

# The income inequality of France in historical perspective

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France presents an unusual case because, unlike several other European countries, there are no estimates of the income distribution for the eighteenth and nineteenth centuries. This is a serious deficiency because it limits the ability to understand how an important dimension of the socio-economic fabric changed during the years preceding and coinciding with the beginning of France's industrial development. In this article we provide estimates that use tax data and the social tables of the eighteenth and nineteenth centuries. While this data does not provide a basis for a perfectly accurate assessment of the income distribution, it does permit an evaluation of the general magnitude of inequality and how it varied in that period. The results suggest that inequality during the eighteenth century was large but decreased during the revolutionary period (1790–1815). Afterwards, and in accordance with Kuznets' hypothesis, when industrialisation began about 1830, inequality increased until sometime in the 1860s when it began its slow decline towards greater equality that characterises the twentieth century.

## **I. Introduction**

Shortly after the 1949 creation of the OECD (OEEC at the time), member countries agreed to prepare national accounts on a standardised basis. Today a continuous and reliable series of national accounts is available for most member countries. Several countries undertook to prepare accounts of their income distributions as well. For more than a decade the World Bank (see World Bank 1998) has collected and published income distributions for as many countries worldwide as possible. In France, INSEE has been responsible for both sets of accounts and as a result consistent and reliable data have been published since the 1950s.<sup>1</sup> However, there are no reliable estimates of how income was distributed before World War II, although Toutain (1987) used production data to estimate 10-year GDP averages for the period 1789 to 1982. The absence of information about the income

<sup>1</sup> Income distribution data are published at irregular intervals in the INSEE series: 'Les revenus fiscaux des ménages'.

distribution in the eighteenth and nineteenth centuries presents a serious impediment to understanding how the socioeconomic fabric of France evolved during those times that preceded, and then coincided with, the beginnings of industrial development. This article presents our effort to reduce the deficiency of information about the income distribution of France during the eighteenth and nineteenth centuries.

Data about individual or household incomes during the eighteenth and nineteenth centuries are a rare commodity in most countries, and in France their absence is particularly notable. In making estimates of the income distribution we have relied on a variety of proxy sources, none of which have the same consistency or reliability as those that are available for many countries in the second half of the twentieth century. Where possible we have provided sensitivity tests to indicate how our estimates would change if the underlying assumptions about the data were different. Given the limited extent and uncertain quality of the sources and in light of the research undertaken elsewhere, our efforts to establish certain orders of magnitude for the income distribution might be viewed as overly audacious. Our hope is that this initial probing will induce others to seek new sources capable of increasing our knowledge of the income distribution in France during the eighteenth and nineteenth centuries.

## **2. The search for income proxies**

There are no completely reliable data about income in France until after World War II. The income tax came into effect during World War I, but the number of persons subject to the tax was so restricted that it provides only limited knowledge about the distribution of income. Toutain's GDP estimates for the nineteenth century provide little information that is directly relevant to determining how income might have been distributed, although the information can be used to corroborate income estimates based on other information. In the absence of direct measures of income, we have used taxes that imperfectly reflect the incomes of those assessed as well as the social tables of contemporaries who had little recourse to the sources of national statistics as they are known today. These proxy sources are undoubtedly imperfect indicators of income, but together they provide a consistency check and a means for evaluating how sensitive the data are to changes in the estimates. The case of France may be qualitatively different from some other European countries, but the task of finding proxy data that accurately reflect the income distribution has often confronted economic historians.

Soltow (1987) used a federal housing survey to estimate the distribution of income for the United States in 1798 because there was a general belief at the time that house values were proportional to the ability to pay. Even so, the data present a problem because the number of families living in each

dwelling is unknown. Soltow (1989) was able to make an estimate of the income distribution for the inhabitants of Amsterdam as early as 1585. However, this and his later estimates for Amsterdam are based on taxes that are simply presumed to be based on general earning-power. A further limitation is that his estimates are based on tax rolls that excluded 50 per cent or more of the population, mainly those in the lower occupational categories. Dumke's (1991) comprehensive survey of the multiple efforts to determine the historical evolution of income inequality in Germany (and previously Prussia) illustrate the need to rely on proxy data for which the quality is uncertain and variable. Among those who have focused on the historical evolution of inequality in Britain are Lindert (1980, 1986, 1994, 1999) and Williamson (1979, 1985). Like others they have sometimes used taxes as a proxy for income, but they have also relied on social tables for the analysis of income (Lindert and Williamson 1983). Relying on proxy measures of income is always open to questioning, and Feinstein (1988) has asserted that Williamson's (1985) conclusions about the evolution of inequality in the nineteenth century rests on assumptions about the underlying data that are questionable and in some instances incorrect.

### 3. The eighteenth century

In the absence of any direct measure of income in eighteenth century France, we present estimates of the income distribution based on three separate methods: (1) inferences from impositions of the *capitation* tax, (2) analysis of the socio-professional structure, and (3) an eighteenth century effort to quantify the economic structure of France.

#### 3.1. The *capitation* tax

The *capitation* tax, introduced by Louis XIV in 1695 to help finance his wars, was the first tax intended to be universal. Except for 1699 and 1700, it was collected every year up to the Revolution. The *capitation* was not France's first direct tax. Another direct tax, the *taille*, had been introduced in 1449 and remained a major source of royal income until the Revolution. But it has major deficiencies as a proxy for income. In some regions of the country the *taille* was based on an estimate of a person's income (*la taille personnelle*), but elsewhere only land was taxed (*la taille réelle*). Furthermore, most nobles were exempt as were certain professions and even entire towns. Without touching the privilege of those exempt, after 1733 a schedule of rates, the *taille tarifée*, applicable for all types of income was established, but it was effective in only limited areas because it depended on the completion of a national *cadastre* that was beyond the capacity of the administration (Touzery 1994, pp. 73–86; Bonney 1999). During the eighteenth century other direct taxes were introduced (*dixième*, *cinquième* and *vingtième*), but

exemptions were so numerous as to render none of them suitable as a proxy for income (Bonney 1995, pp. 472–88).

The *capitation* is no panacea for eliminating the deficiencies of the other direct taxes as a proxy for income, but it provides the most reliable means of estimating how income was distributed in the eighteenth century. The tax, as applied, was only roughly related to a person's income and some persons were exempt. In the first year the population was divided into 22 social classes; within each class persons were assessed identically.<sup>2</sup> The only intended exemptions were people declared by their parish priest to be too poor to pay. Almost immediately, however, the church negotiated an annual payment, and some nobles and a few others were exempt because of the royal offices they held. The king's administrators soon found it easier to assign each community a lump sum (*impôt de répartition*) rather than depend on whatever the community might collect based on the original tax schedule (*impôt de quotité*). At the same time and at their own initiative, communities began to divide their assigned tax by allocating shares to heads of households according to their income rather than blindly applying identical taxes to persons in the same profession but who might have widely divergent incomes. The average level of assessment varies by region and also as between the larger cities and the more numerous villages. The records show that nobles and other privileged persons were more successful than others in having their assessments reduced, but taxpayers were generally able to compare their assessments to those of others and when they felt their burden was unfair, they would cry for justice (Kwass 1994, p. 147). The prolific expert on Old Regime taxes and finances, Marion, concluded that 'the *capitation* was a genuine tax on gross income as estimated by the administration' (Marion 1910, p. 24). The tax rolls themselves, however, contain few examples of income to compare with the tax assessments. In the few tax rolls that have both, the range of tax rate percentages is narrow and in general suggest that nearly flat rates were used. Thus, the *capitation* appears to have evolved towards a flat rate income tax but whose universality had major shortcomings.

At the very bottom of the social hierarchy it is uncertain how many people were exempt because they had no income at all or their income was so small they were excused from the tax. Many communities listed their poor in the *capitation* rolls, but it is impossible to ascertain whether or not the rolls were comprehensive. During the Revolutionary period the administration established a Comité de Mendicité to estimate the extent of poverty in France. Their report concluded that as much as 10 per cent of the population required outside assistance to maintain life and limb (Hufton 1974). In our survey of the *capitation* rolls, we found 4.3 per cent who were

<sup>2</sup> Two of the most useful analyses of the *capitation* tax as it was originally conceived are provided by Bluche and Solnon (1983) and Guery (1986).

assessed nothing because they were either too poor or invalid. Many of these would have been single persons, but undoubtedly some had wives and children. In addition, vagabonds and beggars were usually omitted from the *capitation* rolls. Together with the other poor and invalid, the percentage of persons at the bottom of the income distribution was probably close to the 10 per cent reported by the Revolutionary committee.

Further up the income scale, throughout the eighteenth century 75 per cent of the population of France worked in the agricultural sector. The importance of the own-consumption of food was undoubtedly greatest for the lower level workers, but there is no way to ascertain from the tax assessments whether or not this was considered when the taxes were assigned. Based on the *capitation* statistics, about 5 per cent of the population in eighteenth century France were engaged as household servants, most of whom were housed and fed at their place of work. The scale of taxation for servants was similar throughout France and remained more or less constant throughout the eighteenth century. The tax rates for the higher ranked servants were two or three times the rate for a simple *domestique* and women were normally assessed less than males. By themselves the tax assessments are an inaccurate indicator of their income because they disregard the income in-kind that servants received in the form of lodging and meals.

For nobles who were exempt from the *capitation*, we were usually able to learn the amount that would have been assessed because the assessment was listed and crossed out by the word 'exempt.' But there are cases where no assessment was indicated, and these contribute to underestimating the degree of inequality in the *capitation* rolls. When persons had multiple income sources, the *capitation* law provided that they should be taxed only for their largest source of income. As many nobles and *bourgeois* had several sources of income, based on land and stipends associated with official functions, the *capitation* underestimates their total income. Unfortunately the *capitation* rolls provide no information about the nature or extent of any income that escaped taxation. The *capitation* provided that if individual family members had separate sources of income, each would be taxed accordingly. This provision affected principally the families of nobles because they were the ones where husbands, wives, and often children as well, had separate and taxable income.

Given these caveats about using the *capitation* to approximate income during the eighteenth century, let us look at how the *capitation* assessments were distributed. We looked for *capitation* rolls in the archives of every department in France. Over a period of three years we collected random samples from 189 rolls that we found in the archives of 56 departments.

It seems reasonable to presume that the many rolls that have disappeared were lost due to fire, wars, vandalism and simple negligence, leaving the remaining rolls a random sample of the original population. The number of

Table 1. *Unadjusted distribution of capitation assessments (percentage of assessments by group of taxpayers).*

| Group                | 1695–1704 | 1705–47 | 1748–59 | 1760–90 |
|----------------------|-----------|---------|---------|---------|
| Top decile           | 66        | 61      | 49      | 60      |
| 9th decile           | 13        | 14      | 18      | 16      |
| 4th quintile         | 11        | 13      | 16      | 13      |
| 3rd quintile         | 6         | 6       | 10      | 6       |
| 1st and 2nd quintile | 4         | 6       | 7       | 5       |

Note: Category: Taxpayers.

Source: Capitation rolls from 56 *départements* (304,167 taxpayers).

persons assessed in these rolls amounts to 304,167. Since only heads-of-households were assessed, the total number of persons represented by the rolls is 1,300,000. Table 1 shows the assessments by taxpayer group. With the exception of the period 1741–73, the distribution does not appear to have changed significantly during the eighteenth century. The top decile of the population were taxed about 60 to 65 per cent of all the assessments while the bottom 40 per cent were taxed about four to five per cent of total assessments. The period 1741–73 was influenced by the introduction of another tax, the *vingtième*. It may be that the reduced *capitation* assessments of this period were the result of reductions accorded to people with business income since they were the ones who were most affected by the new tax.

The next task is to adjust the data of Table 1 to account for the own-consumption of persons in the agricultural sector, the income in-kind received by servants, and the fact that some noble and *bourgeois* families had additional sources of income that were untaxed.<sup>3</sup> We have presumed that servants and the lower ranks of those in agriculture received about half their income as income in kind. As for the untaxed income of nobles and *bourgeois*, we assumed this was no more than five per cent of their total income. These adjustments are designed to modify the distribution of assessments so they more accurately reflect the distribution of income. The result of these adjustments are given in Table 2 and can be compared to the original *capitation* data of Table 1.

Two observations may be made about the distribution of income shown in Table 2. First, the net effect of the adjustments reduces the share of income attributed to the top two quintiles while increasing the income for the bottom three quintiles, due principally to the importance of income in kind received by persons in the latter groups. The adjustments undoubtedly

<sup>3</sup> The fact that some nobles and *bourgeois* managed to have their taxes reduced in greater proportion than others need not concern us here as it is the assessments themselves that are the better estimate of income.

Table 2. Distribution of revenue based on capitation assessments: adjusted for income-in-kind and own-consumption (percentage of assessments by taxpayer groups).

| Group                | 1695–1704 | 1705–47 | 1748–59 | 1760–90 |
|----------------------|-----------|---------|---------|---------|
| Top decile           | 62        | 57      | 46      | 56      |
| 9th decile           | 12        | 13      | 17      | 15      |
| 4th quintile         | 10        | 12      | 15      | 12      |
| 3rd quintile         | 8         | 8       | 11      | 8       |
| 1st and 2nd quintile | 8         | 10      | 11      | 9       |

Note: Category: Taxpayers. Data adjustments: corrected for income-in-kind and auto-consumption based on the assumption that 50 per cent of the income of quintiles 1 and 2 and 33 per cent of the income of quintile 3 are received as income-in-kind and auto-consumption that is excluded from the data of Table 1.

Source: Capitation roles from 56 départements (304,167 taxpayers).

contain unmeasurable errors. If the error was as large as  $\pm 10$  per cent, then the range for the top decile during the period 1760–90 would be 51 per cent < 56 per cent < 61 per cent. Second, there may have been a modest decrease in inequality during the eighteenth century. We will return to this issue later after looking at other evidence about the income distribution at the end of the eighteenth century.

### 3.2. The socio-professional structure

Estimates of the socio-professional population exist for the years 1765 and 1788. However, the revenue data for the various categories are more reliable for 1788 than for 1765. Expilly's (1780) estimate of the socio-professional structure appears to be the best available for France in the late eighteenth century. We have assumed that most heads-of-household were in four-person families, except for non-agricultural workers whose families had three persons, and we have assumed that most servants were single.<sup>4</sup> The number of nobles and clergy is open to debate and the same can be said for the number of *bourgeois*. The information about persons in these groups is not sufficiently reliable to estimate the number of active persons in each group or their incomes. We provide only estimates of the total number of nobles, clergy and *bourgeois*, and the combined income for these three groups. According to Toutain (1987, p. 56) the GDP for France during the decade 1781–1790 was 5,941m francs expressed in current prices. We have

<sup>4</sup> In truth, there is no precise figure for household size in the eighteenth century. Because of the disturbances and the great famine of 1709–10, the size was different at different times. Dupâquier (1991, p. 55) notes that while Des Cilleuls (1885) used 4.5 persons per *feux* in estimating the eighteenth century population of France, he believed it is more prudent to use a coefficient of 4 due to the various crises.

Table 3. *Income distribution by social group in 1788.*

| Group  | Population<br>(thousands) | Income per<br>household<br>(livres) | Total income<br>(millions of livres) |        |
|--|---------------------------|-------------------------------------|--------------------------------------|--------|
|  |                           |                                     | 'high'                               | 'low'  |
| (1) Nobles and clergy  | 540                       |                                     | }1,955                               | }1,715 |
| (2) Bourgeois  | 2,160                     |                                     |                                      |        |
| (3) Shopkeepers and<br>artisans                              | 3,240                     | 600                                 | 486                                  | 486    |
| (4) Workers (non-agriculture)                                | 1,500                     | 200                                 | 100                                  | 115    |
| (5) Servants (non-agriculture)                               | 1,080                     | 100                                 | 100                                  | 115    |
| (6a) Small scale farmers                                     | 5,250                     | 250                                 | 330                                  | 390    |
| (6b) Large scale farmers                                     | 2,250                     | 880                                 | 494                                  | 584    |
| (7) Agriculture: day labourers<br>and servants               | 10,150                    | 160                                 | 400                                  | 460    |
| (8) Mixed workers<br>(agriculture and industry) <sup>a</sup> | 1,800                     | 300                                 | 135                                  | 135    |
| Total  | 28,000                    |                                     | 4,000                                | 4,000  |

*Notes:* Category: Population. <sup>a</sup>Agricultural workers who spent part-time as industrial workers, many for cottage industry textiles, others as assistants to artisans. Data adjustments: based on the assumption of 1 male worker for every 4 persons except for workers in the non-agricultural sector (1 for 3 persons) and town servants (1 for 1.08 persons). The 'low' estimate is based on the assumption that the share of agricultural income going to groups 1 and 2 is only 25 per cent instead of 33 per cent. This results in an increase of the income share going to small and large farmers. The 'low' estimate also assumes that the income of agricultural day labourers, servants and non-agricultural workers is increased by 15 per cent which further reduces the income of groups 1 and 2. *Sources:* Population: Braudel and Labrousse (1970, pp. 493, 607, and 659) and Expilly (1780); Income: Braudel and Labrousse (1970), Peuchet (1805, p. 391), and Weir (1991).

used a lower figure of 4,000m francs for the income for 1788 because we excluded the income and production of the State, and because Toutain may have overvalued agricultural income. With these hypotheses we can obtain an approximation of how income in 1788 may have been distributed among the various socio-professional classes; these estimates are provided in Table 3.

Because the income of nobles, clergy and *bourgeois* is less well known than for the other groups, Table 3 provides two estimates (high and low) to illustrate how sensitive the income distribution is to alternative hypotheses. The 'low' estimate incorporates the results of decreasing the share of agricultural income going to these groups from 33 per cent to 25 per cent which increases the incomes of the small and large scale farmers. The 'low' estimate also includes a small increase of the incomes of agricultural day labourers and servants, and non-agricultural workers, that further decreases the income attributed to nobles, clergy and *bourgeois*.

The estimates of Table 3 can be transformed into an income distribution,



Table 4. Household income distribution in 1788 (per cent).

| Groups                        | Population* | Total income*<br>'high' | Adjusted distributions |                        |
|-------------------------------|-------------|-------------------------|------------------------|------------------------|
|                               |             |                         | Population             | Income<br>'High' 'Low' |
| I. Groups 1 and 2             | 9.6         | 48.8                    | 10                     | 53 47                  |
| II. Groups 3 and 6b           | 19.6        | 24.5                    | 20                     | 21 23                  |
| III. Groups 4, 5, 6a, 7 and 8 | 70.8        | 26.7                    | 70                     | 26 30                  |

Notes: Category: Population. Data adjustments: adjusted distributions are from Table 3.  
Sources: Population: Braudel and Labrousse (1970, pp. 493, 607, and 659) and Expilly (1780); Income: Braudel and Labrousse (1970), Peuchet (1805, p. 391), and Weir (1991).

but one that can provide only a rough approximation of what a more detailed distribution might give. This is shown in Table 4.

The incomes taken from Table 3 and combined as groups I, II and III in Table 4 have some deficiencies because the three categories are not entirely homogeneous. There are large differences in the incomes of persons in groups 1 and 2 of Table 3 (nobles, clergy and *bourgeois*). The wealthiest were incredibly rich, even by today's standards. But within these groups there were also nobles and clergy who were as poor as the proverbial church mice. Many of the clergy and some nobles belong in group II of Table 4. By the same token, some of the merchants and large scale farmers included in group II undoubtedly had incomes that would place them in group I. Some of the persons in group II whose incomes were far below the average should really be included in group III. We have adjusted the 'raw data' from Table 3 to reflect the reallocation of persons among the three groups of Table 4. The difference between it and the data from Table 1 is not huge but because it is based on a more explicit analysis of the socio-professional structure, the results presented in Table 4 may have greater accuracy in showing how the income was distributed in 1788 than those of Table 2. The 'adjusted distribution' of Table 4 illustrates the sensitivity of the estimates to variants in the underlying assumptions. The 'high' estimate attributes 53 per cent of the income to the top 10 per cent of the population whereas the 'low' estimate attributes 45 per cent. We believe the lower figure does not represent a reasonable estimate because the measurement errors most likely are biased toward decreasing the income attributed to the top 10 per cent. Consequently, it appears to us that the minimum percentage of income received by the top 10 per cent was probably not less than 50 per cent.

### 3.3. An eighteenth century estimate

As early as 1694 Vauban, the renowned military architect, had attempted to elaborate the socio-professional structure of France in order to illustrate

Table 5. *Isnard's income distribution: 1781.*

|       | Heads-of-households |            | Income per household<br>(livres) | Total income         |            |
|-------|---------------------|------------|----------------------------------|----------------------|------------|
|       | (thousands)         | (per cent) |                                  | (millions of livres) | (per cent) |
| (1)   | 335                 | 5.5        | 3,670                            | 1,230                | 29.5       |
| (2)   | 300                 | 5.0        | 1,800                            | 540                  | 12.9       |
| (3)   | 400                 | 6.6        | 1,200                            | 480                  | 11.5       |
| (4)   | 600                 | 10.0       | 800                              | 480                  | 11.5       |
| (5)   | 800                 | 13.2       | 500                              | 400                  | 9.6        |
| (6)   | 1,000               | 16.6       | 400                              | 400                  | 9.6        |
| (7)   | 1,200               | 19.9       | 300                              | 360                  | 8.6        |
| (8)   | 1,400               | 23.2       | 200                              | 280                  | 6.7        |
| Total | 6,035               | 100.0      |                                  | 4,170                | 100.0      |

Note: Category: Households.

Source: Isnard (1781).

how a flat rate tax on income could solve Louis XIV's revenue problems.<sup>5</sup> Nearly a century later, Thorillon (1787) published another illustration of the revenue that a flat rate tax on income might be capable of producing. About the same time a third estimate of the income of France was prepared by Renard (1790) for the same purpose. Neither of the late eighteenth century estimates of income have any great credibility. We have not used any of these early attempts to estimate social tables for France because all have significant deficiencies.

Isnard (1781), an engineer *cum* economist, produced another more coherent estimate. Like the others, his purpose was to illustrate the revenue that could be obtained from a flat tax of 10 per cent on income. His estimates about the population and its income appear more realistic than those produced by the other authors and closely approximate figures accepted today for the closing decades of the eighteenth century. The details of his estimates are presented in Table 5.

It is remarkable that Isnard's estimates of the income structure, based on such a limited knowledge of France's eighteenth century economy correspond closely with the best informed estimates of that period that we have today. His estimate of the number of heads of households implies a population of about 24m, perhaps 4m less than is generally accepted to have been France's population toward the end of the eighteenth century. It is also clear that his underestimate of France's population mainly resulted from an underestimate of both the number of persons in the lowest income category and the existence of a significant number of poor who had no income at all and depended on the charity of others. Given that Isnard miscalculated the

<sup>5</sup> Vauban's proposal is reproduced in Boislisle (1874, pp. 561-74).

Table 6. *Income distribution: late eighteenth century.*

| Income group                     | Adjusted<br>capitation<br>assessments | Table 4<br>groups | Isnard's<br>unadjusted<br>estimates | Authors' proposed estimates<br>'high' | 'low' |
|----------------------------------|---------------------------------------|-------------------|-------------------------------------|---------------------------------------|-------|
| 5th quintile                     | 71                                    |                   |                                     | 66                                    | 60    |
| 4th quintile                     | 12                                    |                   |                                     | 16                                    | 16    |
| 3rd quintile                     | 8                                     |                   |                                     | 8                                     | 10    |
| 2nd quintile }<br>1st quintile } | 9                                     | 12                | 14                                  | 10                                    | 14    |
| 10th decile                      | 56                                    | 53                | 43                                  | 52                                    | 47    |
| 8th and 9th decile               | 21                                    | 21                | 24                                  | 24                                    | 23    |
| 1st to 7th decile                | 23                                    | 26                | 33                                  | 24                                    | 30    |

Note: Category: Population.

Source: Tables 2, 4 and 5.

number of persons in the lowest income groups, we have adjusted his data to correct for the underestimation. These estimates are summarised in Table 6 along with our proposals which include a 'high' and a 'low' estimate that we believe incorporate the most accurate parts from the other distributions.

It seems likely that the *capitation* data tended to underestimate the income of persons in the bottom 40 per cent whereas Isnard's omission of a large number of poor overestimated the income of the bottom 40 per cent. Adjusting for these differences, we arrive at 51–53 per cent for the tenth decile that is somewhat below what the *capitation* data suggest and somewhat higher than we derived from the group data of Table 4, and considerably more than is contained in Isnard's unadjusted estimates. The adjusted *capitation* data of Table 2 along with the other estimates of Table 6 suggest that the level of inequality in the years leading up to the Revolution was probably little different from what it had been nearly a century earlier.

Since all the estimates of Table 6 are subject to error, it is useful to examine how sensitive they are to change. Rather than examining the sensitivity of each distribution separately, we limit our discussion to changes in only our proposed 'high' and 'low' estimates. The 'low' estimate reduces the top quintile from 66 per cent to 60 per cent and raises the income attributed to the lower groups. For example, the two lowest quintiles would receive 14 per cent as compared with the 10 per cent according to the 'high' estimate. The potential consequences of such changes for the Gini coefficient (measure of inequality) are discussed below.

Our proposed synthesis of the income distribution for France in the late eighteenth century (Table 6) produces a Gini coefficient of 0.59. It is useful to examine how this inequality compares with estimates made for other

countries during similar periods. Soltow (1989, p. 78) estimated a Gini of 0.69 for Amsterdam in 1742. Clark (1951) estimated that the Gini for Prussia in 1852 was 0.34. More recently Dumke (1991, p. 129) has re-estimated it as 0.36 in 1850. Lindert (1999) estimated a Gini of 0.52 for Britain in 1759 and 0.59 for 1801. Lindert and Williamson (1983, p. 98–102) estimated that in the period 1801–3 the Gini coefficient was 0.58; they also cite earlier estimates that put the Gini in the range 0.51–0.58. All the estimates, except for Amsterdam, are somewhat – but not dramatically – lower than our estimate for France. Lindert (1986, p. 1149) estimated that the share of pre-tax income received by the top 10 per cent of households in Britain amounted to 49 per cent in 1803. This is marginally less than the 51–55 per cent we propose for late eighteenth century France. The Gini coefficient for Britain is particularly interesting because its industrial revolution began two or three decades before France, so the figure for 1759 is likely to be comparable with France's development in 1788, and as such it suggests that income inequality in Britain may have been somewhat less than in France. The estimated Gini coefficient for France in the late eighteenth century corresponds fairly closely to the estimates of income inequality that existed during the 1960s in such Third World countries as Brazil, Kenya, and Mexico.

Our estimates appear to portray a level of inequality that was not greatly different from elsewhere in Europe where comparable estimates exist. However, there is some uncertainty about this as both England and Prussia appear to have had somewhat less inequality during roughly comparable periods (Lindert 1999, Dumke 1991). Nevertheless it is useful to enquire how sensitive these results are to changes in our estimates. We can investigate how changes in the income distribution would be reflected in changes in the measure of inequality, the Gini coefficient. Based on our 'proposed distribution of income' we found a Gini coefficient of 0.59. When we recalculate it based on the assumption that the income of the top quintile could vary by  $\pm 10$  per cent, the effect is to increase the Gini coefficient to 0.66 or to lower it to 0.55. The higher estimate would put inequality in France substantially higher than elsewhere in Europe at about the same period. The lower estimate would place France somewhat but not greatly below the estimates for Britain.

#### **4. The nineteenth century**

The French Revolution brought many changes to France that affected the income distribution. Unfortunately there is a paucity of data that could be used as a proxy for income in order to evaluate the effects of these changes. In 1792 the *capitation* was abolished along with the entire tax system of the Old Regime. The new taxes that replaced the old ones were not sufficiently universal to provide information about the entire socio-professional

structure. One third of the population was exempt from the widest based tax, the *impôt immobilier*, because they owned no property. There are no viable indicators that can be used to approximate how the distribution of income changed between 1790 and the 1830s.

While it is impossible to estimate the income distribution during this forty year period, there are several changes that strongly suggest the direction of change during this period. After the Revolution the lower classes benefited from the abolishment of the *dîme*, a tax that had affected them disproportionately. The abolishment of the feudal rights of nobles also enhanced the income of the lower class of farmers who no longer were subject to work *corvées* and other obligations to their seigneurs. Perhaps the most important aspect was the confiscation of church properties and those of many nobles. These were auctioned as *biens nationaux*. While the largest group of buyers were the larger farmers and bourgeois who already possessed land and had the means to acquire more, there were many from the lower ranks of the agricultural hierarchy who were also able to acquire some of the lands auctioned by the government. As a consequence, the structure within the agricultural sector changed dramatically. In the new department Nord, the share of land held by the clergy and nobles decreased from 42 per cent in 1788 to 12 per cent in 1802, and the share held by the *paysans* increased from 30 per cent to 42 per cent.<sup>6</sup> Before the Revolution farmers in the villages of southeastern France who were deemed 'dependent' because they didn't control enough land and other resources to feed and house their families without seeking outside employment or who depended in part on charity outnumbered by more than two to one those who were economically 'independent'. But after the Revolution the percentage of 'dependents' decreased from 46 per cent to 38 per cent while the percentage of 'independents' increased from 20 per cent to 32 per cent.<sup>7</sup> Another related indication of the benefit that workers received relative to the higher classes is that the salary of an urban worker increased by 62 per cent from 1785–89 to 1797–1803 while the price of wheat (the best single indicator of the cost of living) increased only 28 per cent during the same period.

Postel-Vinay (1989) has shown how the inflation during the Revolutionary years benefited those agricultural classes (sharecroppers) who were able to use a depreciated currency to purchase fixed capital and animals for production. Eventually the importance of in-kind sharecropping decreased and was replaced by monetary contracts that favoured the tenant farmers who could pay their debts in a depreciated money. Another consequence of the inflation was that persons in the higher income categories who had paid dearly to obtain the privileged posts and their

<sup>6</sup> Braudel and Labrousse (1976, p. 62).

<sup>7</sup> Snyder and Ostroot (forthcoming).

associated emoluments of the Old Regime found afterwards they had lost the quasi-totality of their investment because they were reimbursed in a depreciated currency.

These changes clearly had the effect of increasing the share of income going to the lower ranks while at the same time the share going to the high officials of the church and many nobles decreased. Although the impact of these changes on income inequality cannot be quantified, the direction is clear. The degree of inequality that existed prior to the Revolution was decreased by changes that benefited the lower classes. It seems likely that this redressing of the income distribution continued from the last decade of the eighteenth century until about the third decade of the nineteenth century.

#### *4.1. The evolution of inequality: 1831–66*

The decline in inequality that began during the Revolutionary period may have lasted less than forty years. The turning point appears to have occurred about 1830, after which inequality continued to increase well into the 1860s.

Beginning with the Napoleonic era, the administration took an increasing interest in conducting censuses that attempted to describe the socio-economic structure of France. Verley (1993) and Marchand and Thélot (1997) provide analyses of the censuses of 1831 and 1866. However, their presentations are not entirely suitable for the purpose of constructing income distributions for these years. Their employment categories are too heterogeneous to serve as income groups and the dispersion within some of the groups is large. For example, according to Chanut *et al.* (1995) in 1860–65, 25 per cent of the workers in the industrial sector had less than 63 per cent of the sector's average salary. The implication is that within the industrial sector there was an elite of highly skilled workers whose salaries were much higher than the large majority, perhaps equal to or larger than the income of small merchants. The same is true of other categories as well. We sub-divided several categories in order to arrive at more homogeneous groups: farmers were divided between large and small according to the size of exploitation based on the analysis of Toutain (1992); the division between employers and the self-employed was based on the statistics of the patent tax provided by Verley; and civil servants were separated according to their rank. These, together with information about their respective incomes, enable us to estimate both the number and income for the major employment categories that are given in Table 7.

Based on the data in Table 7, the increase in inequality that occurred between 1831 and 1866 can be evaluated in several ways. If we combine the three highest income groups of Table 7, (1) large farmers, (2) employers and (3) high level civil servants, together these groups accounted for 10 per

Table 7. *Employment and income: 1831 and 1866.*

|                                      | Employment<br>(thousands) |        | Average<br>income<br>(francs) |       | Total income<br>(millions<br>of francs) |        |
|--------------------------------------|---------------------------|--------|-------------------------------|-------|---|--------|
|                                      | 1831                      | 1866   | 1831                          | 1866  | 1831                                    | 1866   |
| (1) Large farmers                    | 774                       | 820    | 1,725                         | 3,301 | 1,335                                   | 2,707  |
| Small farmers                        | 4,753                     | 5,035  | 280                           | 538   | 1,335                                   | 2,707  |
| Agricultural workers and<br>servants | 4,314                     | 4,302  | 252                           | 372   | 1,088                                   | 1,599  |
| (2) Employers                        | 510                       | 653    | 4,960                         | 9,490 | 2,530                                   | 6,202  |
| Self-employed                        | 2,040                     | 2,614  | 390                           | 582   | 795                                     | 1,520  |
| White collar employees               | 302                       | 827    | 513                           | 692   | 154                                     | 572    |
| Blue collar employees                | 2,098                     | 3,462  | 580                           | 800   | 1,218                                   | 2,771  |
| (3) High level civil servants        | 170                       | 300    | 1,023                         | 1,387 | 174                                     | 416    |
| Low level civil servants             | 170                       | 300    | 347                           | 463   | 59                                      | 139    |
| Total                                | 15,131                    | 18,313 | 573                           | 1,017 | 8,688                                   | 18,633 |

Notes: Category: Labour force. Data adjustments: the decomposition of the three groups of revenue uses the following information: (1) Based on Toutain (1992), we have supposed that 50 per cent of agricultural income is received by 14 per cent of the farmers. (2) Based on the *patente* statistics of employers and the self-employed provided by Verley (1993), 19 per cent of taxpayers received 71 per cent of the profits; his study also provides estimates of the interest and property income received by this group.

Sources: Verley (1993), Marchand and Thélot (1997), Zylberman (1969), and see discussion in text.

cent of employment in both years and incorporate those persons who would be included in the tenth decile of the income distribution. In 1831 their combined income amounted to 46 per cent of total income whereas by 1866 it had increased to 50 per cent of total income, an indication of the increase in inequality. If we look at the lowest income group that includes agricultural workers and both rural and urban servants, their numbers remained virtually the same in 1866 as they had been in 1831; the income of this group increased 46 per cent in nominal terms between 1831 and 1866 whereas total income in France increased by 115 per cent, an indication of the deteriorating position of persons who would be in the first quintile of an income distribution. Between 1831 and 1866 the average income of blue and white collar employees increased less than 40 per cent in nominal terms, but during the same period the average income per person income increased by 77 per cent. These persons and their income roughly occupy a position in the income distribution that corresponds to the second quintile. The fact that the share of total income received by persons occupying the first and second quintiles declined while the share of income going to the top decile increased is a clear indication of the increasing inequality that occurred between 1831 and 1866. One factor that slowed the rise of income for per-

Table 8. *Income distribution derived from Table 7 (per cent).*

| Income group          | 1780  | 1831 | 1866 |
|-----------------------|-------|------|------|
| 10th decile           | 51-53 | 45   | 49   |
| 1st and 2nd quintiles | 10-11 | 18   | 16   |

*Note:* Category: Labour force.

*Sources:* Tables 6 and 7.

sons in the lowest ranks of the income scale was the large influx of rural workers who were happy to accept urban employment for wages that, although low, allowed them to benefit from the enhanced quality of life available in urban areas.

The information contained in Table 7 cannot be transformed into a complete income distribution, but with only minor adjustments it can be used to estimate the extreme classes of an income distribution. These are presented in Table 8 where the similar information for 1780 is repeated.

The data demonstrate clearly the decrease in inequality that occurred between 1780 and 1831, and the subsequent reversal. The degree of inequality that existed in the years prior to the Revolution was never afterwards attained. Although the greater equality that prevailed in 1831 subsequently eroded, the income distribution in 1866 exhibited greater equality than had prevailed prior to the Revolution.

One factor that served as a brake on the rise of inequality after 1831 was the relatively strong increase in agricultural productivity that occurred throughout most of the nineteenth century. Between 1831 and 1866 total employment in France increased by 21 per cent, but the number of persons in the agricultural sector remained constant. During the same period the volume of agricultural production increased by nearly 50 per cent (Toutain 1987, p. 98-102). This substantial increase in agricultural output was accomplished with no increase in agricultural labour, thus resulting in the sharp increase in agricultural productivity without which there would have been an even greater increase in inequality between 1831 and 1866.

#### 4.2. *The income distribution in 1894*

In the last decade of the nineteenth century there was a flurry of attempts to produce income distributions. Much like the primitive attempts of the eighteenth century, the efforts of the late nineteenth century were mostly undertaken to illustrate the effects of various proposals for an income tax that was eventually implemented in 1917.

Colin Clark (1951, p. 535) mistakenly attributed to Pareto an estimate of the income distribution for France in the 'Middle Ages' that he said



Table 9. *The income distribution: 1894 and 1899–1901 (percentage of total income).*

| Income group | Coste's estimate for 1894 | Doumer's estimate for 1894 | Caillaux's estimate for 1894 | Colson's estimate 1899–1901 |
|--------------|---------------------------|----------------------------|------------------------------|-----------------------------|
| 10th decile  | 48.0                      | 41.0                       | 42.0                         | 46.0                        |
| 9th decile   | 15.5                      | 10.0                       | 10.0                         | 10.0                        |
| 4th quintile | 17.0                      | 18.0                       | 18.5                         | 17.0                        |
| 3rd quintile | 10.0                      | 14.0                       | 13.0                         | 12.0                        |
| 2nd quintile | 6.0                       | 10.0                       | 10.0                         | 9.0                         |
| 1st quintile | 3.5                       | 7.0                        | 6.5                          | 6.0                         |
| Total        | 100.0                     | 100.0                      | 100.0                        | 100.0                       |

Note: Category: Population.

Sources: Coste (1895), Colson (1903 and 1927), and Morrisson (1991).

had been based on 'income from rents in Paris'. Pareto had published a distribution based on Paris rents but it was for 1889, and he never intended it to be interpreted as an income distribution.<sup>8</sup> The first attempt to estimate an income distribution for France in the closing decade of the nineteenth century was completed by Adolphe Coste, a senior employee of the Ministry of Finance, who was responsible for collecting and analysing statistics for the *contribution personnelle-mobilière* tax for 1894.<sup>9</sup> The tax had more or less replaced the Old Regime's *capitation* tax although the Ministry of Finance's data were not based on actual collections but rather on what the tax inspectors presumed was the real rental value of residences and other buildings. Since the tax was imposed on every unit in a building, virtually all family units were included except those boarding with others. However, the data used by Coste did not include Paris, a deficiency that was eventually corrected by others. Using these data, Coste (1895) made an estimate of the income distribution by presuming that the tax was equivalent to 0.6 per cent of a person's income. He presented his results to the National Assembly as part of the debate about introducing an income tax.

Over the next three decades the 1894 tax data were used by several others that including two ministers of finance, Doumer and Caillaux, as a basis for estimating the revenue that might be collected from several proposed

<sup>8</sup> This study was first published in the *Bulletin de Statistique et Legislation Comparée* (September 1890), and later included in his first publication (1896) about the 'Pareto coefficient'. Later he published (1897) a second distribution for France, but it was limited to analysing how the shares of the *Crédit Foncier de France* for the years 1888 and 1895 were distributed among the owners.

<sup>9</sup> Earlier Coste (1890) had presented an estimate of the socioeconomic structure of France to the *Société de Statistique de Paris* on 18 June 1890.

Table 10. *Income distributions for 1780, 1864 and 1899–1901 (percentage of total income)*

| Income group       | 1780      | 1866  | 1899–1901 |
|--------------------|-----------|-------|-----------|
| 10th decile        | 51–53     | 48–49 | 45        |
| 9th decile         | 11–15     |       | 10        |
| 4th quintile       | 16        |       | 17        |
| 3rd quintile       | 8         |       | 12        |
| 2nd quintile       | } 10      | } 16  | 9.5       |
| 1st quintile       |           |       | 6.5       |
| Total              | 100       | 100   | 100       |
| Gini coefficients: | 0.60/0.62 |       | 0.48      |

*Note:* Category: Population.

*Sources:* Tables 6, 8 and 9.

income taxes.<sup>10</sup> In 1903 the engineer *cum* economist Colson published a revision based on the 1894 tax data, and then 24 years later (1927) produced what is the most reliable estimate of an income distribution for the turn of the century (1899–1901). Between Colson's two estimates, there had been another revision of the 1894 data by Levasseur (1907). Colson's last estimate is presented in Table 9 where we also present Coste's original estimate for 1894, remembering that this estimate was made before data for Paris were available.

Doumer stated that he had purposely underestimated the income of those in the highest bracket in order not to create too optimistic a view of how much an income tax might produce. Therefore, it is perhaps surprising that his estimate for the tenth decile is not lower than shown. Also, recognizing that Coste did not have access to the tax data for Paris when he made his first estimate, it is somewhat puzzling that his estimate for the tenth decile is the highest among the four late-nineteenth century estimates. Even so, the differences between the four estimates are not large, and except for Coste, the estimates for the bottom two quintiles are quite similar. In order to evaluate the evolution of the income distribution from the late eighteenth century until the beginning of the twentieth century, we present the three estimates we have discussed above in Table 10.

### 5. The Kuznets hypothesis

After analysing the evolution of the income distributions for several industrialised countries, Kuznets (1955) discerned a general pattern that has

<sup>10</sup> The next modification of the 1894 tax data was made by a new Minister of Finance, Doumer (Colson 1903, p. 313). Another revision of the data was made in 1907 by the next Minister of Finance, Caillaux, again in support of his arguments for adopting an income tax (Colson 1927, p. 419).

subsequently been referred to as Kuznets' 'inverted U' hypothesis. The Kuznets hypothesis is that as a country begins the process of industrial development, income inequality increases but eventually greater income equality occurs, producing an inverse 'U' with respect to income inequality.

The income data for France are not sufficiently precise nor continuous to provide a strong test of the Kuznets hypothesis, but what emerges from the available data is that the hypothesis seems to be essentially supported by the case of French industrialisation. In the years just prior to the Revolution, income inequality was probably as high as it has ever been anywhere in modern times. While there are no quantitative data about how that distribution may have changed in the decades immediately following the Revolution, there is considerable reason to believe that a substantial decrease in inequality occurred, ending perhaps about 1830. This period of decreasing inequality occurred prior to the commencement of industrialisation in France. If it is accepted that the industrial revolution in France began sometime after 1830, then this was exactly the period during which income inequality must have begun to increase, because by 1866 we find income inequality almost as high as it was prior to the Revolution. Thirty years later, and based on data that are more reliable than the data available earlier, we find that income inequality had decreased significantly and at a time that is more than a half century after the beginning of the industrial revolution in France. Thus, Kuznets' 'inverted U' hypothesis is further supported by the experience of France.

However, two aspects of the evolution of the income distribution are notable. First, the degree of inequality before the Revolution was already high, even higher than in 1866, nearly a century later. Kuznets concluded from his research that countries generally had a lower degree of inequality before beginning their phase of industrial revolution. Second, in France there was an important decline in inequality during the Revolutionary years 1790–1815. Again this is different from anything Kuznets had observed elsewhere; the decline resulted from France's unique Revolutionary experience.

## **6. The Theil coefficients**

Although the income data have margins of error and we have no clear indications about how large the errors may be at any particular point of time, it is useful to examine what they portray when their information is used to calculate Theil coefficients. The 'total' Theil coefficient can be decomposed into two parts: the intra-group dispersion (variation among members of the same group) and the inter-group dispersion (variation among the groups). Except for the data extracted from the *capitation* rolls, we have no direct information about the magnitude of the intra-group

Table II. *Inter-group, intra-group, and total Theil coefficients.*<sup>a</sup>

| Year | Inter-group<br>Theil | Intra-group<br>Theil | Total<br>Theil |
|------|----------------------|----------------------|----------------|
| 1788 | 0.59                 | 0.36                 | 0.95           |
| 1866 | 0.57                 | 0.36                 | 0.93           |
| 1894 | 0.36                 | 0.33                 | 0.69           |

*Notes:* Category: Population. <sup>a</sup>The formulas for the Theil coefficients are given in an Appendix.

*Sources:* For the intergroup Theils: Tables 3, 7 and Morrison (1991). For the intergroup Theils: see text.

variations. However, knowledge about the members of each group makes it possible to advance some reasonable assumptions about the variations:

- (1) For the top decile the intra-group variation was undoubtedly large because the fortunes of the wealthiest members were many times those of the less wealthy members. For this group we assume an intra-group Theil of 0.5.
- (2) Within each of the sub-groups of civil servants, small farmers, agricultural workers, day labourers, and servants there was little dispersion in incomes as the members of each group were quite homogeneous. For these sub-groups we assume an intra-group Theil of 0.1.
- (3) The remaining groups that included the shopkeepers, artisans and large scale farmers exhibited differences in income that were probably about midway between the above two categories. For these we assume an intra-group Theil of 0.25.

Again, the validity of our assumptions is not known precisely enough to form strong conclusions based on the resulting Theil coefficients, but they provide a way of indicating a general order of magnitude, keeping in mind the approximate nature of the underlying assumptions. The assumptions make it possible to combine the inter-group Theil estimates with the intra-group components in order to arrive at the total Theil coefficients for the socio-professional distribution of income that are presented in Table II.

The composition of the Theil coefficients suggests that there was only a modest decrease in inequality within groups over the nearly hundred years between 1788 and 1894, but that the overall decrease between groups was substantial. The data also suggest that the degree of inequality in 1788 and 1866 was nearly similar. And since we have reason to believe that inequality *decreased* after the Revolution, then it follows that inequality must have *increased* sometime afterwards. It is only by 1894 that we have reliable data

that inequality had decreased from the higher levels it exhibited in the eighteenth century and earlier in the nineteenth century as well.

Another analysis is possible with the Theil coefficients. We can calculate the simple inter-sectorial Theil coefficients for the degree of inequality between the two principal sectors of the economy: agriculture and non-agriculture. These are as follows:

Table 12. *Inter-sectorial Theil coefficients.*

| Year | Sector          | $N_i$<br>(percentages) | $Y_i$ | Inter-sectorial<br>Theil ( $T_a$ ) |
|------|-----------------|------------------------|-------|------------------------------------|
| 1788 | Agriculture     | 68                     | 45    | 0.11                               |
|      | Non-agriculture | 32                     | 55    |                                    |
| 1864 | Agriculture     | 48                     | 44    | 0.01                               |
|      | Non-agriculture | 52                     | 56    |                                    |
| 1894 | Agriculture     | 48                     | 40    | 0.02                               |
|      | Non-agriculture | 52                     | 60    |                                    |

*Note:* Category: Population.

*Sources:* Tables 3, 7 and Morrisson (1991).

This analysis highlights the originality of the French experience. Whereas there was a certain degree of income inequality between the agricultural sector and the rest of the economy during the eighteenth century, apparently the inequality was much diminished by the middle of the nineteenth century and remained so by the closing decades of that century. A consequence of this is that the reduction in inequality that occurred in France between 1866 and 1894 cannot be attributed to a reduction in income inequality between the agricultural and non-agricultural sectors because the degree of inequality was already small by 1866. The small difference in income inequality between the agricultural and non-agricultural sectors in France during the nineteenth century is unusual compared to the experiences of other European countries during similar phases of their economic development.

### 7. Summary and conclusions

This analysis of the evolution of the income distribution for France is limited due to the lack of reliable statistics concerning the economy during much of the period during the eighteenth and nineteenth centuries. Nevertheless, the results suggest that the degree of inequality that existed in the later part of the eighteenth century, and undoubtedly earlier in the century also, was high and perhaps even higher than existed in England at a comparable period in its economic development.<sup>11</sup>

<sup>11</sup> For analyses of the historical evolution of income inequality in England, see: Brown (1988), Lindert (1994, 1999), and Williamson (1979, 1980, 1985).

In the absence of firm statistical data concerning the years following the French Revolution, it is impossible to quantify precisely the change in inequality. However, several changes in economic conditions corroborate the view that inequality decreased. How large was the decrease, how long did it decline, and when did it begin to increase . . . these are all important historical questions but ones for which our analysis does not provide clear answers. It does seem that the turnaround may have occurred sometime near 1830 when France's industrial revolution got underway. What seems more certain is that by 1866 the degree of inequality had increased and was at a level nearly comparable to what had existed in the years prior to the Revolution.

Kuznets observed that the initial phase of economic development usually coincided with an increase in inequality. He attributed this to the combination of a constant and significant income disparity between the agricultural and the non-agricultural sectors, and decreasing employment in the agricultural sector during the process of economic growth. In France between 1830 and 1894, there is evidence that income inequality first increased and then began decreasing, confirming Kuznets' 'inverted U'. However, intersectoral inequality between agriculture and the other sectors contributed virtually nothing to explaining the change in income inequality between 1864 and 1894 (see the Theil coefficients, Table 12). France was unusual because agricultural income increased rapidly between 1830 and 1894 with the result that the income disparity between the agricultural and the non-agricultural sectors decreased.

While not as comprehensive as data from the national accounting systems that countries began using in the second half of the twentieth century, the data for the second half of the nineteenth century strongly suggest that a significant decrease in inequality occurred between 1866 and 1894. The absolute degree of inequality was still high in 1864, and the decrease that occurred between 1866 and 1894 was significant. In the twentieth century, the degree of inequality has generally continued to decrease, although the decline has not been without interruptions. Sauvy (1967) estimated that by 1929 the bottom 40 per cent received 17 per cent as compared with 10 per cent in the late eighteenth century. By 1985, after allowing for government taxes and transfers, the share going to the bottom 40 per cent had risen to 23 per cent. In the upper ranges of the income distribution, the decrease in inequality was equally notable. In 1890 the fifth quintile received 55 per cent of income, and by 1985 it had decreased to 47 per cent (or 40 per cent after taxes and transfers); the tenth decile's income had decreased during the same period from 45 per cent to 31 per cent (or 26 per cent after taxes and transfers).<sup>12</sup>

It is evident that our estimates represent only a first step toward

<sup>12</sup> See Morisson (1991).

determining how income inequality evolved in France between the latter part of the eighteenth century and the beginning of the twentieth century. The next steps to obtain greater precision would be to explore more thoroughly the *capitation* rolls and other taxes that were imposed during the eighteenth century, and especially investigating whether suitable proxies for income can be found for the first half of the nineteenth century. Nevertheless, we believe our estimates provide a solid beginning for understanding the main changes that occurred during the two centuries covered by this study.

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#### **Appendix: Formulas for Theil coefficients**

Formulas for Theil coefficients where  $Y_i$  = percentage income of the  $i$ th group,  $N_i$  = percentage of population in the  $i$ th group, and  $T_i$  = the assumed Theil for the dispersion of income within the  $i$ th group.

$$\text{Inter-group Theil: } T_a = \Sigma[(\ln Y_i/N_i)Y_i]/100$$

$$\text{Intra-group Theil: } T_b = \Sigma Y_i T_i$$

$$\text{Total Theil} = \text{Inter-group Theil } (T_a) + \text{Intra-group Theil } (T_b).$$