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*A Contrast Between Continental European  
and English-Speaking Countries*

*Edited by* A. B. ATKINSON & T. PIKETTY

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## Income, Wage, and Wealth Inequality in France, 1901–98<sup>1</sup>

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### 3.1 INTRODUCTION

The primary objective of this research is to document trends in income inequality in France during the twentieth century. Did income distribution become more unequal or more equal in France over the course of the 1901–98 period? What are the specific periods in which income inequality increased or declined, and what income deciles were most affected by these trends?

The second objective of this work is obviously to understand these facts. What are the economic mechanisms and processes that allow us to understand the way income inequality evolved in France over the course of the twentieth century? As we have seen in Chapter 1, according to Kuznets' influential hypothesis (Kuznets 1955), one should expect income inequality to decline spontaneously in advanced capitalist countries, as more and more workers join the high paying sectors of the economy. Can this model account for what happened in France during the 1901–98 period, or at least during the first half of the twentieth century?

One advantage of looking at France is that French data sources allow for a detailed analysis of inequality trends. In particular, I was able to construct fully homogeneous yearly series running from the First World War until the late 1990s for both income inequality and wage inequality, the first occasion on which (to my knowledge) this has been done for any country. I can therefore distinguish precisely between the trends that are due to changes in the wage structure and those that are due to changes in the concentration of capital income. This allows me not only to better understand the French experience, but also to re-interpret the experience of other countries. The main conclusion is that the decline in income inequality that took place during the first half of the twentieth century was mostly accidental. In France, and possibly in a number of other countries as well, wage inequality has actually been extremely stable in the long run, and the

<sup>1</sup> This chapter presents some of the results of Piketty (2001). It is an extended version of Piketty (2003). I am grateful to seminar participants at Columbia, Harvard, MIT, Chicago, LSE, and Paris for lively discussions. I also thank an editor and two anonymous referees of Piketty (2003) for their helpful comments. I gratefully acknowledge financial support from the MacArthur Foundation.

secular decline in income inequality is for the most part a capital income phenomenon. Holders of large fortunes were badly hurt by major shocks during the 1914–45 period, and they were never able to fully recover from these shocks, probably because of the dynamic effects of progressive taxation on capital accumulation and pre-tax income inequality.

The rest of the chapter is organized as follows: Section 3.2 describes my data sources and outlines my methodology; Section 3.3 presents the basic facts that characterize my income inequality series and that need to be explained; Section 3.4 attempts to account for these facts; in Section 3.5, I briefly discuss whether my French conclusions can be applied to other developed countries; and Section 3.6 concludes.

### 3.2 DATA SOURCES

This work relies on three major types of data sources: data from income tax returns (1915–98), data from wage tax returns (1919–98), and data from the inheritance tax returns (1902–94).

#### Income Tax Returns (1915–98)

The most important data source is the income tax. A general income tax was enacted in France in 1914. It took effect for the first time in 1915 (that is, taxpayers reported their 1915 incomes at the beginning of 1916), and it has applied every year ever since. Most importantly, the French tax administration has been compiling every year since 1915 (including during the Second World War) summary statistics based upon the tabulation of all individual income tax returns. The raw materials produced by the tax administration have had the same general form since 1915: the tabulations indicate the number of taxpayers and the amount of their taxable income as a function of a number of income brackets (the number of brackets is usually very large, especially at the top of the distribution). This basic table is available for each single year of the 1915–98 period.<sup>2</sup>

One important limitation of these annual tables is that they only include those households whose income is high enough to be taxable under the general income tax system.<sup>3</sup> In France, less than 5% of the total number of households had to pay

<sup>2</sup> The complete technical characteristics of these raw statistical materials, as well as the exact references of the official statistical bulletins and administrative archives where these data were originally published by the French Ministry of Finance, are given in the book from which this paper is extracted (see Piketty 2001: appendix A, pp. 555–91).

<sup>3</sup> For simplicity, I will always refer to tax units as ‘households’ in the context of this paper. In actual fact, these are two different concepts: one non-married couple makes two tax units but one household, etc. All estimates reported here were computed in terms of tax units (that is, the ‘top decile income share’ denotes the income share going to the top decile of the tax unit distribution of income per tax

the income tax during the first few years of the income tax system, and the percentage of taxable households fluctuated around 10–15% during the interwar period. This percentage then rose steadily from 10–15% in 1945 up to 50–60% in 1975, and finally stabilized around 50–60% since the 1970s. It is therefore impossible to use these data in order to produce estimates of the entire income distribution, and one needs to concentrate on top fractiles.

The methodology that I applied to the raw data can be described as follows:<sup>4</sup>

1. I used the basic tables produced by the tax administration in order to compute the Pareto coefficients associated with the top of the French income distribution for each year of the 1915–98 period. These structural parameters then allowed me to estimate for each single year of the 1915–98 period the average incomes of the top 10% of the income distribution (i.e., the top decile, which I denote P90–100), the top 5% of the income distribution (P95–100), the top 1% (P99–100), the top 0.5% (P99.5–100), the top 0.1% (P99.9–100) and the top 0.01% (P99.99–100), as well as the average incomes of the intermediate fractiles (P90–95, i.e., the bottom half of the top decile, P95–99, i.e., the next 4%, etc.) and the income thresholds corresponding to the 90th percentile, the 95th percentile, etc. (P90, P95, etc.) For the years 1915–18, due to the small number of taxable households, I only estimated the incomes of fractiles P99–100 and above. The Pareto interpolation technique has been used by other researchers working with historical tax data,<sup>5</sup> and the estimates that I obtain for the French case appear to be as precise as those obtained in other countries (thanks to the large number of income brackets used by the tax administration).<sup>6</sup>
2. I then used French national income accounts in order to estimate total and average household income for the entire population (taxable and non-taxable), and I used these estimates to compute series for the share of fractile P90–100 in total income, the share of fractile P95–100 in total income, etc., and the share of fractile P99.99–100 in total income. This methodology

unit, etc., with no adjustment for the varying size of these tax units). The key point, however, is that the average number of tax units per household has been fairly stable since 1915 (around 1.3), and that the income profile of this ratio has been fairly stable since 1915 (as a first approximation). Tax data on the number of dependants and married couples per tax bracket also show that the income profile of average household size appears to have been relatively stable in the long run (in spite of a sharp fall of average household size).

<sup>4</sup> The methodology is fully described in the book (see especially Piketty 2001: appendix B, pp. 592–646). In particular, the book provides a detailed account of the many technical adjustments that were made to the tax data in order to take into account changes in tax law and to ensure homogeneity of the series. It includes all necessary information and intermediate computations to reproduce my estimates, from the raw data to my final series.

<sup>5</sup> See, e.g., Kuznets (1953) and Feenberg and Poterba (1993) (who applied Pareto interpolation techniques to US income tax returns data over the 1913–48 and 1950–89 periods).

<sup>6</sup> I used large micro-files of individual tax returns (including all taxpayers above a certain income threshold) available for the 1980s–90s in order to make sure that my interpolation technique was indeed very reliable (see Piketty 2001: appendix B, pp. 599–601).

(that is, using tax returns to compute the level of top incomes, and using national accounts to compute the average income denominator) is also standard in historical studies on income inequality (as in Kuznets 1953). The income concept that I have used both for the numerator and the denominator is pre-tax, pre-deductions taxable income.<sup>7</sup> Finally, note that I obtained average estimates of top income shares for the 1900–10 period by using the rough estimates of the income distribution that were made by the French tax administration prior to the First World War for revenue projection purposes (these estimates probably understate inequality a little bit).<sup>8</sup>

### Wage Tax Returns (1919–98)

One important feature of the income tax system that was enacted in France in 1914–17 is that, in addition to the general income tax set up in 1914, it also included a number of taxes levied separately on each income source. In particular, there was a ‘wage tax’, i.e. a progressive tax levied on individual wages, which was first applied in 1917. Individual wages were declared by employers, who had to file wage tax returns indicating the annual amount of wages paid to each individual employee. In 1919, the French tax administration started compiling summary statistics based on these wage returns. The basic statistical information is similar to that contained in the income tax tables: the wage tables indicate for a large number of earnings brackets the number of workers and the total amount of their wages (all sectors and occupations, including government employees, are included). The French tax administration stopped compiling these wage tables in 1939, so that these series only cover the 1919–38 period. In 1947, the French national statistical institute (INSEE) decided to use these wage tax returns to compile new series of annual statistical tables.<sup>9</sup> The INSEE tables look like the tax administration tables of the interwar period (they indicate for each wage bracket the number of wage earners and the total amount of wages), with the important difference that they cover the entire wage distribution, and not only top wages.<sup>10</sup>

I have used these raw data in the same way as the income tax data. Pareto interpolation techniques allowed me to compute the average wage of the top 10% of the wage distribution, the top 5%, the top 1%, etc. (fractiles were defined

<sup>7</sup> The adjustments that I made to national accounts series to ensure that I use the same income concept both at the numerator and at the denominator are described in Piketty (2001a: appendix G, pp. 693–720), where I also offer a detailed comparison of existing national accounts series. Official INSEE national accounts series start in 1949, and for earlier periods I have relied for the most part on the retrospective national accounts published by Villa (1994) and on the very well documented income accounts published by Dugé de Bernonville (1933–39).

<sup>8</sup> The adjustments that I made to these 1900–10 estimates on the basis of the data generated by the first few years of the income tax are described in Piketty (2001: appendix I, pp. 738–41).

<sup>9</sup> The tax on wages was actually repealed in 1948, but the tax administration has kept using these returns to make sure that income tax taxpayers report the right wage.

<sup>10</sup> The 1919–38 tables only cover those wage earners whose wage is high enough to be taxable under the wage tax system (about 15–20% of all workers during the interwar period).

according to the total number of wage earners, taxable and non-taxable), and I have used independent estimates of the total wage bill (coming mostly from the national accounts) in order to compute top wage shares series.<sup>11</sup>

### Inheritance Tax Returns (1902–94)

A progressive inheritance tax was enacted in France in 1901, and it has been in force every year ever since. Before 1901, the inheritance tax was purely proportional, so that the tax administration did not need information on total estates, and did not bother ranking individual estates and compiling statistical tables. In 1901, the tax administration started using inheritance tax returns to compile tables indicating the number of estates and the amount of these estates as a function of a number of estate brackets. These tables were compiled almost every year between 1902 and 1964 (with an interruption during the First World War and the early 1920s). Since 1964, similar tables have been compiled only in 1984 and in 1994. I have used these raw data in order to compute series for the average estate of the top 10% of the estate distribution, of the top 5%, of the top 1%, etc. (fractiles were defined according to the total number of adult decedents, taxable and non-taxable).<sup>12</sup>

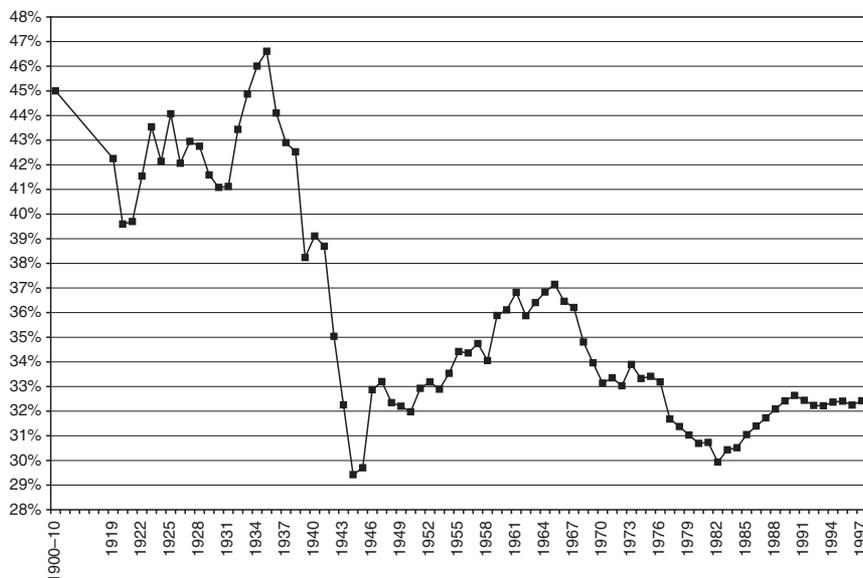
### 3.3 THE BASIC FACTS

Consider first the evolution of the top decile income share (see Figure 3.1). The basic fact is that income inequality in France declined significantly over the course of the twentieth century. According to my estimates, the share of total household income received by the top decile dropped from about 45% at the beginning of the twentieth century to about 32–3% in the 1990s. In other words, the average income of the top 10% was about 4.5 times larger than the average income of the entire population at the beginning of the twentieth century, and it was about 3.2–3.3 times larger than the average income of the entire population in the 1990s.

Next, one can see immediately from Figure 3.1 that this secular decline has been far from steady. The top decile income share dropped during the First World War, and subsequently recovered during the 1920s and the first half of the 1930s.

<sup>11</sup> All technical details are given in Piketty (2001: Appendix D, pp. 657–76). Unlike the annual income tables published by the tax administration (which had never been used to compute long run inequality series until the present study), wage tables had already been used to produce series on interdecile ratios for the post-1950 period (see Baudelot and Lebeauin 1979; Bayet and Julhès 1996). These authors did not compute top wage shares series, however. Most importantly, pre-World War II wage tables had never been used until the present study (the very existence of these tables had probably been forgotten, just like the income tables).

<sup>12</sup> All technical details are given in Piketty (2001: appendix J, pp. 744–71). These inheritance tables had never been used to construct long run wealth inequality series until the present study.



**Figure 3.1** The top decile income share in France, 1900–98

*Source:* Author's computations based on income tax returns. See, Table 3A.1, col P90–100, and Piketty (2001a: appendix B, table B14, pp. 620–1).

In 1935, i.e., at the height of the Great Depression in France, the top decile income share was slightly below 47%.<sup>13</sup> The income share received by the top decile then started to fall sharply in 1936, and even more so during the Second World War. The top decile income share fell to a nadir in 1944–45 (about 29–30%). As far as the post-war period is concerned, three sub-periods need to be distinguished. The top decile income share increased from 1945 (29–30%) to 1967–68 (36–7%). Then it declined until 1982–83, when it reached 30–1%. It has then increased somewhat since the early 1980s (32–3% in the 1990s). Note however that most of the action took place before 1945. Since the Second World War, income inequality in France (as measured by the top decile income share) appears to have been fluctuating around a constant mean value of about 32–3%, with no trend. In other words, most of the secular decline occurred during a specific time period (1914–45). These were times of crisis for the French economy, with two World Wars and the Great Depression of the 1930s. This definitely does not look like a gradual, Kuznets type process.

Moreover, and most importantly, my series show that the secular decline of the top decile income share is almost entirely due to very high incomes. The income share of fractile P90–95 has been extremely stable in the long-run: between 1900

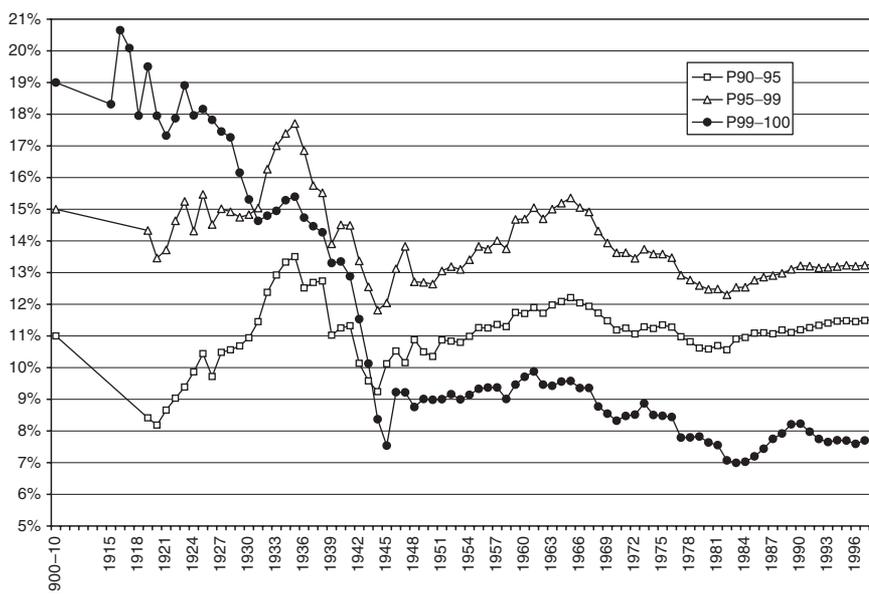
<sup>13</sup> According to my estimates, the top decile income share has never been as high as in 1935 during the entire century. Note however that my average estimates for the 1900–10 decade probably understate inequality a little bit.

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and 1998, that share has always been fluctuating around a mean value of about 11–11.5% of total household income (which means that these households always get about 2.2–2.3 times the average income) (see Figure 3.2). The income share of fractile P95–99 has experienced a modest secular decline, from about 15% of total household income at the beginning of the twentieth century to about 13–13.5% during the 1990s, i.e. a drop of about 10% (see Figure 3.2).

In contrast, the top percentile income share has dropped by more than 50%. The share of total income received by the top 1% was about 20% at the beginning of the twentieth century, and it was only about 7–8% during the 1990s (see Figure 3.2). In other words, the average income of the top 1% was about 20 times larger than the average income of the entire population at the beginning of the century, and it was about 7–8 times larger at the end of the century. Moreover, my series clearly show that the higher you go within the top percentile of the income distribution, the larger the secular decline (see Table 3.1). The most extreme case is that of the top 0.01%: their income share has dropped from about 3% at the beginning of the century to about 0.5–0.6% since 1945. In fact, the average real income of the top 0.01% has not increased at all during the entire twentieth century: expressed in 1998 French francs, it is about 15% lower in 1990–98 than what it was in 1900–10. During the same time period, the average real income of



**Figure 3.2** The income share of fractiles P90–95, P95–99, and P99–100 in France, 1900–98

Source: Author's computations based on income tax returns. See this chapter, Tables 3A.1 and 3A.2, and Piketty (2001a: appendix B, tables B14 and B15, pp. 620–2).

**Table 3.1** Income growth and income shares in France, 1900–10 and 1990–98

Fractiles	Income growth	Income share (%) 1900–10	Difference (points) 1990–98	Difference (%)	Share of total decline of top decile share corresponding to each fractile (%)	
P0–100	<b>4.48</b>	100.0	100.0	0.0	0.0	
P90–100	<b>3.23</b>	45.0	32.4	–12.6	–28.0	<b>100.0</b>
P95–100	<b>2.77</b>	34.0	21.0	–13.0	–38.3	<b>103.2</b>
P99–100	<b>1.84</b>	19.0	7.8	–11.2	–59.1	<b>88.9</b>
P99.5–100	<b>1.54</b>	15.0	5.2	–9.8	–65.6	<b>78.1</b>
P99.9–100	<b>1.12</b>	8.0	2.0	–6.0	–75.0	<b>47.6</b>
P99.99–100	<b>0.83</b>	3.0	0.6	–2.4	–81.6	<b>19.4</b>
P0–90	<b>5.51</b>	55.0	67.6	12.6	22.9	
P90–95	<b>4.65</b>	11.0	11.4	0.4	3.6	–3.2
P95–99	<b>3.95</b>	15.0	13.2	–1.8	–12.0	14.2
P99–99.5	<b>2.94</b>	4.0	2.6	–1.4	–34.4	10.9
P99.5–99.9	<b>2.02</b>	7.0	3.2	–3.8	–54.9	30.5
P99.9–99.99	<b>1.30</b>	5.0	1.4	–3.6	–71.1	28.2
P99.99–100	<b>0.83</b>	3.0	0.6	–2.4	–81.6	19.4

Note: ‘Income growth’ refers to the ratio between the average household incomes of 1990–98 and 1900–10 (both expressed in 1998 French Francs).

Source: Author’s computations based on income tax returns (see Piketty 2001a: tables 2.1 and 2.2, pp. 128–9).

the entire population, as well as the average real income of fractile P90–95, has been multiplied by about 4.5 (see Table 3.1). According to my series, almost 90% of the secular decline of the top decile income share is due to the top percentile, and more than half of the top percentile drop is due to the top 0.1% (see Table 3.1).

The timing of the fall of very top incomes is also striking. Between 1945 and 1998, the income share of the top 1% has been fairly stable (see Figure 3.2). The secular fall took place exclusively during the 1914–45 period, and especially during the 1930s and the Second World War. It is interesting to note that that the deflationary years of the Great Depression had a very different impact on moderately high incomes and on very top incomes. While the income shares of fractiles P90–95 and P95–99 (the ‘upper middle class’) increased sharply during the early 1930s, the income shares of fractiles P99–100 and above (the ‘rich’) fell.<sup>14</sup> I will come back on this below.

### 3.4 ACCOUNTING FOR THE FACTS

The key facts that need to be explained are the following: the secular decline in the top decile income share took place during a specific time period (i.e., between 1914 and 1945, and mostly during the 1930s and the Second World War), and it is

<sup>14</sup> See Figure 3.2 and Tables 3A.1 and 3A.2.

due for the most part to the sharp drop in the top percentile income share (and, to a significant extent, to the sharp drop in the top 0.1% income share). How can one account for these facts?

### Income Composition Patterns

One first needs to be aware of the large differences in income composition that have always characterized the various sub-fractiles of the top decile. Every single year of the 1915–98 period, tax returns tabulations show that the share of wage income declines continuously from fractile P90–95 to fractile P99.99–100, while the share of capital income (dividends, interest, and rents) rises continuously from fractile P90–95 to fractile P99.99–100. The shape of the self-employment income share is intermediate between the wage share and the capital share: it rises until fractile P99.5–99.9 (approximately), and declines afterwards. These variations in income composition within the top decile are truly enormous. Whereas the households of fractile P90–95 have very little capital or self-employment income (about 80–90% of their income is made of wages), the households of fractile P99.99–100 rely for the most part on their capital and self-employment income (typically, more than 60% of their income is made of capital income, and an extra 20% is made of self-employment income). Tax returns tabulations also distinguish between rents, dividend, and interest income, and my detailed series show that top capital incomes are mostly made of dividends (the share of interest and rents in total income is basically flat within the top decile, and the share of interest and rents in total capital income is steeply downward-sloping).<sup>15</sup> Large capital owners are predominantly shareholders, not bondholders or landlords.<sup>16</sup>

These composition patterns suggest that the secular decline of income inequality is primarily a capital income phenomenon. That is, the fractiles relying mostly on wage income did not experience any significant decline in the long run (or experienced a limited decline), whereas the fractiles relying mostly on their capital income experienced major shocks between 1914 and 1945 (wars, inflation, depression), from which they never fully recovered. This interpretation is consistent with the fact that the capital share at the level of fractile P99.99–100 was as small as 15% in 1945–46, and that the incomes of the top 0.01% were mostly made of self-employment income (more than 70% of total income) during those years. This is the only instance during the entire century when capital income is not the dominant source of income for very top incomes (capital income returned to its dominant position during the late 1940s and early 1950s, albeit at a somewhat lower level than during the interwar period). This clearly shows that the large drop in top income shares observed between 1914 and 1945 was due to a large extent to the fall of top capital incomes.

<sup>15</sup> For the detailed composition series, see Piketty 2001: tables B16–B18, pp. 625–34.

<sup>16</sup> It is interesting to note that large capital owners were already predominantly shareholders (and to some extent bondholders, but very rarely landlords) at the beginning of the twentieth century.

The fact that the capital share is particularly low at the end of the Second World War is also consistent with macroeconomic data. Available series on factor shares do indeed show that the capital share in French corporate value-added has never been as low in 1944–45 (see Figure 3.4 below). French GDP has never been as low as in 1944–45 during the twentieth century (fighting between the Germans and the Allies took place over significant portions of the French territory after D-Day, and firms were completely disorganized), and the big wage increase implemented by the provisional government implied that there was almost nothing left for profits.

The composition patterns derived from tax returns also allow me to account for the sharp divergence between moderately high incomes and very top incomes observed during the deflationary Great Depression of the early 1930s. Given that fractiles P90–95 and P95–99 mostly rely on wages, one should indeed expect these fractiles to benefit from the fall in prices : real wages did increase during the 1929–35 period (thanks to the nominal rigidity of wages and the fall in prices), at a time when real output was falling. Moreover, the high wage employees (and especially the government employees) of fractiles P90–95 and P95–99 were shielded from unemployment which hurt mostly low wage workers (such as low skill manufacturing or rural workers). Conversely, given that fractiles P99–100 and above mostly relied on capital income and business profits, one should indeed expect these fractiles to lose out in the recession (the capital share fell sharply during the early 1930s). This process reversed in 1936, when the Front Populaire decided to devalue the French franc and to put an end to the deflationary strategy. The high wage employees of fractiles P90–95 and P95–99 started to lose ground (inflation pushed their real wages down), while the fall of the profit holders of fractiles P99–100 and above was temporarily halted. This again shows that one needs to distinguish between the different sub-fractiles of the top decile in order to account properly for the inequality facts (this is true both for long run trends and for short run fluctuations).

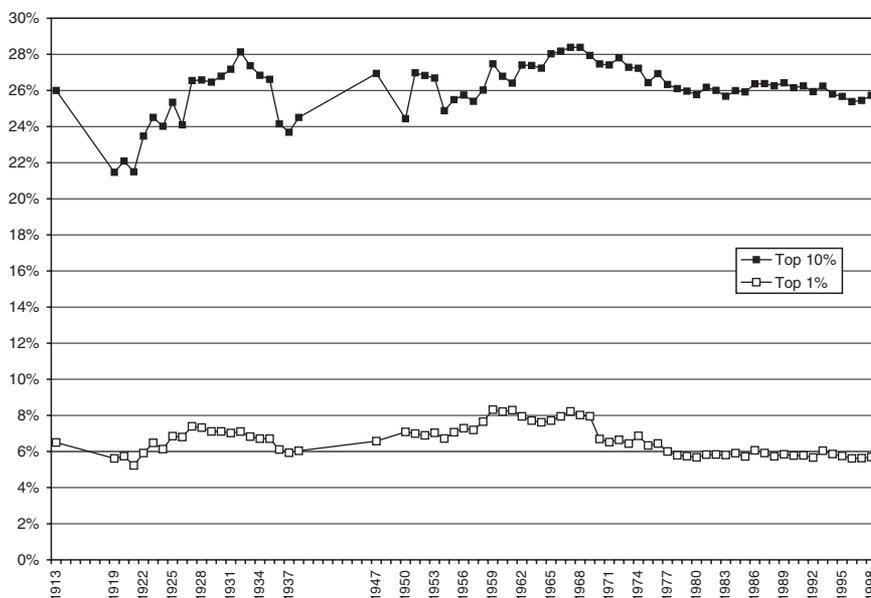
### The Long-Run Stability of Wage Inequality

Before I further explore the nature of the shocks suffered by capital owners during the 1914–45 period and the reasons why they never managed to fully recover from these shocks, it is important to make sure that the capital income view of the inequality facts is the right one. That is, I need to show that wage inequality did not play any significant role in the secular decline of the top decile income share.

My wage series demonstrate that wage inequality in twentieth century France has been extremely stable in the long run. The share of the total wage bill received by the top decile of the wage distribution has always fluctuated around a mean value of about 25–6%, and the share of the total wage bill received by the top 1% of the wage distribution has hovered near to 6–7% (see Figure 3.3). Note that the wage shares of the top decile and top percentile were substantially below their secular mean in 1919 (when my annual series start) and during the early 1920s.

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**Figure 3.3** The top decile and top percentile wage shares in France, 1913–98

Source: Author's computations based on wage tax returns (see Piketty 2001a: appendix D, tables D7 and D16, col. P90–100 and P99–100, pp. 664 and 675).

But there is ample occupational and sector-specific evidence showing that this was not a 'normal' situation. The wage structure did narrow substantially during the First World War in France (low wage workers enjoyed nominal pay increases that were significantly higher than those obtained by high wage workers), and one can show that the top decile and top percentile wage shares were at the eve of the First World War very close to their secular mean.<sup>17</sup>

More generally, the fact that wage inequality has been extremely stable in the long run does not mean that the French history of wage inequality was smooth and steady during each single decade of the twentieth century. Both World Wars led to significant compressions of the wage structure. But the point is that, after each World War, the wage share received by high wage workers quickly recovered its pre-war level. My wage series also confirm that the deflationary depression of the early 1930s led to a widening of wage inequality: high-wage workers benefit from the nominal rigidity of their wages and from the fact that they are less exposed to unemployment than low wage workers. In the same way as with the income series, this process ends in 1936, when the Front Populaire decides to put an end to the deflationary strategy. The 1967–68 and 1982–83 turning points are also visible in

<sup>17</sup> See Piketty (2001: 188–91, 199–200). The estimates for 1913 reported on Figure 3.3 (26% for the top decile share, 6.5% for the top percentile share) were computed on the basis of this occupational and sector-specific data (and in particular on the basis of public sector data).

my wage series. Wage dispersion significantly widened between 1950 and 1967–68, and the sharp increases in the minimum wage implemented in the summer of 1968 and during the 1970s led to a significant decline in wage inequality until 1982–83, when the newly elected socialist government decided to freeze the minimum wage (wage dispersion has increased somewhat since then). In other words, wage inequality during the twentieth century France has been going up and down for all sorts of reasons in the short and medium run, but it has always reverted back to its secular mean. No long run trend can be detected in the series.

The contrast between the long-run evolution of the share of total income received by the top percentile of the income distribution (Figure 3.2) and the long-run evolution of the share of the total wage bill received by the top percentile of the wage distribution (Figure 3.3) is particularly striking. While the top percentile income share has declined sharply from about 20% at the beginning of the century to about 7–8% in the 1990s, the top percentile wage share has always been near 6–7%.

My wage inequality series therefore confirm that the capital income interpretation of the inequality facts is the right one. The secular decline in the top percentile income share is due for the most part to the sharp drop in the level of the top capital incomes received by the affluent. Had this level remained constant (relative to the average income), there would have been no secular decline in the top percentile income share.<sup>18</sup>

Another advantage of looking at wages is that data are available on the entire distribution, and not only on the average and on the top decile. For the 1950–98 period, one can compute annual series for all percentile ranks of the wage distribution. By looking at the evolution of ratios such as P10 to the average wage, P50 to the average wage, and P90 to the average wage during this period, one can see that the entire distribution of wages has been extremely stable in the long run, and not only the top decile and top percentile shares.<sup>19</sup> Again, one does observe important fluctuations in the short run and medium run: the P90/P10 ratio rose sharply between 1950 and 1968, then declined sharply between 1968 and 1982–83, and finally rose somewhat since 1982–83.<sup>20</sup> But these short and medium run fluctuations cancel out in the longer run, in the same way as for top decile and percentile wage shares.

<sup>18</sup> Strictly speaking, this is more than the data can actually say: depending on the trends in family structure and correlations between the various types of incomes, a given trend in wage inequality can translate into various trends in income inequality. But the gap between Figure 3.2 and Figure 3.3 is simply too big to be undone by that kind of bias. Moreover, note that the correlation of wages between spouses has probably been trending upwards during the twentieth century (as a consequence of the upward trend in female participation), so that a stable level of wage concentration should actually give rise to an increasing level of income concentration (everything else equal).

<sup>19</sup> During the 1950–98 period, P10 has always been fluctuating around 45–50% of average wage, P50 around 80–5% of average wage, and P90 around 160–70% of average wage (see Piketty 2001: appendix D, Table D12, p. 671).

<sup>20</sup> The fact that the turning points of post-war trends in wage inequality coincide with the breaks in French minimum wage policy was already apparent in the series compiled by Baudelot and Lebeauupin (1979) and Bayet and Julhès (1996).

The same phenomena seem to have occurred during the 1900–50 period. Available wage returns data do not allow me to estimate annual series for lower deciles prior to 1950, but occupational and sector-specific wage data can to some extent serve as a proxy. During the first half of the twentieth century, agricultural workers were very numerous (around 30% of all wage earners in 1900, down to 20% in 1930, 10% in 1950, and 1% in 1998), and very low wages were concentrated in this sector. By using the lowest wages observed in the agricultural sector as a proxy for P10, one finds that the P10/(average wage) was already around 45–50% in 1900 and 1930, i.e., around the same mean level as during the 1950–98 period.<sup>21</sup> That is, migration from the low wage rural sector to the high wage urban sector did not lead to a structural compression of wage inequality. Low wage rural workers disappeared, but they were replaced by low wage urban workers, so that the hierarchy did not change very much in the long run. This evidence stands in contrast with the theoretical predictions of Kuznets' two sector development model, according to which one should expect inequality to decline as more and more workers join the high paying, urban sector of the economy.

### The Robustness of Wealth Levelling

As was already noted above, the fact that capital owners experienced major shocks during the 1914–45 period (and especially during the 1930s and the Second World War) is fully consistent with the general economic history of France during that period. In a sense, what happened between 1914 and 1945 period is just the normal consequence of an extraordinary recession. Capital income generally tends to be pro-cyclical, and it is natural to expect capital owners to suffer a lot from the Great Depression and the War and to be at their secular low in 1944–45, at a time when the French GNP was also at a century low.

In fact, what really needs to be explained is why capital owners never managed to fully recover from the shocks of the 1914–45 period. One explanation would simply be that capital owners were confronted during the 1914–45 with major shocks to their capital holdings (and not only to their capital income), and that it takes a long time to reconstitute the level of fortunes and capital income that capitalists enjoyed before these shocks. The shocks to capital holdings took three main forms: inflation, bankruptcies, and destructions.

First, one must bear in mind that inflation did act as a powerful capital tax. The French CPI was multiplied by a factor of more than 100 between 1914 and 1950, which means that bondholders were fully expropriated by inflation. The same process applied, in a less extreme way, to real estate owners and landlords. Rent

<sup>21</sup> See Piketty 2001: 214–15, and appendix H, tables H2–H4, pp. 726–8. These P10 estimates for 1900 and 1930 were computed by using wages for low skill agricultural workers and rural female domestic workers as proxies. We only used money wages estimates, and we did not try to take into account in-kind payments (which were quite important for agricultural and domestic workers). The resulting estimates should therefore be considered as a lower bound for the true P10 in 1900 and 1930: the true P10/(average wage) ratio might have declined somewhat between 1900 and 1950, but it certainly did not rise.

control was severe during both World Wars, and the real value of rents was divided by 10 between 1913 and 1950.<sup>22</sup> Further the 1914–50 inflationary process was something entirely new for the economic agents of the time. There had been virtually no inflation since the Revolutionary and Napoleonic wars (the average annual inflation rate between 1815 and 1914 was 0.3%), and the government suddenly started to print vast quantities of money after 1914 to pay for the huge budget deficits brought on by the First World War.

Next, the ‘recession’ induced by the Great Depression of the 1930s and by the Second World War was not a ‘normal’ recession. Real GDP declined by 20% between 1929 and 1935, and by 50% between 1929 and 1944–45.<sup>23</sup> Many firms faded and disappeared during that time (much more than during a ‘normal’ recession). Bankruptcies were particularly numerous in manufacturing and in finance. Large fortunes have always comprised far more equity shares than bonds or real estate during the twentieth century. The impact of the bankruptcies of the 1930s and of the Second World War on top fortunes was therefore probably even larger than the impact of inflation.<sup>24</sup>

Finally, and most importantly, the physical destructions induced by both World Wars were truly enormous in France. According to the best available estimates, about 1/3 of the capital stock was destroyed during the First World War, and about 2/3 during the Second World War. This reflects the fact that the bombing technology was far more destructive during the Second World War than during the First World War. According to these estimates, the (capital stock)/(national income) ratio was around 5 at the eve of the First World War, and it then fell to 3.5 in 1934 and 1.2 in 1949.<sup>25</sup>

It is also important to recall that the French government enacted a broad nationalization program in 1945. The nationalization process often was straight expropriation: prices for shares were often set at an arbitrary low level, so as to punish the ‘capitalists’, who were often accused of ‘collabouration’ with the Vichy government. A leading example of this kind of punitive nationalization/expropriation process was the car company Renault.<sup>26</sup> At the same time, the provisional government decided to implement in 1945 a one-shot tax on capital holdings, with

<sup>22</sup> See Piketty 2001: appendix F, table F1, pp. 690–1). On the history of rent control legislation in France since 1914, see Hirsch (1972) and Taffin (1993).

<sup>23</sup> See Piketty 2001: appendix G, table G1, p. 695.

<sup>24</sup> It is unfortunately very difficult to quantify the impact of bankruptcies on the distribution of wealth. We know that the annual number of bankruptcies more than doubled between 1929 and 1935 (see INSEE 1966: 170–1), but we do not have systematic information about the individuals who own these firms and their rank in the wealth distribution.

<sup>25</sup> See Piketty 2001: 137. These estimates are due to Sauvy (1965–75, 2: 442; 1984, 2: 323), who uses estimates of the capital stock computed by Cornut (1963: 399). These estimates are not fully homogenous (the 1949 capital stock is probably underestimated somewhat; see INSEE 1958: 34–5), but they are broadly consistent with the independent computations by Divisia et al. (1956, 3: 62), who also find that World War II destructions were about twice as large as World War I destructions.

<sup>26</sup> Unfortunately, there does not seem to exist any systematic, quantitative study of the 1945 nationalization process. Divisia et al. (1956, 3: 73–6) describe a number of interesting examples of nationalization/expropriation, but they do not attempt to quantify the process at the national level.

rates up to 20% on top fortunes (and 100% on those fortunes which experienced substantial nominal increases during the war!).<sup>27</sup>

In other words, there are good reasons to believe that the accumulation process for large capital holdings was to a large extent set back to zero (or close to zero) in 1945. This interpretation is consistent with the composition patterns described above: in 1945, very top incomes were mostly made up of new entrepreneurs, simply because the old capitalists had disappeared.

But such an explanation cannot be the full story. More than 50 years have elapsed since 1945, and it would seem that this is a sufficiently long time period for capitalists to recover from the 1914–45 shocks (at least partly). The point is that the top percentile income share did not rise at all during the 1945–98 period (see Figure 3.2). Apparently, something important has changed over the course of the twentieth century: it just seems impossible to accumulate individual fortunes as large as those that were accumulated in the past.

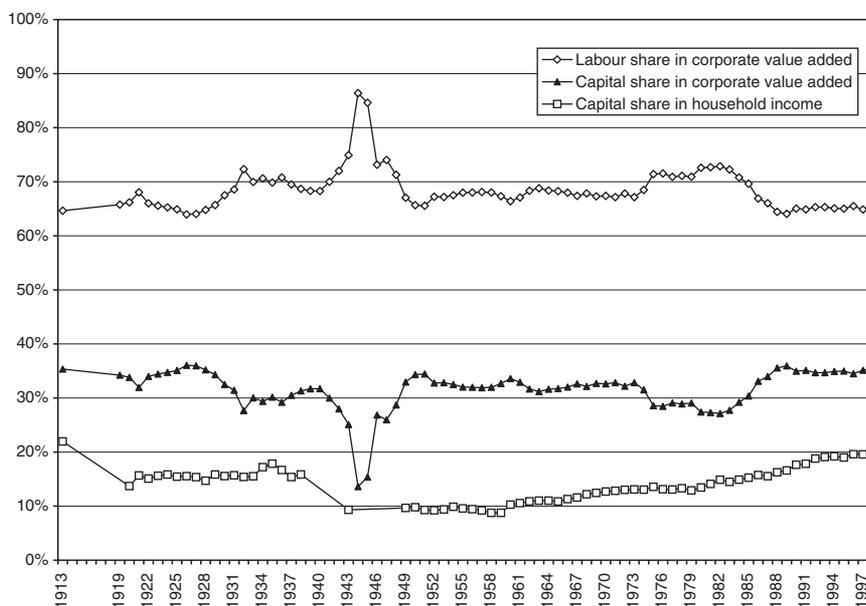
It is also important to emphasize that the decline of top capital incomes is the consequence of a decreased concentration of capital income and not of a decline in the share of capital income in the economy as a whole. According to national accounts, the share of capital income (dividends, interest, and rent) in aggregate household income is approximately the same at the end of the twentieth century as at the beginning of the twentieth century, i.e., about 20% (see Figure 3.4). This is not too surprising, given the well-known long run stability of the capital share in corporate value-added. Note, however, that while it took only a few years for the capital share in corporate value-added to recover from the 1944–45 secular low, it is only in the 1980s–90s that the capital share in aggregate household income reached the levels observed in the interwar and at the eve of the First World War (see Figure 3.4). This important time lag is due to a mixture of two factors. First of all, retained earnings were unusually high during the reconstruction period in France (1950s–60s),<sup>28</sup> and the profit share was unusually low during the 1970s.<sup>29</sup> This explains why distributed dividends and interest income did not return to their pre-First World War and interwar levels (as a percentage of household income) until the 1980s–90s. Next, several decades were needed for the real value of rents to recover from the 1914–50 inflation. Here again, one needs to wait until the 1980s–90s to see the (rent index)/CPI ratio and the share

Similarly, Andrieu et al. (1987) offer a detailed analysis of the political context of the nationalization policies, but they do not try to quantify their importance. I return below to the complicated issue of the long run impact of the 1945 nationalizations.

<sup>27</sup> See Piketty (2001: 138).

<sup>28</sup> High retained earnings during the 1950s–60s were due primarily to the high investment needs of companies. This was exacerbated by the fact that retained earnings were close to zero during the 1930s (i.e., companies did not cut dividends as much as they should have during the Great Depression). See Malissen (1953) and Piketty (2001: 62–3).

<sup>29</sup> The fall in the profit share was due primarily to the big wage push of the 1970s (the minimum wage was increased by 130% in real terms between 1968 and 1982–83, while GNP increased by only 40%) The profit share started recovering when wages were frozen in 1982–83.



**Figure 3.4** Factor shares in France, 1913–98

Source: Author's computations based on national accounts (see Piketty 2000a: appendix G, tables G3–G6 and G9, pp. 703–5 and 710–13).

of rents in household income returning to their pre-First World War level.<sup>30</sup> These time lags demonstrate the importance of the 1914–45 shocks. But the key point is that aggregate capital income has now fully recovered from these shocks, while top capital incomes did not recover.

One could also wonder whether the decline of top capital incomes could simply be the consequence of fiscal manipulation and tax evasion. I have performed two kinds of checks in order to make sure that fiscal manipulation and tax evasion can only be a small part of the story (at most), and that the observed trends do indeed describe a real economic phenomenon.

First, I have adjusted the capital income figures reported in tax returns so as to match the capital income totals coming from national accounts. The general conclusion is that the observed trends are simply too large to be explained by this kind of factor. Whatever the way one makes the adjustment, the trends are still very large.<sup>31</sup> In fact, all available information suggests that tax evasion in France has never been as high as in the interwar period, i.e., at the time when reported incomes at the very top of the distribution were much higher than what they were in

<sup>30</sup> One key reason why it took so long is because French landlords can (partially) adjust their rent to market conditions only when they have a new tenant. Note that high inflation (wage driven) during the 1970s temporarily halted this recovery process (in the same way as for dividends).

<sup>31</sup> For detailed computations, see Piketty 2001: 408–48.

the 1990s. If one looks at the (tax return capital income + legally tax exempt capital income)/(national accounts capital income) ratios, which can be viewed as a measure of tax evasion, then one finds ratios over 90% for the 1980–90s, versus 60–70% for the interwar period. This is consistent with the fact that the tax administration had much less investigative power before the Second World War than it has today. Tax evasion therefore seems to amplify the trends rather than to reduce them.<sup>32</sup>

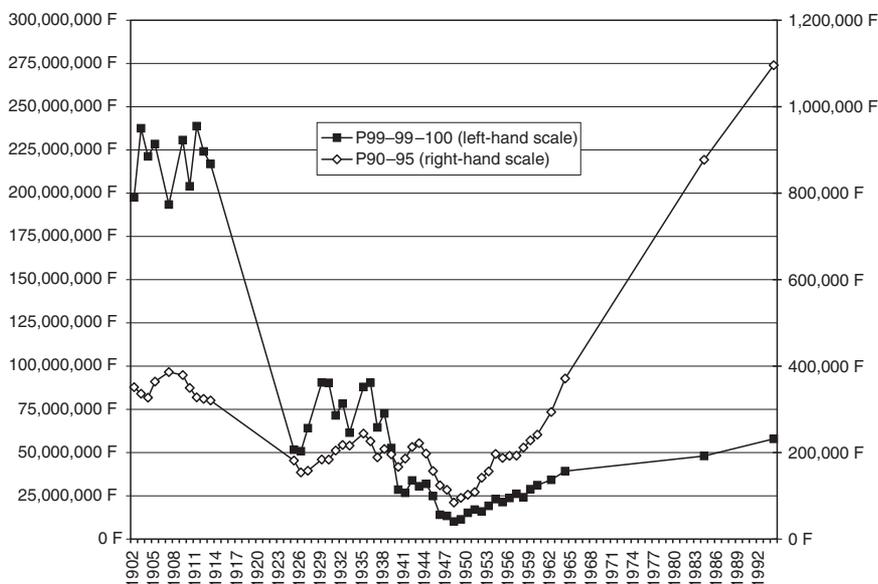
Next, I have used inheritance tax return data in order to test whether the leveling of fortunes is a real economic phenomenon. The results are spectacular (see Figure 3.5). Whereas the average estate left by the fractile P90–95 of the estate distribution has been multiplied by about 3.2 in real terms between 1900–10 and the 1990s, the average estate left by the fractile P99.99–100 of the estate distribution is nearly 4 times smaller during the 1990s than what it was in 1900–10. The decline in capital concentration seems truly astonishing. Inheritance tax returns are obviously subject to fiscal manipulation and tax evasion, but the trends are so enormous that these explanations can only be a small part of the story. One would need to assume that the reporting rate was 100% at the beginning of the twentieth century and less than 10% at the end of the twentieth century! This does not seem plausible. Moreover, in the same way as for income tax returns, it is likely that tax evasion was actually larger at the beginning of the twentieth century and during the interwar period than later in the century. It is also important to note that the inheritance tax and the gift tax were unified in France in 1942. One important consequence is that my pre-1942 top estates estimates exclude inter-vivos gifts, while my post-1942 estimates do include inter-vivos gifts. This again tends to amplify the trend rather than to reduce it (inter-vivos gifts were already quite important at the beginning of the twentieth century).

Inheritance series show that the decline of top fortunes is the consequence of a decreased concentration of wealth and not of a decline in aggregate wealth in the economy as a whole. Top estates never recovered from the shocks, but lower estates did recover perfectly well and were able to compensate the fall in top estates. This is consistent with macroeconomic estimates showing that the (capital stock)/(national income) ratio was about 5 in the late 1990s, i.e., at about the same level as at the eve of the First World War.<sup>33</sup> In other words, both capital income and the capital stock have returned to their pre-First World War levels. The distribution has changed, not the aggregates.

Although the French tax administration did not compile inheritance tax tables until 1901, a number of inheritance series (based upon samples of tax returns

<sup>32</sup> I have also checked that legally tax exempt capital income (which has become more and more important over time) and capital gains (which were excluded from my basic series altogether) can only be a small part of the story. For instance, tax return data shows that capital gains represent an average income supplement of about 25% for fractile P99.99–100 (see Piketty 2001: 420–31, and Appendix A, pp. 586–8). This is a non-negligible amount in absolute terms, but this is not going to explain why the income share of fractile P99.99–100 has been divided by 5 during the twentieth century.

<sup>33</sup> For the 1999 figures, see INSEE 2001: 34 and 38):  $36583/6951 = 5.2$ . The capital stock estimate for 1999 is not fully homogeneous with the estimates given above for 1913, 1934, and 1949, but the orders of magnitude seem right.



**Figure 3.5** The average estate left by the fractiles P90–95 and P99.99–100 in France, 1902–94 (1998 French Francs)

Source: Author's computations based on inheritance tax returns (see Piketty 2001a: appendix J, table J–9, p. 763).

collected by historians) are available for the nineteenth century. Those series show that wealth concentration increased sharply in France between 1815 and 1914 (top estates rose more than lower estates), and that wealth inequality did not start declining until the First World War. This seems to confirm our ‘accidental’ interpretation of the inequality decline: no ‘spontaneous’ downward trend was taking place before the shocks.<sup>34</sup>

Finally, there is plenty of anecdotal evidence suggesting that the decline of top capital incomes is indeed a real economic and social phenomenon. Individuals living off large capital incomes were plentiful in the literature of the nineteenth century and the early twentieth century (see, e.g., the novels by Stendhal, Balzac, Proust, etc.), whereas they have virtually disappeared from the literary scene since the Second World War. It is also interesting to note that ‘rentiers’ have disappeared from French census questionnaires in 1946: since the 1946 census, one can no longer describe oneself as ‘rentier’ (this category was used in all censuses through 1936). Another interesting piece of evidence is the evolution of the number of household workers and domestic servants. At the eve of the First World War,

<sup>34</sup> Inheritance series for the nineteenth century can be found in Daumard (1973) and Bourdieu et al. (2001). Morrisson (2000) reports top income shares estimates according to which income inequality declined somewhat in France between 1860 and 1900. But these estimates are based on macro-economic data alone and do not take into account the rise in wealth concentration that took place during this period. On these issues, see Piketty 2001: 535–42.

household workers and domestic servants were very numerous in France: about 0.9–1 million according to the censuses, i.e., around 5% of the labour force. This number fell suddenly in the aftermath of the First World War and during the 1930s (down to about 0.7 million, 3.5% of the labour force), and even more so in the aftermath of the Second World War. The number of household workers and domestic servants has stabilized around 0.2 million since 1950s–60s, i.e., about 1% of the labour force, 5 times less than at the eve of the First World War.<sup>35</sup> The parallelism between this evolution and the evolution of top income shares is striking. It is particularly important to note that the number of household workers and domestic servants was relatively stable at the eve of the First World War. The obvious interpretation is that this number suddenly started falling together with the number of wealthy households who could afford having domestic servants.<sup>36</sup>

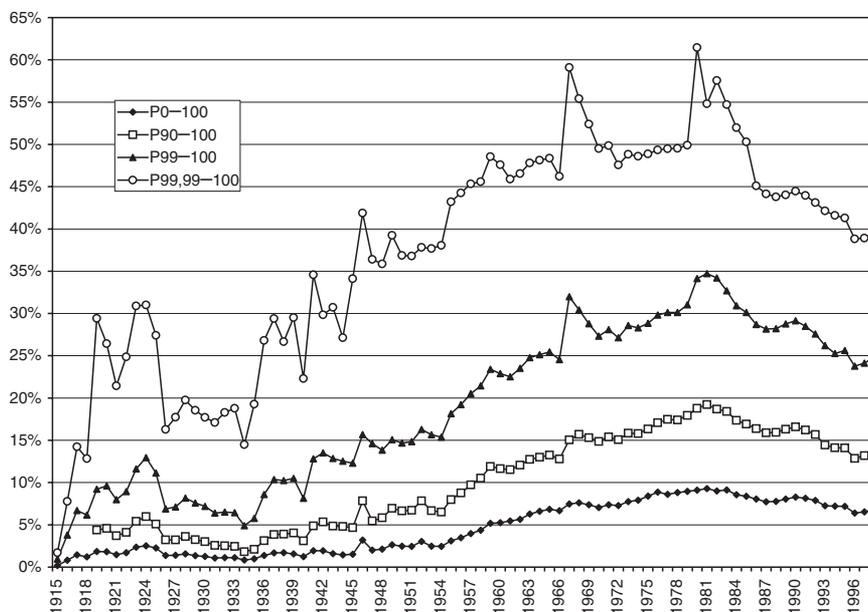
### The Role of Progressive Taxation

How can one account for the fact that large fortunes never recovered from the 1914–45 shocks, while smaller fortunes did recover perfectly well? The most natural and plausible candidate for an explanation seems to be the creation and the development of the progressive income tax (and of the progressive inheritance tax). The large fortunes that generate the top capital incomes observed at the beginning of the twentieth century were accumulated during the nineteenth century, at a time when progressive taxation did not exist and capitalists could use almost 100% of their pre-tax income to consume and to accumulate.<sup>37</sup> The conditions faced by twentieth century capitalists to recover from the shocks incurred during the 1914–45 period were quite different. The top marginal rate of the income tax was set to only 2% in 1915 in France, but it quickly reached very high levels (over 60%) during the interwar period, and it stabilized around 60–70% after 1945. These high marginal rates applied only to a small fraction of incomes, but the point is that they were to a large extent designed to hit the incomes of the top 1% (and even more so the top 0.1% and 0.01%) of the income distribution, i.e., the incomes that depend primarily on capital income and capital accumulation. Effective average tax rates have always been fairly moderate at the level of fractile P90–95: less than 1% during the interwar period, and

<sup>35</sup> For detailed series on the number of household workers and domestic servants since the 1901 census, see Piketty 2001a: appendix H, pp. 726–8.

<sup>36</sup> The labour cost of a domestic servant has increased at a slightly higher rate than per capita income in the long run (see Piketty 2001a: 86–7), but the gap seems far too small to explain why the number of domestic servants was divided by 5 across the century. In any case, labour costs cannot explain why the number of servants dropped so suddenly after the First World War (there was no sudden variation in labour costs).

<sup>37</sup> Before the creation of a progressive income tax in 1914, personal taxation relied on individual characteristics such as housing rents, the number of doors and windows, etc. Effective tax rates were roughly proportional and never exceeded 3–4% of income (see Caillaux 1910: 208–9 and Piketty 2001: 236–9). Note also that there did exist an inheritance tax during the nineteenth century, but it was purely proportional and the rate was only 1% (see below).



**Figure 3.6** Effective average income tax rates in France, 1915–98

Source: Author's computations based on income tax returns and income tax laws (see Piketty (2001a: appendix B, table B-20, pp. 636–7).

between 5% and 10% since the Second World War. In contrast, effective average tax rates borne by fractile P99.99–100 reached 30% during the interwar period, and stabilized around 40–50% since the Second World War (see Figure 3.6).<sup>38</sup> It is therefore not surprising if progressive taxation had a substantial impact on capital accumulation at the very top and a negligible impact for smaller fortunes.

Needless to say, these numbers are not sufficient to prove in a rigorous way that the dynamic effects of progressive taxation on capital accumulation and pre-tax income inequality have the ‘right’ quantitative magnitude to account for the observed facts. One would need to know more about the savings rates of capitalists, how their accumulation strategies have changed since 1945, etc. Note however that the orders of magnitude do not seem unrealistic, especially if one assumes that the owners of large fortunes, whose pre-tax incomes and lifestyles were already severely hit by the 1914–45 shocks, were not willing to reduce their consumption down to very low levels and to increase their savings so as to counteract the rise in tax rates.<sup>39</sup>

<sup>38</sup> The large year-to-year variations on Figure 3.6 (especially for top incomes) show how chaotic the history of the income tax has been in France. For instance, the 1968 and 1981 spikes correspond to the large tax increases on the rich that were voted in the aftermath of the 1968 general strike and of the 1981 socialist electoral victory. I offer a detailed historical account of these politico-economic developments over the 1914–98 period in Piketty (2001: chap. 4, pp. 233–334).

<sup>39</sup> Existing evidence shows that the negative shocks incurred between 1914 and 1945 and the rise in progressive taxation induced French wealthy families to reduce drastically their savings rate between

In fact, in the most standard economic models of capital accumulation, the behavioural response tends to amplify (and not to counteract) the rise in tax rates. That is, a rise in tax rates imposed on very top incomes leads wealthy taxpayers to increase their consumption and to reduce their savings. In the Barro-Becker dynastic model of capital accumulation, this behavioural effect is so large that large fortunes completely disappear in the long run. Progressive taxation leads to truncated wealth distribution in the long run, in the sense that there is nobody above the top marginal rate threshold.<sup>40</sup> In less extreme and more realistic models of capital accumulation, the impact of progressive taxation is smaller (large fortunes do not completely disappear). But the impact is still substantial. For instance, simple computations show that a capitalist will deplete his or her wealth at a very high rate if he or she keeps the same consumption after progressive taxation is introduced. In the absence of taxation (say, before the First World War), the capital stock of a capitalist consuming each year the full return (say, 5%) to his or her capital stock is stationary. But if an effective tax rate of 30% is suddenly introduced (say, in the interwar period), and if this capitalist keeps consuming the full before-tax return to his or her capital stock, then he or she will need to consume some his or her capital stock each year: 18% of the initial capital stock is destroyed after ten years, 42% after 20 years, etc., and there is no capital left after 35 years.<sup>41</sup>

Consider now the more interesting case of a capitalist (or a would-be capitalist) in 1945, and assume that this capitalist is ready to devote a large fraction of his or her income to capital accumulation. How much can he or she accumulate in 50 years? The point is that progressive taxation drastically reduces the assets that one can accumulate, including for capitalists adopting relatively low living standards (see Table 3.2). For instance, with a 5% before-tax return and for a consumption level equals to 40% of the before-tax return to the initial capital stock, one can accumulate in 50 years a fortune that is about 5 times as large with a 0% tax rate as with a 50% tax rate. That is, the initial capital stock is multiplied by 7.3 after 50 years in the absence of taxation, while the initial capital stock is multiplied by only 1.5 with a tax rate of 50%. This tax rate of 50% corresponds approximately to the average effective tax rates faced by fractile P99.99–100 in France since the Second World War, and the factor of 5 corresponds approximately to the secular decline in the income share of fractile P99.99–100.

Note also that these simple simulations do not take into account the impact of the progressive inheritance tax. During the nineteenth century, the French inheritance tax was strictly proportional, with a fixed 1% tax rate. A progressive

1873–1913 and 1946–53 (see Perrot 1961). Note however that this research by Perrot relies on a few hundred private account books from French wealthy families, and that it would need to be supplemented by extensive new research based on larger samples.

<sup>40</sup> For a formal proof of this result, see Piketty 2001a: 30–2.

<sup>41</sup> This cumulative process would take place at an even faster pace in case of higher returns and/or higher tax rates (see Piketty 2001a: table 3). This mechanism is trivial, but I believe that it did contribute to amplify the shocks incurred by capital owners during the 1914–45 period.

Table 3.2 The impact of progressive taxation on capital accumulation

	r = 5%, t = 0%	r = 5%, t = 30%	r = 5%, t = 50%	r = 10%, t = 0%	r = 10%, t = 30%	r = 10%, t = 50%
c = 100%	1.0	0.0	0.0	1.0	0.0	0.0
c = 80%	3.1	0.3	0.0	24.3	0.0	0.0
c = 60%	5.2	1.7	0.5	47.6	5.1	0.0
c = 40%	7.3	3.0	1.5	70.8	13.2	3.1
c = 20%	9.4	4.3	2.5	94.1	21.3	7.3
c = 0%	11.5	5.6	3.4	117.4	29.5	11.5

Note: This table reads as follows: assume that a capitalist's consumption level is equal to a fixed fraction  $c$  (say,  $c = 20\%$ ) of the full return  $r$  (say,  $r = 5\%$ ) to his or her capital stock; in the absence of taxation ( $t = 0\%$ ), his or her capital stock will be multiplied by 9.4 after 50 years; with an effective tax rate  $t = 50\%$ , his or her capital stock will be multiplied by 2.5 after 50 years (I assume that the capitalist keeps the same absolute consumption level during 50 years). The corresponding formula is given by:  $x_n = c/(1-t) + [1 + (1-t)r]^n x[1 - c/(1-t)]$ .

inheritance tax was introduced in 1901, but tax rates remained low until the First World War: at the eve of the war, top tax rates did not exceed 5%. In the same way as with the progressive income tax, the top rates of the progressive inheritance tax suddenly reached non-trivial levels in the aftermath of the First World War. One can compute that the effective tax rate faced by fractile P99.99–100 of the estate distribution was about 20–5% during the interwar period (or even 30–5% during the early 1920s), 30–5% during the 1950s, 15–20% during the 1960s–70s and again 30–5% during the 1980s–90s.<sup>42</sup> Note however that the long run impact of the progressive inheritance tax on capital accumulation, though important, has probably been less drastic than the impact of the progressive income tax. Because the income tax applies every year and has cumulative effects, an effective income tax rate of 50% can reduce by a factor of 5 the size of fortunes that one can accumulate in 50 years. In contrast, assuming the inheritance tax is paid once every 50 years (on average), an effective inheritance tax rate of 50% reduces by a factor of 2 the size of fortunes that one can accumulate in 50 years.

Finally, it is worth emphasizing that it is not that easy to find convincing explanations (other than the introduction of progressive taxation) that can account for the non-recovery of large fortunes. For instance, explanations based on hypothetical changes in before-tax returns to capital do not seem to work. All capital holders should have been hit by a reduction in before-tax asset returns. The point is that large fortunes were unable to recover from the 1914–45 shocks, while fortunes that were slightly smaller did recover perfectly well. One needs an explanation that applies only to the top of the distribution and nowhere else, and progressive taxation looks like an obvious candidate.

Another possible explanation would be the existence of a large public sector in France after the nationalizations of 1945. But the negative impact on private capital accumulation would seem to apply to all capital holders, or at least to broader segments of the wealth distribution than simply the very top. Moreover, one should not exaggerate the importance of the public sector in post-war France.

<sup>42</sup> See Piketty 2001: appendix J, pp. 767–71.

For instance, the output share of nationalized firms never went above 15–20% in the manufacturing sector.<sup>43</sup> This is a substantial share in absolute terms, but this does not seem sufficient to explain the magnitude of the observed trends. Although there was a public sector in postwar France, the point is that private capital accumulation could freely take place in at least 80–5% of the manufacturing sector. It is also interesting to note that Carré et al. (1972), in their standard account of post-war growth in France, have pointed out that the bulk of the growth performance came from manufacturing sub-sectors where there was almost no nationalized firm.<sup>44</sup> This suggests that there were plenty of economic opportunities to accumulate large fortunes with little interference with the public sector.

Assuming that the rise of progressive taxation is indeed the right explanation for the observed facts (or at least for a significant fraction of the observed facts), what was the economic impact of the non-recovery of large fortunes? More generally, what were the consequences for the performance of the French economy of the shocks incurred by capital owners during the 1914–45 period and the structural decline in the concentration of wealth? It is obviously very difficult to give a satisfactory answer to such a complex question. One could try to construct a historical micro data base on French firms so as to compare the growth performance of firms with different levels of capital dispersion and different levels of exposure to shocks during the 1914–45 period. In the meantime, one can make a number of simple remarks based on available macro-economic data.

First of all, the decline in wealth concentration does not seem to have been an obstacle to growth. Growth rates were extremely high from the late 1940s to the 1970s, and this period is now referred to as the '*Trente Glorieuses*' (the 'Thirty Glorious Years') in France.<sup>45</sup> Needless to say, these very high growth rates are to a large extent the consequence of the abysmal economic performance of the 1914–45 period (which was itself the consequence of the two World Wars and the Great Depression). During the '*Trente Glorieuses*', France was simply catching up with the most advanced capitalist countries, and in particular with the United States. According to Maddison's estimates, the ratio between US GDP per capita and French GDP per capita (both expressed in PPP terms) was about 1.4–1.5 at the eve of the First World War, up to 1.8 in 1950, and down to 1.2–1.3 in the late 1970s (this ratio has stabilized around 1.2–1.3 during the 1980s–90s).<sup>46</sup> Of course, one cannot rule out the possibility that French growth rates would have been even higher during the '*Trente Glorieuses*' if capital concentration had remained at the same level as in 1914. Note however that several macro-economic

<sup>43</sup> According to (incomplete) estimates given by Delion and Durupt (1982: 191), this output share was around 15–20% between 1945 and 1982, and it soon reached 30% between 1982 and 1986 (following the nationalizations of 1982), before being drastically reduced following the privatizations of 1986–87. Nationalized firms have been privatized one by one since 1986–87, and the public sector share is now converging toward 0%.

<sup>44</sup> See Carré, Dubois and Malinvaud 1972: 614–15.

<sup>45</sup> The idea of the '*Trente Glorieuses*' was coined by Fourastié (1979). Average real household income grew at about 5% per year between 1948 and 1978 in France (see Piketty 2001: 72).

<sup>46</sup> See Maddison 1995: 194–7.

historians have suggested that the decline in wealth concentration might have had a positive growth impact. For instance, Carré Dubois and Malinvaud (1972) have pointed out that wealth redistribution during the 1914–45 period (in particular the inflation induced redistribution from creditors to debtors) might have favoured the development of new firms and new generations of entrepreneurs.<sup>47</sup> In presence of credit constraints, high capital concentration can indeed entail negative consequences for productive efficiency, and wealth redistribution can under certain conditions have positive efficiency effects. This is all very hypothetical however, and extensive research based on new micro-data sets would be necessary to test these hypotheses.

It is also important to emphasize that the rise of progressive taxation had apparently no negative impact on aggregate capital accumulation. As was already noted above, the (capital stock)/(national income) ratio seems to have fully recovered from the 1914–45 shocks, with a ratio around 5 both at the eve of the First World War and in the late 1990s. That is, the fall of large fortunes was compensated by rapid accumulation at intermediate and moderately high wealth levels, so that the structural decline in capital concentration seems to have had little impact on the average capital stock. It is interesting to note that this is exactly what the Barro-Becker dynastic model of capital accumulation would predict. In the presence of progressive taxation, dynastic preferences with a fixed rate of time preference imply that capital de-accumulation by the wealthy will be fully compensated by increased accumulation from individuals with lower wealth.<sup>48</sup> This does mean however that there is no efficiency cost: aggregate capital stock will recover in the long run, but it might well be inefficiently low during the transition. The analysis of the efficiency properties of progressive taxation in less extreme and more realistic models of capital accumulation is an issue that would deserve further research.

Finally, it is important to note that although progressive taxation seems to have had a substantial dynamic impact on capital concentration, its static impact on income inequality has been more moderate. During the 1990s, the after-tax top decile income share was quite close to the before-tax top decile share (30% vs. 33%). This reflects the fact that effective income tax rates have always been fairly moderate for the vast majority of top decile taxpayers (e.g., effective tax rates have never exceeded 5–10% at the level of fractile P90–95). Unsurprisingly, the impact is larger for higher incomes: during the 1990s, the after-tax top percentile income share is about 25% smaller than the before-tax top percentile income share (6% vs. 8%). At the level of fractile P99.99–100, after-tax income shares are more than 40% smaller than before tax income shares during the 1990s (0.35% vs. 0.6%).<sup>49</sup> It looks as if progressive taxation was designed to hit top capital incomes rather than to reduce drastically the top decile income share as a whole.<sup>50</sup>

<sup>47</sup> See Carré et al. 1972: 457–9 and 620.

<sup>48</sup> For a formal proof, see the Appendix to this chapter and Piketty 2001a: 30–2.

<sup>49</sup> Series on after-tax income shares were computed by applying effective tax rates series to pre-tax income shares series (see Piketty 2001: table B22, pp. 640–1).

<sup>50</sup> This conclusion would not be dramatically altered by the inclusion of non-taxable income transfers (most income transfers (pensions, unemployment benefits, etc.) are taxable and are therefore already taken into account in our before tax series).

### 3.5 HOW SPECIFIC IS THE FRENCH EXPERIENCE?

Estimates for other continental European countries (see Chapters 9, 10, and 11 in this volume) seem consistent with my French findings. First, the secular decline in the top decile income share seems to have occurred in all European countries during a specific time period, i.e., between 1914 and 1945 (and especially during the 1930s and the Second World War). Next, the substantial 1914–45 decline in the top decile share seems to be due for the most part to the top percentile share. Existing estimates also suggest that countries with larger war destructions experienced a larger decline of their top centile income share (for instance, total decline was apparently larger in Germany than in the UK), which again is consistent with my explanation. This would seem to imply that the 1914–45 inequality decline was in all European countries an accidental, capital-income phenomenon (for the most part).

The US case is particularly interesting. Kuznets (1953) used US tax returns statistics to construct annual 1913–48 top income shares series, and these series constitute a most valuable source of information on US inequality dynamics during the first half of the twentieth century (see also Chapter 5). Kuznets' series show that the significant decline in the top decile income share that took place between 1913 and 1948 is almost entirely due to the sharp decline of the top percentile income share. The total decline of the top percentile income share, though very significant, seems smaller than what I found in France. This is consistent with the capital-income explanation: the World Wars induced a much more severe shock on capital holders in France than in the US (unlike the Great Depression of the 1930s, which was more severe in the US). Kuznets' series also confirm that the inequality decline was not a linear, continuous process: the top percentile income share dropped during the First World War, recovered during the 1920s, and dropped again during the Great Depression and the Second World War.

Unfortunately, Kuznets did not construct separate series for wage inequality (there was no separate wage tax in the US, so the data are less rich than in France). It is therefore impossible to undertake the same kind of test than what I did for France. In particular, it is impossible to know whether US wage inequality declined significantly during the 1900–50 period (which would mean that what happened was not just an accidental capital-income phenomenon). (But see Chapter 5 below.) Since the time of Kuznets, several economists have collected long term, occupational wage data in order to shed light on this issue.<sup>51</sup> These data do show that there was significant wage compression during both World Wars (like in France). However, these data not allow any strong conclusion regarding the existence of a more general equalizing trend during the 1900–50 period.<sup>52</sup>

<sup>51</sup> See, e.g., Williamson and Lindert 1980; Goldin and Margo 1992; and Goldin and Katz 1999.

<sup>52</sup> Given the large changes in workforce composition, it is problematic to use occupational wage ratios to analyze long-run trends in wage inequality. In France, the ratio between average wage of managers and the average wage of production workers has declined enormously in the long run (both

It is interesting to note that Kuznets himself, in his 1955 article, started by proposing an interpretation of his 1953 series that was very much in line with the capital-income interpretation that I have advocated in this paper. Kuznets emphasized the shocks incurred by capital owners during the 1914–45 period, and he mentioned explicitly the dynamic impact of progressive taxation on capital accumulation and income inequality. But, by the end of his article (which was also his presidential address to the American Economic Association), Kuznets formulated a completely different theory. Kuznets argued that there could well exist an endogenous mechanism forcing inequality to decline in advanced capitalist countries: in a two-sector model of economic development, one should indeed observe inequality to rise when only a small fraction of the population benefits from the incomes generated by the high-productivity sector, and to decline when most workers join the high-productivity sector.<sup>53</sup> Kuznets had basically no empirical evidence to support this theory: ‘this is perhaps 5% empirical information and 95% speculation, some of it possibly tainted by wishful thinking.’<sup>54</sup> Although this optimistic theory quickly became popular, it is important to recall that the theory of the ‘Kuznets’ curve’ is not supported by Kuznets’ series. Kuznets’ himself believed more strongly in the effect of shocks and progressive taxation than in the Kuznets’ curve, and the first part of his theory seems to have been overly neglected by economists.

Regarding the more recent period, there exists one important divergence between US and French inequality dynamics. Top income shares have been increasing sharply in the US since the 1970s,<sup>55</sup> while my series show that they have been flat in France. The very steep rise in top incomes observed in the US since the 1970s seems to be due to large increases in high skill wages and executive compensation. The large decline in top tax rates observed in the US since the 1970s also provides a test for the theory of progressive taxation and capital accumulation. One should expect the decline in top tax rates to facilitate the accumulation of large fortunes and the resurgence of top capital incomes during the next few decades.

### 3.6 CONCLUDING COMMENTS

In this chapter I have presented new inequality series on France during the twentieth century. The main conclusion is that the decline in income inequality that took place during the first half of the twentieth century was mostly accidental.

during the 1900–50 and the 1950–98 periods), although the top decile and top percentile wage shares have been roughly constant (the explanation for this paradox is simply that the number of managerial jobs has increased a lot; see Piketty 2001: 203–10). To my knowledge, there does not exist any US wage inequality series expressed in terms of fractiles prior to 1940 (starting in 1940, censuses ask a question on wages).

<sup>53</sup> Kuznets also mentioned that with a higher variance of earnings in the urban sector it might take a long time before inequality starts declining (and it might not decline at all).

<sup>54</sup> See Kuznets 1955: 26.

<sup>55</sup> See Feenberg and Poterba 1993, 2000; and Chapter 5 in this volume.

In France, and possibly in a number of other developed countries as well, wage inequality has actually been extremely stable in the long run, and the secular decline in income inequality is for the most part a capital income phenomenon: holders of large fortunes were badly hurt by major shocks during the 1914–45 period, and they were never able to fully recover from these shocks, probably because of the dynamic effects of progressive taxation on capital accumulation and pre-tax income inequality.

More research is needed in order to better understand the determinants of long run inequality dynamics. The dynamic interplay between progressive taxation, capital accumulation and income inequality needs to be analyzed more carefully, both from an empirical and theoretical standpoint. I hope that the empirical findings presented in this chapter will contribute to stimulate future research in this area.

### APPENDIX 3A: PROGRESSIVE TAXATION WITH DYNASTIC CAPITAL ACCUMULATION

I consider an infinite-horizon, discrete-time economy with a continuum  $[0;1]$  of dynasties. All dynasties maximize a standard dynastic utility function:

$$U_t = \sum_{t \geq 0} U(c_t)/(1 + \theta)^t$$

$$(U'(c) > 0, U''(c) < 0)$$

All dynasties supply exactly one unit of (homogeneous) labour each period. Output per labour unit is given by a standard production function  $f(k_t)$  ( $f'(k) > 0, f''(k) < 0$ ), where  $k_t$  is the average capital stock per capita of the economy at period  $t$ . Markets for labour and capital are assumed to be fully competitive, so that the interest rate  $r_t$  and wage rate  $v_t$  are always equal to the marginal products of capital and labour:

$$r_t = f'(k_t)$$

$$v_t = f(k_t) - r_t k_t$$

For simplicity, I assume a two-point distribution of wealth. Dynasties can be of one of two types: either they own a large capital stock  $k_t^A$ , or they own a low capital stock  $k_t^B$  ( $k_t^A > k_t^B$ ). The proportion of high wealth dynasties is equal to  $\lambda$  (and the proportion of low wealth dynasties is equal to  $1 - \lambda$ ), so that the average capital stock in the economy  $k_t$  is given by:

$$k_t = \lambda k_t^A + (1 - \lambda) k_t^B$$

In such a dynastic capital accumulation model, it is well known that the long-run steady-state interest rate  $r^*$  and the long-run average capital stock  $k^*$  are uniquely

determined by the utility function and the technology (irrespective of initial conditions): in steady-state,  $r^*$  is necessarily equal to  $\theta$ , and  $k^*$  must be such that  $f'(k^*) = r^* = \theta$  (if the interest rate is above the rate of time preference, then agents choose to accumulate capital indefinitely, and this cannot be a steady-state; conversely, if the interest rate is below the rate of time preference, agents dis-accumulate capital indefinitely and this cannot be a steady-state either). This does not mean however that convergence in individual wealth levels occurs in a such a model: in fact, any wealth distribution such that the average wealth is equal to  $k^*$  (the ‘golden rule’ capital stock) can be a long-run steady-state.

*Proposition 1.* In the absence of taxation, all long-run steady-state wealth distributions  $(k_\infty^A, k_\infty^B)$  ( $k_\infty^A > k_\infty^B$ ) are characterized by the following condition:

$$(i) \quad \lambda k_\infty^A + (1 - \lambda)k_\infty^B = k^* \text{ (with } k^* \text{ such that } f'(k^*) = r^* = \theta)$$

Consider now the effects of progressive taxation. Assume that individual capital stocks are taxed each period at a marginal tax rate  $\tau > 0$  above some capital stock threshold  $k_\tau$ .<sup>56</sup> In other words, the tax is equal to 0 if  $k < k_\tau$ , and the tax is equal to  $\tau(k - k_\tau)$  if  $k > k_\tau$ . Further assume that the threshold  $k_\tau$  is larger than the ‘golden rule’ capital stock  $k^*$  (defined by  $f'(k^*) = r^* = \theta$ ). One can easily show that the only long-run effect of this progressive capital tax is to truncate the distribution of wealth. That is, the long-run distribution of wealth must be such that  $k_\infty^A < k_\tau$ , but long-run average wealth is unchanged (it is still equal to the ‘golden rule’ level  $k^*$ ). Note that this truncation result holds no matter how small the tax rate  $\tau$ :  $\tau$  just needs to be strictly positive (say  $\tau = 0,0001\%$ ), and one gets the result according to which individual wealth levels above the threshold  $k_\tau$  must completely disappear in the long-run. This illustrates how extreme the dynastic model really is.

*Proposition 2.* With progressive capital taxation at rate  $\tau > 0$  levied on capital stocks above some threshold  $k_\tau$  (with  $k_\tau > k^*$ ), then all long-run steady-state wealth distributions  $(k_\infty^A, k_\infty^B)$  ( $k_\infty^A > k_\infty^B$ ) are characterized by the following two conditions:

$$(ii) \quad \lambda k_\infty^A + (1 - \lambda)k_\infty^B = k^* \text{ (with } k^* \text{ such that } f'(k^*) = r^* = \theta)$$

$$(iii) \quad k_\infty^B < k_\infty^A < k_\tau$$

*Proof:* In steady-state, after tax interest rates faced by both types of dynasties must be equal to the rate of time preference. This implies that both types of dynasties must be in the same tax bracket in the long run: either  $k_\infty^B < k_\infty^A < k_\tau$ , or  $k_\tau < k_\infty^B < k_\infty^A$ . Assume that  $k_\tau < k_\infty^B < k_\infty^A$ , and note  $k_\infty$  the average long-run capital stock ( $k_\infty = \lambda k_\infty^A + (1 - \lambda)k_\infty^B$ ). The long-run before tax interest rate  $r_\infty$  is given by  $r_\infty = f'(k_\infty)$ , and the long run after-tax interest rate  $(1 - \tau)r_\infty$  faced by both types of dynasties is such that  $(1 - \tau)r_\infty = \theta$ . But  $k_\tau > k^*$  implies that

<sup>56</sup> A similar result applies if one replaces the progressive capital tax by a progressive tax on capital income.

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Table 3A.1 Top income shares in France, 1900–98 (I)

	P90–100	P95–100	P99–100	P99.5–100	P99.9–100	P99.99–100
1900–1910	45.00	34.00	19.00	15.00	8.00	3.00
1915			18.31	14.49	7.90	3.03
1916			20.65	16.52	9.39	3.79
1917			20.09	16.05	8.89	3.44
1918			17.95	14.28	7.67	2.87
1919	42.25	33.84	19.50	15.36	8.26	2.81
1920	39.59	31.41	17.95	14.12	7.63	2.86
1921	39.70	31.04	17.32	13.49	7.23	2.65
1922	41.54	32.50	17.87	13.84	7.26	2.51
1923	43.54	34.15	18.91	14.68	7.61	2.61
1924	42.14	32.27	17.96	13.91	7.05	2.39
1925	44.07	33.63	18.16	14.00	7.07	2.38
1926	42.06	32.34	17.82	13.73	6.98	2.41
1927	42.95	32.47	17.45	13.43	6.87	2.35
1928	42.75	32.19	17.27	13.24	6.77	2.33
1929	41.59	30.90	16.15	12.39	6.25	2.16
1930	41.08	30.14	15.31	11.59	5.79	1.93
1931	41.12	29.67	14.63	10.95	5.37	1.77
1932	43.44	31.06	14.80	10.89	5.22	1.67
1933	44.87	31.95	14.95	10.92	5.20	1.69
1934	46.01	32.68	15.28	11.17	5.31	1.71
1935	46.61	33.10	15.40	11.21	5.31	1.74
1936	44.10	31.58	14.74	10.77	5.17	1.74
1937	42.90	30.21	14.46	10.67	5.24	1.83
1938	42.52	29.79	14.27	10.49	5.05	1.75
1939	38.24	27.21	13.30	9.98	4.99	1.73
1940	39.11	27.85	13.35	9.89	4.90	1.65
1941	38.70	27.37	12.88	9.33	4.27	1.30
1942	35.04	24.90	11.53	8.26	3.64	1.06
1943	32.26	22.68	10.13	7.13	3.01	0.84
1944	29.42	20.18	8.37	5.75	2.32	0.61
1945	29.70	19.58	7.54	5.04	1.96	0.51
1946	32.87	22.34	9.22	6.35	2.61	0.72
1947	33.20	23.05	9.22	6.31	2.59	0.68
1948	32.35	21.46	8.75	6.00	2.43	0.63
1949	32.20	21.70	9.01	6.25	2.61	0.70
1950	31.97	21.62	8.98	6.23	2.60	0.70
1951	32.93	22.06	9.00	6.19	2.55	0.68
1952	33.19	22.35	9.16	6.27	2.53	0.65
1953	32.89	22.10	9.00	6.13	2.48	0.65
1954	33.53	22.55	9.14	6.20	2.45	0.64
1955	34.42	23.16	9.33	6.30	2.48	0.65
1956	34.36	23.11	9.37	6.29	2.46	0.65
1957	34.74	23.38	9.37	6.28	2.44	0.64
1958	34.05	22.76	9.01	6.02	2.34	0.60
1959	35.88	24.14	9.46	6.27	2.37	0.60
1960	36.11	24.40	9.71	6.48	2.45	0.62
1961	36.82	24.92	9.88	6.57	2.48	0.64
1962	35.88	24.16	9.46	6.25	2.34	0.58
1963	36.41	24.43	9.43	6.19	2.29	0.56

*(contd.)*

Table 3A.1 (Contd.)

	P90–100	P95–100	P99–100	P99.5–100	P99.9–100	P99.99–100
1964	36.84	24.75	9.56	6.28	2.30	0.56
1965	37.15	24.94	9.58	6.27	2.30	0.56
1966	36.46	24.41	9.36	6.14	2.26	0.57
1967	36.21	24.27	9.36	6.16	2.29	0.59
1968	34.80	23.08	8.77	5.76	2.15	0.56
1969	33.96	22.48	8.55	5.61	2.09	0.55
1970	33.14	21.95	8.33	5.45	2.02	0.53
1971	33.35	22.10	8.47	5.57	2.07	0.53
1972	33.03	21.97	8.52	5.63	2.11	0.55
1973	33.90	22.61	8.87	5.90	2.26	0.62
1974	33.33	22.09	8.50	5.60	2.09	0.53
1975	33.41	22.06	8.48	5.56	2.08	0.54
1976	33.19	21.91	8.44	5.53	2.08	0.54
1977	31.68	20.71	7.79	5.11	1.94	0.51
1978	31.38	20.56	7.80	5.11	1.93	0.50
1979	31.03	20.42	7.82	5.15	1.97	0.52
1980	30.69	20.11	7.63	5.01	1.91	0.50
1981	30.73	20.04	7.55	4.95	1.89	0.50
1982	29.93	19.37	7.07	4.61	1.72	0.44
1983	30.43	19.53	6.99	4.51	1.63	0.40
1984	30.52	19.57	7.03	4.51	1.65	0.41
1985	31.05	19.96	7.20	4.66	1.70	0.43
1986	31.39	20.30	7.44	4.85	1.81	0.46
1987	31.73	20.66	7.75	5.13	1.98	0.53
1988	32.09	20.90	7.92	5.28	2.06	0.57
1989	32.42	21.31	8.21	5.51	2.20	0.62
1990	32.64	21.45	8.23	5.52	2.20	0.62
1991	32.44	21.18	7.97	5.30	2.07	0.57
1992	32.23	20.90	7.75	5.12	1.97	0.54
1993	32.22	20.81	7.65	5.05	1.94	0.53
1994	32.37	20.90	7.71	5.10	1.98	0.55
1995	32.41	20.93	7.70	5.08	1.96	0.54
1996	32.25	20.79	7.59	5.01	1.92	0.53
1997	32.42	20.93	7.70	5.10	1.98	0.55
1998	32.50	20.98	7.72	5.10	1.97	0.55

Source: Author's computations based on income tax returns (see Piketty 2001a: appendix B, table B14, pp. 620–1).

$k_\infty > k^*$ , which in turn implies that  $r_\infty = f'(k_\infty) < r^* = f'(k^*) = \theta$ , which leads to a contradiction. Therefore  $k_\infty^B < k_\infty^A < k_\tau$ . This implies that the tax does not bind in the long-run and that  $r_\infty = \theta$  and  $k_\infty = k^*$ , in the same way as in the absence of tax. *CQFD*.

Tables 3A.1, 3A.2, 3A.3, and 3A.4 present the data on top income shares in France, the sources for French income tax data, and income and population totals for France during the period of 1900–98.

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Table 3A.2 Top income shares in France, 1900–1998 (II)

	P90–95	P95–99	P99–99.5	P99.5–99.9	P99.9–99	P99.99–100
1900–1910	11.00	15.00	4.00	7.00	5.00	3.00
1915			3.82	6.59	4.87	3.03
1916			4.14	7.13	5.60	3.79
1917			4.04	7.16	5.45	3.44
1918			3.68	6.60	4.80	2.87
1919	8.41	14.33	4.15	7.10	5.45	2.81
1920	8.18	13.46	3.83	6.49	4.77	2.86
1921	8.66	13.72	3.83	6.26	4.58	2.65
1922	9.04	14.63	4.03	6.58	4.74	2.51
1923	9.38	15.25	4.22	7.08	4.99	2.61
1924	9.86	14.31	4.05	6.86	4.66	2.39
1925	10.44	15.47	4.16	6.93	4.69	2.38
1926	9.72	14.52	4.09	6.75	4.58	2.41
1927	10.48	15.02	4.02	6.56	4.52	2.35
1928	10.56	14.92	4.03	6.47	4.44	2.33
1929	10.69	14.75	3.77	6.13	4.09	2.16
1930	10.94	14.83	3.72	5.80	3.86	1.93
1931	11.45	15.04	3.69	5.57	3.61	1.77
1932	12.38	16.26	3.90	5.68	3.54	1.67
1933	12.92	17.00	4.02	5.72	3.51	1.69
1934	13.33	17.39	4.12	5.86	3.60	1.71
1935	13.50	17.71	4.19	5.90	3.57	1.74
1936	12.51	16.85	3.97	5.60	3.43	1.74
1937	12.69	15.75	3.79	5.44	3.41	1.83
1938	12.73	15.52	3.78	5.44	3.30	1.75
1939	11.03	13.91	3.32	4.99	3.26	1.73
1940	11.25	14.51	3.45	5.00	3.25	1.65
1941	11.32	14.49	3.55	5.06	2.97	1.30
1942	10.14	13.37	3.27	4.62	2.58	1.06
1943	9.58	12.55	3.00	4.12	2.18	0.84
1944	9.24	11.81	2.62	3.43	1.71	0.61
1945	10.12	12.04	2.50	3.08	1.45	0.51
1946	10.52	13.12	2.88	3.73	1.90	0.72
1947	10.16	13.83	2.91	3.72	1.91	0.68
1948	10.88	12.71	2.76	3.57	1.80	0.63
1949	10.50	12.69	2.76	3.64	1.91	0.70
1950	10.35	12.64	2.76	3.62	1.90	0.70
1951	10.87	13.05	2.82	3.63	1.88	0.68
1952	10.84	13.19	2.89	3.74	1.88	0.65
1953	10.80	13.10	2.86	3.65	1.83	0.65
1954	10.99	13.41	2.94	3.75	1.81	0.64
1955	11.26	13.83	3.02	3.82	1.83	0.65
1956	11.25	13.74	3.08	3.83	1.81	0.65
1957	11.36	14.01	3.09	3.84	1.80	0.64
1958	11.29	13.75	2.99	3.68	1.74	0.60
1959	11.74	14.68	3.19	3.90	1.77	0.60
1960	11.71	14.69	3.23	4.03	1.83	0.62
1961	11.90	15.05	3.31	4.09	1.84	0.64
1962	11.71	14.70	3.21	3.92	1.76	0.58
1963	11.98	15.00	3.24	3.90	1.73	0.56

*(contd.)*

Table 3A.2 (Contd.)

	P90-95	P95-99	P99-99.5	P99.5-99.9	P99.9-99	P99.99-100
1964	12.09	15.19	3.28	3.97	1.74	0.56
1965	12.21	15.36	3.31	3.97	1.74	0.56
1966	12.04	15.05	3.22	3.88	1.70	0.57
1967	11.93	14.92	3.20	3.86	1.70	0.59
1968	11.72	14.31	3.02	3.60	1.60	0.56
1969	11.48	13.94	2.94	3.52	1.54	0.55
1970	11.19	13.63	2.87	3.44	1.49	0.53
1971	11.25	13.63	2.90	3.50	1.54	0.53
1972	11.06	13.45	2.89	3.51	1.56	0.55
1973	11.29	13.74	2.98	3.64	1.63	0.62
1974	11.23	13.59	2.90	3.51	1.55	0.53
1975	11.35	13.59	2.92	3.48	1.54	0.54
1976	11.28	13.47	2.91	3.45	1.54	0.54
1977	10.97	12.92	2.68	3.17	1.43	0.51
1978	10.82	12.77	2.69	3.18	1.43	0.50
1979	10.62	12.59	2.67	3.18	1.45	0.52
1980	10.59	12.47	2.62	3.11	1.41	0.50
1981	10.69	12.49	2.61	3.06	1.39	0.50
1982	10.56	12.30	2.46	2.89	1.28	0.44
1983	10.91	12.53	2.49	2.88	1.23	0.40
1984	10.95	12.54	2.51	2.87	1.24	0.41
1985	11.09	12.76	2.54	2.95	1.28	0.43
1986	11.10	12.86	2.59	3.04	1.34	0.46
1987	11.07	12.91	2.62	3.15	1.44	0.53
1988	11.19	12.98	2.64	3.21	1.49	0.57
1989	11.11	13.10	2.70	3.31	1.57	0.62
1990	11.19	13.22	2.71	3.32	1.57	0.62
1991	11.26	13.20	2.67	3.23	1.50	0.57
1992	11.33	13.15	2.63	3.15	1.43	0.54
1993	11.40	13.16	2.60	3.11	1.41	0.53
1994	11.47	13.19	2.60	3.13	1.43	0.55
1995	11.48	13.23	2.61	3.13	1.42	0.54
1996	11.45	13.20	2.58	3.08	1.40	0.53
1997	11.49	13.23	2.60	3.12	1.43	0.55
1998	11.52	13.27	2.62	3.13	1.42	0.55

Source: Author's computations based on income tax returns (see Piketty 2001a: appendix B, table B15, pp. 621-2).

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**Table 3A.3** Sources for French income tax data, 1915–98

Income year	Sources
1915	BSLC mai 1920, tome 87, p.766; BSLC octobre 1921, tome 90, p.746
1916	BSLC mai 1920, tome 87, p.767; BSLC octobre 1921, tome 90, p.747
1917	BSLC mai 1920, tome 87, p.767; BSLC octobre 1921, tome 90, p.747
1918	BSLC avril 1921, tome 89, p.629; BSLC octobre 1921, tome 90, p.749
1919	BSLC octobre 1921, tome 90, p.750 BSLC mars 1923, tome 93, pp.466–467 BSLC janvier 1924, tome 95, pp.106–107 BSLC janvier 1925, tome 97, pp.214–215 BSLC novembre 1925, tome 98, pp.732–733
1920	BSLC mars 1923, tome 93, pp.472–473 BSLC janvier 1924, tome 95, pp.112–113 BSLC janvier 1925, tome 97, pp.220–221 BSLC novembre 1925, tome 98, pp.736–737
1921	BSLC janvier 1924, tome 95, pp.118–119 BSLC janvier 1925, tome 97, pp.226–227 BSLC novembre 1925, tome 98, pp.740–741
1922	BSLC janvier 1925, tome 97, pp.232–233 BSLC novembre 1925, tome 98, pp.744–745
1923	BSLC novembre 1925, tome 98, pp.748–749 RSRID 1926, pp.234–235
1924	BSLC octobre 1926, tome 100, pp.702–703 RSRID 1927, pp.250–251
1925	BSLC septembre 1927, tome 102, pp.416–417 RSRID 1928, pp.266–267
1926	BSLC octobre 1928, tome 104, pp.688–689 RSRID 1929, pp.230–231
1927	BSLC septembre 1929, tome 106, pp.474–475 RSRID 1930, pp.256–257
1928	BSLC septembre 1930, tome 108, pp.606–607 RSRID 1931, pp.270–271
1929	BSLC décembre 1931, tome 110, pp.1020–1021 RSRID 1931–1932, pp.48–49
1930	BSLC octobre 1932, tome 112, pp.720–721
1931	BSLC septembre 1933, tome 114, pp.588–589
1932	BSLC septembre 1934, tome 116, pp.618–619
1933	BSLC juillet 1935, tome 118, pp.26–27
1934	BSLC juin 1936, tome 119, pp.1046–1047
1935	BSLC août 1937, tome 122, pp.288–289
1936	BSLC juillet-août 1938, tome 124, pp.36–37
1937	BSLC juillet-août 1939, tome 126, pp.66–67
1938	BSMF n°3 (3ème trimestre 1947), pp.676–677
1939	BSMF n°3 (3ème trimestre 1947), pp.696–697
1940	BSMF n°3 (3ème trimestre 1947), pp.714–715
1941	BSMF n°3 (3ème trimestre 1947), pp.732–733
1942	BSMF n°3 (3ème trimestre 1947), pp.750–751
1943	BSMF n°3 (3ème trimestre 1947), pp.768–769
1944	BSMF n°6 (2ème trimestre 1948), pp.310–311
1945	BSMF n°6 (2ème trimestre 1948), pp.338–341
1946	S&EF n°3 (mars 1949), pp.198–202; S&EF 'supplément Statistiques' n°4 (4ème trimestre 1949), pp.610–615

*(contd.)*

Table 3A.3 (Contd.)

Income year	Sources
1947	S&EF n°8 (août 1949), pp.624–627; S&EF ‘supp. Statistiques’ n°7 (3ème trimestre 1950), pp.574–577
1948	S&EF n°20–21 (août-septembre 1950), pp.628–631; S&EF ‘supp. Stat.’ n°14 (2ème trimestre 1952), pp.204–207
1949	S&EF ‘supp. Statistiques’ n°14 (2ème trimestre 1952), pp.244–247; S&EF n°31 (juillet 1951), pp.636–639
1950	S&EF ‘supp. Finances Françaises’ n°18 (4ème trimestre 1953), pp.346–349; S&EF n°46 (octobre 1952), pp.882–885
1951	S&EF ‘supp. Finances Françaises’ n°21 (3ème trim. 1954), pp.98–101; S&EF n°57 (septembre 1963), pp.812–813
1952	S&EF n°67 (juillet 1954), pp.630–633
1953	S&EF n°80 (août 1955), pp.796–797
1954	S&EF ‘supplément’ n°96 (décembre 1956), pp.1364–1367; S&EF n°93 (septembre 1956), pp.936–937
1955	S&EF ‘supplément’ n°109 (janvier 1958), pp.40–43; S&EF n°106 (octobre 1957), pp.1096–1097
1956	S&EF ‘supplément’ n°121 (janvier 1959), pp.42–45; S&EF n°116 (août 1958), pp.920–921
1957	S&EF ‘supplément’ n°133 (janvier 1960), pp.42–45; S&EF n°131 (novembre 1959), pp.1372–1375
1958	S&EF ‘supplément’ n°145 (janvier 1961), pp.44–47; S&EF n°143 (novembre 1960), pp.1230–1233
1959	S&EF ‘supplément’ n°155 (novembre 1961), pp.1622–1625; S&EF n°155 (novembre 1961), pp.1386–1389
1960	S&EF ‘supplément’ n°170 (février 1963), pp.386–389; S&EF n°168 (décembre 1962), pp.1408–1411
1961	S&EF ‘supplément’ n°182 (février 1964), pp.192–195; S&EF n°179 (novembre 1963), pp.1378–1383
1962	S&EF ‘supplément’ n°196 (avril 1965), pp.608–611; S&EF n°193 (janvier 1965), pp.36–41
1963	S&EF ‘supplément’ n°209 (mai 1966), pp.754–757; S&EF n°207 (mars 1966), pp.270–275
1964	S&EF ‘supplément’ n°221 (mai 1967), pp.566–569; S&EF n°221 (mai 1967), pp.588–591
1965	S&EF n°221 (mai 1967), pp.534–537
1965	S&EF ‘supplément’ n°230 (février 1968), pp.378–381; S&EF n°238 (octobre 1968), pp.978–981
1966	S&EF ‘supplément’ n°245 (mai 1969), pp.48–53
1967	S&EF n°258 (juin 1970), pp.68–71
1967	S&EF ‘supplément’ n°258 (juin 1970), pp.46–51
1968	S&EF n°263 (novembre 1970), pp.28–31
1968	S&EF ‘série bleue’ n°270 (juin 1971), pp.50–55
1969	S&EF ‘série rouge’ n°271–272 (juillet-août 1971), pp.74–77
1969	S&EF ‘série bleue’ n°280 (avril 1972), pp.48–53
1970	S&EF ‘série rouge’ n°283–284 (juillet-août 1972), pp.84–87
1970	S&EF ‘série bleue’ n°297 (septembre 1973), pp.46–51
1971	S&EF ‘série rouge’ n°293 (mai 1973), pp.98–101
1971	S&EF ‘série bleue’ n°304 (avril 1974), pp.46–51
1972	S&EF ‘série rouge’ n°309 (septembre 1974), pp.24–27
1972	S&EF ‘série rouge’ n°319–320 (juillet-août 1975), pp.22–25

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1973	S&EF 'série rouge' n°328 (avril 1976), pp.26–29
1974	S&EF 'série rouge' n°337 (janvier 1977), pp.28–31
1975	S&EF 'série rouge' n°353 (mai 1978), pp.28–31
1976	S&EF 'série rouge' n°363–364–365 (février 1980), pp.160–163
1977	S&EF 'série rouge' n°371 (septembre 1980), pp.96–99
1978	S&EF 'série rouge' n°380 (juin 1981), pp.81–83
1979	S&EF 'série rouge' n°390 (1983), pp.98–100
1980	S&EF 'série rouge' n°394 (1984), pp.40–42
1981	S&EF 'série rouge' n°394 (1984), pp.48–50
1982–86	Etats 1921 (situation au 31/3/n+2), tableaux IIA
1987–97	Etats 1921 (situation au 31/12/n+2), tableaux IIA
1998	Etat 1921 (situation au 31/12/n+1), tableau IIA

Notes: BSLC = Bulletin de Statistique et de Législation Comparée (Ministère des Finances, monthly publication, 1877–1940)

BSMF = Bulletin de Statistique du Ministère des Finances (Ministère des Finances, quarterly publication, 1947–48)

S&EF = Statistiques et Etudes Financières (Ministère des Finances, monthly publication, 1949–85)

RSRID = Renseignements Statistiques Relatifs aux Impôts Directs (Ministère des Finances, annual volumes, 1889–1975)

Etats 1921 = 'Etats statistiques' released by the Service d'Enquêtes Statistiques et de Documentation (SESDO) of the DGI (Ministère des Finances) (no formal publication)

**Table 3A.4** Income and population totals for France, 1900–98

	(1)	(2)	(3) (= (1)/(2))	(4)	(5)	(6) (= (5)/(2))
	Total tax income (millions current french francs)	Total number of tax units (thousands)	Average tax income per tax unit (current FF)	Average tax income per tax unit (1998 FF)	Total number of tax units (thousands)	Fraction of tax units subject to income tax (%)
1900	20.2	14.119	1.430	28.760		
1901	19.4	14.119	1.377	27.537		
1902	18.8	14.187	1.326	26.819		
1903	19.6	14.261	1.376	27.979		
1904	20.0	14.331	1.396	28.787		
1905	19.9	14.394	1.380	28.474		
1906	20.1	14.448	1.389	28.310		
1907	21.8	14.510	1.502	30.185		
1908	22.1	14.563	1.518	29.821		
1909	22.8	14.642	1.558	30.660		
1910	23.1	14.708	1.571	29.994		
1911	25.0	14.802	1.686	29.279		
1912	26.5	14.938	1.772	31.123		
1913	25.7	15.117	1.701	28.893		
1914	26.2	15.294	1.716	29.140		
1915	27.4	15.249	1.799	25.740	260	1.7%
1916	30.6	15.205	2.013	25.717	474	3.1%
1917	39.0	15.160	2.575	27.460	594	3.9%

(contd.)

Table 3A.4 (Contd.)

	(1) Total tax income (millions current french francs)	(2) Total number of tax units (thousands)	(3) (= (1)/(2)) Average tax income per tax unit (current FF)	(4) Average tax income per tax unit (1998 FF)	(5) Total number of tax units (thousands)	(6) (= (5)/(2)) Fraction of tax units subject to income tax (%)
1918	48.0	15.116	3.178	26.127	689	4.6%
1919	61.7	15.071	4.091	26.908	541	3.6%
1920	82.9	15.027	5.516	26.408	977	6.5%
1921	86.1	15.323	5.616	30.692	1.119	7.3%
1922	89.2	15.453	5.775	32.840	1.027	6.6%
1923	99.5	15.609	6.377	32.671	1.201	7.7%
1924	115.7	15.803	7.323	32.941	1.488	9.4%
1925	126.0	16.001	7.874	33.009	1.939	12.1%
1926	148.8	16.147	9.218	29.702	2.589	16.0%
1927	150.5	16.254	9.257	28.569	2.902	17.9%
1928	161.8	16.347	9.895	30.602	1.985	12.1%
1929	175.9	16.454	10.689	31.127	1.923	11.7%
1930	182.1	16.556	11.000	31.778	2.150	13.0%
1931	171.0	16.729	10.220	30.721	2.080	12.4%
1932	153.6	16.767	9.159	30.224	1.922	11.5%
1933	147.4	16.810	8.769	29.892	1.920	11.4%
1934	136.9	16.837	8.132	28.937	1.745	10.4%
1935	131.5	16.874	7.794	30.245	1.633	9.7%
1936	147.3	16.889	8.720	31.537	1.639	9.7%
1937	176.9	16.899	10.470	30.099	2.288	13.5%
1938	196.3	16.915	11.605	29.367	2.795	16.5%
1939	199.8	16.172	12.352	29.323	2.103	13.0%
1940	181.7	16.229	11.198	22.415	1.883	11.6%
1941	218.0	15.368	14.182	24.200	2.733	17.8%
1942	292.6	15.372	19.034	27.044	3.838	25.0%
1943	361.8	15.277	23.680	27.089	2.045	13.4%
1944	439.1	15.089	29.101	27.221	2.780	18.4%
1945	791.1	15.138	52.260	32.984	1.539	10.2%
1946	1343.5	16.536	81.249	33.605	4.149	25.1%
1947	1774.5	16.648	106.590	29.509	1.486	8.9%
1948	3015.1	16.818	179.285	31.315	2.690	16.0%
1949	3843.5	16.962	226.600	34.964	3.413	20.1%
1950	4489.1	17.077	262.870	36.873	2.982	17.5%
1951	5629.0	17.205	327.181	39.462	2.552	14.8%
1952	6621.6	17.302	382.705	41.250	3.370	19.5%
1953	6848.1	17.410	393.338	43.129	3.095	17.8%
1954	7319.2	17.497	418.299	45.683	3.142	18.0%
1955	7938.3	17.647	449.832	48.689	3.765	21.3%
1956	8792.4	17.820	493.392	51.251	4.401	24.7%
1957	9882.8	18.007	548.838	55.350	4.430	24.6%
1958	11382.3	18.223	624.607	54.727	4.984	27.4%
1959	12213.7	18.418	663.131	54.762	5.045	27.4%
1960	136.0	18.613	7.306	58.183	5.456	29.3%
1961	149.1	18.803	7.931	61.144	6.103	32.5%
1962	169.7	19.026	8.921	65.684	6.752	35.5%

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1963	190.3	19.535	9.741	68.439	7.710	39.5%
1964	209.2	19.804	10.566	71.792	8.362	42.2%
1965	226.3	20.018	11.303	74.926	8.573	42.8%
1966	244.7	20.166	12.133	78.316	8.955	44.4%
1967	267.0	20.324	13.135	82.633	9.591	47.2%
1968	294.7	20.454	14.408	86.657	10.480	51.2%
1969	332.6	20.734	16.042	90.596	10.503	50.7%
1970	380.8	21.033	18.104	97.186	10.513	50.0%
1971	423.5	21.355	19.833	100.919	11.020	51.6%
1972	474.2	21.653	21.898	104.920	11.502	53.1%
1973	537.1	21.921	24.501	109.405	12.092	55.2%
1974	629.3	22.161	28.398	111.530	12.768	57.6%
1975	729.2	22.364	32.608	114.546	13.495	60.3%
1976	841.9	22.497	37.421	119.939	14.243	63.3%
1977	963.6	22.709	42.432	124.315	14.007	61.7%
1978	1103.8	22.939	48.118	129.214	14.564	63.5%
1979	1260.6	23.186	54.368	131.768	15.001	64.7%
1980	1446.4	23.457	61.661	131.552	15.290	65.2%
1981	1661.5	23.750	69.960	131.620	15.056	63.4%
1982	1899.9	24.043	79.024	132.981	15.309	63.7%
1983	2098.5	24.283	86.419	132.688	15.242	62.8%
1984	2256.8	24.572	91.844	131.301	15.210	61.9%
1985	2418.0	25.144	96.169	129.946	15.252	60.7%
1986	2556.5	25.534	100.121	131.731	13.314	52.1%
1987	2697.4	26.341	102.403	130.682	13.369	50.8%
1988	2836.0	26.791	105.854	131.534	13.470	50.3%
1989	3016.4	27.360	110.248	132.106	13.882	50.7%
1990	3215.5	28.029	114.718	132.943	14.297	51.0%
1991	3369.3	28.607	117.780	132.259	14.643	51.2%
1992	3478.4	29.052	119.729	131.296	14.754	50.8%
1993	3555.7	29.558	120.295	129.330	14.907	50.4%
1994	3634.7	30.038	121.003	127.917	14.990	49.9%
1995	3753.6	30.585	122.725	127.569	15.474	50.6%
1996	3878.3	31.134	124.569	126.946	15.181	48.8%
1997	3979.9	31.538	126.194	127.077	15.680	49.7%
1998	4163.1	32.251	129.085	129.085	17.007	52.7%

Sources: see Piketty 2001: tables A1, G2, and H1).

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