Where have (almost) all the wealthy gone? Spatial decomposition of wealth trends in France, 1820-1939

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Summary – *This paper examines the evolution of wealth distribution in France during the urbanization process of the nineteenth century, based on a comprehensive dataset of individual inheritances. It presents a spatial decomposition between rural and urban areas, distinguishing Paris from other cities. We use a non-parametric approach based on wealth density functions. Changes in the level of wealth explained most of the spatial evolution of wealth during 1820-1939; at the turn of the century however, the effect of urbanization on wealth distribution increased gradually.*

Keywords: *wealth distribution, decomposition, semi-parametric and nonparametric methods*

Où vont les richesses ? Décomposition spatiale des patrimoines en France, 1820-1939

Résumé – Cet article analyse l'évolution de la distribution de la richesse en France durant le processus d'urbanisation entre 1820 et 1939, à partir d'une base de données individuelles de successions. Nous explorons la dimension géographique de l'évolution de la répartition des patrimoines en distinguant Paris, les autres villes et les territoires ruraux. Nous utilisons des techniques de décompositions non paramétriques et de micro-simulations pour mesurer l'importance de la croissance économique et de l'urbanisation dans l'accumulation du patrimoine. Les changements dans le niveau de richesse expliquent une grande part de l'évolution de la répartition de la richesse pendant toute la période entre 1830 et 1939, tandis que l'effet de l'urbanisation sur la distribution du patrimoine augmente à la fin du 19e siècle.

Mots-clés : répartition du patrimoine, décomposition, méthodes semi-paramétriques et non paramétriques

1. Introduction

The period between the early nineteenth century and the Second World War was one of considerable structural changes in France. Once rural and mainly agricultural, it progressively turned into an industrial and urbanized country. While less than one fifth of the population lived in towns around 1800, more than one half did in the 1930s. This paper studies changes in private wealth distribution that paralleled these structural changes, with a focus on geographical differences, between rural and urban areas, and among the latter, between Paris and other cities.

The evolution of income distribution during the process of development from an agricultural economy to an industrial one has been modeled in the dual framework of A.W. Lewis (1954). In that framework, Kuznets (1955) conjectured that a rise in the proportion of individuals employed at a higher wage in the modern sector would lead first to rising and then to falling overall inequality (the so-called Kuznets 'inverted-U' curve). Key assumptions related on the proportion of individuals employed in each sector, the degree of inequality within sectors, and the difference between the mean incomes across sectors.

Extending Kuznet's conjecture to wealth distribution is not straightforward. Indeed, as a first approximation, the evolution of wealth should be similar to that of income, perhaps with a time lag (since wealth could be considered as a stock resulting from accumulated flows of income). However, wealth can also be independent from income for various reasons. First, a large part of wealth is inherited and depends therefore not only on one's own life-cycle earnings. Next, specific shocks might affect wealth more than income, such as inflation leading to differentiated valuation of assets or war destructions. Moreover, wealth is more concentrated than income. The top of the distribution owns most of the total amount of wealth. Thus, usual indicators such as means are sensitive to what happens at extreme levels, which might be not representative of other parts of the wealth distribution. This caveat extends to scalar inequality indices based on means. At the other end, people might earn a living without detaining any assets. Actually, according to the dataset used in this paper, only around one half of the population owned wealth. More precisely, the share of individuals leaving an inheritance decreased over time: as high as 68% of all decedents in 1820-47, it dropped to 54% in 1919-39 (Bourdieu *et al.*, 2003). These zero values must be taken into account, the more so because their evolution over time could be related to the same structural changes that affected the amounts of wealth.

Despite these difficulties, a small number of case studies have nevertheless examined the long-run evolution of the wealth distribution during the process of development. In the United States, after a relatively egalitarian colonial era, wealth inequality increased and then decreased in three steps, during the Civil War (for Southern inequality), during WWI and, most of all, after 1929 (Williamson and Lindert, 1980). For Britain, Atkinson and Harrison (1978) have also found falling wealth inequality after WWI. Using Swedish data for the period 1873-2005, Roine and Waldenström (2007) showed that wealth concentration was already high in the agrarian state; an increase in wealth concentration occurred during industrialization

but it was small and limited to the top percentile. These studies however leave aside the problem of the zero wealth.

In the case of France, Daumard (1973) studied estates in five cities (Paris, Lille, Lyon, Bordeaux and Toulouse) at three points in time over the period 1815-1914. She showed that, overall, the amounts of wealth increased and the five cities studied by Daumard did not evolve in the same way. Lille seemed to have benefited most from industrialization in terms of capital accumulation, and Toulouse the least. In Paris, the wealthiest of all French lived side by side with those in extreme poverty. Another recent paper sheds light on the long-run evolution of the top percentile of wealth holders in France (Piketty *et al.*, 2006). Wealth concentration increased during the nineteenth century up until WWI, driven by large industrial and financial estates: the share of total wealth held by the richest percentile of the population grew from 43.4% in 1807 to 54.9% in 1914. The rise in inequality did not slow down after 1870, especially in Paris. The decline after WWI was abrupt and mostly driven by exogenous shocks.

This paper studies the spatial distribution of wealth in the nineteenth century and first half of the twentieth century. We depart from previous studies in three ways. First, we consider not only wealth owners but also those who do not leave any inheritance. Second, we control for the influence of extreme values on means. We choose the rather drastic option of getting rid of the top percentile. Indeed, the trajectory of the top percentile does not necessarily reflect what happened to the great majority of the French population. The weight of the top percentile in the total amount of wealth crushes and masks events at more modest but perhaps more representative wealth levels: those of ordinary people. Third, we go beyond summary indices such as means or scalar indices of inequality. We use a non parametric decomposition approach in order to estimate the role of urbanization and the rural-urban wealth gap in explaining changes in the wealth distribution.

Our method follows the line of Jenkins and Van Kerm (2005) adapted for wealth as in Jenkins and Jäntti (2005). Contrary to the latter, we do not encounter the problem of negative wealth, as the definition used in this paper is gross assets, in estates registered for fiscal purpose. Changes in the density function of wealth are decomposed in two elements, one that accounts for changes in the amounts of wealth and another element that accounts for changes in the spatial structure of the population. The latter element actually represents both urbanization process and the fact that the share of wealth owners did not evolve in the same way in rural and urban areas. Changes in the amount of wealth, in turn, are also decomposed between changes in the mean wealths (the rural/urban wealth gap) and changes in the form of the distribution. The size of each element is measured by a summary index and is compared, between them and over time.

Our results suggest that changes in wealth distribution in France were dominated during the nineteenth century by the change in the number of asset owners (decreasing over time) and the rural/urban wealth gap. The period between the end of nineteenth century and WWII saw a growing importance of urbanization and changes in the shape of the distribution. Wealth ownership increased in Paris, but not enough to

overcome the general drop observed in other areas. Putting together the evolution of wealth owners and those leaving no inheritance, our results suggest a polarization of French society in the long run.

The structure of the paper is as follows. The next section presents the dataset used. Section 3 describes our non-parametric decomposition of changes in the wealth distribution, which allows for a broad-brush identification of the relevant sources of distributional trends. Section 4 analyses the spatial decomposition of wealth distribution in France from 1820 to 1939 and discusses the contribution of the different factors in the observed changes in the distribution of wealth. The last section concludes.

2. Data and definitions

The data set comes from the TRA-wealth survey, based on French estate tax returns (Bourdieu *et al.*, 2003). Since 1791, the French tax administration has collected the total amounts of wealth of all decedents for nearly all types of property and at any level of wealth. When originally set up, a random selection was made by sampling individuals whose family name started with the letters "TRA". This unique survey is known to give a reliable picture of the national distribution of wealth within the general population, although it is ill-suited for the study of the super-rich (see Bourdieu *et al.*, 2004; and Piketty *et al.*, 2006). The sample includes 41,489 adult individuals, over 20 years old when they died, in the period between 1820 and 1939. The variable used as an indicator of wealth is gross assets at death, deflated by a national cost of living index (all results are expressed in 2007 Euros) [1].

In the following, the century and a half under survey has been divided into 5 sub-periods, omitting WWI. The first period, 1820-1847, is characterized by slow economic growth during the Restoration, before a deep crisis on the eve of the Second Republic. The second period, 1848-1869, covers two decades of marked industrialization during the Second Republic (1848-1851) and the Second Empire. This period of prosperity was interrupted by war, the loss of two rich regions of Eastern France and the Commune in Paris; a long deceleration followed in the third period, 1870-1895. Growth resumed in the fourth period (1895-1914). The last period (1919-1939) is characterized by the ups and downs of the inter-war years. A quarter of the individuals in the dataset belong to the deceleration of 1870-1894, with the rest being equally divided over time.

The original sources of the TRA survey are the "*tables des successions et absences*" (hereafter TSA), and the "*registres de mutations par décès*" (hereafter RMD). Despite the remarkable continuity of these sources from the beginning of the nineteenth century, the degree of detail has evolved over time. First, they progressively took into account new types of assets as they appeared. Second, and more importantly, the way wealth is

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[1] The price index is based on a cost of living index computed by D.R. Weir up to 1913 (Weir, 1991), the corresponding index in Piketty (2001) and INSEE series. We are grateful to D.R. Weir who generously provided us with this series.

reported evolved. For about half of the period under consideration, we can take advantage of the work of the estate tax administration. For every person who died, the administration opened an entry in a first set of volumes (the TSA) and then completed it, either when estate taxes had been paid or when the administration was satisfied that the individual had left no wealth behind. These entries include name, occupation, residence, marital status, age, and, for individuals with wealth, information about heirs and the date at which the declaration was filled out. Up until 1870 the TSA also included a summary of the individual's estate, broken down into moveable wealth and real estate. Hence our data up to the 1860s relies heavily on the TSA. At later dates, wealth information was no longer recorded in the TSA. For these cases, we start from the TSA and, for each entry with a positive but unknown amount of wealth, we turn to a second set of registers (the RMD) where a complete description of the estates appears, and then append this wealth information to the first set of entries gleaned from the TSA. As this matching process is extremely labor intensive, it has not been carried out for the whole sample. Consequently, we have less wealth data in the second half of our period, after 1870.

The lack of readily available information on the precise amount of wealth after 1870 for part of our sample could be a source of bias. There is no straightforward solution to this problem. To counterbalance this effect, we have chosen to reweigh the sample by applying raising factors after 1870 to groups of individuals for whom we know the amount of wealth declared and who share the same characteristics as those for whom we lack wealth information. These groups are defined by time period, region, urban-rural location, age at death and gender [2]. For instance, women living in Paris, who deceased in 1871 at ages 45 to 64 and whose inheritance are known, are deemed to be representative of the sub-group of women aged 45 to 64, who deceased during 1870-94, in Paris and whose wealth is unknown, but known to be different from zero.

Wealth data present specific challenges, compared to more regular income data (Jenkins and Jäntti, 2005). First, wealth is concentrated in the hands of only a few, which means that its distribution exhibits a large spike at the value of zero. Second, even among the lucky few, wealth is highly unequally distributed. This means that wealth distributions are usually right-skewed with extremely long and sparse right-hand tails. Third, wealth distributions suffer from the problem of influential observations with extreme values. In other words, usual moments, such as the mean, are driven by a small number of estates at the very top of the distribution, and are thus imprecisely estimated. The best solution to this problem would have been to include exhaustively the super-rich in our sample, which we cannot do. The typical solution is to trim the data at the very top and perform sensitivity analysis to evaluate the impact of alternative trimmings. This is the strategy we follow in this paper. We trim the data using an exogenous 99th percentile thresholds estimated in Piketty *et al*. (2006), and

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[2] Region is defined by 6 categories: North West, North East and Ile de France, Paris, South East, South West and Other (this includes colonies, "*territoires d'outre-mer*" and foreign countries). Age at death has also been grouped into three broad categories: from 20 to 44 years old, from 45 to 64, and 65 or over (younger individuals are excluded from the sample). Results obtained without weights are available from the authors upon request.

we then carry out sensitivity tests based on the 99th and 95th percentile thresholds found in the original TRA sample (table A1 in the appendix provides basic information about original and final samples for comparison). Leaving out the top percentile is by no means a negligible assumption, because it entails that a far larger share of wealth is neglected and previous work focusing on top fortunes during the same period in France showed that these were closely related to growth and industrialization (Piketty *et al.*, 2006).

To evaluate the consequences of trimming, table 1 provides a hypothetical exhaustive sample made up of our sample complemented by the super-rich picked up in Piketty *et al.* (2004, 2006). Trimming halves the mean wealth values, as the mean estate value of the top one per cent of the distribution is so high. Unsurprisingly, this difference is greatest in Paris, where presumably the majority of the top one per cent are located. The gap deepens over the nineteenth century and decreases after WWI. Table 1 underlines that the world of the super-rich differs strikingly from the world of ordinary people. This is so not only in terms of amounts of wealth but also regarding the timing and the rates of wealth accumulation. While the French super-rich enjoyed their highest increase in mean wealth (by 60%) from 1848-69 to 1870-94, this was the case only later for the rest of the French population (and with a more modest rise of 31%). From now on, between the two worlds of the super-rich and ordinary people, we will focus only on the latter (who still represent 99% of the total population). Our story is one of wealth holders in France, not of wealth per se.

Consistent with previous studies for France (Daumard, 1973; Piketty *et al.*, 2006), we intend to contrast Paris and other cities. Of course, while it might be possible to "locate" precisely the source of income, it is more difficult to "locate" wealth. Real estate is of course by definition, precisely located. But, it may happen that a rural estate is owned by a Noble living elsewhere, in a provincial town or in Paris. The diffusion of financial assets throughout the nineteenth century makes this localization even more complex. The definition we use in the paper is to relate individuals to the area type [3] where they died: rural areas, Paris or other cities (called hereafter "provincial cities" [4]).

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[3] On the rural-urban devide in a historical perspective, see Pirenne (1927), Duby *et al.* (1983), De Vries (1984), Hohenberg (2004).

[4] Here we define as rural (urban) a "commune" (the smallest administrative unit) with fewer (greater) than 5 000 inhabitants. In order to take into account changes in size over time, we use three population censuses, in 1841, 1876 and 1926, and relate each decedent in our sample to the survey of the year closest to her year of death. As a result, around 9 percent of all "communes" shifted from rural to urban during the sample period. As is often the case, Paris is an outlier and all the more so in that the city limits changed over time. For simplicity, we choose a middle of the road solution: for the whole period surveyed, we suppose that Paris is defined by its current boundaries. As a result, early nineteenth century suburbs (incorporated in the city in 1859) are supposed to be "Paris" whereas more distant suburbs are considered as provincial cities.

Table 1. **Mean wealth levels, total population and trimmed population**

	1820-1847	1848-1869	1870-1894	1895-1913	1919-1939
France					
(1) Mean wealth, P99-P100*	594 688	850 333	1 367 163	1 716 274	646 176
(2) Mean wealth, trimmed	6 719	9 247	11 779	15 444	9 019
(3) Mean wealth, total	12 599	17 658	25 333	32 452	15 391
(4) : (2) / (3)	0.53	0.52	0.46	0.48	0.59
Paris					
(1) Mean wealth, P99-P100*	2 340 239	3 808 107	5 959 094	7 992 802	3 286 677
(2) Mean wealth, trimmed	7 061	7 894	11 603	11 184	8 019
(3) Mean wealth, total	30 392	45 896	71 078	91 000	40 805
(4) : (2) / (3)	0.23	0.17	0.16	0.12	0.20

* P99-P100 is the top percentile of the distribution.
Note: in 2007 Euros
Sources: (1) Tables A2 and A3 in Piketty *et al.* (2004). (2) TRA survey trimmed at P99 with Piketty *et al.* (2004) thresholds. (3) TRA survey trimmed for P0-99 and Piketty *et al.* (2006) for P99-100.

3. Accounting for changes in wealth: The decomposition methodology

To overcome the limitation of scalar measures, researchers have explored inequality decompositions in a less parametric framework (see DiNardo *et al.*, 1996; Jenkins and Van Kerm, 2005). In this section, we follow this line of research and appeal to a density function decomposition approach.

Using the additive decomposability property, we can represent the total wealth density function $g_t(y)$ at any date t as the combination of a point mass at value zero capturing the proportion of decedents without wealth plus a certain density function for the asset owners:

$$g_t(y) = \left(1 - \frac{A_t}{N_t}\right) \cdot 0 + \left(\frac{A_t}{N_t}\right) \cdot f_t(y) \tag{1}$$

where A_t / N_t is the share of asset owners in the total population in period t. The wealth density function for asset owners in period t, $f_t(y)$, can again be represented as a weighted sum of the densities for k mutually exclusive subgroups of population (in our case, k = 1, 2, 3, corresponding to rural areas, provincial towns and Paris). Thus, we can write:

$$g_t(y) = \frac{A_t}{N_t} \cdot \sum_{k=1}^{3} \frac{A_t^k}{A_t} \cdot f_t^k(y) = \sum_{k=1}^{3} v_t^k f_t^k(y) \tag{2}$$

where v_t^k is the sample fraction of wealth owners who died in region k at time t (A_t^k) over the total number of decedents (N_t) and f_t^k is the wealth density function of wealth owners in region k in period t.

Changes in the distribution of wealth can be written as the sum of two components. The first represents the part that can be imputed to a change in 'levels', here the **amounts** of wealth that asset owners possess within each region k; this is represented by the regional wealth density functions. We call this the **wealth amount changes among asset owners** noted hereafter $C_D(y)$. The second element represents the part that can be imputed to 'quantities', or **changes in the structure of the population**, $C_P(y)$; the latter represents urbanization, inclusive of the evolution of the regional share of asset owners:

$$\Delta g(y) = \sum_{k=1}^{3} v_{t+1}^{k} \Delta f^{k}(y) + \sum_{k=1}^{3} \Delta v^{k} f_t^{k}(y) = C_D(y) + C_P(y) \tag{3}$$

Borrowing from the literature on income distribution and development, which offers a number of different methods for decomposing distributional changes into a growth component and an inequality component (see, for example, Kakwani, 1993; Datt and Ravallion, 1992), we additionally construct counterfactual distributions based on additive transformations and decompose the change in the wealth density function of each region k, $\Delta f^{k}(y)$ into two components: the change due to a *ceteris paribus* shift in regional means wealth among asset owners (**means effect**), and the change due to a *ceteris paribus* shift in the regional distribution around a constant mean (**pure distribution effect**):

$$\Delta f^{k}(y) = \underbrace{\varphi_t^{k}(y; \overline{y}_{t+1}^{k}) - f_t^{k}(y)}_{\text{means effect}} + \underbrace{f_{t+1}^{k}(y) - \varphi_t^{k}(y; \overline{y}_{t+1}^{k})}_{\text{pure distribution effect}} \tag{4}$$

The first component captures the distribution-neutral enrichment that asset owners in each region experienced over the period. The second component picks up distributional changes around a constant mean which occurred in each region at any point along the wealth line (hence, going beyond a scalar measure of inequality). The aim is to determine, within each region, which of the two components has been more important in explaining observed changes in the wealth distribution.

The change in population structure ($C_P(y)$) can also be decomposed into two terms [5]. We express the share of each region v^{k} as the product of the proportion of individuals in region k (N^{k}/N) by the proportion of asset owners in region k ($s^{k}=A^{k}/N^{k}$). The change in the latter component A^{k}/N^{k} identifies regional movements in the proportion of individuals leaving an estate. The former element N^{k}/N measures the pure urbanization effect (due to changes in location, independent of changes in the number of asset owners by region).

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[5] Our wealth decomposition draws on the one developed by Jenkins and van Kerm (2005). The essential difference between the two is that they add an additional component to the decomposition of changes in wealth amounts, while we include a new decomposition of changes in the population structure.

We now substitute in equation (3) for the structural and wealth changes observed in each region by their respective sub-components. We are thus able to write the changes in the distribution of wealth in France as the sum of four explanatory effects [6]:

$$\Delta g(y) = C_D(y) + C_P(y) = \sum_{k=1}^{3} v_{t+1}^k \left[\varphi_t^k(y; \overline{y}_{t+1}^k) - f_t^k(y) \right]$$

$$+ \sum_{k=1}^{3} v_{t+1}^k \left[f_{t+1}^k(y) - \varphi_t^k(y; \overline{y}_{t+1}^k) \right]$$

$$+ \sum_{k=1}^{3} \Delta\left(\frac{N^k}{N}\right) \cdot \left(\frac{A^k}{N^k}\right)_{t+1} \cdot f_t^k(y) \tag{5}$$

$$+ \sum_{k=1}^{3} \Delta\left(\frac{A^k}{N^k}\right) \cdot \left(\frac{N^k}{N}\right)_t \cdot f_t^k(y)$$

$$= C_M(y) + C_I(y) + C_U(y) + C_S(y)$$

where the first two components capture changes in the levels of wealth: $C_M(y)$ the **regional means effect** for France and $C_I(y)$ the **intra-regional pure distribution effect** for France. As noted above, the last two components capture respectively the **pure urbanization process** of the French population (holding everything else constant), $C_U(y)$, and the regional change in the share of asset owners in France, $C_S(y)$. Note that the **regional means effect** for France $C_M(y)$ takes into account not only the common global enrichment enjoyed by all regions (the French **mean wealth effect**), but also the fact that actual wealth growth rates varied from one region to another (the changes in the urban/rural wealth gaps).

4. The spatial decomposition of wealth distribution in France from 1820-48 to 1919-39

4.1. The wealth density function

Figure 1 plots kernel density estimates of the wealth distribution for France and by location in 1820-1847, 1870-1894 and 1919-1939 (the horizontal axis is on a logarithmic scale, though intermediate values in 2007 Euros are also given to ease interpretation). A tabulation of the data by wealth ranges is also presented in table A2 of the appendix.

The kernel function in France moves progressively to the right between 1820-1847 and 1919-1939, especially for the bottom part of the wealth distribution, as well

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[6] This type of nonparametric decomposition is essentially an accounting exercise carried out by generating appropriate counterfactual distributions, and is not insensitive to the year taken as the reference point in the weighting procedure (either base year or final year values). We present the methodology with the choice of aggregation weights that correspond to the results shown in the paper, that is, final year values for v and initial year values for f^k, but the robustness of our main conclusions to different weighting choices has been tested and is discussed below. Results for the different combinations of weights are available from the authors upon request.

Figure 1. Wealth distribution in France and by location
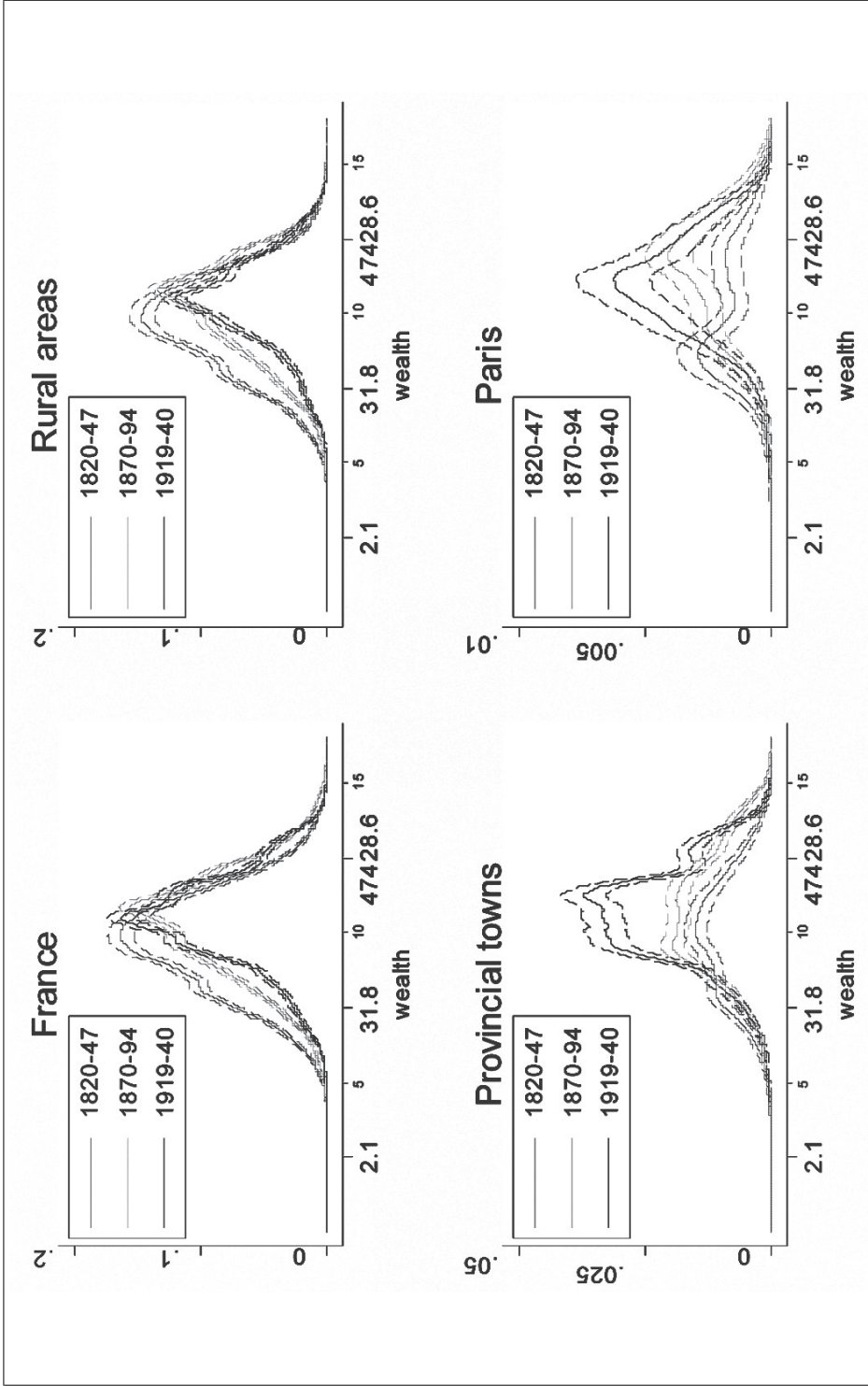
as some (but not all) of the upper quantiles. It is clear that, because the majority of our sample is rural (80% in 1820-48, and still 57% in 1919-40) the curve for all of France resembles that for the rural areas, especially in the initial period. Nevertheless, the curves for Paris and the provincial cities are higher in the final period, showing the growing role of cities in wealth distribution. Figure 1 shows that there was not only a broad enrichment of asset owners in France (despite the fact that we compare our initial period with the situation after WWI and its devastating effects), but, more interestingly, the actual **shapes** of the distribution functions changed, particularly in provincial towns and in Paris. Here, we see a hollowing out of the low and high ends of the asset distribution towards intermediate levels, up to the point that, in the case of Paris, we actually pass from a bi-modal to a unimodal distribution. In Piketty *et al.* (2006) the super-rich (the top percentile) experienced falls in wealth shares after WWI. In figure 1 we see that such movements at the higher end of the distribution were also shared at more ordinary levels of wealth (on our trimmed sample), especially in Paris, and (although less so) in provincial towns. Note also that the "missing part" of the story, absent from figure 1, is the number of decedents without assets in France, which rose from about 31% in 1820-47 to about 46% in 1919-39 (see table 2). Putting these individuals back into the picture, the kernel curve for France shows a polarization between an increasing mass at zero wealth and a process of mass concentration at around 6 400 Euros in rural areas and at 13 000 Euros in urban zones.

4.2. The elements of decomposition

Before describing the *ceteris paribus* contribution of each term of our decomposition to wealth distribution changes, we will describe the actual evolution of each term of interest over time. Let us start by the historical process of urbanization of the French population (see table 2). Between 1820 and 1847, 80% of the French population died in rural areas. Between 1919 and 1939, 57% of the population was still rural. Thus, there was a slow, but constant migration to provincial towns and to the capital. Paris' share in the total population reached 8 percent at the end of the nineteenth century and stayed at this level thereafter.

Next, let us look at the second factor of the change in the structure of population, that is, the share of asset owners by region. As said above, asset owners are defined as decedents who left a positive estate, no matter how small the actual quantity. Table 2 suggests three important findings. First, there is a strong discrepancy between geographical areas. In 1820-1847, most rural decedents held some wealth (74% on average). On the contrary, the majority of urban decedents left nothing behind (while about half of the population left nothing behind in provincial towns, this proportion climbed up to a striking figure of 70% in Paris). This ranking was maintained over the century. The greater share of asset owners in the countryside is due to real estate and dates back to the "*Ancien Régime*". It was enhanced both by Revolutionary redistribution [7] and by the rural development throughout the nineteenth century of agricultural and non-agricultural activities, such as handicrafts, cottage industries and

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[7] See Bodinier and Teyssier (2000)

Table 2. **Trends in population shares**

	1820-1847	1848-1869	1870-1894	1895-1913	1919-1939
France					
Total population	7 577	7 878	10 687	7 419	7 923
Share of asset owners	68.2%	66.5%	60.6%	56.3%	53.8%
Rural areas					
Population share	80.0%	75.5%	67.5%	64.1%	57.6%
Share of asset owners	73.8%	74.9%	71.8%	68.1%	64.4%
Paris					
Population share	4.5%	6.0%	8.2%	8.2%	8.2%
Share of asset owners	30.4%	24.5%	22.6%	22.5%	29.4%
Provincial towns					
Population share	15.5%	18.5%	24.3%	27.7%	34.2%
Share of asset owners	50.1%	45.7%	42.4%	39.0%	41.8%

Source: Trimmed TRA survey

the public sector. In the countryside, it was easy to buy a piece of land, because there was no downward limit on the size of parcel holdings. On the contrary, in large cities like Paris, it was only possible to own whole buildings (Rosenthal, 2002). Thus, the fixed cost of real-estate ownership was very high in cities. Moreover, it was profitable for farmers to own part of their land, while in most other activities workers could not own their means of production. Last, in the countryside, owning even a tiny parcel would entitle the owner to participate in local activities or obtain access to local poor relief and credit in bad times.

Second, the share of decedents who left an estate fell sharply from 68% to 54% between 1820 and 1939. This confirms a stylized fact, which was established, and tested for robustness and significance, in a previous paper (Bourdieu *et al.*, 2003), where this decline in the number of wealth owners was shown to be homogeneous with respect to gender, age group and professional status.

Third, the fall in the proportion of population owning assets was general throughout France, with one exception. Between 1820-47 and 1919-39 the share of asset owners in rural areas and in provincial towns dropped by 9.4 and 8.4 percentage points respectively. In Paris however, the fall was smaller, at only 1.4 percentage points. In fact, the percentage of asset owners in Paris is similar in the first and last time periods, showing a U-shaped pattern over time: it fell by 8 percentage points between 1820-1847 and 1870-1913, before increasing by 7 percentage points after WWI.

It is of interest to note that rural-urban migration cannot explain this secular decrease in asset owners, since the drop is observed both in rural areas and cities. Moreover, if the probability of asset-holding was higher in rural areas than in cities, why did people (and not necessarily the more devoid of) migrate to cities? Two arguments can be brought up. First, there was a general change in the role of wealth-holding in society: with the rise of wage earners, salaried employees, and the public sector, not only in cities but also in the countryside, it became less necessary to hold

assets. An additional explanation appeals to wealth levels: if city dwellers end up far richer than rural inhabitants, even with a lower probability, rural-urban migration would still be justified in this framework. In the following, we will show that this was indeed the case, especially until 1895-1913, for the wealthiest.

Let us now turn to the changes in the amounts of wealth (table 3).

Wealth levels of asset owners in all three areas and at all points of the wealth distribution follow a similar pattern: they increase until WWI and then drop in 1919-1939. The fall in wealth after WWI was greatest for the richest quartiles: the top 25% wealthiest lost 40% on average, while the bottom 25% lost only 13.4%, and those at the median 26%.

Considering regions separately, mean wealth levels of asset owners were lowest in the countryside, followed by provincial towns and Paris. In the latter, mean wealth was over twice as large as that in rural areas. The greatest gap pertained in 1870-1894, a period of great hardship in the countryside [8]. During these years, the ratio of wealth

Table 3. **Trends in wealth levels of asset owners: Mean and quartiles**

	1820-1847	1848-1869	1870-1894	1895-1913	1919-1939
France					
Mean level	9 854	13 916	19 433	27 418	16 767
1st quartile	846	1 325	1 634	2 637	2 283
Median level	3 013	4 321	5 880	8 351	6 170
3rd quartile	8 967	12 647	16 540	27 934	16 936
By subpopulation groups:					
Rural areas					
Mean level	8 954	12 065	14 960	24 037	14 452
1st quartile	882	1 338	1 546	2 765	2 134
Median level	2 934	4 182	5 515	7 816	6 013
3rd quartile	8 453	11 659	14 425	23 889	15 184
Paris	0	0	0	0	0
Mean level	23 218	32 187	51 393	49 596	27 231
1st quartile	777	787	3 340	2 108	3 584
Median level	3 025	3 152	16 797	14 786	10 074
3rd quartile	22 383	33 359	49 883	60 967	29 487
Provincial towns					
Mean level	14 345	23 110	34 708	37 274	20 995
1st quartile	728	1 487	1 789	2 160	2 507
Median level	3 423	6 018	6 984	9 388	6 976
3rd quartile	12 953	22 526	29 086	42 173	18 396

Note: in 2007 Euros
Source: Trimmed TRA survey

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[8] See Grantham (1996)

Tableau 4. **Wealth inequality levels among asset owners**

	1820-1847	1848-1869	1870-1894	1895-1913	1919-1939
Theil indices					
France	1.065	1.064	1.130	0.980	0.854
	(0.020)	(0.021)	(0.023)	(0.019)	(0.014)
Rural areas	1.029	0.998	1.000	0.952	0.818
	(0.025)	(0.027)	(0.031)	(0.023)	(0.020)
Paris	1.080	1.176	0.910	0.880	0.754
	(0.088)	(0.087)	(0.066)	(0.090)	(0.048)
Provincial towns	1.057	1.050	1.136	0.975	0.873
	(0.044)	(0.046)	(0.035)	(0.037)	(0.023)

Note: Standard error estimates based on 100 resampling bootstraps are provided in parenthesis
*Source*: Trimmed TRA survey

between Paris and the rural areas reached 3.5, with an analogous figure between provincial towns and rural areas of 2.4. This wealth gap then decreased in 1895-1913. After WWI, the ratios with respect to rural areas dropped to 1.9 for Paris and 1.5 for provincial towns. The median wealth levels (of the sub-sample of asset owners) add more detail to the picture. First, the median wealth gap was still in favor of provincial towns with respect to the countryside, by a factor which varies between 1.2 and 1.5. However, the position of Paris in the median wealth ladder reversed itself. Until 1870, median wealth in Paris lagged behind rural wealth. In 1870-1894, this gap reversed: median wealth in Paris jumped to three times that of its rural counterpart, then decreased to a ratio of 1.6 by 1919-1939. For quantiles of wealth below the median, there is no constant ranking between geographical areas. As a result, the dominance of cities over the countryside reflected in the mean levels is mostly due to the top quartiles of the wealth distribution.

The fourth element of our decomposition, corresponding to the observed changes in the distribution of wealth among asset owners, has already been described in the previous subsection, by looking at the actual shapes of the density functions. Let us nevertheless provide additional evidence by looking at standard inequality indices. Table 4 presents Theil indices for France and disaggregated by area, for which bootstrapped standard errors have been computed. Inequality among asset owners did not significantly increase over the nineteenth century until 1870-94, and then significantly declined, particularly in the interwar period. Inequality started declining first in 1870-94 in Paris, and only later in provincial towns and rural areas at the turn of the nineteenth century. In terms of levels, inequality is greatest in Paris throughout the whole period, followed by provincial towns and lowest in rural areas.

4.3. The contribution of the different factors

We have described the evolution of the different factors of interest. We want to be able to rank the relative importance of each factor in the observed changes in the distribution of wealth. Figure 2 represents and quantifies the *ceteris paribus*

Figure 2. **Counterfactual distribution changes in France, 1820-47 to 1919-39**
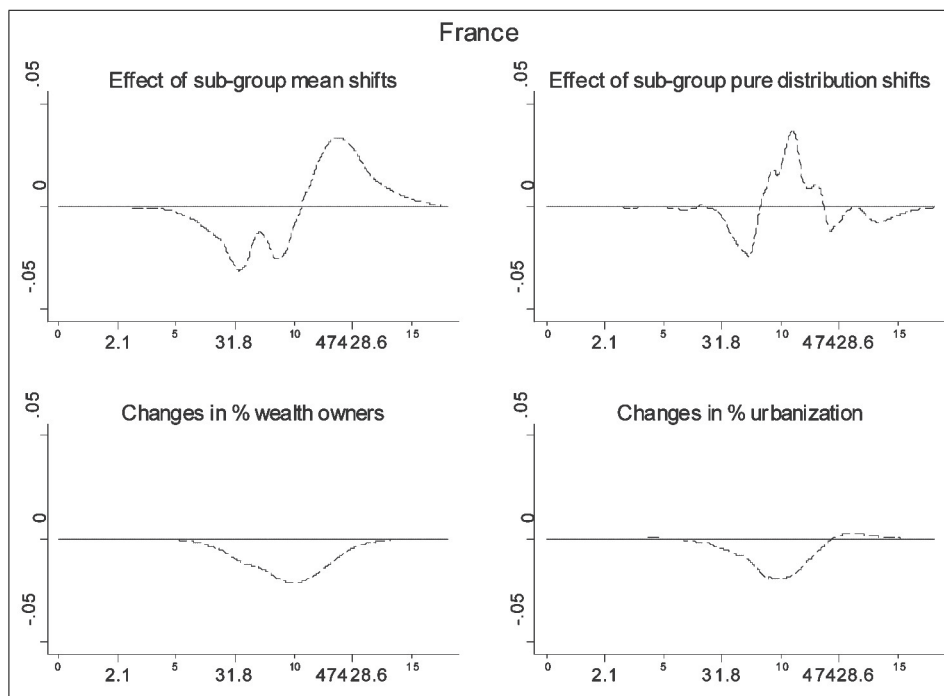
Note: The curves represented correspond to the choice of weights of equation (5). The horizontal axis is on a logarithmic scale, with intermediate values in 2007 Euros.

contributions of the four different explanatory factors in our decomposition of changes in the distribution of French wealth between 1820-47 and 1919-39. The closer the curve is to zero at any wealth level, the less important that factor is in accounting for total wealth changes. The upper left graph of figure 2 represents the regional means effect ($C_M(y)$) and shows how the increase in mean wealth levels in every geographical location has shifted density mass to the right. The intra-regional pure distribution effect ($C_I(y)$) at the upper right graph of the figure shows how the distribution of wealth exhibits falling density at both high and low wealth levels, illustrating the process of wealth concentration among wealth owners [9]. The two bottom graphs show the contributions of population changes to wealth density changes. On the left, the decrease in the regional share of asset owners ($C_S(y)$) in France, everything else being equal, will by construction increase the mass point at zero wealth and proportionately

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[9] We could speak of increasing polarization between wealth owners and wealth deprived. Esteban *et al.* (1994) describe a polarization process as a result of greater intra-group homogeneity (what they define as the "identification function") and greater inter-group heterogeneity (their "alienation function"). Our regional means effect would capture the increasing gap between asset owners and decedents with zero wealth (since at the same time the share of asset owners is decreasing). Wealth density concentration captured by the pure intra-regional distribution effect would relate to a process of 'identification' among the wealth owners.

decrease the wealth density mass everywhere else. The pure urbanization effect ($C_U(y)$) is captured in the bottom right-hand figure. The *ceteris paribus* wealth changes due to the decrease in the rural population (wealth mass losses) are not completely compensated by the increase in the urban population (implying mass gains at slightly higher wealth levels).

To gauge the relative importance of these different decomposition components in observed changes in wealth distribution, we need a measure of their size. Here, the size of each component is estimated by the surface between the horizontal axis and the curve depicting the contribution of each component in figure 2. Technically, this size is measured by the integral, in absolute terms, of the kernel density change corresponding to each component. This value gives an order of magnitude that is comparable across components and over time.

Table 5 indicates the dominant factors explaining the change in the wealth distribution between 1820-1847 and 1919-1939. To see if the ranking across components has changed over time, we separate the nineteenth century changes (from 1820-47 to 1870-94) from more recent changes (from 1870-94 to 1919-39). Results shown are robust to different weighting choices (*i.e.* across different specifications of equation (5)). Confidence intervals (at the 95% level) are also computed via bootstrap resampling and reestimation of the decomposition of wealth changes for 100 replications. Such bootstrap assesses the robustness of the results with respect to the choice of the sample points used to draw the kernel functions. When the dominant term is written between brackets it denotes insignificance of its relative importance, according to our bootstrapped confidence intervals. Table 6 provides the detail of integral measures and the values of the confidence intervals, for the weighting procedure used in equation (5).

Table 5. Summary of dominant factors across different components of our decomposition of wealth changes using aggregate kernel density estimates

	Changes in distribution, $C_D(y)$, *vs* Changes in population, $C_P(y)$	Inter-regional means changes, $C_M(y)$, *vs* Pure distribution changes, $C_I(y)$	Pure urbanization changes, $C_U(y)$, *vs* Changes in % asset owners, $C_S(y)$
France			
Changes from 1820-47 to 1919-39	$C_D(y)$	$C_M(y)$	$C_S(y)$
– Changes from 1820-47 to 1870-94	$C_D(y)$	$C_M(y)$	$(C_S(y))$
– Changes from 1870-94 to 1919-39	$(C_D(y))$	$C_I(y)$	$(C_S(y))$

Note: The relative importance of each factor is measured by the numerical integration of absolute value kernel density changes attributable to each component (see Table 6), and the dominant factor is the one represented in each case. These rankings for France are preserved no matter the weighting procedure used in equation (5).
Terms in brackets denote insignificant differences between factors according to 95% bootstrapped confidence intervals obtained through resampling.
Source: Trimmed TRA survey

Table 6. **Relative importance of different components to aggregate kernel density changes**

	Changes from 1820-47 to 1919-38		Changes from 1820-47 to 1870-93		Changes from 1870-94 to 1919-38	
Intra-regional changes in the amounts of wealth						
	0.203		0.181		0.092	
Confidence interval	0.176	0.230	0.163	0.200	0.083	0.110
Changes in population structure						
	0.146		0.076		0.073	
Confidence interval	0.132	0.161	0.063	0.089	0.062	0.088
Intra-regional pure distribution changes						
	0.099		0.043		0.089	
Confidence interval	0.081	0.116	0.036	0.065	0.081	0.107
Intra-regional means changes						
	0.166		0.161		0.026	
Confidence interval	0.150	0.188	0.144	0.179	0.013	0.043
Intra-regional changes in shares of asset owners						
	0.089		0.032		0.046	
Confidence interval	0.075	0.106	0.018	0.044	0.034	0.061
Pure urbanization effect						
	0.066		0.048		0.029	
Confidence interval	0.061	0.071	0.043	0.054	0.025	0.035

Note: The relative importance of each factor is measured by the numerical integration of absolute value kernel density changes attributable to each component. Values shown correspond to the choice of weights of equation (5). Confidence intervals (at 95%) were computed via bootstrap resampling that assesses the robustness of the results with respect to the sample points used to draw the distribution curve.
Source: Trimmed TRA survey

Overall, the evolution of wealth in France from 1820-47 to 1919-39 shown in figure 1 is essentially determined by distributional changes, $C_D(y)$, and more particularly by regional means changes in distribution ($C_M(y)$, that is, growth and the rural/urban wealth gap). However, the relative importance of this component is not constant over time. During the nineteenth century, this was clearly the most influential factor (with an integral value of 0.16, three times larger than the next most important factor), but from 1870-94 to the interwar period, relative positions changed and the dominant explanatory factor became $C_I(y)$, the intra-regional pure distribution changes (with an integral value now four times larger than the former). In other words, after 1870, the pure changes in the wealth distribution functions in each region (the shape of the curves itself) was more important than the mean difference across regions or even global enrichment.

Changes in the population structure, $C_P(y)$, though not negligible, played a relatively less important role throughout the period, especially before the turn of the nineteenth century (with integral values of about 0.07, while distributional changes

were up to 0.18). From 1870-94 to the interwar phase, its relative weight in explaining wealth changes increased, the difference between the distribution and population changes becoming insignificant at the 95% confidence level to bootstrapped resampling. In this last period, changes in both location and in the regional share of asset owners became nearly as important as the evolution of the amounts of wealth.

5. Conclusion

This paper traces back the evolution of wealth distribution in France in the nineteenth century and the first half of the twentieth century and measures the role of urbanization. According to Kuznets, income inequality first increases then decreases along the development path. The process is determined, in a dual framework, by the transition from agriculture to industry. Three parameters summarize this transition in Kuznets' framework: the sectoral share of population, the mean income gap and within-sector inequality. Our results conform with others in the literature in underlining that other parameters need to be included in the analysis of the relationship between inequality and growth.

This paper shows that, in terms of wealth at death, another significant parameter should be considered: the share of the population leaving no estate at all. This share of the population leaving no estate matters in explaining the overall distribution. It increased by 14 percentage points between 1820 and 1939, throughout all the population, independent of age group, gender or sector of activity. However, in Paris, there were two separate trends: an increase of 8 percentage points of the share of those leaving no inheritance between 1820-1847 and 1870-1913 was followed by a decrease of the same magnitude after WWI.

Contrary to the Kuznetsian assumption of a constant rural-urban gap (at least for income), the wealth gap was neither constant over time, nor homogeneous across different levels of wealth. For the top of the distribution – or almost the top, to be precise –, the ratio of relative urban/rural wealth followed an inverted U-shape, with the maximum being reached in 1870-1894. On the contrary, for those with median wealth or below, the rural/urban wealth gap fluctuated over time, without any particular pattern. It is important to note that as the mean level of wealth is influenced by the extreme values of the upper end of the distribution, such specific evolution at lower levels of wealth is neglected when one looks only at aggregate inequality indices and standard inequality decompositions, such as those obtained using Theil indices and based on mean wealth. Thus, a non-parametric analysis was performed, that provides a detailed evaluation of the whole distribution. Wealth density changes are decomposed into changes in the localization of the population and changes in the amounts of wealth; the latter was the dominant factor in explaining overall wealth evolution over the period of study. However, the role of urbanization has increased over time, by which we mean not only population migrations but also the change in the regional shares of asset owners. The pattern of distribution changed too, at least in urban areas. In provincial towns, there was a concentration in the intermediate part of the distribution, with a hollowing out of the density curve in the lower and upper ends of the distribution. In Paris, the shape of the density curve evolved from a bi-modal to a

uni-modal distribution. For overall France, the density function of wealth distribution moved to the right (wealth owners got richer over time) with a rising mass at zero (there were more and more individuals leaving no inheritance at all). Putting both elements together, we can conclude to a polarization of French society between those who had none and those who were better off.

Finally, the paper highlights several additional measurement issues. First, it is difficult to relate precisely an individual and his/her assets to one given location. Indeed, real estate is of course precisely located. But, it may happen that a rural estate is owned by an city dweller. The diffusion of financial assets throughout the nineteenth century makes this localization even more complex. It is not uncommon to see a person living in a remote rural area corresponding with banks or notaries in the city and investing in financial assets. Second, in this paper, a person is defined as rural if she/he died in a rural area. This definition might overlook life-time migration. For instance, a person born in the countryside who went to the city, succeeded there and returned back to his/her birthplace for retirement will be labeled rural. It is also possible that rural-urban migrants were selected from the poorest of the rural population, or on the contrary, from the richest (those that could afford the cost of migration). This point extents to a broader issue, that of wealth mobility. Take for instance, families who stood at the top of the wealth distribution before WWI. In what part of the distribution could their ancestors be found in the early nineteenth century? These extensions deserve further research.

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APPENDIX

Table A1. **Comparing data sets**

	1820-1847	1848-1869	1870-1894	1895-1913	1919-1939
Original TRA sample					
Total	7 656	7 927	10 793	7 531	8 026
Asset owners [1], wealth known	4 618	4 836	3 054	918	1 121
Asset owners, wealth unknown	628	448	3 530	3 373	3 244
No asset	2 410	2 643	4 209	3 240	3 661
Reweighted TRA sample [2]					
Total	7 656	7 927	10 789	7 515	8 026
Asset owners	5 246	5 284	6 580	4 275	4 365
No asset	2 410	2 643	4 209	3 240	3 661
Reweighted and trimmed (at 99th percentile) sample [3]					
Total	7 578	7 875	10 687	7 417	7 924
Asset owners	5 168	5 232	6 478	4 177	4 263
No asset	2 410	2 643	4 209	3 240	3 661
Largest wealth value	1 073 047	1 626 897	2 374 914	2 539 507	1 126 396

Notes: [1] Asset owners are defined as decedents leaving a positive bequest. [2] Any difference in the number of asset owners before and after reweighting is due to rounding. [3] The thresholds used for trimming are those reported by Piketty *et al.* (2004).
Source: TRA survey

Table A2. **Shares of population by wealth interval (%)**

	1820-1847	1848-1869	1870-1894	1895-1913	1919-1939
No assets	31.81	33.55	39.38	43.67	46.21
Less than 1 000 Euros	18.42	13.38	10.91	7.41	7.24
Between 1 000 and 10 000	34.01	33.02	27.50	23.01	26.40
Between 10 000 and 50 000	13.03	15.98	16.96	17.70	15.36
Between 50 000 and 100 000	1.70	2.53	2.91	4.25	3.28
Between 100 000 and 500 000	1.03	1.55	2.34	3.96	1.50

Source: TRA survey