in the hands of bourgeois and wealthy farmers. On the contrary, in the West, sharecropping was widespread, and wage labor would have been much rarer, the share of peasant ownership larger, and their relationships with landlords better. The opposition between cash tenancy and sharecropping would have been that of "antagonistic" and mutual-interested relationships between peasants and landlords. Lastly, the South was intermediate, with more freeholding – according to the Roman law principle of "no Lord without a title" – and the opportunity of multicropping that insured against wheat crises, while the Center was mostly poor[68]. Goldstone (1991) relies on this regional division to add that the Northeast was also the region of highest population growth, leading peasants to face even greater difficult access to land (p. 259). Population series by

[68]The Center had been the region hardest hit by the demographic crisis of the 1690s, in which it lost one fifth of its population, and did not regain its population of the 1680s before the 1760s (Figure B.24). According to contemporary accounts like Controller-General Orry's in 1745, a large part of it belonged to the regions of "misery" in 1745 (Appendix Map C.24). Moreover, heights appear to have been distinctively low: 2.6 cm less than in the Paris region for adult men in the province of Marche (Appendix Table A.3 and Map C.21) – even though this might also have been the result of ethnic specificity.

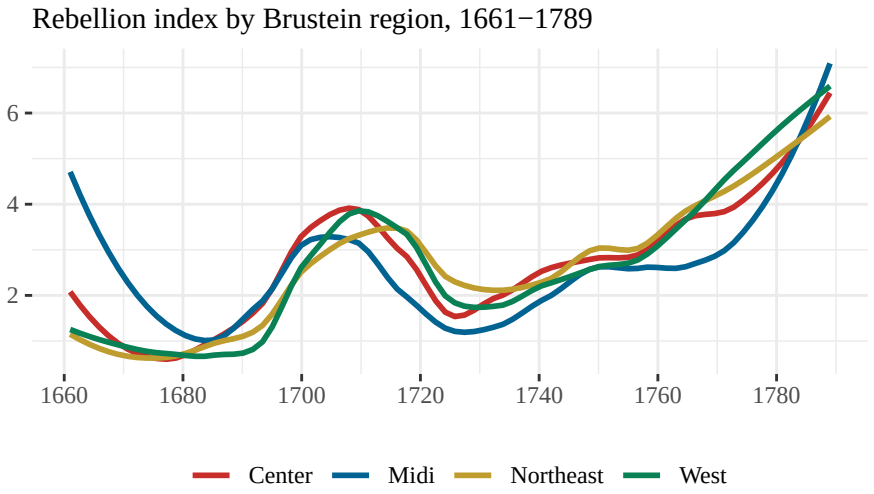


FIGURE 17: *LOESS of the annual number of rebellions per million inhabitants, according to the regional division of Brustein, 1661-1789.*

Note: LOESS span = 0.4. Brustein regions are shown in Appendix Map C.23. *Source:* Nicolas (2002), database by Chambru (2019); Brustein (1986), and population series by department of section 1.1.5.

Lachiver region indeed confirm this, if one considers the regions North and East (Figure B.24). However, Markoff (1996) has opposed this idea the North was the "heartland of the Revolution", based on his study of peasant rebellions during the Revolution (p. 352). In Figure 17, I present the smoothed trends of rebellion indices by region of Brustein. It appears that they evolved similarly, and that at this level of aggregation, no big region can really be distinguished from another. This result is in line with Markoff's rebuttal. At the same time, it is quite informative: it means that a common trend was driving the propensity to rebel overall the country, despite local peculiarities.

I repeat the same exercise, this time with a different – and more precise – regional division: that of Lachiver, shown in Appendix Map C.8. It has the advantage of corresponding to the most reliable population series (see section 1.1.5). The result, shown in Figure 18, suggests once again a common trend across the territory. However, some regional differences begin to appear: higher rebelliousness in the Southeast and in the North (which includes the Paris region), while the Southwest – which had been the heartland of the great Croquants revolts in the sixteenth and first half of the seventeenth century – is the most quiet[69]. Although the regional division is not strictly the same, this can be compared to the evolution of age at marriage from 1740 to 1791 by region of the Henry survey, obtained by GAM fitting and presented in Figure 19. No clear pattern can be brought out, except that age at marriage increased significantly faster in the East than in other regions. The East was also the region who experienced the fastest population growth in the eighteenth century (Figure B.24), in particular due to higher fertility (Appendix Map C.7). Lastly, it was in the East that height decreased at most after 1750 (Table

[69]Of course, the rebellion index of Figure 17 is not size-weighted, implying that the large-scale revolt of Tard-Avisés in 1707 is counted as every other one. See section 1.2.2.

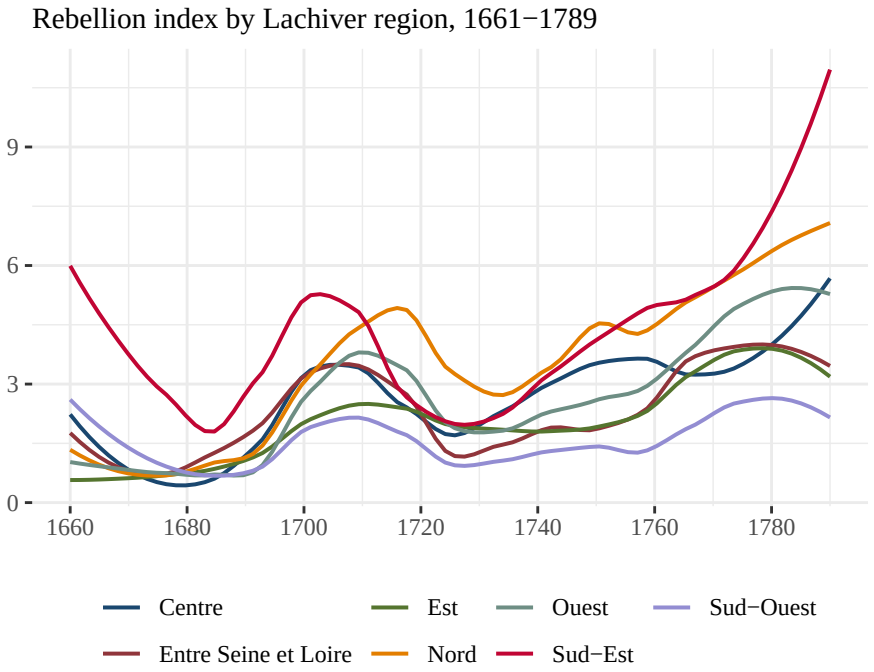


FIGURE 18: *LOESS of the annual number of émotions populaires per million inhabitants, by Lachiver region.*

Notes: LOESS span = 0.4. Lachiver regions are shown in Appendix Map C.8.
Sources: Chambru (2019), based on Nicolas (2002), Lachiver (1991) and Figure 2 for population.

2 and Figure C.22). But when it comes to rebellion, the East appears to be one of the most quiet regions in absolute terms (Map 3). And even though it followed the general increasing trend, as suggested by Figure 18, this was not more noticeable than in other regions. So even if the East may have experienced a Malthusian scheme regarding the link between population pressure, land availability and welfare, it did not lead to more rebellion.

2.3.2 Spatial distribution

A common trend does not imply a unique level. As shown in Map 3, based on postrevolutionary departments, the intensity of rebellion was highly variable across the country. Several hotbeds can be identified. Paris is obviously one of them, with the distinctive feature of concentrating opposition to the authority of the state police, justice and military, which represented 40 percent of cases. In particular, one quarter of Parisian émotions are revolts following an arrest, which suggests that the challenge to state authority was already well established before the sans-culottes movement. An other overrepresented type is labor dispute. Labor conflicts were chiefly conducted by skilled laborers inside the corporatist system, *compagnons*, who benefited from an organization based on official and secret networks, respectively *confréries* and *compagnonnages*, that were effective in defending their interests (Léon, 1993). From this perspective, the rise in

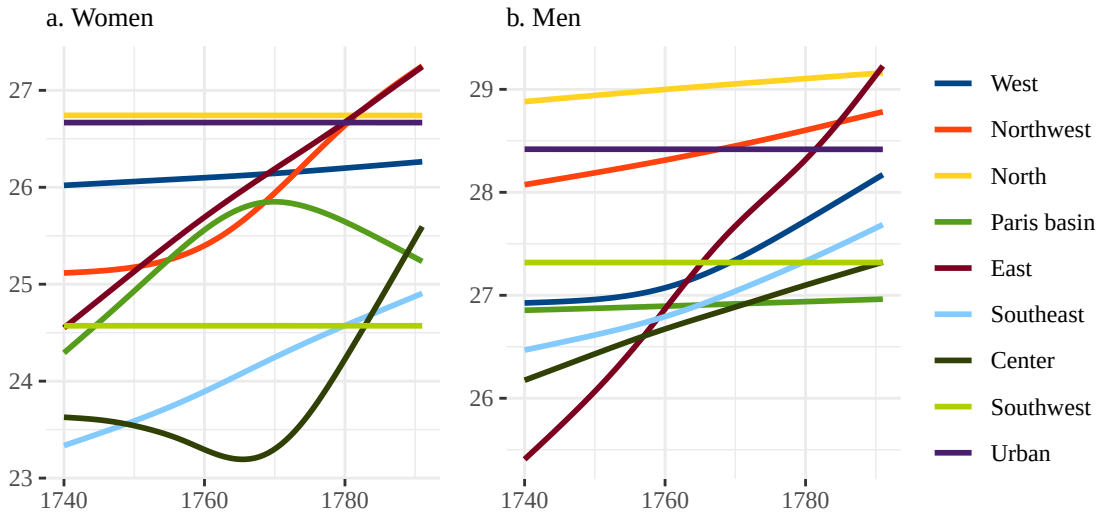


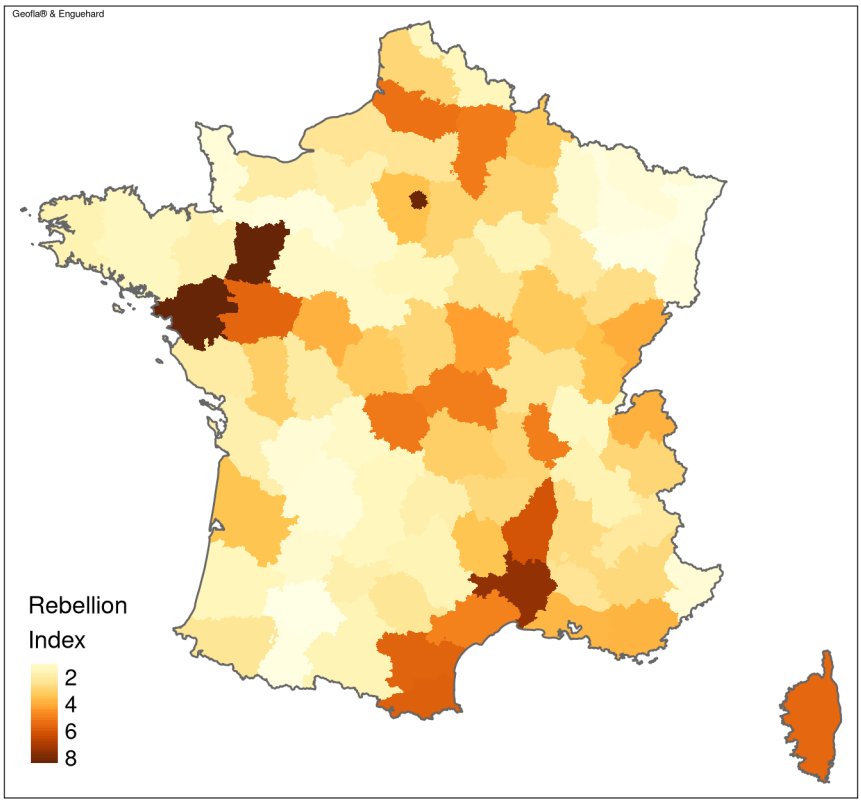
FIGURE 19: *Evolution of mean age at first marriage by region, anonymous sample (1740-1791).*

Notes: Obtained by GAM fitting on the sample. Minimal sample size is 231 (southwestern women). 1791 is chosen to prevent any distortion induced by the increase in age report due to the 1792 law (see section 1.1.2). The regional division is the Henry survey's original one, shown in Appendix Map C.4. For convenience of the graph, regions Center East and East are brought together into East, and Center West and Center into Center, as their trends are close to each other. Regions include only rural marriages, while urban marriages in whole France are brought together into the category "urban". Individuals for which previous marital status is non-single or unknown are excluded from the sample.
Source: Henry survey, database in Séguy (2001).

labor conflicts visible in Figure 6e may be related to a decrease in skill premium over the whole period, which can be observed among building workers according to Ridolfi (2019)'s series. As shown in Appendix Figure B.31, the declining trend in skill premium was even stronger in Paris: while the skill premium, measured by the ratio of the wage of a building craftsman over the wage of a building laborer, was 30 percent higher in Paris than in the rest of France around 1660, it almost converged to the country level over the period. An increased employers' offensive against corporatist rights, with the blessing of the state, could have been the cause (Nicolas, 2002, pp. 436-530); a rise in the number of entrants fostered by demographic growth as well. This is consistent with the view of Ridolfi (2019), that skill premium should have decreased more in urban areas due to increased competition between skilled workers (Online Appendix S1). In particular, this led insiders of the corporatist system to Malthusian reactions, like limiting the number of apprentices and favor sons of masters, instead of compagnons, for the places of master (Goldstone, 1991, p. 269). This could only block social mobility and fuel frustration..

Paris was also part of a larger zone around the Seine basin, until Rouen and Upper Normandy, which experienced numerous food riots, as it can be observed in Map C.16[70]. As explained in section 2.1.3, this was due to the pressure of a dense population on a common supply of wheat. While food riots were otherwise quite evenly distributed over the territory, this was not the

[70]These were large-scale: the généralité of Rouen appears to be a rebellious place according to the size-weighted rebellion index (Appendix Map C.14), but not according to the standard rebellion index (Appendix Map C.13).



Map 3: *Mean annual number of émotions populaires recorded within present French borders per million inhabitants, by department.*

Sources: Chambru (2019), based on Nicolas (2002), and section 1.1.5 for population.

case for émotions with other motives. For example, the maps of rebellion against state and local authorities (Appendix Maps C.18 and C.19) suggest in both cases a concentration in pays d'états, those that had kept the most autonomy with respect to the state (see section 2.2.2): Languedoc, Provence, Bourgogne, Franche-Comté – only Brittany was spared.

Map 3 indicates that rural hotbeds are still strongly related to fiscal geography: in the West, the edge of exempted Brittany, in the North, the border of exempted Artois and Flanders, in the Center, the border with southwestern *pays rédîmés*. In western Mayenne, department of *grande gabelle* adjacent to Britanny, two thirds of rebellions were linked to salt and tobacco smuggling; this proportion peaked to 70 percent in northern Somme and in Allier, in the Center. However, these concentrations of antifiscal unrest cannot be reduced to the arbitrariness of borders: it can be observed in Map 2 that all fiscal borders did not generate high levels of rebellion, especially in the East (see also Map C.17 for overall tax rebellion). Conversely, western tax resistance was not limited to salt. In Loire-Atlantique, the most troubled department in France with Mayenne according to the rebellion index, more than a third of events were related to *aides*, the consumption duties that weighed particularly on alcoholic beverages.

2.3.3 The West

Loire-Atlantique had a very specific situation inside Brittany: while the rest of Brittany was quiet, and troubles related to salt smuggling concentrated on the other side of the border (on the "taxed" side), they extended inside Loire-Atlantique and coalesced with rebellions against aides and traites. The presence of the city of Nantes, with its harbor Saint-Nazaire, was probably a key factor. If one relates the number of émotions populaires between 1661 and 1789 to the communal population given by the census of 1793, Nantes was by far the most rebellious city in France: twice as much as Bordeaux, three times more than Paris, six times more than Marseille and nine times more than Lyon. Movement of goods imported by sea (such as tobacco) may have mattered, as suggested by the second rank of the other great port city, Bordeaux, in which unrest focused on custom duties. But there was also probably a context specific to the West, which urban Nantes was only the epicenter. In the western countryside, peasant communities had a long tradition of tax resistance; first against seigneurial deductions, and then increasingly against both state and urban bourgeoisie, as the "new lords" were replacing the old ones (Bercé, 1974). According to Bercé, there is a direct continuity from this to the Chouan counterrevolutionary revolt[71]. The West was also specific from a demographic point of view: it had been preserved from the great demographic crises of the sixteenth and seventeenth century, maybe due to its milder climate, and its population had grown steadily until the 1670-1680s (Biraben et al., 1988, pp. 158-161). Then, population growth went far more slowly. The population of "rebellious" departments of Loire-Atlantique, Mayenne and Maine-et-Loire, grew by only 10 percent between 1720 and 1790, while this figure was 27 percent for whole France[72]. This does not seem to be the result of less children by marriage (see Appendix Map C.7), but mainly of less marriages: estimates based on the Henry survey suggest that the number of marriages even decreased in the West (including Normandy) between the years 1670-1699 and 1760-1789 (Dupâquier and Lepetit, 1988, p. 80). Did previous population growth lead to an increased difficulty to access land and to set up, and thus prevented couples to marry? It is difficult to conclude. There was also a rise in men's age at marriage between 1740 and 1790, but comparable to that of other regions (Figure 19)). Lastly, the West seems to have been preserved from the post-1750 decrease in height (Table 2 and Map C.22).

2.3.4 Languedoc

Another hotbed of rebellion, less concentrated though larger, was to be found in Languedoc, as indicated by indices by department and généralité (Maps 3 and C.13). In Gard and a little less in Lozère and Ardèche, the rebellion index is driven up by the Protestant upheaveal of Camisards, in the 1700s. But even in Gard, conflicts with religious motives do not account for more than one quarter of all émotions populaires. Interestingly, the most represented category, with 27 percent of events, is that of various collective violence, which significantly contributed to the rise of rebellion (Figure 6f). The over-representation of the former Camisard region in this type of unrest can also be observed in Appendix Map C.20. Could it be the continuation of the same spirit of rebellion, as that which animated the Camisards? Besides, rebellious attitudes extended

[71] The map of tax rebellion (Appendix Map C.17) indeed suggests an overlap of old regime western tax resistance and Chouannerie, except for quiet northeastern Brittany.

[72] Figures by généralité suggest a larger increase for Brittany, but they may underestimate the population of Brittany in 1700, as suggested by Dupâquier and Lepetit (1988, p. 79).

to the whole region of Languedoc, until its most southern parts which were not concerned by Camisards. There is still a fair number of various collective violences in Hérault and Aude, while the most represented types are opposition to the state police, justice or military, and tax rebellion (still related to indirect taxation). All of this draws a continuum of various types of resistance to authority within a unique region, which suggests that those were indeed related to each other. Even considering Southeast as a whole (see Map C.8), the region brought a significant contribution to the prerevolutionary rise in rebellion: Figure 18 indicates that from 1740, the prevalence of rebellion in the Southeast was the highest with that in the North, and exploded in the 1780s. According to Orry, Languedoc was poor in 1745 (Map C.24), and it belongs to regions in which height decreased after 1750 (Table 2 and Map C.22) – even though it was not the worst place. Considering Southeast as a whole, age at marriage rose between 1740 and 1790, but still less than in quiet Northeast. Once again, no clear evidence points towards a specific regional combination of Goldstonian features.

Concluding remarks

Was population pressure decisive to the destabilization of French Old Regime society? Did it worsen the contradiction of the state between its ends and its means, leading to a growing distrust of its authority? This essay cannot claim to provide more than a few pieces of evidence and general insights, and certainly not definitive answers. Its main result is to bring out a general dynamics consistent with the Goldstonian narrative for eighteenth-century France. But while country-level indicators indeed point toward a stagnation or even worsening of the conditions of the poor peasantry and the urban laborers that came from it, the effect it had on the rise in rebellion is still a probable guess and not a proven statement. Many other political, ideological and cultural factors may have played a role at least as decisive[73]. Furthermore, there is no obvious correlation at the regional level between rebellion and indicators suggesting the population pressure hypothesis.

Of course, these results remain quite impressionistic. In one respect, available data on eighteenth and even seventeenth century France is no doubt extremely rich and diverse, and this dissertation seeks to contribute to the connection of its many dimensions. From another viewpoint, it remains either too general or too fragmented. In particular, wage series for French regions are still to be built, as well as the evolution of land distribution at the regional level is still to be further assessed. Finally – and although this has in all likelihood no consequence on the results of this dissertation –, population reconstruction for France at the country and regional levels, based on the Henry data, is a research agenda that deserves to be reopened. It is certainly a demanding and nontrivial one, involving processing a gigantic amount of non-digitized data for the period 1670-1740. But this would offer undeniable prospects for research. In this regard, the ongoing digitization of parish registers and archived civil status documents may offer new perspectives.

[73] Literacy was studied by Markoff (1986) in the case of peasant unrest during the Revolution, with the conclusion that it influenced the form of disturbances, but not their intensity. It should also be remarked that the static map of old regime literacy, which basically divides France into a northeastern half and a southwestern half, has absolutely no relation with that of rebellion, as presented in this essay.

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Appendix

A Appendix Tables

TABLE A.3: *TRUNCATED REGRESSION OF HEIGHT BY PROVINCE, 1660-1770*

Dependent variable is height (French inches).

	Estimate	**Std. Error**	**t-value**	**Pr(>|t|)**
Intercept (unknown province)	62.10	0.10	600.87	0.00
Alsace	-0.59	0.21	-2.89	0.00
Anjou	-0.82	0.19	-4.41	0.00
Artois	0.09	0.15	0.59	0.55
Aunis	-0.57	0.45	-1.26	0.21
Auvergne	-1.18	0.19	-6.24	0.00
Béarn	-0.14	0.42	-0.32	0.75
Berry	-0.84	0.23	-3.66	0.00
Boulonnais	-0.23	0.36	-0.64	0.52
Bourbonnais	-0.93	0.23	-3.99	0.00
Bourgogne	-0.58	0.12	-4.93	0.00
Bretagne	-0.77	0.15	-5.09	0.00
Champagne	-0.35	0.12	-2.96	0.00
Foix et Roussillon	-0.09	0.37	-0.23	0.82
Dauphiné	-0.67	0.16	-4.24	0.00
Flandre	-0.02	0.13	-0.12	0.90
Franche-Comté	0.00	0.12	0.03	0.97
Gascogne	-0.29	0.20	-1.46	0.14
Guyenne	-0.42	0.11	-3.86	0.00
Hainaut	0.08	0.18	0.46	0.64
Île-de-France	-0.61	0.11	-5.55	0.00
Languedoc	-0.20	0.12	-1.70	0.09
Limousin	-1.00	0.24	-4.17	0.00
Lorraine	-0.03	0.11	-0.29	0.77
Lyonnais	-0.08	0.15	-0.52	0.60
...	...	...	...	...

Continues on next page.

CONTINUED TABLE A.3: *TRUNCATED REGRESSION OF HEIGHT BY PROVINCE, 1660-1770*

Dependent variable is height (French inches).

	Estimate	**Std. Error**	**t-value**	**Pr(>|t|)**
Continued from previous page.				
...	...	...	...	...
Maine	-0.47	0.18	-2.60	0.01
Marche	-1.61	0.43	-3.71	0.00
Nivernais	-0.75	0.29	-2.61	0.01
Normandie	-0.45	0.11	-3.92	0.00
Orléanais	-0.43	0.17	-2.53	0.01
Picardie	-0.10	0.12	-0.83	0.41
Poitou	-0.86	0.18	-4.68	0.00
Provence	0.05	0.16	0.31	0.76
Saintonge	-0.80	0.20	-3.94	0.00
Touraine	-0.98	0.24	-4.05	0.00
Venaissin	-0.17	0.43	-0.41	0.68
σ	2.01	0.02	91.60	0.00

$N = 28158$. Log-Likelihood: -38445 on 55 Df.

Notes: Truncated regression estimated by Maximum Likelihood with R package *truncreg* (Croissant and Zeileis, 2018). See these results on Map C.21. Following Komlos (2003a), the point of truncation is set to 61.75 F.i., minimum age in the sample to 23, and a dummy variable is added for grenadiers. Regression is performed controlling for the birth decade (reference level is 1700), for age (below 16, 17, 18, 19, 20, 21, 22, 23 and more) and for being a grenadier. It should be noted that although p-values are displayed, they only measure if the province is significantly different from the reference level (soldiers of unknown province). Database available in Uni Tübingen *Data hub "Heights and Biological Standard of Living"*.

B Appendix Figures

B.1 Family behavior

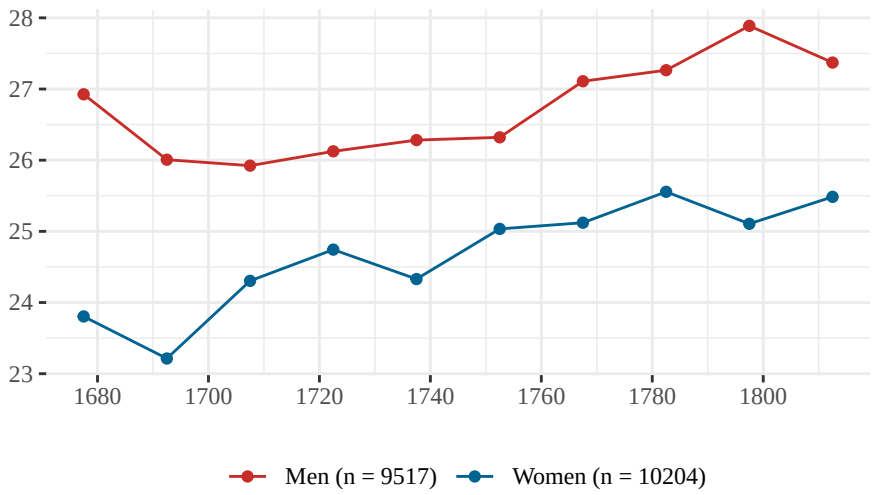


FIGURE B.20: *Mean age at first marriage by year of marriage in rural France, nominative sample (1670-1819).*

Notes: 15-year averages. Individuals for which previous marital status is non-single or unknown are excluded from the sample. Minimal sample size is 169 (men, 1700-1715). I also check for outliers with trimmed means and exclusion of ages below 15 and above 50, which does not change the shape of the curve.
Source: Henry survey, database in Séguy (2001).

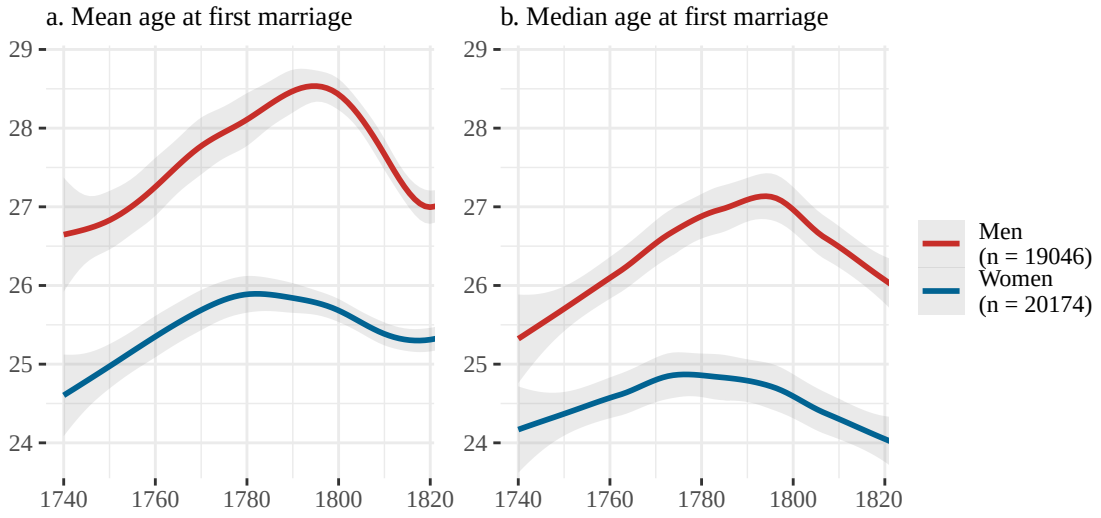


FIGURE B.21: *Age at first marriage by marriage year in rural France, anonymous sample (1740-1829).*

Notes: a. is obtained by GAM fitting on the sample and b. by LOESS of annual medians (span = 0.75); 95% confidence interval in shaded area. Urban marriages and individuals for which previous marital status is non-single or unknown are excluded from the sample.
Source: Henry survey, database in Séguy (2001).

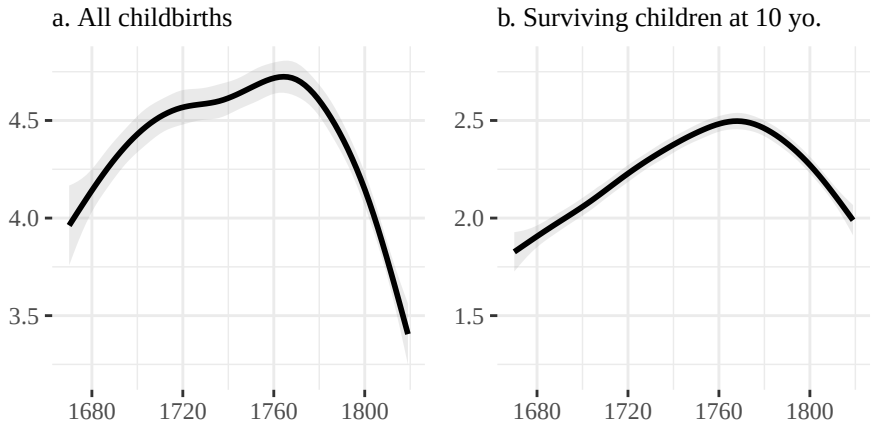


FIGURE B.22: *Mean number of children per marriage in rural France by marriage year (marriages with a at least one child): a. all childbirths, and b. children surviving at least 10 years only.*

Notes: Obtained by GAM fitting on the sample. 95% confidence interval in shaded area. N = 24146. Chart b. is obtained by multiplying the number of children of each marriage in the sample by the proportion of surviving children at 10 yo. in the birth cohort of the year of marriage, taken from Houdaille (1984, Table 2) for 1705, 1735, 1765 and from Bideau et al. (1988, Table 31) for 1805, 1815 and 1825 (see footnote 11), linearly interpolated between those years and kept constant before 1705. For both charts, I check that including childless marriages or restricting to first marriages does not change the shape of the curve.
Source: Henry survey, database in Séguy (2001).

B.2 Population

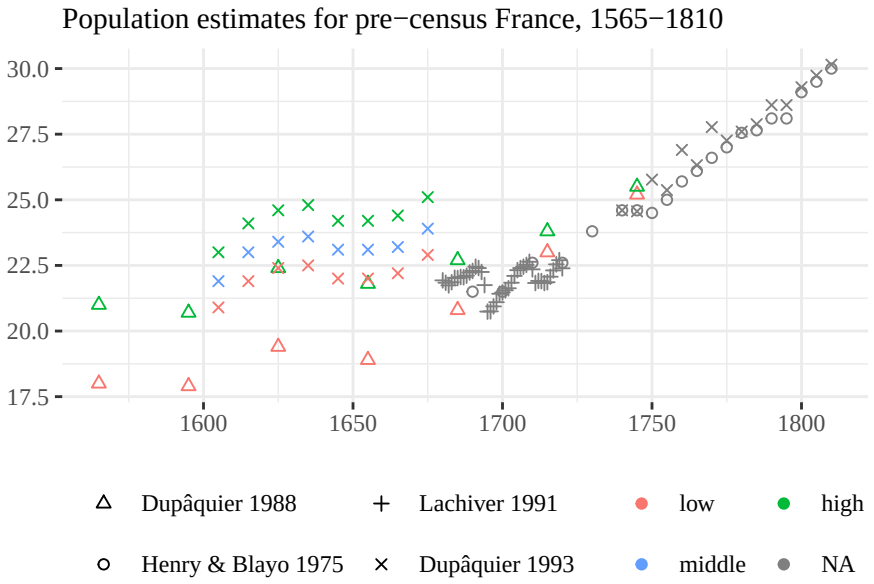


FIGURE B.23: *Population (million inhabitants) within present French metropolitan frontiers (including Corsica), from various sources.*

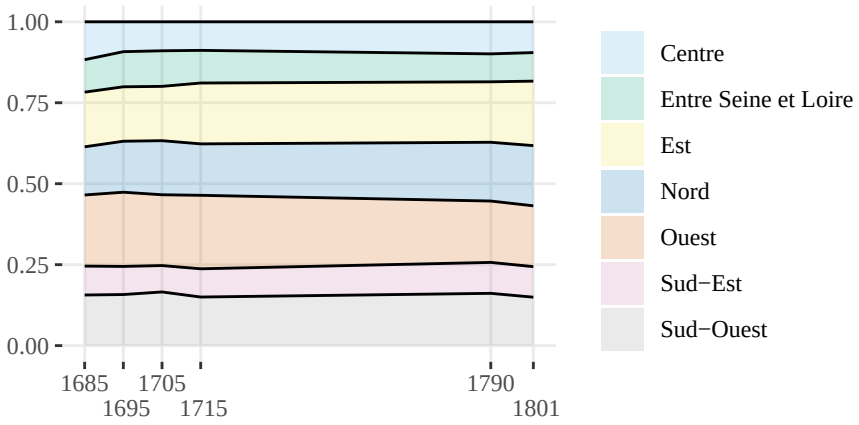


FIGURE B.24: *Share of each Lachiver region in the total population, 1685-1801.*

Note: Ticks indicate existing figures for the considered year. *Sources:* Figures for the years 1685-1715 are from Lachiver (1991). Figures for 1790 are based on Langlois (1976) and figures for 1801 on SGF censuses.

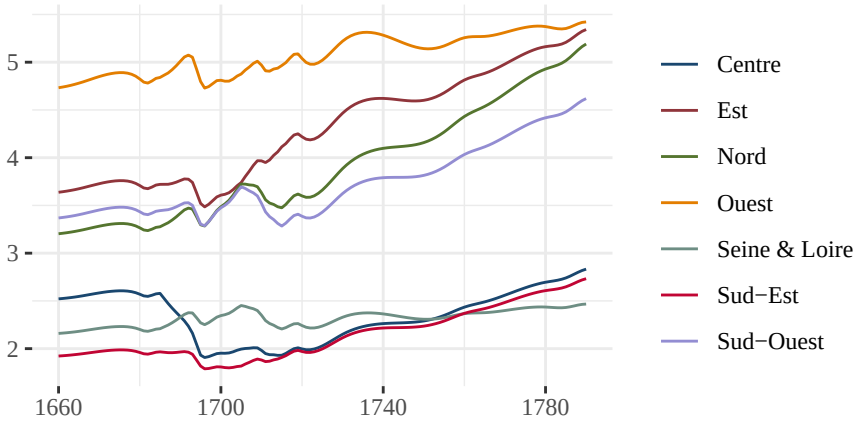


FIGURE B.25: *Population by Lachiver region (million inhabitants).*

Notes: Regional population shares are based on Lachiver (1991) for 1685-1715 and on Langlois (1976) for 1790 (plus subsequent SGF censuses for missing departments), linearly interpolated between 1715 and 1790, and kept constant before 1685. These shares are applied to the French population series of Figure 2. Lachiver's regional division is presented in Map C.8.

B.3 Rebellion

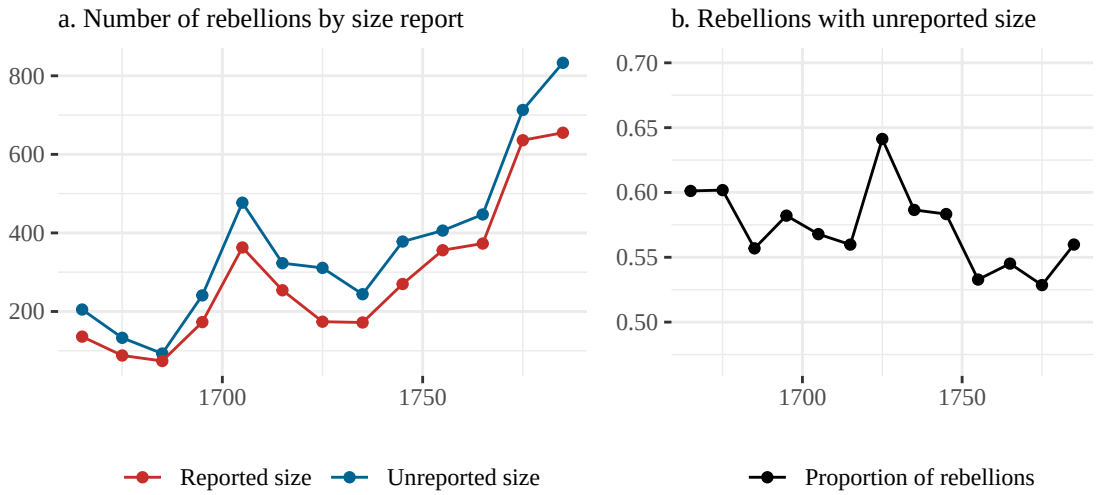


FIGURE B.26: *Evolution of rebellion size report in the database, in absolute value and in proportion, 1661-1789.*

Notes: Size is an indication of the number of participants. Figures are computed over ten-year spans.
Source: Chambru (2019) and Nicolas (2002).

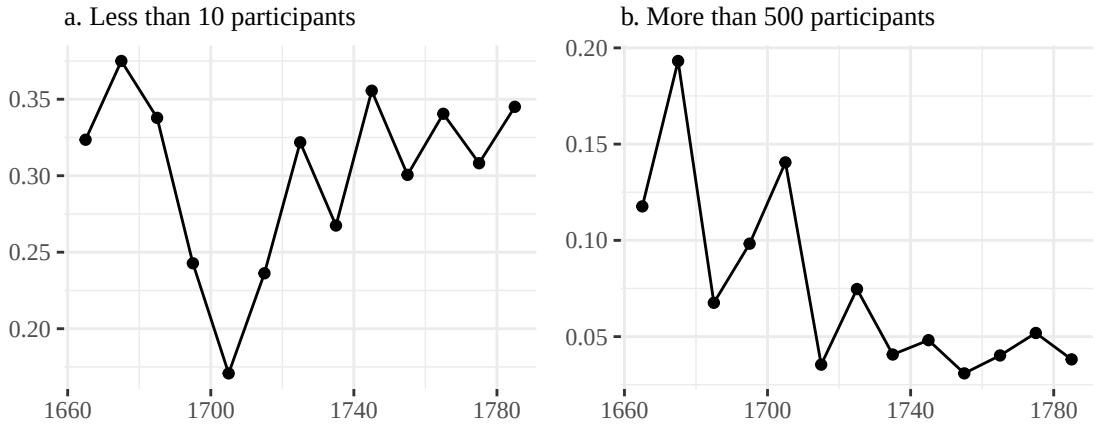


FIGURE B.27: *Proportions of rebellions with at most 10 participants and at least 500 participants, respectively (1661-1789).*

Notes: Subsample of 3724 events for which the information is available. Figures are computed over ten-year spans.
Source: Chambru (2019) and Nicolas (2002).

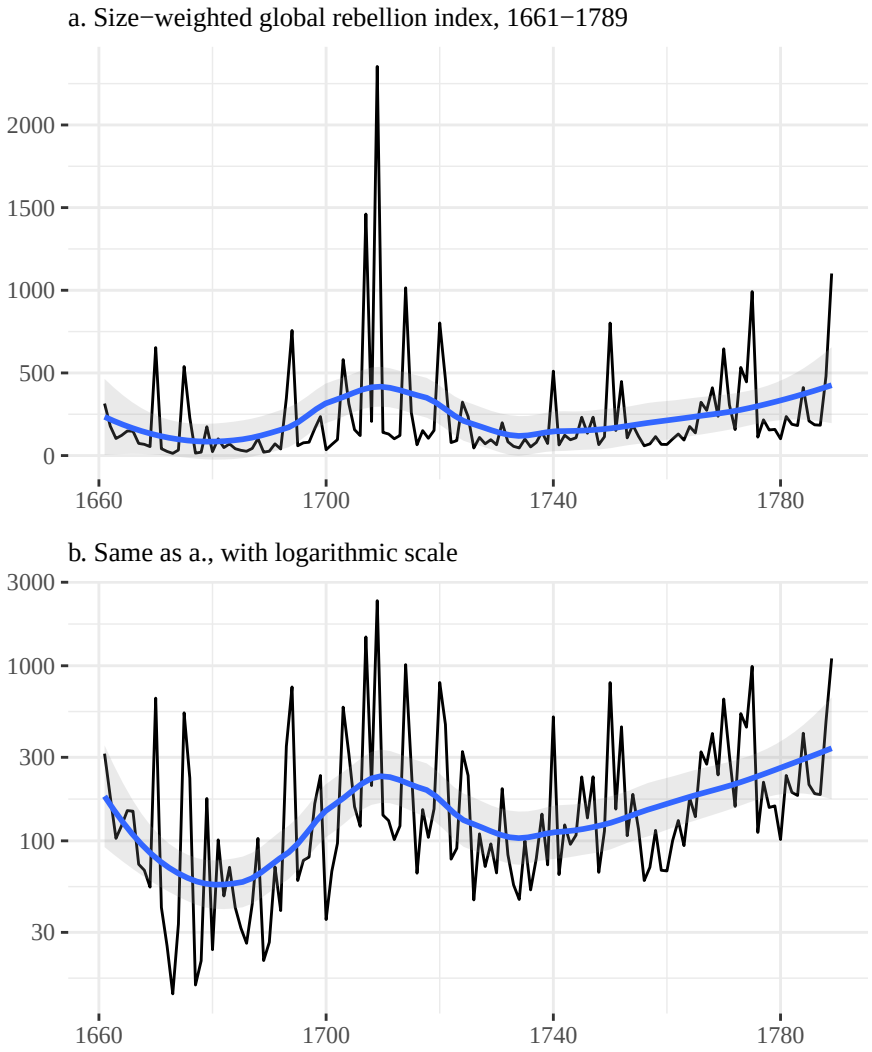


FIGURE B.28: *Annual number of participants in rebellion recorded within present French borders per million inhabitants, 1661-1789.*

Notes: Blue curve is the LOESS of the annual series (span = 0.5), with 95% confidence interval in shaded area. Missing numbers of participants are set to 20 (see section 1.2.2).
Sources: Chambru (2019), based on Nicolas (2002), and Figure 2 for population.

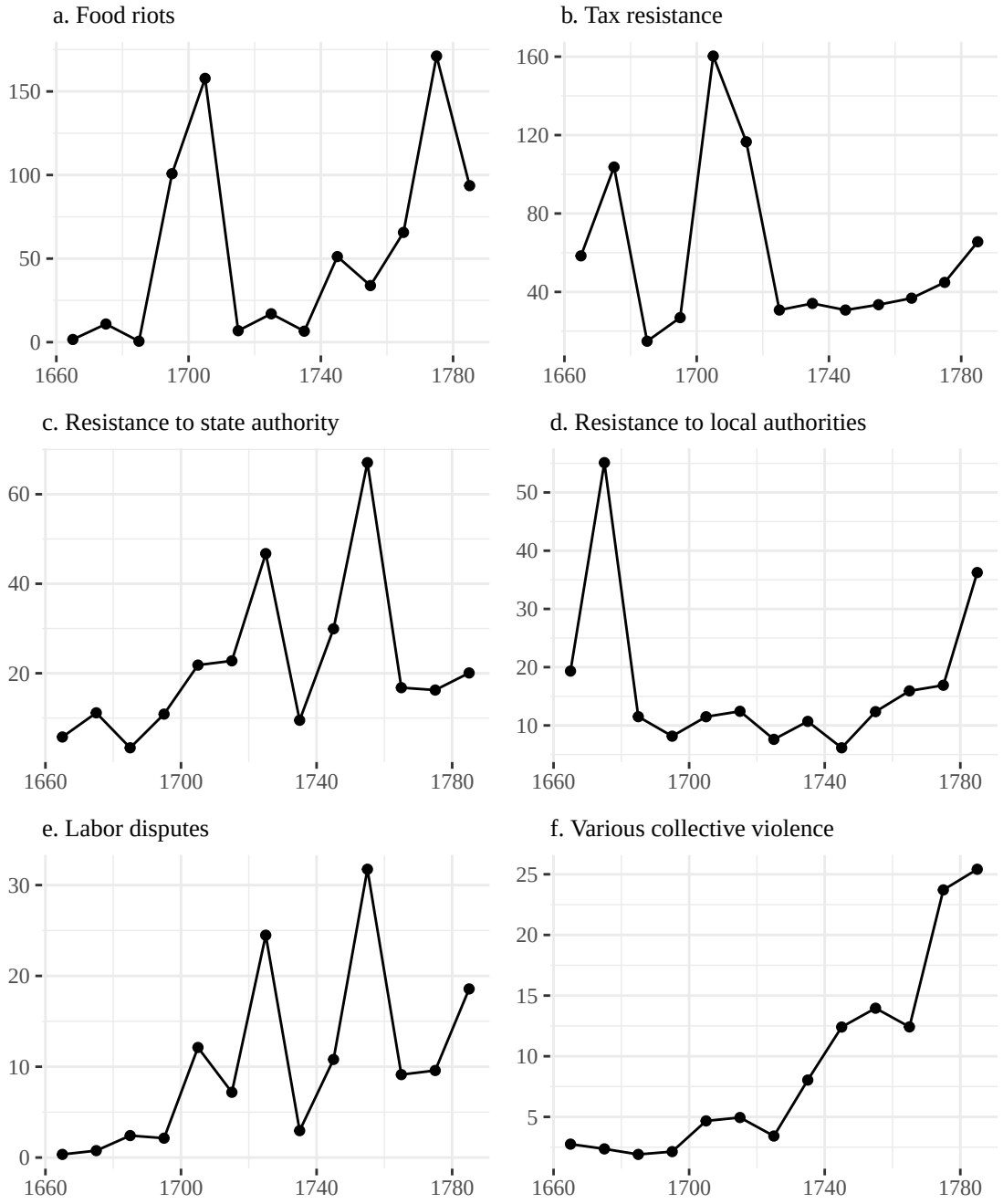


FIGURE B.29: *Annual number of participants in rebellion recorded within present French borders per million inhabitants, 1661-1789.*

Notes: Ten-year averages. Missing numbers of participants are set to 20 (see section 1.2.2).
Sources: Chambru (2019), based on Nicolas (2002), and Figure 2 for population.

B.4 Economic time series

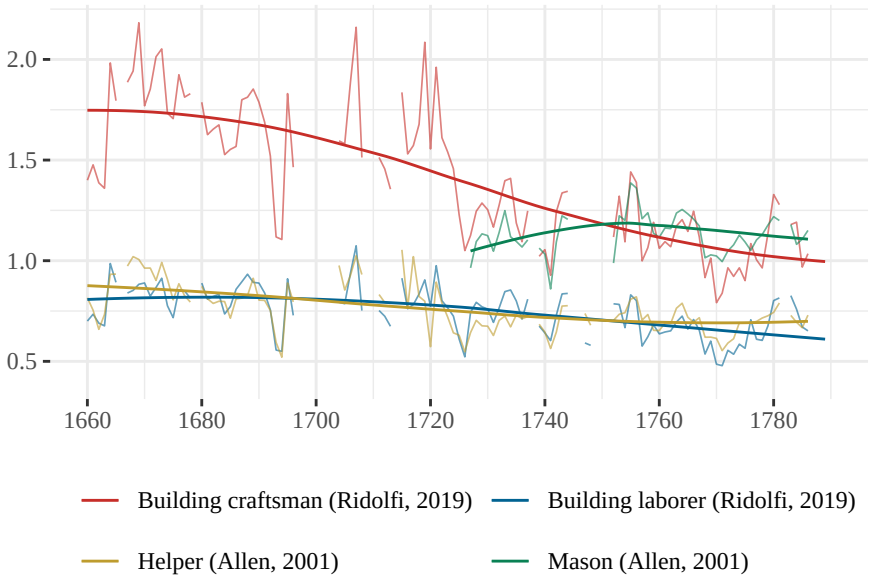


FIGURE B.30: *Annual wage of a male worker divided by the cost of a barebones consumption bundle for a couple with two children.*

Notes: Allen (2001) and Ridolfi (2019) have certain sources in common for prices and wages, the same assumptions on annual working time and family multiplier and their respective consumer price indices are computed according to the same basket of good. Annual series smoothed by LOESS (span = 1).

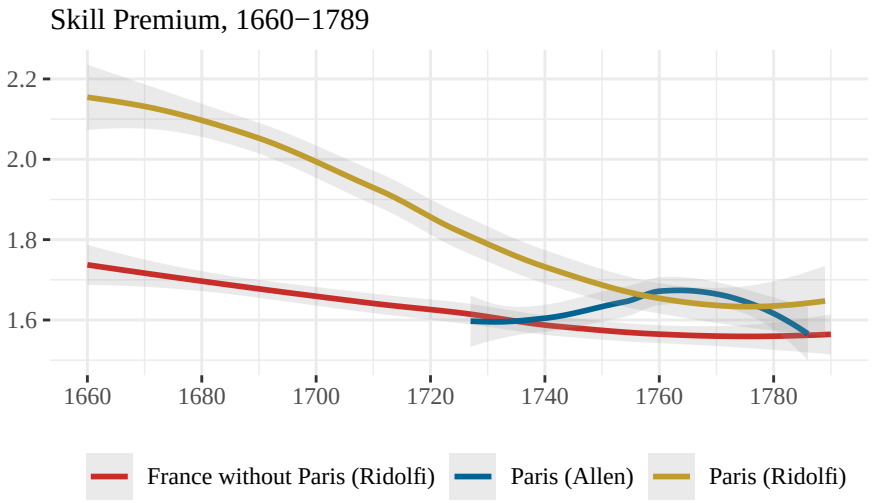


FIGURE B.31: *Annual wage of a building craftsman divided by the annual wage of a building laborer.*

Notes: LOESS based on annual series, with 95% confidence interval in shaded area (span = 1).
Sources: Allen (2001) and Ridolfi (2019).

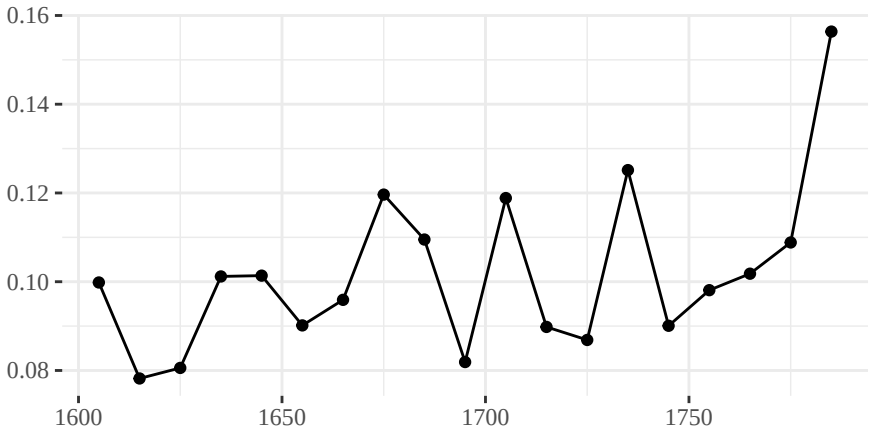


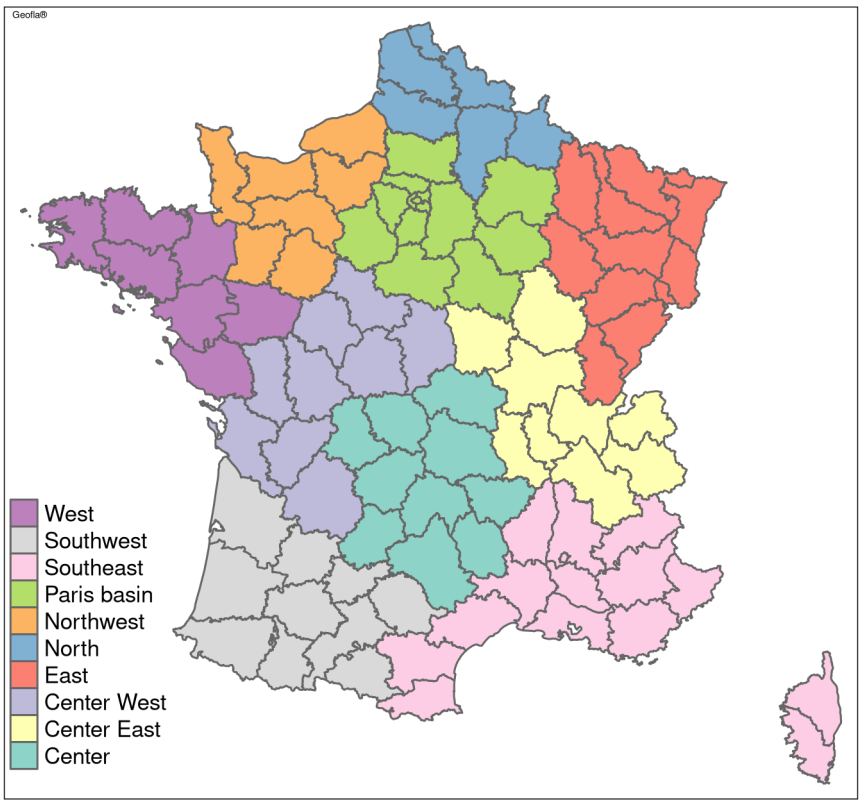
FIGURE B.32: *Land rent in the Paris region compared to wheat price (proportion of the available yield), 1600-1788.*

Notes: Monetary land rent divided by wheat price times the available yield. Each value is the ratio of ten-year averages. Available yield is the yield minus the part that had to be kept for seeding.

Sources: Quality-adjusted monetary land rents come from the Notre Dame sample of Hoffman (1996, p. 90, col. 3). Wheat prices are from Baulant (1968). Both series were found in the database of Allen (2001). The figures for yield per hectare, assumed constant (19.5 hl wheat, including 2.1 hl for seeding), are those retained by Hoffman in other calculations and were taken from Pavard (1976).

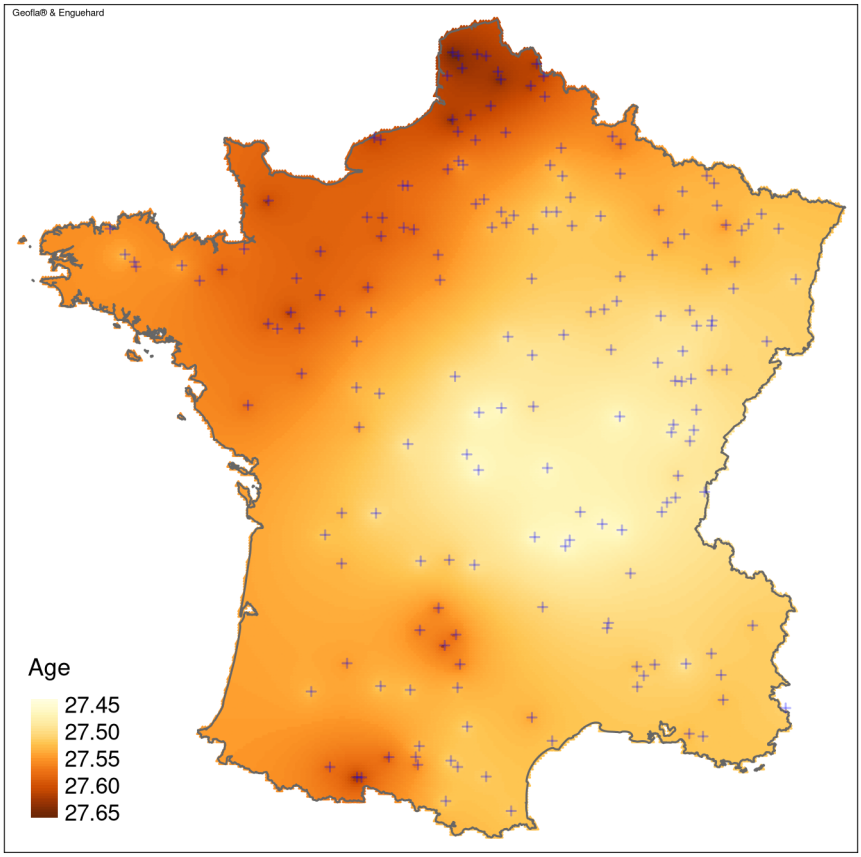
C Appendix Maps

C.1 Family behavior



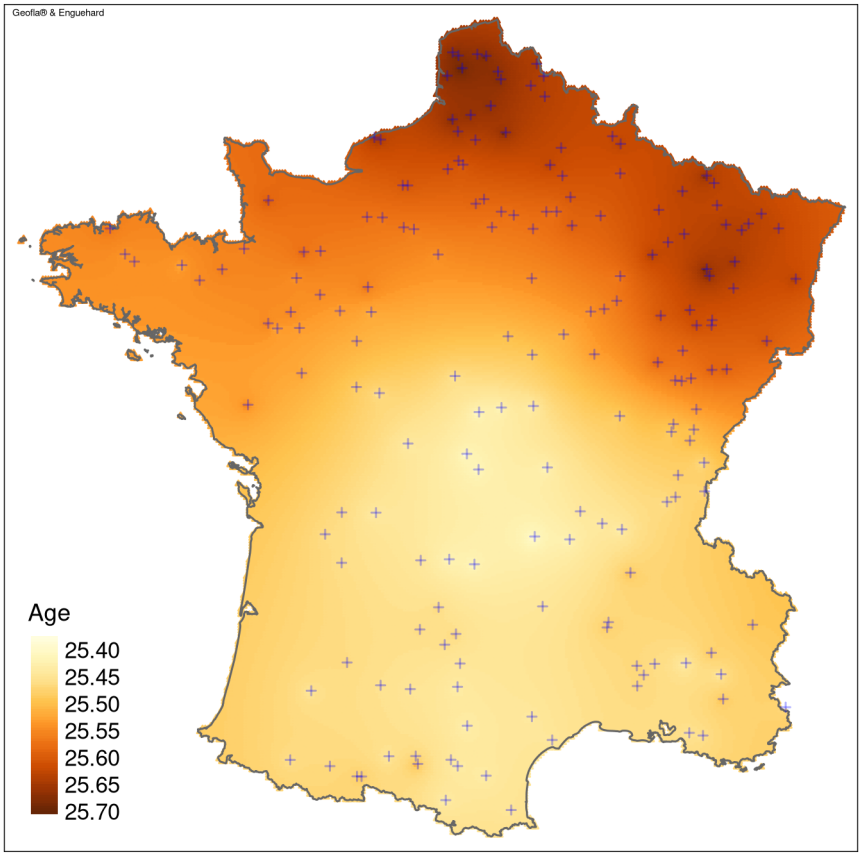
Map C.4: *Regional division used for the anonymous part of the Henry survey.*

Note: In Appendix Figure 19, regions Center East and East brought together into East, and Center West and Center into Center.
Source: Séguy (2001, p. 94).



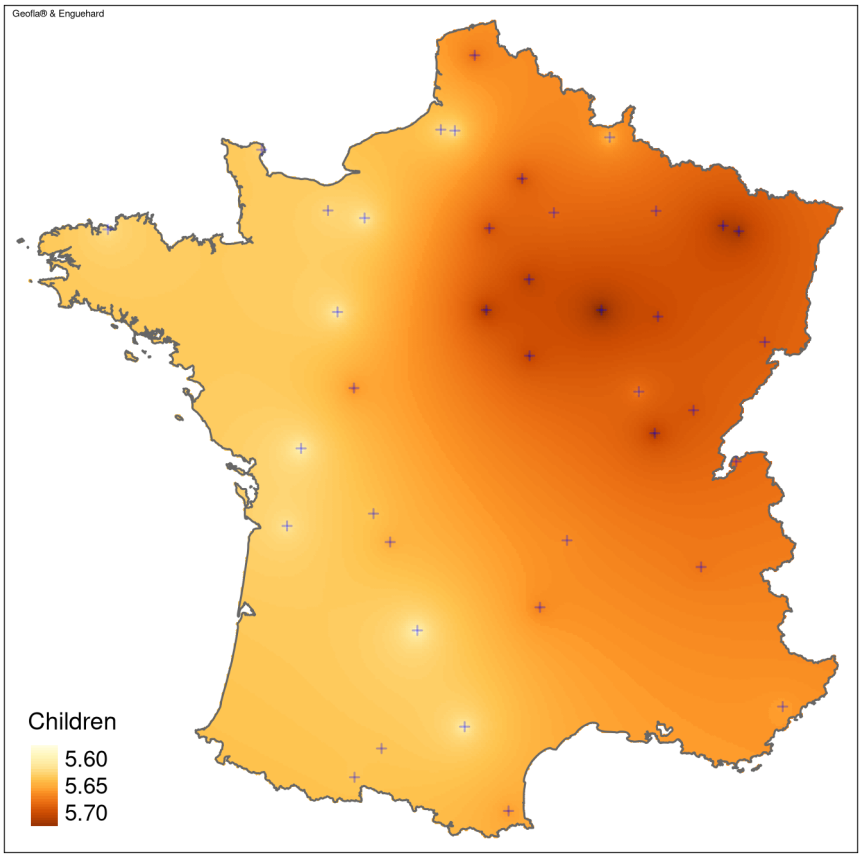
MAP C.5: *Mean age of men at first marriage in rural France, interpolated by inverse distance weighting (1740-1789).*

Notes: Inverse distance weighting power = 0.2. Blue dots are the villages of the sample. Villages with too few observations are dropped and villages closer than 5km to each other are brought together. Since village means are based on few observations and thus the variance across villages is very high, this has to be compensated by increased averaging, hence the small range of values for age.
Source: Henry survey, database in Séguy (2001).



MAP C.6: *Mean age of women at first marriage in rural France, interpolated by inverse distance weighting (1740-1789).*

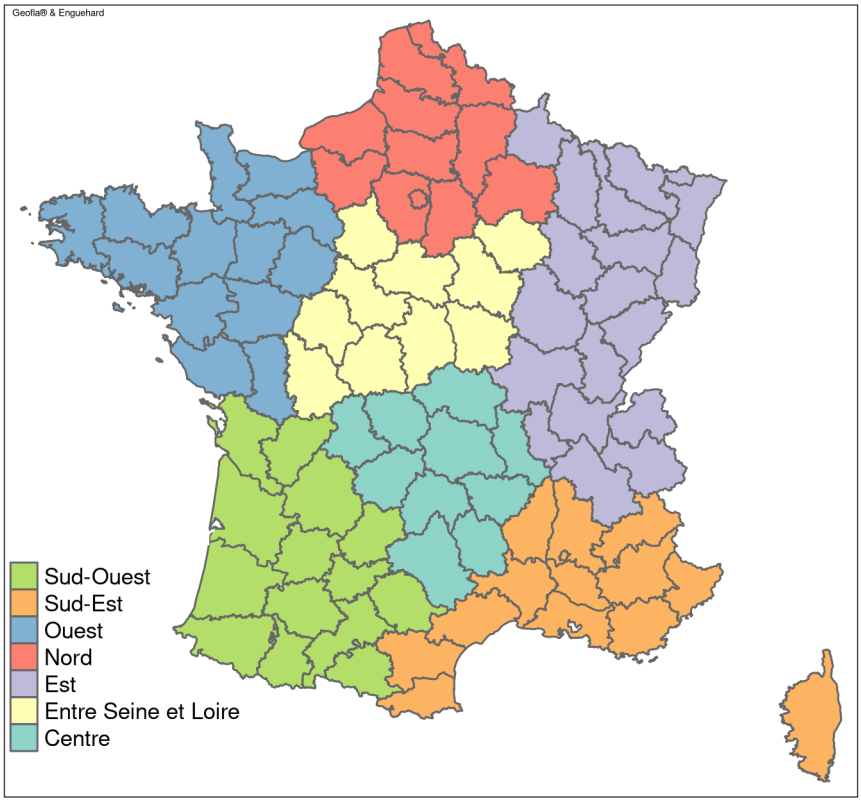
Notes: Inverse distance weighting power = 0.2. See notes of Figure C.5.
Source: Henry survey, database in Séguy (2001).



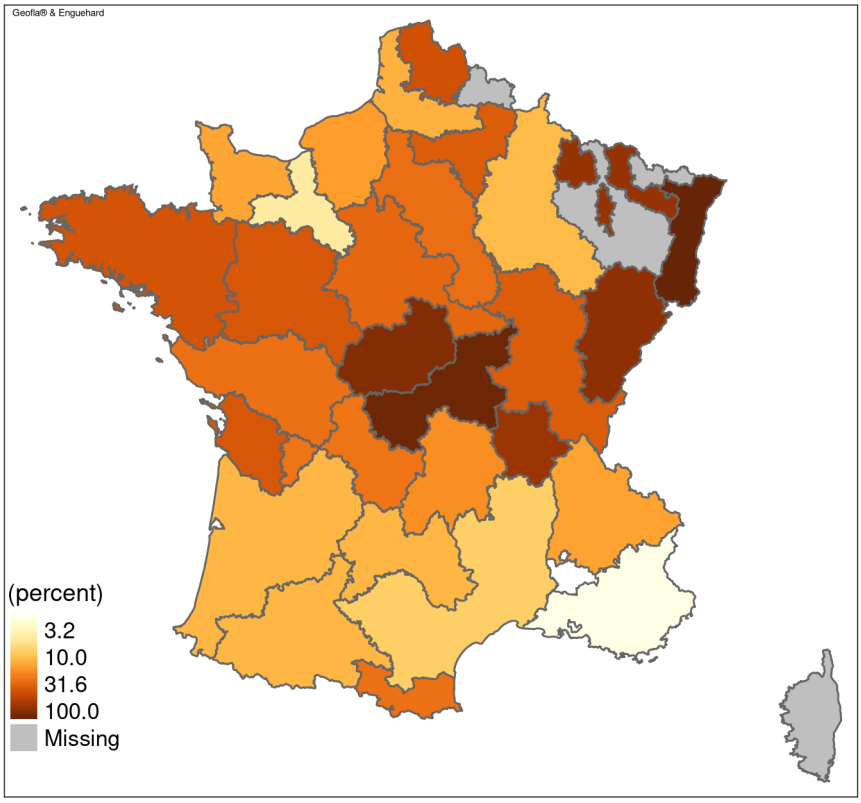
Map C.7: *Variations of marital fertility rural France, interpolated by inverse distance weighting (1670-1789).*

Notes: Inverse distance weighting power = 0.2. The proxy for marital fertility is the average number of children among marriages observed more than 15 years, which were the wife's first marriage and for which the wife's age at death is at least 45 yo. The number of such marriages in the sample until 1789 is 5498. See also notes of Figure C.5.
Source: Henry survey, database in Séguy (2001).

C.2 Population

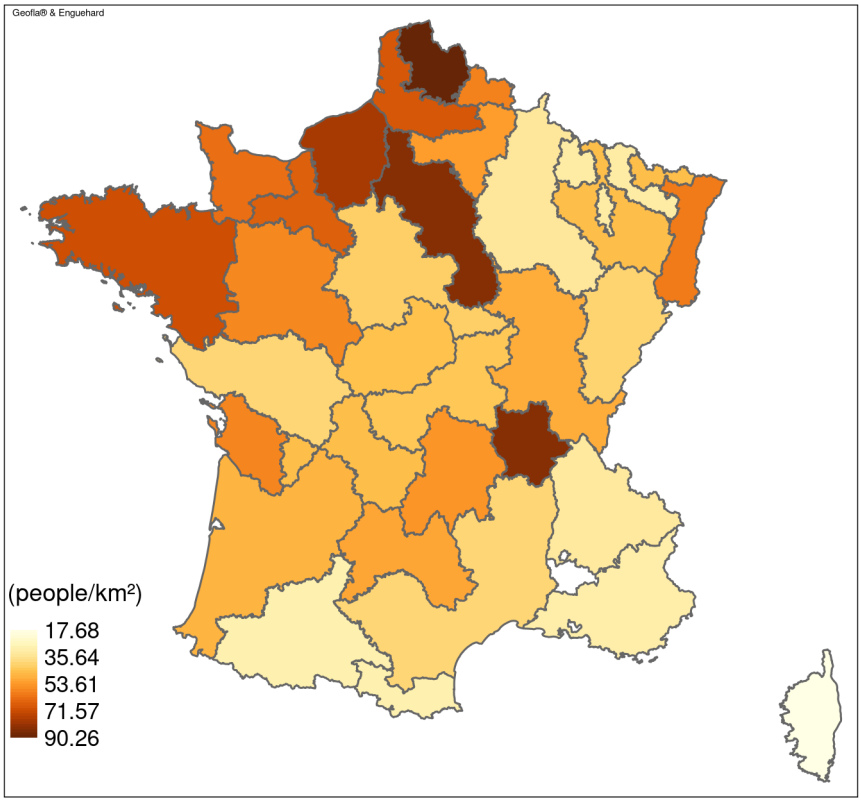


MAP C.8: *Regions from Lachiver, 1991 (p. 481)*



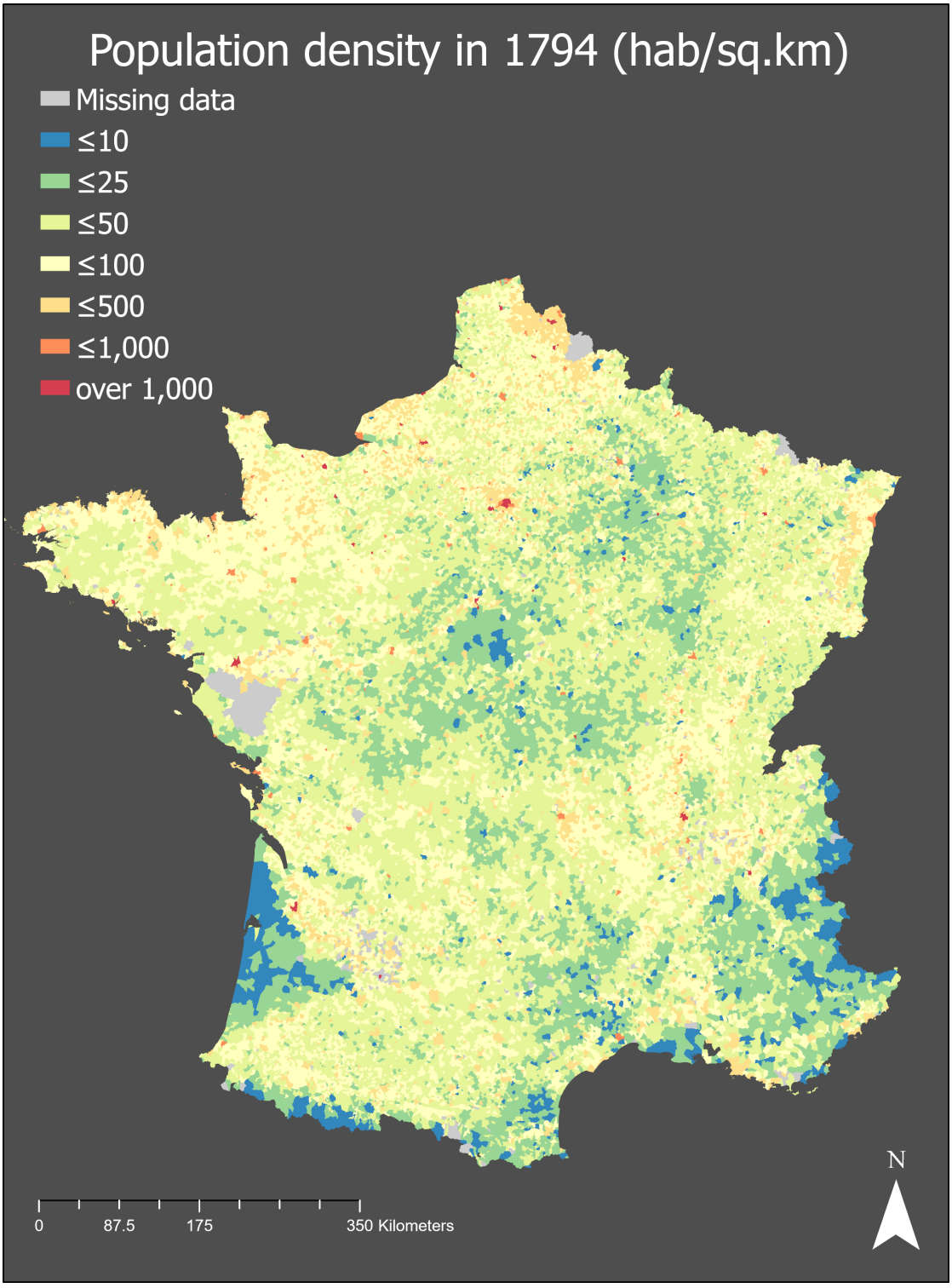
MAP C.9: *Population growth by généralité between 1699 and 1783.*

Note: The map of *généralités* is an approximation based on current *arrondissements* (department districts).
Source: Based on Dupâquier and Lepetit (1988); see section 1.1.5 for the correction used.

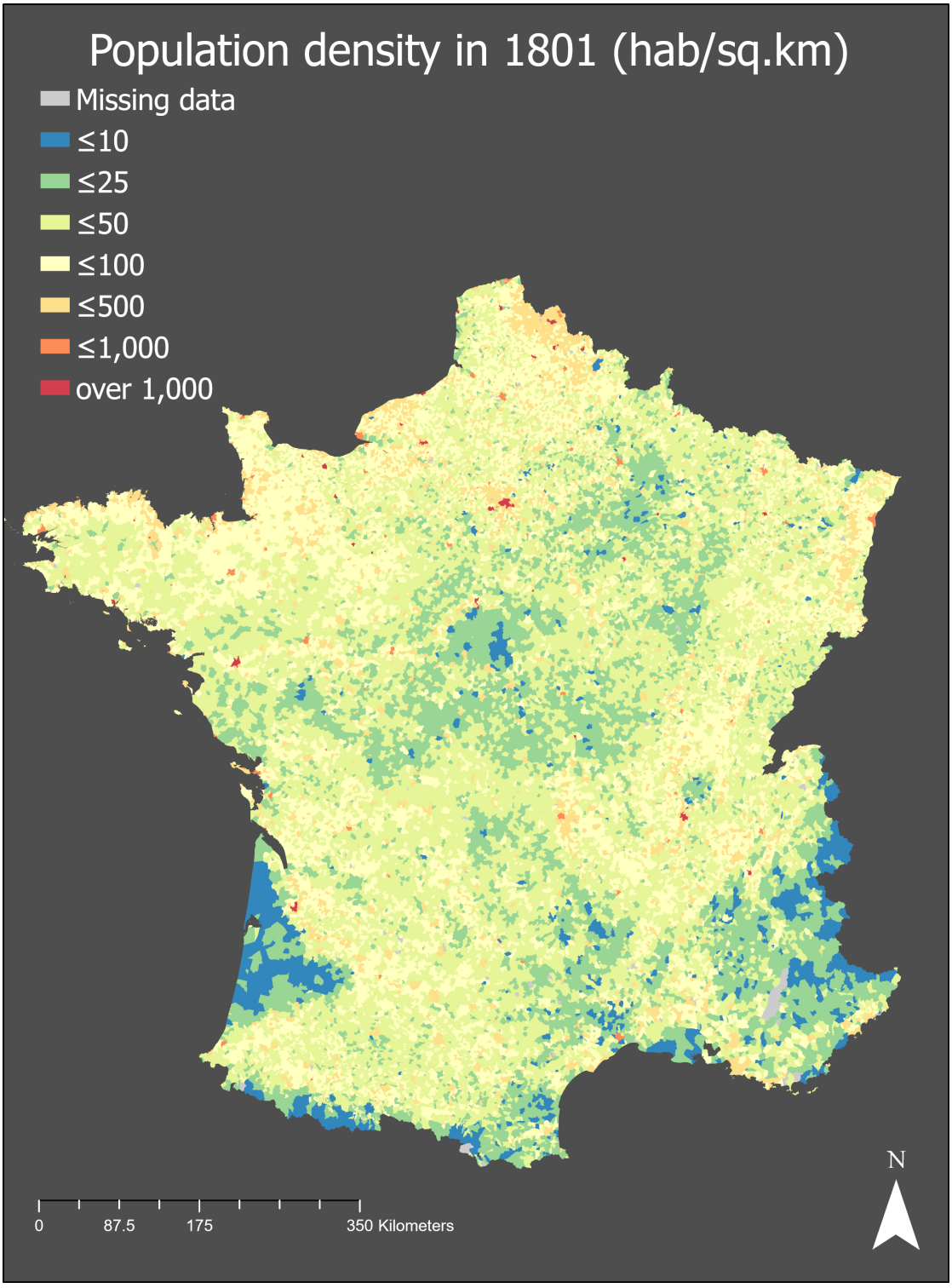


Map C.10: *Population density by généralité, 1778-1787.*

Note: The map of *généralités* is an approximation based on current *arrondissements* (department districts).
Source: Dupâquier and Lepetit (1988)

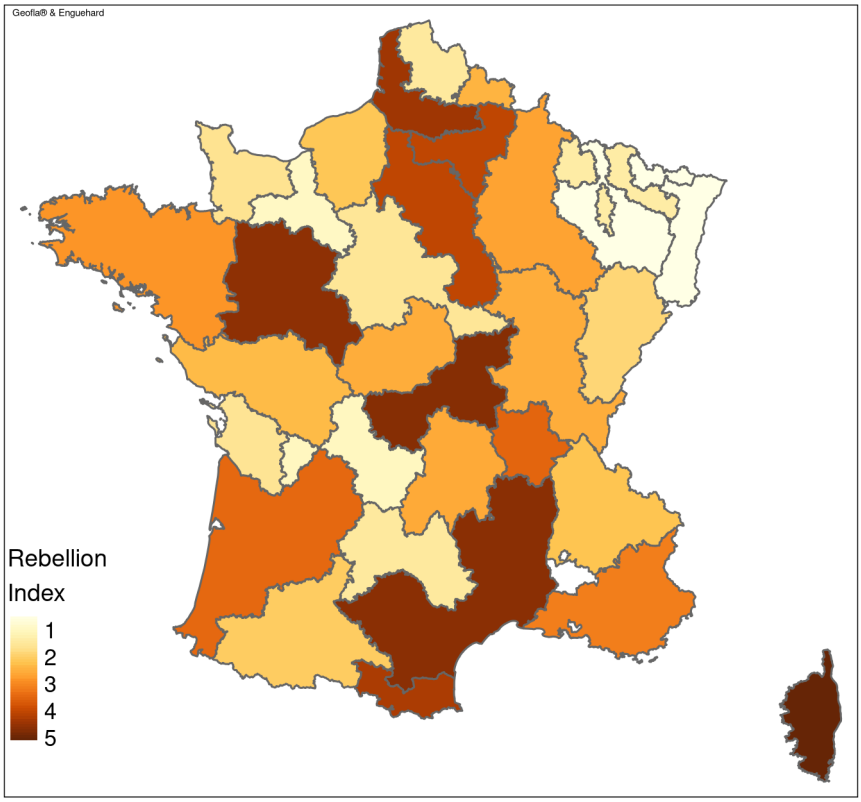


Map C.11: *Population density at the communal level, 1794.* French Historical GIS, 1700-2020. Administrative units, Populations, Transports, Economy. *(forthcoming 2023)* DOI: *10.5281/zenodo.3727274*



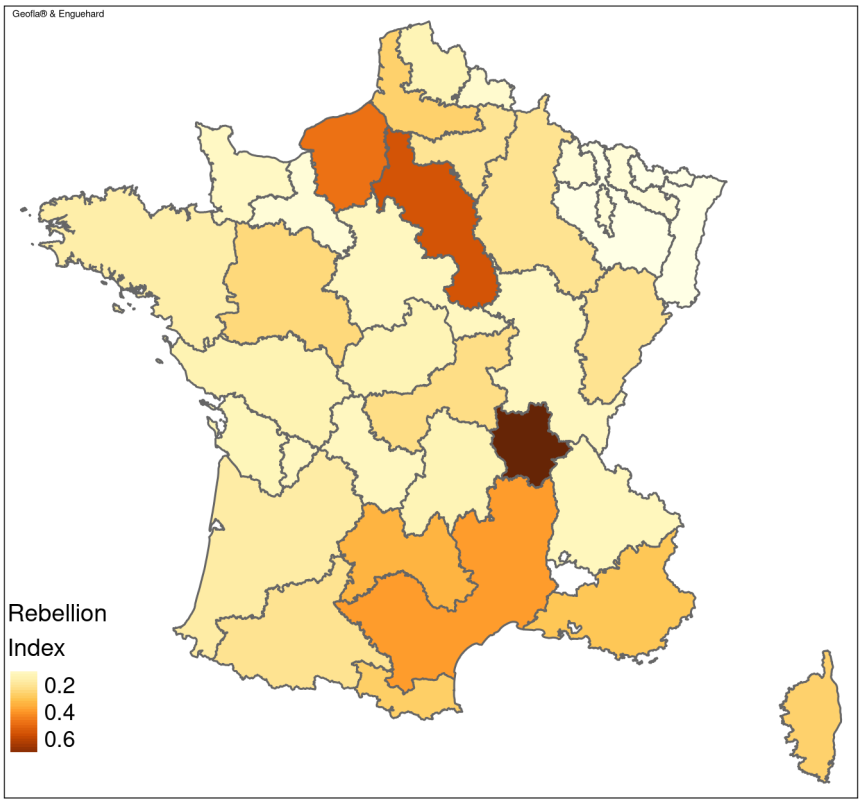
Map C.12: *Population density at the communal level, 1801.* French Historical GIS, 1700-2020. Administrative units, Populations, Transports, Economy. *(forthcoming 2023)* DOI: *10.5281/zenodo.3727274*

C.3 Rebellion



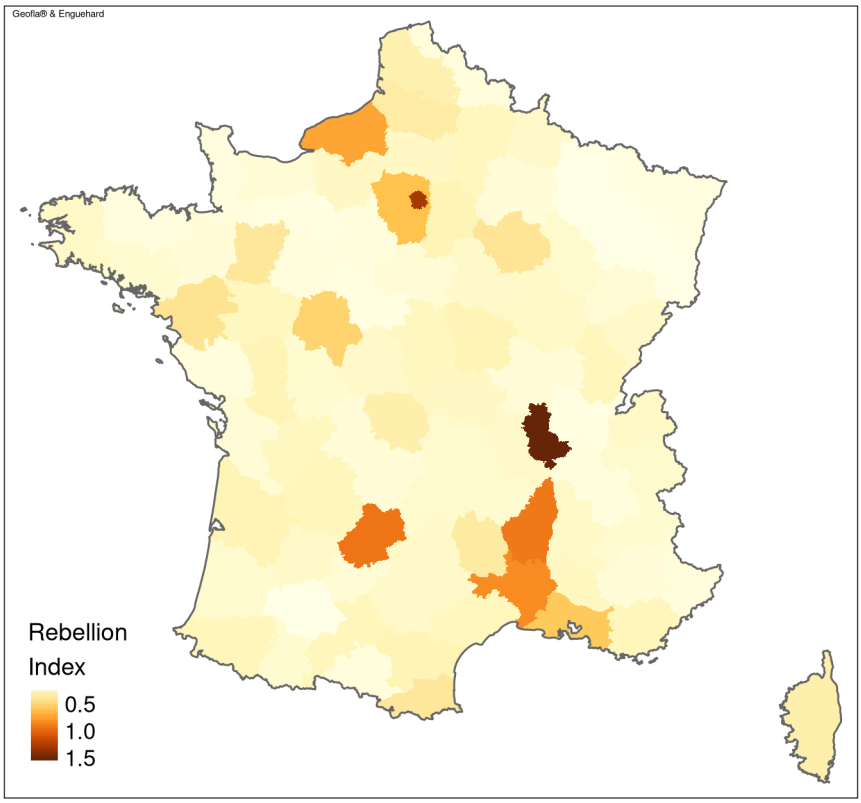
Map C.13: *Mean annual number of émotions populaires recorded within present French borders per million inhabitants, by généralité.*

Sources: Chambru (2019), based on Nicolas (2002), and section 1.1.5 for population.



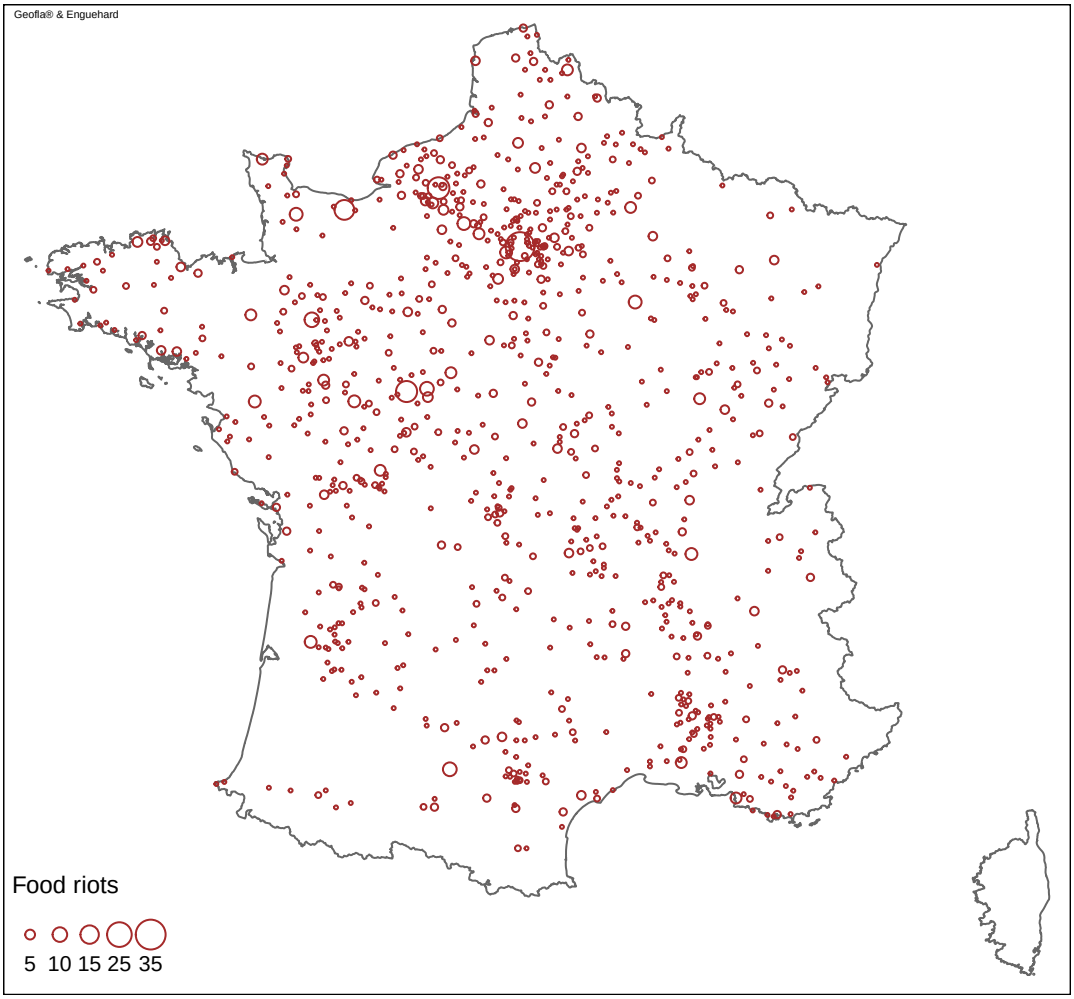
Map C.14: *Size-weighted rebellion index by généralité, 1661-1789.*

Note: Rebellion index is the total number of participants in rebellion per thousand inhabitants per year. Missing sizes are set to 20 (see section 1.2.2).
Sources: Chambru (2019), based on Nicolas (2002), and population series by *généralité* of section 1.1.5.



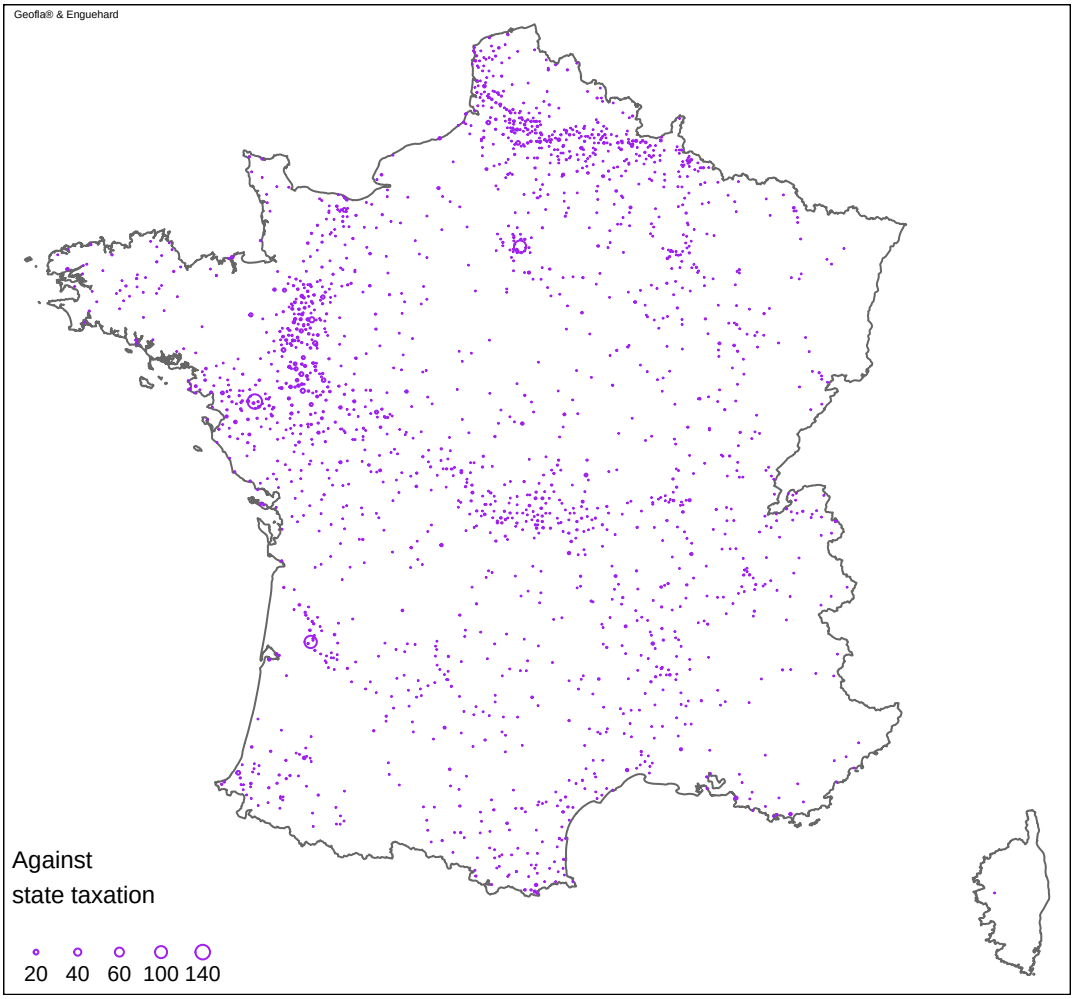
Map C.15: *Size-weighted rebellion index by department, 1661-1789.*

Note: Rebellion index is the total number of participants in rebellion per thousand inhabitants per year. Missing sizes are set to 20 (see section 1.2.2).
Sources: Chambru (2019), based on Nicolas (2002), and population series by department of section 1.1.5.



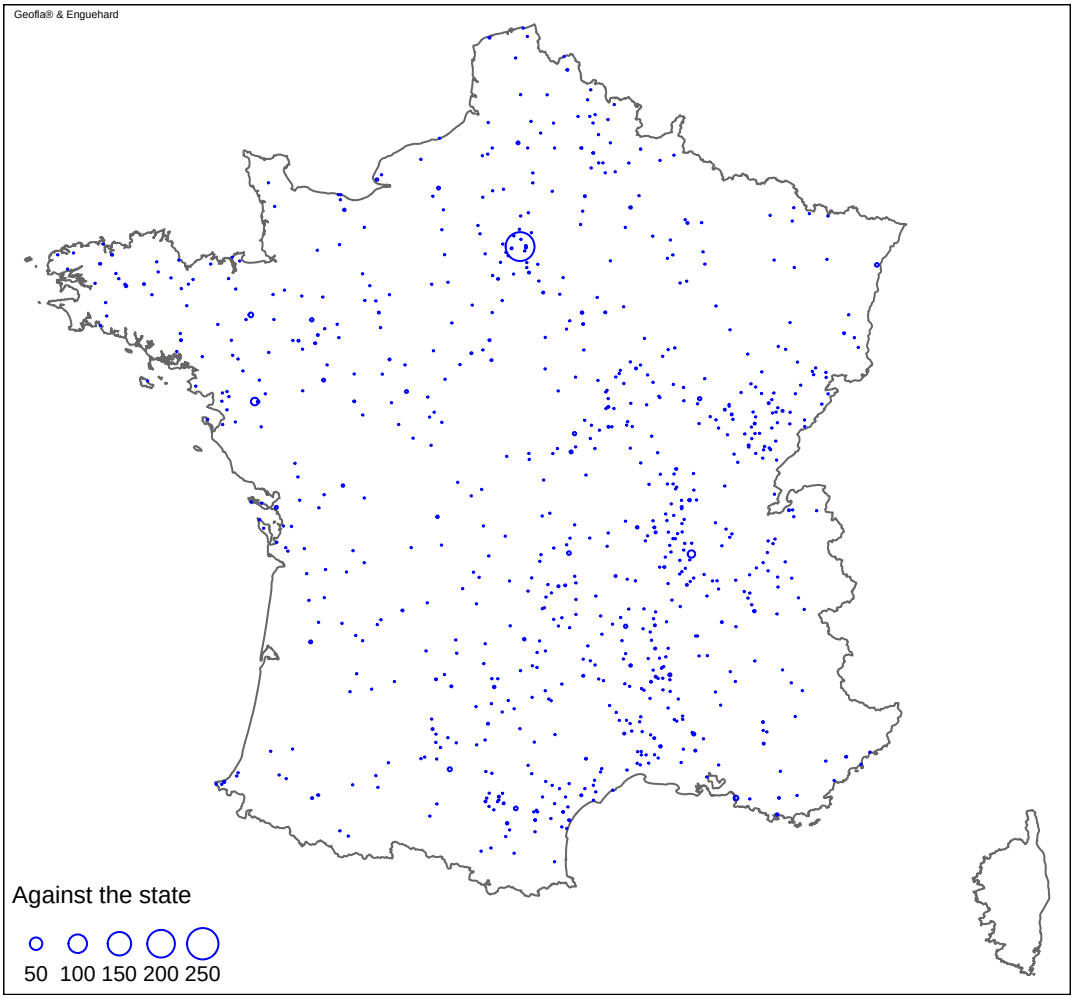
Map C.16: *Map of food riots, 1660-1789.*

Source: Chambru (2019) and Nicolas (2002).



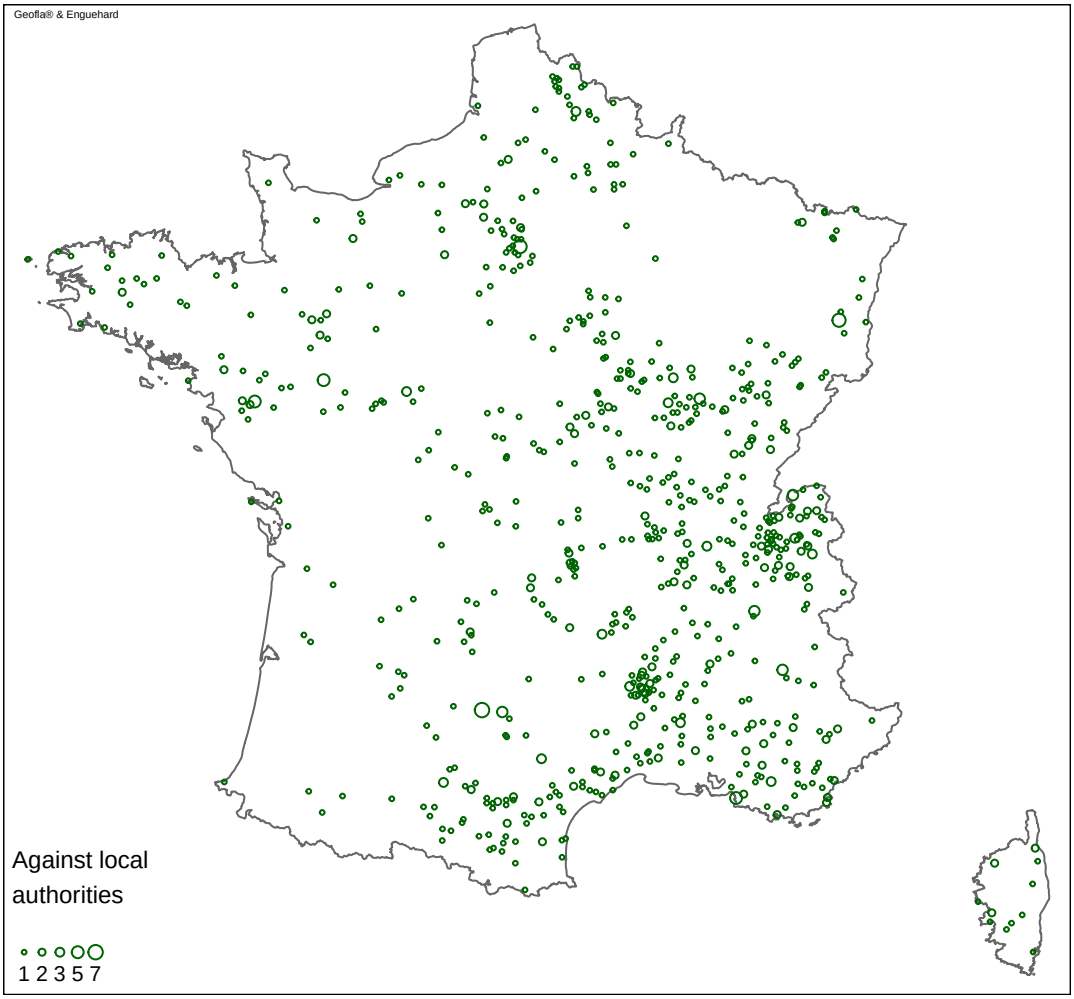
Map C.17: *Map of rebellions against state taxation, 1660-1789.*

Source: Chambru (2019) and Nicolas (2002).



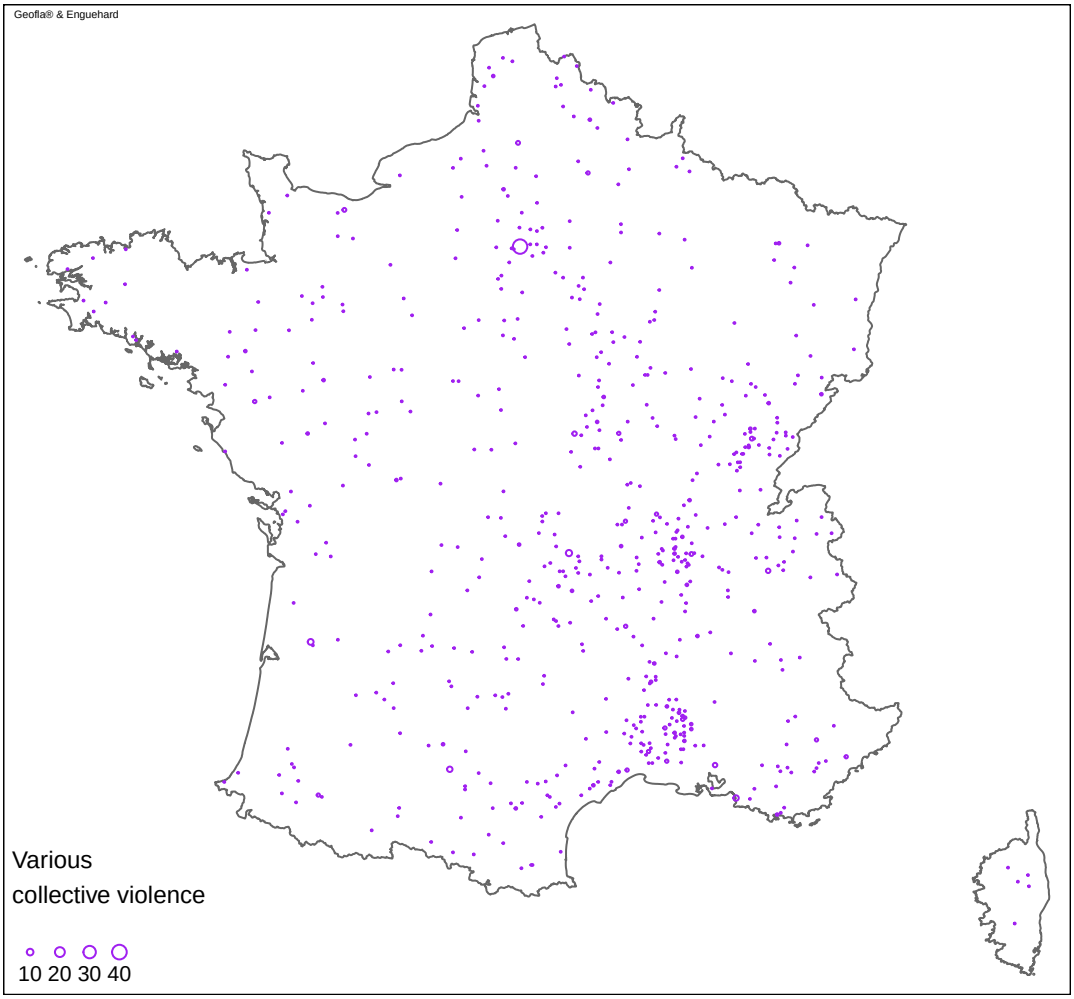
Map C.18: *Map of rebellions against state authority, 1660-1789.*

Source: Chambru (2019) and Nicolas (2002).



Map C.19: *Map of rebellions against local authorities, 1660-1789.*

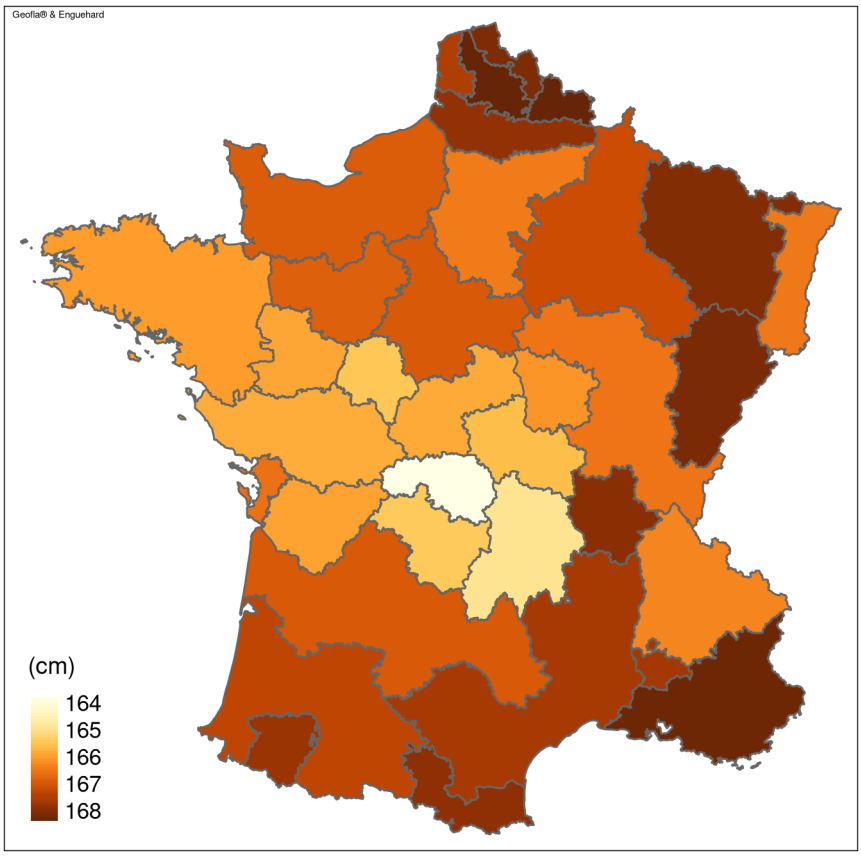
Source: Chambru (2019) and Nicolas (2002).



Map C.20: *Map of various collective violence, 1660-1789.*

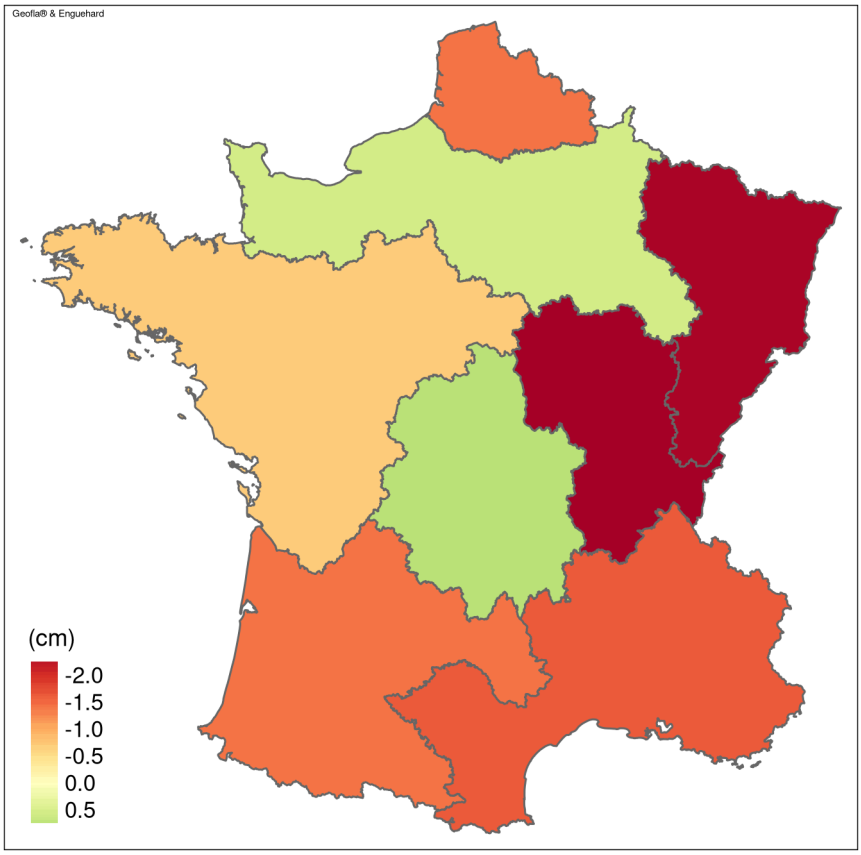
Source: Chambru (2019) and Nicolas (2002).

C.4 Anthropometrics



Map C.21: *Height of adult French men by province, 1660-1770.*

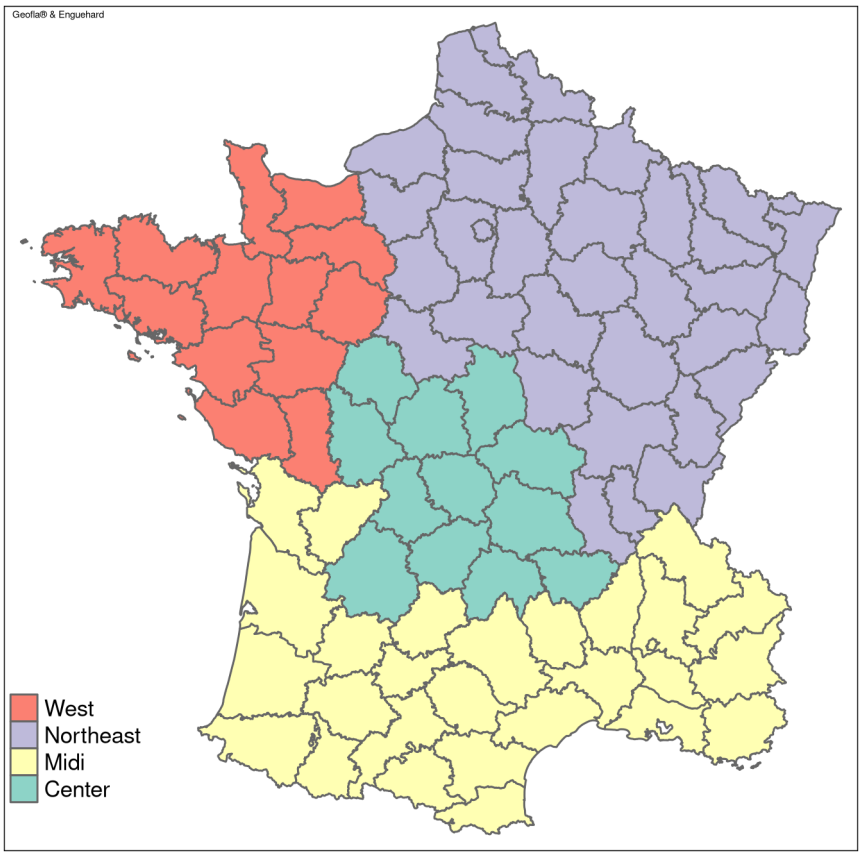
Notes: See Appendix Table A.3. The map of provinces is an approximation based on present *arrondissements* (department districts).



MAP C.22: *Height increase of adult French men between 1740-1749 and 1750-1763, by region.*

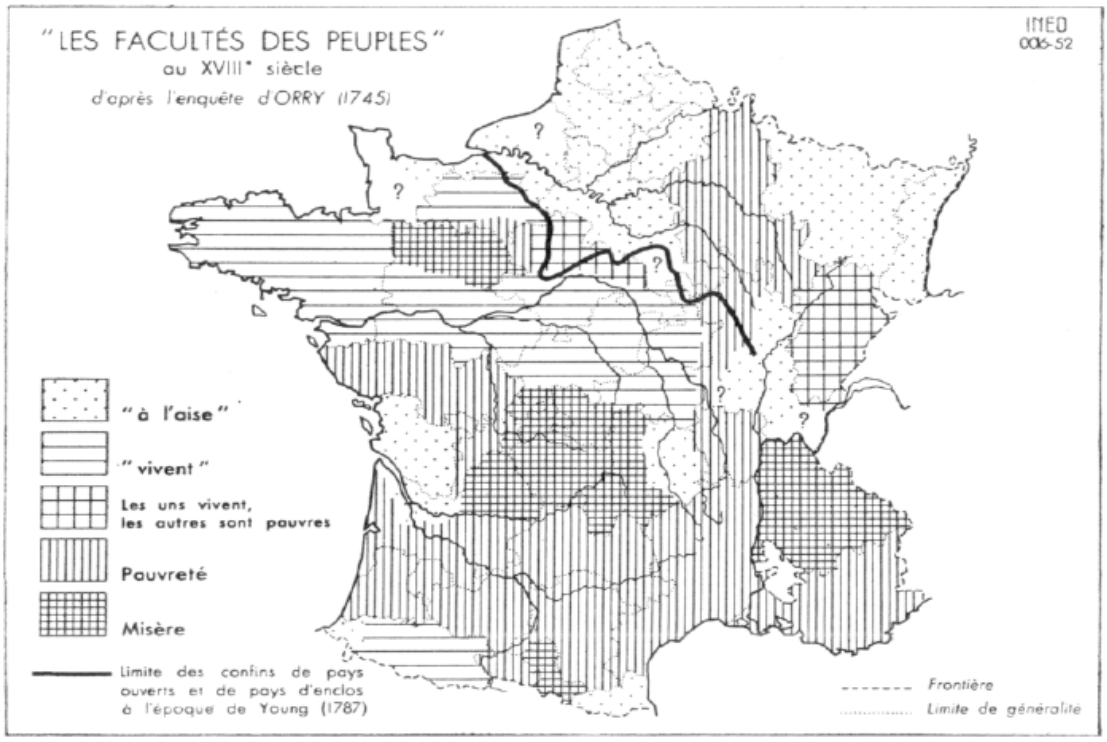
Notes: See Appendix Table 2.

C.5 Regional patterns



Map C.23: *Regional social orders according to Brustein.*

Source: Brustein (1986, p. 147).



Map C.24: *Regional welfare according to Orry (1745).*

Source: Dainville (1952, p. 59).

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