Introduction

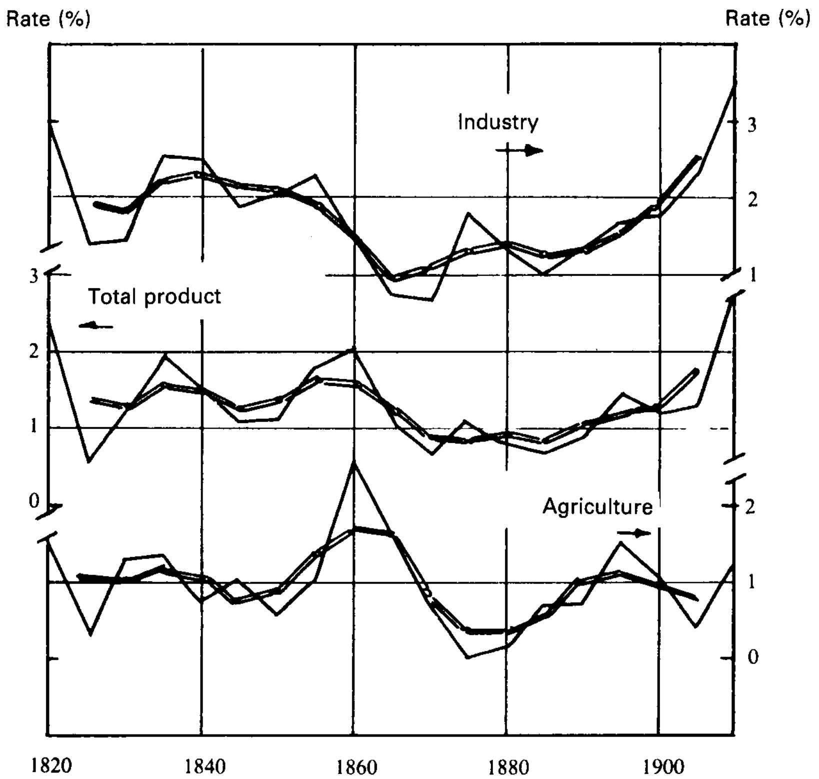
Although quantitative methods and their applications to history have been of real interest for a number of years, there does not as yet exist a body of statistics that makes it possible to assess the overall performance of the French economy throughout the nineteenth century and to retrace, at various levels, the stages of its development. There are no means for describing with accuracy the successive structures of production and its financing, the available capital and labour, the amount of productivity in the different sectors, the amount and distribution of income and, in consequence, the special features of the country's evolution. This gap is probably due to the difficulties of documentation, but also to the fact that the study of the operation of the economy was for a long time sacrificed to the study of its growth. It was assumed, perhaps too summarily, that the various industrialized countries followed in their development a sort of single path and that it sufficed to measure their overall advance to grasp the essentials. Experience shows, in fact, that each economy was submitted to specific constraints that often weighed decisively on its performance and that the process of evolution can only be understood by widening the field of analysis to include, in addition to national product, consumption and investment, production and trade, savings and credit – in brief, the market and its main components. Therefore, this study was initially undertaken to broaden the quantitative base on which economic history rests. However, by using a large number of series and substituting annual data for simple ten or five year averages there was the risk of aggregating and collating incompatible series. For this reason it was felt necessary to submit the entire set of data to the test of an econometric model to check its consistency. But originally the object of this work was essentially to provide a more complete and more reliable research tool by combining more numerous and more diverse statistical series, thus facilitating the presentation of the nineteenth century economy, its resources, its functioning and its performance.

Later on, however, the order of priorities had to be reversed. The new statistical material confirmed the reality of the French deceleration in the middle of the century and the econometric analysis appeared by its results to be a particularly effective means for explaining the economy's mechanisms, especially in revealing the economy's successive structures. Actually, the parameters of the problem were already identified. It was known that the country had gone through a phase of lesser success between 1860 and 1890. The rate of growth for industrial output had dropped by half, while agriculture underwent, after a certain delay, an even more pronounced slow-down. In the trough of the depression of the 1880s, the growth of per capita national income had fallen to some 0.5% per annum even though no domestic unrest, protracted war, or even grave crisis in the economy – except perhaps the bank panic of 1882 – could be given as explanations for this negative performance (see figure 0.1). Curiously, however, this break in French growth has not been properly investigated. Either it was assumed, according to the theory of long-term cycles, that in the nineteenth century 'the alternation of phases of growth and regression or lesser growth' resulted in promoting and spreading technical innovations, thus keeping the different industrial countries at similar levels of income; or it was observed that the economy vigorously recovered at the turn of the century under the force of industrial development and that the rates of growth in 1905–13 were at comparable, if not higher, levels to those of 1835–60.

Yet, the final recovery of production does not signify that the country's power of initiative and its standing were preserved. First, the intensification of international competition in the middle of the century meant that it could not keep its market shares and competitiveness intact. Furthermore, the period of lesser growth, across sectors, undermined the capacity of French firms to expand and consequently that of the economy as a whole. Three instances may be given on this point.

In the first place, the settling down of economic activity happened in a period when the reduction of trade tariffs, the extension of transport networks and the movement of migrants and capital towards overseas countries expanded markets and contributed to integrating economies much more tightly than in the past. An opportunity was thus offered which France, unlike its closest competitors, could seize only imper-

Figure 0.1 Growth of the French economy: average annual rates by sector, 1815–1913



Source: appendix, table A-IV The rates were calculated for ten year periods. Thus, 1820 represents the rate of growth for 1815–25; 1825 for 1820–30; etc. Total product covers four sectors – agriculture, industry, construction and transportation – and is four-fifths of the national product.

fectly. The country had doubled its productive capital in the second third of the century, readied and unified its domestic market, invested abroad in the early 1860s and acquired trade positions that should have prepared for a new stage of expansion; around 1872–5, immediately after the opening of the Suez Canal, the country achieved export sales equivalent to 18% of its national income. But these efforts remained partly futile because the slow-down of economic activity, which lowered the country's share to approximately 6–7% of international sales and industrial capacity, prevented it from building the commercial and financial structures that would have helped it to consolidate its position. The role of clearing between the different financial markets on the Continent that Paris had played in the past was lost to London in the 1870s. Trading and shipping companies could not, for a time, enlarge the sphere of their operations abroad, since the growth of exports had declined (in volume) to an annual average of 1.5% in 1876–96, that is, one-quarter of the rate achieved during the period of trade liberalization between 1846 and 1876. On the eve of the war, though, thanks to the improvement in international demand, France's position was rectified. The commercial transactions of the country – exports and invisibles – were, taking the 1910–13 average, around 45–50% of those of England, 55% when these figures were adjusted for the level of the population. But the acceptance credits made available by banks to foreign business, and the income received from investment abroad were considerably lowered; they only represented 23% and 35%, respectively, of the British levels. Consequently, despite the economic recovery and the more favourable performance of the banks and financial companies on the domestic market, they had not recovered by 1913 the means and the role they had had earlier in the century.

Furthermore, production had lost some of its adaptability. Even assuming that, in the long-run, depressions favour the introduction of new technologies – in so far as the slow-down and the consequent fall in prices may induce firms to seek new sources of profit more efficiently than in periods of high demand – the levelling-off of demand and the strong foreign competition meant that, in the French case, the consequences were of a different sort.

Actually, prices moved downward (by some 35% between 1857 and 1896), but the fall was greater for manufactured goods than raw materials, and, simultaneously, wages rose steeply, affecting firms' profit margins and their ability to invest; for that reason, a slow-down appeared in patent registration, while net fixed domestic capital formation returned, after the crash of 1882, to a level equivalent (at current prices) to 6.3% of the national product, compared to 8.2% in 1855–7 and 9.1% in 1881–3. Moreover, because of the delays in their careers and reduced discrepancies in hierarchical rewards, the recruitment and training of managers was neglected. Enrolment had dropped at the Ecole Centrale in the aftermath of the war of 1870. Later on this extended to the business schools, some of which had to reorient their students towards the civil service examinations, as well as to the technical *grandes écoles*; the number of engineers entering industry after studying stopped growing between 1880 and 1895, after having doubled during the years of active industrialization. Incidentally, it was at that time that Germany outstripped France in the employment of personnel trained in the sciences: engineers working in industry were between 10,000 and 11,000 for both countries around 1865–9, but 40,000 and 25,000 respectively in the 1890s.

In the meantime, because of insufficient opportunities in industry and public works, excess labour had to enter new sectors: the railways (until 1883) and increasingly the civil service – the post office, the army, schools and ministries – where 500,000 jobs were created in the last quarter of the century. In the short term, these transfers buffered the impact of the depression. But, by strengthening sectors that contributed little to the national product, they also resulted in a reduction of the economy's total productivity. In 1886 agriculture still provided 48% of employment; transportation and services a total of 27%, compared to barely 20% in 1866; so that industry was left with 25% of the workforce, or 4.3 million workers out of a total close to 17 million. Of course, this situation was only temporary. In the subsequent stage, the recovery in investment and the upturn in recruitment by industry (its share in 1911 was to reach 30% of a workforce that had risen to 20 million), the rearrangement of careers, and the opening of the hierarchy of skills and wages contributed to restoring the efficiency of the labour market. But the status and importance of the new categories of employment and their negative influence on growth were not questioned.

Lastly, and this could well be a consequence of the delay in mobilizing capital and labour, concentration in industry remained below foreign standards. Yet, on this point, French past experience had not been negligible. In the middle of the century, the mechanization of tasks and the search for practical means of economizing energy had led industrialists to concentrate work and to create large integrated concerns. Among the main companies, up to 2,000–3,000 workers were counted per firm in mechanical industries and textiles, 5,000 in glass and chemicals, 9,000 in heavy industry – Le Creusot and Anzin had, at the end of the 1860s, workforces of 10,000 and 12,000 employees respectively – and the figures per firm were two or three times higher in the railway sector. Teams of similar size were to be found in 1913 in the

Table 0.1. *Industrial output and national product: comparison of growth rates in four countries (annual averages in percentage)*

	Industrial output (total)				Industrial output (per capita)				National product (per capita)			
	Germany	U.S.A.	France	U.K.	Germany	U.S.A.	France	U.K.	Germany	U.S.A.	France	U.K.
1840-1860	2,8	6,7	2,1	3,2	2,2	3,8	2,0	2,8	1,4	1,5	1,1	1,7
1860-1875	5,1	4,0	1,1	2,8	4,0	1,6	1,1	1,9	2,1	1,0[a)]	1,1	1,5
1875-1890	2,5	5,9	1,3	1,8	1,5	3,7	1,0	1,0	0,8	2,4	0,5	0,8
1890-1910	3,9	5,7	2,0	1,8	2,6	2,4	1,8	0,9	1,6	1,9	1,2	0,9
1860-1890	3,8	4,9	1,2	2,3	2,8	2,7	1,0	1,5	1,5	1,3	0,8	1,2
1840-1910	3,5	5,7	1,7	2,4	2,6	2,9	1,5	1,7	1,5	1,7	1,0	1,2

a) 1859-1879.

Sources: Germany: R. G. Hoffmann, *Das Wachstum der Deutchen Wirtschaft seit der mitt des 19. Jahrunderts* (1965). United States: R. E. Gallman, 'Commodity Output, 1839–1899', in NBER, *Trends in the American Economy in the 19th Century* (1960); E. Frickey, *Production in the U.S., 1860–1914* (1947); and J. W. Kendrick, *Productivity Trends in the U.S.* (1962). United Kingdom: B. R. Mitchell and P. Deane, *Abstract of British Historical Statistics* (1962); and C. P. Feinstein, *Statistical Tables of National Income, Expenditure and Output of the U.K., 1855–1960* (1972). France: see appendix.

same sectors: 15,000–16,000 in industry and 60,000 in the railways. Furthermore, the taste for technological achievements specific to manufacturers during the second industrialization period, should have led them to build larger production units to reap economies of scale in the modern sectors. But this was not the case. In the automotive industry, in particular – and the example is of general value – manufacturers, instead of building integrated plants and of rationalizing work, subcontracted as many operations as possible and limited themselves to the design of their models and the assembling of the parts that were delivered to them from the outside. The growth of the sector was therefore achieved, in a way, by stepping up unitary output, but, even more so, by an increase in the number of firms. They were around thirty in 1900, fifty-seven in 1910 and 110 in 1913 with an average of 400 workers per unit. Employment by the three leaders was of the order of 2,000–4,000, the equivalent of a large textile factory fifty years earlier.

In a similar way, the development of mass consumption in the pre-war years made it possible for a great number of manufacturers, in the downstream sector, to take charge of the distribution of their products, whether they required publicity, sales promotion, specialized services and repairs, or simply a better inventory management. There is no branch in this sector where one does not find firms that had a complete control over the supply of the raw materials and components they used and the manufacturing and (retail) sales of their products. But, ultimately, this was still done on a modest scale. Of the 115 most important industrial corporations listed on the Paris stock exchange in 1912, barely twenty-two belonged to this sector, that is one out of five, while the proportion was of the order of four or even five out of ten among the large Anglo-American companies, according to reports made in 1905 and 1917. Furthermore, with a market value of some 500 million francs, the aggregated assets of these firms were barely valued at a level equivalent to those of a major colliery like Lens or Bruay. In fact, they represented only 8.5% of the 6,200 million francs at which the market valued the 115 companies listed. Whatever the criterion, workforce or assets, it can be seen that business concentration was less advanced in the modern downstream sectors, then in full expansion, than in the older sectors led by large internationally-oriented concerns that had given the French industry its reputation.

These facts have been widely debated in the years preceding the war.

Table 0.2. *Comparison of income levels in four countries: per capita GDP (in constant prices), 1853–1913*

	1853	1865	1880	1890	1900	1910	1913	1913[a]
U.S.A.	83,7	84,4	88,6	95,5	102,9	121,5	121,6	126,2
U.K.	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
France	67,6	72,7	71,5	65,7	70,9	74,6	79,0	62,6
Germany	53,5	56,3	55,1	58,4	64,4	70,5	71,9	72,4

Sources: A. Maddison, 'Per Capita Output in the Long Run', *Kyklos*, vol.32 (1979), sections 1–2, pp.425f.; for 1913[a]: P. Bairoch, 'The Main Trends in National Economic Disparities Since the Industrial Revolution', in P. Bairoch and M. Lévy-Leboyer, *Disparities in Economic Development Since the Industrial Revolution* (1981), p.10.

Largely because the lead taken by foreign countries made apparent at this time, often strikingly, the deficiencies that had accrued in the depression – in 1910, real output per capita in France was 40% less than in the United States, 25% less than in England or Belgium and some 10% less than in Germany, although France and Germany were in a reversed position until then (see table 0.2). Furthermore, perhaps because industry had developed rather early in the century, contemporary authors had the impression that the country still possessed, due to its past success, sufficient means to adapt its structures and to stay level with its competitors. Hence, the numerous criticisms that were made at the time. Authors highlighted the new expansion of markets, the opportunities offered by technical innovations and, by contrast, the still limited accomplishments in France, the apparent slackness of firms, their weak penetration in the market, the ageing of equipment and the misallocation of labour. All these things were taken up later on, especially in the periods of expansion, when comparisons with more advanced countries could lead to equally unfavourable conclusions. Too often the effects of the deceleration of the 1860–90 period were ignored, so that the lag in the utilization of new technologies and in the organization of the market was simply noted as if it were a permanent feature that had to be explained by taking into account mentalities and attitudes specific to the French milieu.

It has become common to refer, firstly, to the country's insufficient labour supply. This is not attributed to malnutrition and poor hygiene, nor to sustained levels (until 1905) of child mortality and therefore to the incomplete modernization of the economy. Instead, the voluntary reduction of the birth rate has been almost exclusively emphasized with its long-term consequence of an excessively slow redistribution of the workforce and a generalization of Malthusian reflexes. To quote Alfred Sauvy, 'the secular ageing of the population could only atrophy the creative spirit, substituting for it fear and the concern for protection'. Secondly, the insufficient amount of invested capital has also been called upon. Difficulties were interpreted not as a result of the depressed levels of income and savings in a period of recession, but, again, as the sign of a lack of confidence, manifested in the 'deliberate and voluntaristic attitude', attributed to French bankers by several commentators from Lysis to Jean Bouvier, 'of directing and orienting abroad domestic savings' at the risk of sterilizing them. Thirdly, in a more general way, many studies, taking up themes developed by David Landes, have pointed to behaviours that were deemed specific to France and that may have delayed industrialization: the respect for established positions; the attraction of public offices sheltered from risk; the sentiment that business family structures had to be preserved and that competition was to be limited by protecting and sharing out markets, that is, attitudes that partially explain the lags observed in restructuring the economy,[1] and that may be surmised at the end of the century from the survival of a host of ill-equipped and unproductive workshops, many of which should have been absorbed (half a million of the industrial establishments, i.e. 84% of their total number in 1896, only employed one to ten workers), and the fact that, due to the low level of productivity, the purchasing power of the French worker, according to a Board of Trade's survey, was 60–65% of the British level in 1905 and at less than 50% of real wages recorded in the United States.

These facts are indisputable. And it is clear that the overall improvement in productivity – the output gains that can be expected from stronger individual motivation, improved management methods, and more efficient market structures, as opposed to the quasi physical increase in available capital and labour – was to play a key role in the recovery that occurred in the twentieth century. The increase in productivity and inputs contributed, in equal measures, to the progress achieved between 1913 and 1963; their annual growth rates were, respectively, 1.1% and 1.0% during this period. Therefore it might have been tempting to transpose the same approach into the previous century and to break down the sources of growth by calculating separately the accumulation of quantifiable inputs (capital and labour) and the residual (deducting the combined contribution from the total increase) representing the general efficiency of the system. But, even though this procedure has been successfully applied to other countries, it was thought better not to use it because the expected results seemed less appropriate to the French case and, to a certain extent, less fruitful than those of an econometric estimation based on an almost complete set of annual series. This choice was made for several reasons.

What was looked for was an explanation for the concrete behaviour of the economy: the factors that affected growth, but also the mechanisms (as well as the mistaken policy decisions) that may account for the slow-down from the 1860s onwards. In this view, it is unclear what role to attribute to the residual term and its components. When underlining, for example, the prestige of public careers, as opposed to private employment, should it be concluded that this was an obstacle that constantly impeded the recruitment of managers to industry, or a momentary feature related to the vicissitudes of the overall economic situation? The second hypothesis seems more likely because transfers of engineers from the public to the private sector, which effectively slowed down at the end of the century, were sizeable in the phases of acceleration (at the time of railway construction and again in the years 1905–13). Likewise, was the retention of a part of the labour force in the countryside, after a major period of migration, the result of a deliberate choice dictated by the individualism of the rural community and its anti-modernist prejudices or a necessity due to the slow-down in economic activity following the depression of the 1880s? From the same perspective it can be recalled that the scaling down of workshops came from the collapse of many large firms during the crisis and that, conversely, their subcontractors and the firms that had preserved their service activity withstood better. To take a specific case in Paris, the leading engineering firms disappeared between 1876 and 1896, but the workshops doubled in number with a practically stable labour force (1,000 workshops employed 14,000 workers at the turn of the century), which explains the ease with which the automobile industry was established in the capital and its immediate success. The breakdown of the sources of growth, if it was possible, would probably allow identification of the periods when productivity had an apparent driving or braking role. But it is impossible to know whether the residual term,