The French cliometric revolution: A survey of cliometric contributions to French economic history

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This article surveys cliometric research on the development of the French economy, with special emphasis on the fiscal and monetary history of the Revolution, the alleged retardation of the French economy in the nineteenth century, and the question of agricultural productivity in the early modern and industrial age.

1. Introduction

The Nobel Prize citation to Laureates Robert Fogel and Douglass North describes Cliometrics as a blending of modern economic theory and econometrics with traditional methods of historical analysis in order to investigate economic change in the long run. This is a workable definition for sifting from the literature of French economic history works that arguably belong in the cliometrics inventory. Most of this work focuses on France's monetary and fiscal history and on her alleged economic retardation in the nineteenth century, topics that have long dominated academic and non-academic debate. The cliometric contribution to this debate is recent, and has not yet made its way into textbooks or popular works on the French economy. It has nevertheless worked a true revolution in scholarly assessment of France's economic performance in the age of industrialization. This reassessment has important implications for the 'modernization' paradigm that currently dominates the interpretation of modern comparative economic history.

1.1. Revolution delayed

French cliometrics originated in the mid-1950s in a grant awarded to Simon Kuznets by the Social Science Research Council to fund the construction of historical income and product accounts for the developed nations. Kuznets subcontracted the French accounts to Jean Marczewski, who recruited a small group of talented young economists to compile the relevant statistical data from nineteenth-century surveys and censuses and eighteenth-century
conjectures. The first French cliometric productions (Toutain 1961, 1965; Marczewski 1965, Markovitch 1965) were contemporaneous with the first British and American ones (Deane and Cole 1962, Conference on Research in Income and Wealth 1960, 1966). While the prompt publication of France’s historical output series augured a significant French contribution to the development of cliometrics, this was not to be, for reasons that are peculiarly French.

On the occasion of Toutain’s (1961) publication of the agricultural output series, Marczewski (1961a) declared the arrival of a new quantitative history, which would impose needed order on French economic history by exploiting the logic of national income accounting. Since the product accounts capture every act affecting the allocation of resources, it followed that the historical significance of every dated event could be fixed by determining its effect on the level and structure of the national product.¹ The proclamation of an historical method that looked suspiciously like book-keeping was received in French academic circles with amused scepticism. As the neoclassical economic foundations of the method became more evident this scepticism turned to derision and finally oubli.² The episode was unfortunate, because the misunderstanding caused the historical income project to be underfunded, delaying final publication of the complete accounts by two decades (Toutain 1987). More importantly, it retarded the emergence of a community of scholars capable of carrying on a cliometric conversation.

The reasons for the abortive beginning were institutional and ideological. Institutionally, economic history belonged to history rather than to economics, which meant that candidates for the national examination (agréation) selecting candidates for posts in the national teaching and research establishment did not have to study economics, and given the competition from other historians were well-advised not to. Moreover, the 1950s and 1960s was a chateau-fort of the Left and hence singularly inhospitable to research guided by neoclassical economics. The Left had also appropriated the right to define the history of post-Revolutionary France, and it placed a socialist narrative on that history which had little in common with questions about economic growth addressed by Kuznets. Thus, findings by Crouzet (1964, 1966) and Lévy-Leboyer (1964) that a quarter century of Revolution and war had probably slowed the growth of the French economy were widely taken as right-wing attacks on the Revolution itself. This atmosphere was not propitious to the establishment of an analytical revisionist economic history.

¹ ‘Le trait distinctif fondamental de l’histoire quantitatif est que les conclusions auxquelles elle aboutit sont reliées de façon continue à l’ensemble des événements retenus dans le modèle descriptif . . . ’ (Marczewski 1961a, p. viii).
² Chaunu (1964, 1968) and Vilar (1965) wrote sympathetically critical reviews. Le Roy Ladurie’s (1968) assessment of Toutain’s agricultural estimates for the eighteenth century was devastating.
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In the 1960s and 1970s cliometric studies of French economic history were therefore carried out mainly by American and British scholars. The most important work in the proto-cliometric period was Cameron's (1961) study of French foreign investment, which produced new estimates of the balance of trade and import and export price indices. This work continued a line of research originally carried out by Taussig's students at Harvard on balance of payment adjustment mechanisms under the gold standard (White 1933). Landes' (1950) critique of Labrousse's model of the eighteenth-century 'crisis' was another early attempt to introduce economic reasoning into French historical discourse. Further colonization of French economic history by Anglo-American economists was delayed, however, by abundant research opportunities in American and British economic history and by the language barrier raised by the substitution of mathematics for the foreign language requirement in American Ph.D. programmes. It was not before the early 1970s that cliometric studies on the French economy began to appear in print (Newell 1973, Grantham 1975). The culmination of this initial phase was O'Brien and Keyder's (1978) reworking of Toutain and Marczewski's physical product series into purchasing-power parity estimates for comparing British and French growth in the nineteenth century. The estimates gave a more optimistic picture of the relative performance of the French economy before the First World War, setting the terms of the debate that was to follow.

The cliometric revolution in France began in the mid-1980s with the publication of Lévy-Leboyer and Bourguignon's (1985, 1990) macro-economic model of the nineteenth-century economy. This coincided with a cluster of essays by French scholars applying econometrics and other quantitative tools of economic research to French historical statistics (Heffer et al. 1986, Grenier 1987, Aftalion 1988, Strauss 1988, Verley 1988). By the end of the decade knots of talented young economists engaged in historical investigation were forming at the Ecole des Hautes Etudes en Sciences Sociales, the University, INSEE, INRA, ISMEA, and the Banque de

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3 The best review of the early literature is by Verley (1985).
4 Paris has nine university campuses. I include all of them under the denomination 'University'.
5 Institut National de la Statistique et des Etudes Economiques, which is the official statistics office of the French Government.
6 Institut National de la Recherche Agronomique. The social science section of this institution is one of the most productive centres of the New Economic History in France. It contains a small contingent of historians, demographers, econometricians and economic theorists engaged in cliometrics under the direction of G. Postel-Vinay.
7 Institut des Sciences Mathématiques et Economiques Appliquées, formerly the Institut de Science Economique Appliquée. Since the end of the 1950s it has been responsible for publishing the historical income and product accounts in the series AF (Histoire quantitative de l’économie française) of the Cahiers de l’ISEA (since 1967 Economies et sociétés).
France. In the United States the handful of adventurers were reinforced by a second generation of talented researchers. The quality of this group may be judged from the fact that since 1990, the Cole Prize for the best article in the *Journal of Economic History* has been awarded three times to articles in French cliometric history, and since 1978 five times.8

### 1.2. The quantitative foundations

Owing to a precocious centralization, France possesses Europe’s best administrative archives for the period between 1650 and 1880.9 By the 1780s the state already had enough data on incomes and output for Lavoisier (1988 [1791]) to make a serviceable estimate of French national income, and the Napoleonic regime continued this pioneering effort by compiling departmental statistiques whose quality equals that of any estimate of economic activity for a century to come.10 The Restoration abandoned large-scale enquiries, but it kept up annual reporting of crop production and consumption and the census of population. In the 1830s the statistical impulse reasserted itself, and for the next six decades the state conducted censuses of agriculture and manufacturing at approximately decadal intervals, and undertook special enquiries into working conditions, wage rates and specific industries. The reassessment of rural property in 1850–51 generated a huge volume of detailed information about economic conditions at the village level. Much of this information was never published, but the original returns are preserved in departmental archives. The geographical resolution of the data is often high, providing a solid base for cross-section analysis of wages, working conditions, savings rates and industrial organization. Towards the end of the nineteenth century, the wave of large-scale country-wide enquiries was replaced by more limited punctual investigations into questions of special interest.

The eighteenth-century is not as well-endowed with homogeneous series as the nineteenth, but the data base is generous. The nineteenth-century statistics were heir to a long tradition of official enquiries into economic conditions. The agricultural survey that Vauban ordered to be carried out in the Election of Vézelay in 1696 is as complete as any nineteenth-century agricultural census.11 Eighteenth-century sources include nominative lists of persons on tax rolls, classified by occupation and wealth, weekly and bi-weekly lists of food prices on local markets (*mercuriales*), parish registers of vital events, production and employment in the regulated manufactures, trade statistics and the records of the mint. Notarial archives make up

9 See Gille (1980) for an overview of the information to be found in official surveys. For a bibliography of published numerical sources consult Goy and Grenier (1985).
10 See Perrot (1975) and Bourguet (1988) for critical evaluations and a full bibliography.
11 *’Description géographique de l’élection de Vézelay*, Archives Nationales.
another prolific body of quantitative information on France's social and economic life. Analysis of these archives is greatly aided by registers maintained by the Contrôle des Acts for the purpose of taxing transactions. Béaur's (1984) study of land sales in the Beauce between 1761 and 1790 is a good example of how this summary of the date, purpose and parties to transactions can be quantitatively exploited. They can also be utilized to trace the evolution of non-bank credit (Postel-Vinay 1989a, 1997; Hoffman et al. 1992, 1994, 1995). The information available at the village level invites linkage. An outstanding example is Weir's (1995) collation of individual tax assessments with information on vital events in the parish registers to study the evolution of fertility and mortality in a French village. The information available supports the construction of panel data sets. For example, notarial documents record intergenerational wealth transfers with uncommon precision; their analysis in conjunction with data on family vital events could throw strong light on the evolution of motives for savings.

In summary, French quantitative data on the eighteenth- and nineteenth-century economy are among the richest of any country, and surely the richest of any large country. The temporal and geographical span of the data make France an ideal laboratory for formulating and testing hypotheses about secular economic processes. Cliometric study of French economic history can therefore handle problems that transcend the parochial issues of France's economic performance as compared with those of other nation states. National history nevertheless supplies the warp on which most economic history is woven, and it is to the cliometric products of that history that we now turn.

2. Monetary history

France has a turbulent and well-documented monetary history, which has stimulated many case studies analysing her succession of monetary regimes. Cliometric work centres on four topics: the monetary and fiscal history of the Revolution, the effects of sovereign manipulation of the silver content of the official unit of account, the mechanics and evolution of the nineteenth-century bimetallic standard, and the undervaluation of the franc between 1926 and 1930. We consider the first three topics.

2.1. The financial history of the Revolution

Seymour Harris's doctoral dissertation on the assignats\(^\text{12}\) (Harris 1930) is arguably the first 'cliometric' essay in French history. Writing in the

\(^{12}\) The dissertation was awarded the Wells prize. Harris went on to become one of the leading Keynesian economists of his generation.
aftermath of the monetary disturbances that ensued from the suspension of gold convertibility during the First World War, he analysed the Revolution's experiment in paper currency for the light it might throw on conditions governing public confidence in newly established fiat money. Harris imposed the now standard specification of the demand for real balances as a function of real income and the expected rate of inflation. To test whether the demand for assignats was stable he computed monthly series of the floating debt and new issues of assignats, and estimated a current price index using the tables of monthly prices published in 1797 to index debts contracted in the years of high and hyper-inflation when the assignat was legal tender. Harris found that the real value of the assignat did not fall rapidly until early 1793, when an economic recession reduced the demand for money at the same time that falling tax revenue was forcing the government to print more assignats to cover current outlays. He concluded that the demand for the Revolution's fiat money was a stable function of prices and real output. The crucial act that secured its initial acceptance by the public was the government's promise to retire the assignat with the proceeds of sales of the land confiscated from the church.

Harris's conclusions have survived the test of modern monetary theory. Velde and Weir (1992) and Sargent and Velde (1995) show that the assignats' acceptance was due to a credible redemption guarantee in nationalized church land. White (1995) observes that the public lost confidence in the assignat precisely when the Revolutionary government shifted the guarantee to property expropriated from the émigrés and other 'enemies of the Revolution'. Unlike church land, whose expropriation enjoyed wide popular support, nationalized private land was thought to be potentially restorable to its original owners by a future government, which made it a flawed security for paper currency. Sargent and Velde (1995) also confirm Harris's conjecture that the Terror's harsh penalties for violating price controls and refusing to accept assignats at par had a salutary effect on the public's willingness to hold legal tender, which in 1793 and 1794 permitted the embattled state to finance its war for survival entirely out of the proceeds of seigniorage. This source of revenue evaporated when the death penalty for violating the monetary law was repealed on the morrow of Thermidor; the ensuing collapse in demand for assignats caused a repressed inflation to explode into hyperinflation. The story has a curious dénouement. When the public replenished its depleted real balances after the demonetization of the assignat and its short-lived successor, the mandat territorial, the resulting demand for gold, which was partly satisfied by importing specie from abroad, may have helped push England off the gold standard.

13 See White (1991) for a revised set of tables based on departmental returns.
14 The original issue was a compulsory asset exchange, in which the holders of liquid government debt were forced to take assignats in exchange for claims on the state.
15 The pound became inconvertible three weeks after France's official return to specie.
2.2. The fiscal crisis of the Old Regime

Harris’s account of the assignat’s troubled history raises questions about the connection between fiscal policy and the viability of fiat money that were not seriously addressed by economic theorists until the 1970s, when the abandonment of fixed exchange rates lent urgency to the question of what guarantees the credibility of a government’s fiscal and monetary regime. Current macroeconomic reasoning holds that the solvency of a state and the strength of fiat money depend on two linked conditions: the time consistency of the fiscal regime – i.e. whether the present value of expected income from taxes and asset sales covers the present value of expected outlays – and the credibility of the regimes that meet this standard – i.e. whether the public believes that current promises with respect to future spending and taxes will be honoured by future governments. Failure on either score can cause a government’s credit rating to collapse. A sustainable fiscal and monetary regime must thus satisfy two conditions: the intertemporal government budget constraint, and a Nash equilibrium between the state and its creditors that permits the national debt to be held. This theoretical perspective has occasioned a re-evaluation of the fiscal crisis that precipitated the Revolution and reinterpretation of the subsequent monetary chaos in terms of a process of fiscal stabilization.

Cliometric analysis of that crisis focuses on the date when the monarchy’s fiscal regime became time-inconsistent. This question presumes the resolution of a more fundamental one: what grounds did creditors have for believing that the Crown would maintain a time-consistent fiscal regime? In other words what was the ‘commitment mechanism’ supporting the monarchy’s ability to borrow? Since the commitment mechanism constitutes the constitutional regime on which all else depends, to answer this question is tantamount to dating the origins of the Revolution, insofar as it was precipitated by fiscal crisis. There are two different cliometric approaches to this problem: one locates the source of the crisis deep in France’s constitutional fabric; the other in imprudent decisions by French finance ministers in the early 1780s.

Velde and Weir (1992) and Sargent and Velde (1995) advocate the first approach. They argue that the monarchy’s commitment mechanism was irreparably flawed by the constitutional separation of the authority to borrow and spend, which was vested in the crown, from the authority to sanction the levy of new taxes, which was vested in the Parlement of Paris, a judicial body responsible for ensuring the compatibility of new laws with existing legislation. This division of fiscal responsibility at a time when the rising cost of military operations was inflating the cost of government made it impossible for the government to undertake the painful budgetary decisions required to maintain sustainability of the national debt. As the obvious escape from this dilemma was sovereign default, investors in French
debt demanded high risk premia. Velde and Weir contend that this condition held as early as the 1760s following the partial default of 1759. White (1989, 1995), on the other hand, argues that down to the early 1780s the budget was sustainable. Testing the French permanent deficit in the 1770s and 1780s for sustainability, he finds that although it was not sustainable in the steady state, the French government was nevertheless able to borrow at non-usurious rates of interest, because the partial default of 1770 and the budget reforms of Turgot and Necker had brought the ‘ordinary’ peace-time budget into surplus, the proceeds of which were dedicated to servicing the ‘extraordinary’ debt floated to finance France’s participation in the American Revolution. If France could avoid a new war, this debt would be eventually paid off and the government could refund its ordinary debt at normal rates of interest. This condition ceased to hold in the early 1780s when tax exemptions and venal offices were restored by Necker’s successors, throwing the ‘ordinary’ back into deficit. From this point the state was basically insolvent.

Resolution of the two approaches to the fiscal crisis of the old regime turns on a subtle point concerning creditors’ beliefs. White takes them as being conditional on the current state of the budget, insofar as it could be ascertained. When creditors concluded that it was no longer sustainable they treated the monarchy as bankrupt, at which point the optimal course of action was *sauve qui peut*: the monarchy no longer had access to the capital market. In contrast, Velde, Weir, and Sargent presume that investors could not ignore the fatal institutional flaw in France’s fiscal constitution, which implies they always accepted the risk that sooner or later the monarchy would default on part of its obligations. The proof was that it had done so in 1759 and again in 1770. Thus, whereas White holds that creditors treated the entire French debt as being in default when the budget became unsustainable, Velde, Weir and Sargent assume that the state’s creditors believed an inevitable default would affect only some classes of debt, since a government that knew it would have to return to the market could hardly be expected to completely ruin its credit by reneging on the entire debt. Empirical testing of these propositions turns on interpretation of movements in the interest rates on French public debt.

Weir (1989a) and Velde and Weir (1992) contend that because the French monarchy’s commitment to repay all its debt lacked credibility, lenders demanded special guarantees and higher risk premia when they subscribed to state loans. Changing beliefs in the monarchy’s solvency should therefore show up as changes in the internal rate of return to the

16 ‘Sustainability’ means that a given fiscal regime meets the condition that current government outlays are less than or equal to taxes plus the amount of new debt and money the public is willing to hold at the real rate of interest. In the absence of a fiat currency, this condition exists when the rate of growth of per capita income exceeds the real rate of interest.
monarchy’s debt. To test this hypothesis they computed the current internal rate of return on every loan raised between 1746 and 1793 for which they could obtain current price quotations in secondary markets and information on current payment schedules (which were sometimes revised). The computations indicate that movements in risk premia were more closely associated with events signalling changes in the credibility of the monarchy’s commitment to pay specific loans in full, than with the changing state of the overall deficit. Investors in French debt expected the crown to default; what they demanded was a guarantee or an insurance premium on the part they held.

Their study also resolves a conundrum about the pricing of government securities. Because France’s public credit was so shaky, finance ministers resorted to ingenious attempts to target investors whose specific demands were not fully met by private offerings of debt. Most of the loans raised by the monarchy were on life annuities (rentes), which offered investors a means of securing retirement income for themselves, their relatives and their servants. As privately constituted rentes were subject to an interest-rate ceiling and could be redeemed at the will of the borrower, the monarchy could tap this market by offering high rates of return. The curiosity is that it priced its life annuities without regard to differences in the age of the named annuitants, which implies that rentes settled on younger persons yielded higher realized rates of return than those settled on their elders. Weir (1989a) conjectured that the premium had been put in expressly to secure political support from the bourgeoisie, to whose needs the loans seem to have been tailored. If so, the attempt backfired, because the payment schedules were revised downward in the partial default of 1770, an event that understandably caused considerable resentment. Velde and Weir (1992), on the other hand, find that the high rate of return earned by rentes settled on healthy Genevan maidens reflects the supply price of capital to the monarchy. The named annuities were subscribed by a consortium of Geneva bankers acting as intermediaries for other investors, and were traded in secondary markets. The paradox of annuity pricing thus resolves into a case of price discrimination by the monarchy, which was able to tap a demand for retirement income from older investors who had already settled their bequests and merely wanted to convert their remaining assets into a stable income stream.

2.3. Fiscal stabilization

The monarchy’s failure to market the five per cent rente of 1783 marks the start of the financial slide to the Revolution. It signalled the ruin of the monarchy’s credit, forcing the king finally to convene an Estates General in a last-ditch attempt to obtain the consent of the nation to new taxes. The overthrow of the monarchy by this assembly did not erase the state’s debts, nor did it resolve the issue of who was to pay them. The threat of sovereign
default thus survived the transfer of sovereignty from king to nation, and with it the problem of coming up with a credible commitment mechanism, since the Revolutionaries had nothing to gain by ruining the credit of a state they now controlled. The subsequent financial history of the Revolution was consequently a fiscal stabilization pitting rentiers against tax payers and state pensioners in a war of attrition over who should bear its cost. The first action was the despoliation of the church, which was an attempt to avoid war at the expense of an innocent third party. Had the Revolution managed to preserve the old tax administration, the ordinary income plus the proceeds expected from the sale of nationalized church land would have been sufficient to restore the state’s credit, but the collapse of tax collections in 1790 followed by the outbreak of war in 1792 made this impossible. As a result the domestic war of attrition over stabilization was inevitable.

According to Bordo and White (1991) and White (1995) the hyperinflation of 1794–95, followed by the repudiation of the national debt in 1797 and Napoleon’s authoritarian reinstition of the tax system (aided by tribute from conquered states) are events in that war. They illustrate Alesina and Drazen’s (1991) model of fiscal stabilization as a non-cooperative game between parties each of whom believes it can shift the cost of stabilization by blocking measures that affect it adversely. The game continues in stalemate until the parties conclude that the costs of further delay exceed a reasonable estimate of the benefits, or until one party succeeds in imposing its will. The hyperinflation of 1793–95 resulted from a game in process, while the default of 1797 shows the acceptance by rentiers that the costs of monetary chaos exceeded the cost of writing off an already much devalued debt. Napoleon’s restoration of the tax collections represents the final dictatorial solution.

This game-theoretic approach to the Revolution may be contrasted with the model of democratic log-rolling proposed by Aftalion (1990). He argues that the fiscal deficit was caused by politicians currying favour with the electorate by promising benefits to be paid for by others. This echoes the conservative critique of the Revolution, which holds that the revolutionaries consolidated power by issuing fiat money backed by assets confiscated from an unpopular minority, and having exhausted this source of largesse, they proceeded to expropriate political opponents, and to impose price controls to maintain the support of followers in the large cities. An objection to this model of irresponsible populism is that the revolutionary assemblies were not products of direct election but were chosen by electors who were themselves elected by fewer than ten per cent of the voting-age population. Moreover, no general elections were held between 1792 and 1795, when the suffrage was drastically curtailed, which diminishes the importance of electoral motives in the evolution of fiscal policy. The advantage of the attrition model is that the only mechanism it requires is the capacity of major interest groups to delay action on the budget, something which can be accomplished without elections.
2.4. Free banking

Because the assignats were initially issued in large denominations, they were unsuitable for transacting small sums, and as the discount on the paper money drove coins out of circulation, there was a shortage of small coin for making ordinary payments. To meet this need there emerged local private institutions known as caisses patriotiques, which took assignats on deposit and issued in exchange for them notes in small denomination (billets) redeemable on demand. When the government began to issue its own small denomination notes in August 1792, it outlawed the private billets, and the following year it closed the caisses. This brief episode of free banking provides the occasion for testing whether the private incentives of unregulated banking restrict fraud and overextension of credit. Estimating a demand function for the declared note issues of 1,666 known caisses, White (1990) shows that the demand for billets was a stable function of income and prices, and that the banks did not issue more notes than their reserves could safely support. The inference that unregulated banking is incentive-compatible with monetary stability must be tempered, however, by the briefness of France’s escape from regulation; had free banking been as long-lived as in the United States or early nineteenth-century England, one would expect more instances of imprudent lending and bankruptcy.

2.5. From Bimetallism to Gold

The franc germinal instituted by Napoleon in 1803 was a bimetallic currency. Milton Friedman’s (1990) essay on the economics of bimetallism thus revived interest in a topic of special importance to France, which was the nineteenth-century’s largest bimetallic economy.17 Friedman pointed out that in a large bimetallic economy the monetary substitution of the metal whose price is tending to fall for the scarcer metal may be large enough to stabilize the world price at the bimetallic mint ratio, invalidating Gresham’s Law to the extent the bimetallic economy can absorb the depreciating metal at a constant price in terms of the other metal. This was the case of mid-nineteenth century France, which in the 1850s and 1860s was the world’s third largest economy after Britain and the United States (Maddison 1991). Owing to the unhappy experience with assignats, her citizens held an exceptionally high proportion of their real balances in specie, which made the French monetary system an even deeper buffer against monetary supply shocks.18 France’s demand for specie was thus high enough to absorb the

17 The United States was officially bi-metallic until 1862, but because the market prices of silver and gold deviated so much from the mint ratio, it was on a de facto silver standard until 1834 and a de facto gold standard thereafter.

18 According to Friedman, France absorbed more than half of the world’s gold output between 1850 and 1870 into her money stock, while maintaining the stock of monetary silver roughly constant.
flush of new gold from California and Australia at the bimetallic price. By keeping the price of gold in terms of silver near the mint ratio, French money demand stabilized exchange rates between gold and silver currency areas, giving Europe as a whole an effectively fixed exchange rate regime even before the general adoption of the gold standard. It also eased Germany's problem of obtaining an adequate supply of money at a time of accelerating growth in population and output, which otherwise would have had to be satisfied by internal deflation. French bimetallism was thus not an economic curiosum, but a critical component of the international monetary system prior to the generalization of the gold standard.

Why did France take so long to abandon bimetallism? Redish (1995) contends that the reason was the inability of the French mint to coin counterfeit-proof token money, which meant that small coins had to be full value in silver. According to her, the mint only adopted the superior British stamping technology when the mid-century gold strikes threatened to demonetize France's silver. Once the new minting technology was in place, France had no further need to retain silver coinage and subsequently went over to gold. This explanation thus takes the change as an optimizing response by the government to an exogenous price shock. It implies that given the mid-century increase in world gold supplies, the transition to gold was inevitable.

Flandreau (1995, 1996a, 1996b) offers a sharply contrasting account of this transition. He argues that France's attachment to bimetallism was not due to deficient stamping machines, but because France had a large trade with both the gold area centered on London, and the silver-currency area of central and eastern Europe. This meant that French producers and merchants benefited from being able to transact exclusively in the metal employed in the currency area with which their trade was most extensive. No overriding advantage attached to France's going on gold as long as her major trading partners in the silver-standard countries stayed on silver, which they in turn had no reason to abandon as long as bimetallic substitutions in France fixed the European price of silver in terms of gold.

Why did the mid-century gold strikes fail to demonetize France's silver coinage? One reason is that the franc/sterling exchange gave some play to the band separating the bimetallic specie points, which provided a little leeway for the silver price of gold to fall in France without provoking a major outflow of silver. Because bankers could make payments between France and London alternatively in silver, gold, or bills of exchange, exchange rates could fluctuate somewhat without precipitating specie flow. The width of the band for which this condition held was a function of the relative price of the two metals in the two capitals. When it was the same, the width was at its maximum; when the two relative prices differed, the band width narrowed, becoming zero when the silver price of gold fell to the point where it paid to make payments on London in silver and payments on Paris in gold.
Flandreau applies Krugman's (1991) model of target rate zones to show that with the variable band, arbitrageurs stabilized the rate near the French mint ratio. The sterling/franc exchange was thus buffered by two types of arbitrage. When the band was open, the target zone speculation stabilized the rate near the mid-point of the specie points; when it closed the rate was stabilized by changes in the composition of the French money stock. Between 1850 and 1865 the exchange rate moved towards the gold import point and silver export point as a result of the gold then coming into Europe. After 1865 France imported both metals, which could only happen if her balance of payments was strong enough to raise the bill rate above both specie import points.

Flandreau's analysis highlights the crucial role played by the French economy in coordinating exchange rates between gold and silver currency areas. The size of French bimetallic demand for money and France's trade surplus made it possible for the French monetary system to absorb new gold without having to expel an equivalent value of silver. It also meant that France served as the arbitrageur of last resort in gold and silver. When the increased supply of gold put upward pressure on world prices, the French capacity to function with either metal made it possible for her to release silver to the silver-standard area. When the supply of silver began to rise again in the late 1860s, the reverse substitution made gold available to gold-using nations. The size of the specie substitutions in France casts doubt on the historic inevitability of the gold standard. Flandreau (1995) shows that France's monetary holdings of gold and silver in 1870 were large enough to sustain a fixed gold-silver exchange for the foreseeable future.

Most economic historians consider Germany's decision to adopt the gold standard on the strength of the five billion franc war indemnity extracted from France as the event that tipped the network externalities of the international payments system to monometallism. The success of this conversion, however, depended on France's willingness to absorb German silver thalers at France's mint price. The German government calculated that France had no choice but to absorb them because refusal would effectively demonetize France's silver. Bismark thus initiated a Mexican stand-off which he thought the Germans could win. This judgement turned out to be mistaken. Although France had more than sufficient gold in her reserves to buy up the thalers, the French government in a fit of pique limited daily minting of silver francs to 280,000 (Flandreau 1996b). This caused an immediate drop in the price of silver, putting a stick in the spokes of Germany's conversion, leaving the Reichsbank with a large stock of demonetized silver.19 As the Reichsbank could not sell its thalers for gold without suffering a huge capital loss on its holdings, it had to raise the

19 The French government probably also wanted to reassure holders of France's debt, which was payable in gold.
discount rate to obtain the gold it needed to maintain convertibility. This occurred just when the German economy was heading into recession. The ultimate consequence of France’s decision to limit free coining of silver, however, was to confirm the general move to gold. Because the Bank of France was bound by law to accept silver in exchange for its notes or gold, it ended up holding almost 60 per cent of France’s stock of monetary silver. To protect its dwindling gold reserves the Bank lobbied successfully for further restrictions on free coinage of silver, which made further coining of silver and note issue contingent on additions to the Bank’s gold reserves. At this point France was on a de facto gold standard. Bimetallism became impossible when the smaller silver-standard countries trading with Germany individually went on to gold, which they could do without loss because their stocks of silver were too small to affect the world price. But this made it impossible for Germany to return to the silver standard, which eliminated the possibility of France remaining bimetallic. As Flandreau observes, this sordid history does not argue for the superior efficiency of a gold standard. Rather, it shows how non-cooperation between two major economic powers destroyed a viable bimetallic regime whose maintenance might have allowed the world economy to avoid the long deflation between 1873 and 1896, which was partly responsible for the growth of virulent nationalism and the retreat from free trade.

2.6. Monetary mutations

French kings possessed the regal right to declare the value of coins in the official unit of account. In the fourteenth and fifteenth centuries this right was frequently exercised to induce the public to bring coins to the mint to be recoined. The success of this operation, known as a mutation, is puzzling, since it implies the coins circulated at values different from their silver content (Rolnick et al. 1996). This raises the question whether commodity monies stabilize prices in the natural units of their metallic base. To investigate this question Sussman (1993) estimated the demand for coins minted in the Dauphiné in the early fifteenth century. He finds that the public held the coins at their nominal rather than their ‘real’ value for significant periods of time. This argues against commodity money as an automatic stabilizer of prices. In contrast Glassman and Redish (1988) argue periodic debasement reflected de facto devaluation of coins caused by wear and tear, in which case it had no impact on prices. This is doubtful, because most debasements were carried out in wartime, when the financial stress on the monarchy made the profits of seigniorage most tempting. Even Louis XIV engaged in the practice. The issue of how much price stability the silver standard conferred remains unresolved. Riley and McCusker’s (1983) study of the velocity of money in the seventeenth and eighteenth century reveals no relation between the stock of money and the price level.
2.7. Financial intermediation

French financial history has long been dominated by the history of banking, owing to a comparison between Britain, Belgium and Germany that suggested that France's banks in the early nineteenth century were not up to the task of financing industrialization (Cameron 1961, 1967; Kindleberger 1984). This view has been revised by the recognition that France had two systems of financial intermediation. The first was the network of merchants and professional bankers who discounted trade bills and handled inter-regional payments; it adequately served the traditional needs of commerce. Plessis (1987) shows that if one defines a bank as an institution accepting deposits and discounting bills, France had 2000 banks in 1870 and 3000 in 1875.\footnote{Scholars underestimated the number of such banks because before 1941 money-lending was an unregulated or 'free' profession, which meant there were many agents who combined financial intermediation with other business.} The second system was operated by notaries who served as intermediaries between savers and borrowers. Like merchant banking, notarial financial intermediation originated in the Middle Ages. As legal officers responsible for registering property transfers, they were early involved in writing contracts that assigned a permanent stream of income from specified properties in payment for a capital sum received. This hypothec of landed property (rente) was used by landowners to settle debts, finance inter-generational transfers, and to buy land. Unlike bills of exchange, the private rente was confined to long-term credit and was not negotiable.

Notaries are legally required to maintain records of every transaction they validate, making their minutes an unrivalled treasure of information about the evolution of long and medium-term lending. Rosenthal's (1993) analysis of loans in Avignon between 1660 and 1789 reveals that the notarial lending system was economically efficient. Interest rates reflected ex ante default risks and the cost of acquiring reliable information about borrowers and lenders. Most loans financed land purchases and endowments on children and wives; lenders placed funds as a way of converting illiquid assets into income streams that helped them smooth their life-cycle consumption paths. Rosenthal finds that the growth in the value of loans at Avignon was considerably faster than the growth in population, quadrupling between 1670 and 1770. An even more rapid expansion of notarial credit occurred in France's largest capital market. On the basis of a large sample of loan contracts from a dozen Paris notarial practices Hoffman et al. (1992, 1994, 1995) estimate that on the eve of the Revolution Paris notaries were probably negotiating half of France's outstanding private debt, much of which was financed by funds raised in the countryside.

The notarial archives provide an entry into the workings of pre-nineteenth-century financial markets. The contracts analysed by Hoffman et al. (1994, 1995), for example, show that in the 1760s and 1770s government...
loans displaced no more than 20 to 25 per cent of private investment. This implies a high interest-elasticity of loanable funds. A peculiarity of this market is that the funds were not raised through direct substitution of public for private long-term debt. Private \textit{rentes} were illiquid, owing to the legal requirement making them redeemable at the will of the issuer and hence unnegotiable. As a result, the government announced new issues well in advance to give potential investors time to build up liquidity by drawing on other sources, which had the perverse effect of flooding the short-term credit market with funds in the months immediately preceding a major government loan. These funds were usually placed with private bankers, who extended trade credit and bought short government debt that was retired when the major loan was raised. As these loans were not subject to the interest rate ceiling, they may have come at the expense of privately constituted \textit{rentes}. This is an important topic for future enquiry, and promises to yield insight into the evolution of continental money markets.

In the eighteenth century notarial credit was shaken by two catastrophic inflations (Hoffman \textit{et al.} 1995). The first one associated with John Law's bank did not permanently incapacitate notarial lending because there were then no alternatives to \textit{rentes} for financing asset transfers and marriage settlements. The same cannot be said of the Revolutionary hyperinflation, which lasted longer and savaged the long-term lending that comprised the core of notarial intermediation. By 1797 the average term of a notarial loan was down to two years and after the retreat from Moscow it sank to one year. The short terms favoured the expansion of lending by banks, whose transactions costs on short loans were lower than the fees charged by notaries for what was normally long-term credit (Hoffman \textit{et al.} 1994). Inflation also sabotaged the ability of the Paris notariat to centralize credit, because it destroyed the value of \textit{rentes}, which was the primary means by which they mobilized provincial savings. The collapse of Paris-mediated notarial lending probably explains much of the early nineteenth-century agitation for investment banks, which were a new source of long-term credit and a new means of doing what the incipient system of notarial credit had been doing before it was broken by Revolutionary upheaval.

Notaries remained the primary intermediaries in the countryside, where they effectively competed with banks in arranging mortgages and placing government and other secure long-term debt to the end of the nineteenth century (Postel-Vinay 1997). The major part of their business involved the financing of agricultural fixed capital, which experienced its most rapid increase between 1815 and 1870 (Grantham 1996). In contrast to the Paris notariat, however, the savers and borrowers linked by rural notaries were local, which made this kind of credit highly vulnerable to region-specific supply and demand shocks. Thus, although notaries had managed to finance the replanting of southern vineyards after the devastation wreaked by the \textit{phylloxera}, the notarial credit did not survive the collapse of wine
prices in the early twentieth century, which touched both the borrowers and lenders in winemaking districts (Postel-Vinay 1989a). Inflation during the first World War and the 1920s further reduced the market for notarial credit in rural areas. In the 1930s, when the financing of agricultural improvements fell to state-supported credit cooperatives and banks, the notaries retreated to their original tasks of handling the paperwork of wills, dowries, mortgages and land sales (Postel-Vinay 1997). For centuries, however, the notaries had organized long-term credit with a level of efficiency that blocked the expansion of the other system of credit rooted in the commercial activities of towns.

2.8. Further research

The most important feature of France’s monetary evolution between 1200 and 1800 was the changing relation of local to inter-regional clearing systems. How late medieval practices of local debt settlement evolved into a unified payments system is potentially the most rewarding research topic in French monetary history. Down to the early nineteenth century a large proportion of the exchanges in the countryside were transacted by reciprocal credits payable in labour services and shares in the harvest. These debts were frequently divisible and were often assigned to third parties. The existence of these localized and informal methods of making payment, which have their counterpart in the more formal sector of rentes and fiscal obligations, is of great significance to the interpretation of market prices in medieval and early modern Europe, as it is by no means evident that they were perfect substitutes for clearing systems based on media of exchange. This raises the question what was the precise monetary function of the debased silver and copper coinage (bilal) that circulated locally under the old regime (Meuvret 1947, 1957). Historians have not seriously addressed the issue of how different modes of rural payment were related to each other and how rural payments systems were connected to the more sophisticated monetary economy of the towns. The investigation of these issues will require modelling methods that are currently on the frontier of theoretical monetary economics (e.g. Townsend 1987, 1989; Kiyotaki and Wright 1993).

3. The cliometrics of French retardation

The historiography of French economic development in the industrial age is obsessed with failure. French economic history bears the weight of having to explain a long decline from the cultural and political grandeur of Louis XIV to the humiliation of Vichy. To many, the decline had an economic origin: in 1820 France was still the world’s largest economy, whereas in 1913 she was a distant fourth (Maddison 1991). As Thiers put it, ‘We did not win the battle of Trafalgar. We have not remained masters of the sea and we do not
have 200 million consumers as do the British. That is the secret of our inferiority' (O'Brien and Keyder 1978, p. 76). The vision long seemed to be confirmed by statistics. In 1913 French real per capita income was 25 to 30 per cent lower than British (Crafts 1983, 1984); 35 per cent of her population lived in towns larger than 3,000, as compared with 78 per cent in Britain. The shares of agriculture output in GDP were 35 and eight per cent, respectively; the shares in employment 41 and five per cent (O'Brien 1996). By conventional standards France’s economy had lagged.

The impression of a retarded economic transformation was sharpened by the weakness of the French economy during the Great Depression, which exaggerated the rural traits of a society that still held more than half its population in small towns and agricultural villages that, except for their depopulation and the monuments commemorating those who died in the trenches, had scarcely changed since the 1880s (Asselain 1991). The myth that this traditional society represented the ‘eternal’ France was of course a fabrication by reactionaries who wanted to erect a mythic counterweight to the socialism of the industrial suburbs. What little credibility it possessed it owed to unemployed workers and shopkeepers driven back to their rural origins by the collapse of industrial employment, and to a partial reversion to self-sufficiency induced by the collapse of urban outlets for farm produce (Postel-Vinay 1991). The return to normalcy was delayed by the Second World War, which further depleted the capital stock and helped maintain a late nineteenth-century way of life in isolated regions to the end of the 1950s (Wylie 1957).

One of the paradoxes in this picture of backwardness is that the relative per capita income gap between France and Britain was probably constant from the late seventeenth century to the early twentieth. Gregory King conjectured that in the 1690s France’s per capita income was about 70 per cent of Britain’s; on the eve of the first World War, it was 73 or 74 per cent (Maddison 1991), which implies that productivity had risen at approximately the same rate. We must therefore seek the source of the notion not in economic, but in diplomatic performance. At the end of the seventeenth century, economists like Boisguilbert (1707) were already explaining France’s military and diplomatic defeats by lesser powers as a consequence of an ailing economy. Unfavourable comparison of France’s economy to Britain’s appeared after the unsatisfactory conclusions to the Wars of the Austrian Succession and Seven Years, and again during the Napoleonic wars, which stimulated a burst of comparative studies of the two econo-

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21 Boisguilbert (1707 [1696], pp. 78–79) writes: ‘Il est certain que l’Angleterre ne vaut point le quart de la France, et quand on dirait encore moins on croiroit dire vraie, soit par le nombre du Peuple, qui est une partie essentielle à la bonté du Pais ... soit pour la fertilité du terroir ... Cependant l’Angleterre vient de rapporter depuis dix ou douze ans près de quatre-vingt millions par an au Prince d’Orange; et cela sans reduire les Peuples à la médiocrité, ni les mettre dans l’obligation d’abandonner la culture des terres...’
Economic and industrial backwardness was asserted after Waterloo in support of protective tariffs, but the development of the myth really dates to the last three decades of the nineteenth century, when the sharp deceleration in the growth of France’s population unfavourably altered the European balance of power. In 1870 French GDP was 74 per cent of British, 67 per cent of American, and 118 per cent of German; in 1913 the respective proportions were 59, 23 and 61 per cent. This augured poorly for France’s ability to maintain her role as a great power. The economic significance of this relative decline was less portentous; in per capita terms, French income was probably gaining on British, and French living standards were still well above those in Germany. Looking ahead, French industrial performance during the First World War belies all charges of backwardness; despite the loss of her most important industrial region, France was able to supply her soldiers with munitions as effectively as Germany.

The ‘problem’ of French economic backwardness, then, is largely an artefact of non-economic concerns about the declining role of France in world politics. It nevertheless remains true that French per capita income at the beginning and the end of the Industrial Revolution was significantly lower than Britain’s, and that, real or not, the problem has sustained a large literature. This literature divides at the Revolution. The pre-Revolutionary debate is about whether the Revolution originated in economic failure; the post-Revolutionary debate is whether France’s growth in the nineteenth century was slower than it could have been. We begin with the pre-Revolutionary debate.

3.1. The economic ‘crisis’ of the eighteenth century

The economic history of eighteenth-century France was long dominated by the proposition that the French economy was heading towards disaster in the years leading up to the Revolution. Labrousse was the foremost expositor of this catastrophic vision, which he expounded from France’s sole chair in economic history in France from 1945 to his retirement in 1967. Marxist in politics, though eclectic in his economics, Labrousse prepared his doctoral dissertation (Labrousse 1933) in economics under Aftalion and Simiand. He intended the Esquisse des mouvements des prix en France au xviiie siècle (Outline of Price Movements in France in the Eighteenth Century) to be the prolegomena to a history of social insurance, which would contrast the forms of economic insecurity of the pre-industrial economy with those of the industrial age. The dissertation is a massive compilation of prices extracted from local mercuriales (official market price quotations), reduced

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22 Perrot’s bibliography (1992, pp. 467–69) contains 49 comparative works published between 1796 and 1825.

23 Restoring Alsace-Lorraine would have increased French real GDP in 1913 by only 4.6 per cent, while reducing German GDP by at most 2.8 per cent (Maddison 1991).
to temporal order by the then novel technique of the moving average. This connection between quantitative historical methods and business cycle analysis parallels the early development of cliometrics in the United States, which was strongly influenced by the work and methods of Wesley Mitchell (Parker 1986). Had the term then existed, Labrousse would almost certainly have called himself a 'cliometrician'. He had a statistician's feel for the abstract nature of economic data, and of economics as a science of the relation between statistically distributed phenomena, which distinguished him from contemporaries who admitted no historical entity superior to the individual fact.

Labrousse set forth his catastrophic model in the introduction to a study of the evolution of the French economy between 1774 and 1789 (Labrousse 1944). He believed that the smoothed series of prices and wages traced out a secular decline in real wages, which 'scientifically' measured the increasing distress that would issue in social revolution. He based his model of wages and revolution on contemporary profit-inflation theory, which was based on the proposition that wages are 'stickier' than other prices. Investment is encouraged by moderate inflation because it fattens profit margins. The growth produced by this investment, however, carries the seeds of its own destruction, because the decline in real wages that makes it profitable to invest also compresses the size of the mass market. The ensuing crash is thus dialectically inherent in the growth process. The model could be easily adapted to the demands of a Marxist social and political history. Growth-induced redistribution of income from workers and peasants to capitalists and landlords expressed a dialectical contradiction in the capitalist economy. Immiseration was not reversed by the arrest of economic expansion, because capitalists tried to compensate the fall in the rate of profit by increasing the rate of exploitation of the workers. This was the secret spring of the Revolution. The actual event was precipitated by a long-festering agricultural crisis that was itself the expression of another historical contradiction between feudalism and capitalism. The two contradictions reinforced each other, as harvest shortfalls communicated themselves to the capitalist economy through the displacement to foodstuffs of an already weakened effective demand for manufactures. The triggering event could even be detected in a 'spike' in grain prices that occurred just before the fall of the Bastille. Labrousse rhapsodized:

"La vue est grandiose sur le xviiiie siècle économique et social. Le bouleversement des prix a provoqué le bouleversement des conditions. Le bouleversement des institutions a suivi" (Labrousse 1933, t. 1, p. xxvi).24

Labrousse's synthesis is one of the great performances in economic history. Combining theory and meticulous evaluation of quantitative data, it

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24 "This gives a grandiose perspective on the eighteenth century. The upheaval of prices produced an upheaval in social conditions; the upheaval of institutions followed."
set the standard for a generation of quantitative historians in France.\textsuperscript{25} Foreign criticism (Clough 1946, Landes 1950) did not prevent it from becoming the dominant interpretation of the Revolution for a generation. One effect of its success, however, was to delay the introduction of econometric research methods founded on clear identification of supply and demand functions. Labrousse's methodology gave primacy to the reduced form as manifested in the long series of prices, outputs and yields collected by his students. The aim was to detect historical turning points. In this respect it maintained the NBER tradition criticized by Koopmans (1970 [1947]) as 'measurement without theory'. Yet to compare Labrousse's work with the phenomenology of the NBER is unfair; he had a theory.

In the 1950s and 1960s Malthusian population dynamics were added to Labrousse's paradigm, linking the late eighteenth-century crisis to a longer history of an economy unable to respond elastically to demographic pressure (Goubert 1960, Le Roy Ladurie 1966, Richet 1968). Advances in historical demography underwrote this development. Family reconstitution from parish registers of vital events for the first time provided secure data on pre-industrial demographic behaviour at the household level, while Dupâquier's ambitious reconstruction of the seventeenth- and eighteenth-century French population from the middle of the seventeenth century from tax rolls and other census-like enumerations (Dupâquier 1974, 1977, 1979a, b) linked the micro-demography of family reconstitution to the national aggregates that presumably determined the movement in real income. Labrousse's long graphs of prices and wages could now be matched against equally long graphs of population and tithe receipts that monitored the pulse of agricultural production (Goy and Le Roy Ladurie 1982). The conjunction showed an eighteenth-century economy hostage to the law of diminishing returns. The fall in real wages was proof positive that the pre-Revolutionary economy was blocked.\textsuperscript{26} By a different route, the demographic historians had arrived at Labrousse's destination.

3.2. The cliometrics of the eighteenth-century crisis

Cliometric criticism of Labrousse's account has proceeded along three lines: the first questions its microeconomic logic, the second criticizes its macro-

\textsuperscript{25} Pierre Chaunu wrote, 'La pensee de Labrousse est tellement incorporee a notre pratique de l'histoire, traitement des materiaux et conceptualisation du discours, qu'il arrive qu'on en oublie l'origine.' Cited by Grenier et Lepetit (1989), p. 1338.

\textsuperscript{26} 'In short, the issue whether or not the demographic revolution preceded the economic take-off can be easily determined: if agricultural production had increased first, supply would have exceeded demand and the second half of the eighteenth century would have been characterized by falling agricultural prices. In the opposite case, the increased number of mouths to feed would have betrayed itself by a tightening of the market and a sustained rise in prices. One has only to glance at the statistics to have the answer.' (Dupâquier 1979, p. 86)
economics, and the third reexamines the contention that output was growing slower than population.

Landes (1950) criticized Labrousse’s argument that negative agricultural supply shocks were communicated to the industrial sector via displacement in consumer demand on the grounds that if the demand for cereals were price-inelastic the reduction in the real income of food purchasers would be offset by increases in the incomes of food sellers. He did not prove this point analytically, however, and Simonin (1993) has since demonstrated that Labrousse’s proposition holds when the ratio of the share of total expenditures on foodstuffs to the share of expenditures on manufactures is greater than unity. As this is likely to be true only when grain prices are high relative to those of manufactures, Labrousse’s proposition is not generally true.27

The relative price of foodstuffs was low in the early and high in the late eighteenth century, but this is equally true of Britain, where no one has seriously argued the Labroussian model.

Macroeconomic criticism of Labrousse’s model has focused on its ‘wages-fund’ theory of aggregate demand. Weir (1989b) observes that a rise in monetary expenditures on grain resulting from harvest shortfalls would increase the demand for real balances. As the supply of money was inelastic, the increased demand would have to be satisfied through an increase in velocity. It is hard to see how this could be achieved in practice when firms and ordinary individuals were becoming less credit-worthy. Moreover, although excess demand for money should precipitate economic recession, this is true only when prices are downward inflexible, and industrial prices at that time show considerable downward flexibility. Weir (1993) also argued that the cause of the secular increase in grain prices had been misidentified. It was not population pressure but market integration, which lifted prices in the provinces to levels consistent with those prevailing in Paris. Grantham (1989a) extended his criticism by noting that one cannot infer population pressure from national price movements because by the eighteenth century the prices of wheat and rye were determined in the Atlantic economy.

Labrousse believed that the ‘feudal’ structure of France’s pre-revolutionary agricultural economy was incapable of sustaining prolonged expansion. Evidence on this point is mixed. Toutain’s (1961) estimates that agricultural production rose at an annual rate of 0.5 per cent between 1700 and 1789 has been contested on the grounds that it rests on unverifiable conjectures. Hoffman’s productivity estimates from the price dual to the agricultural production function suggest an annual rate of 0.15 to 0.3 per cent, which implies that output barely kept pace with the growth of

27 When grain prices are high the income effect of a further rise in grain prices can be large enough to cause the aggregate demand for manufactures to fall. This result holds, however, only when the number of food substitutes for cereals is small. If there are many commodities, the negative income effect of higher grain prices is dissipated (Simonin 1993).
population. Weir (1991) also uses the price dual to estimate aggregate factor productivity. He finds that in the eighteenth century total factor productivity was growing at a rate of 0.27 per cent per year, which implies that real incomes were rising 0.1 per cent per year. This is less than half the rate of growth in England (Crafts 1987), but does not support a charge of immiseration. An optimistic view is supported by other evidence. Crouzet (1964, 1966, 1990) showed that sectors whose prosperity depended on foreign trade grew rapidly. Exports were fuelled by the revival of demand in the Levant, by growth in Germany, and above all by the capture of the European market by French sugar from the Antilles. The stellar manufacture was woollens, which according to official statistics grew three times as fast as population (Markovitch 1976). These successes offset the slower pace of agricultural expansion. Marczewski’s (1965) estimate of physical output in the 1780s implies that the economy had been growing strongly for decades, a finding supported by Riley’s (1986) conjectural projection of per capita output on the population series.

The first major assault on the Malthusian component of the stagnationist hypothesis was Weir’s (1984) demonstration that the eighteenth-century fertility and mortality schedules do not have the symptoms of a ‘high-pressure’ demographic regime. Taking short-run price movements as a proxy for negative shocks to the food supply, Weir found that mortality and fertility rates in France were not more sensitive to them than they were in England, which enjoyed a ‘low-pressure’ regime free of Malthus’ positive checks. Weir further found that the predicted positive correlation between fertility and real income was absent from the French demographic data, which implied that the growth of population was not constrained by low income. This in turn implies that the early adoption of birth control by French couples could not have been in response to Malthusian stress, but probably reflected changes in the implicit returns to having large families. He conjectured that the likely source of the change was the growth of economic opportunity outside the family business, which weakened parents’ hold on the labour of their adult offspring and raised the relative return to investment in tradable capital. This finding is supported by Chevet (1993a), who has called into question the very existence of eighteenth-century subsistence crises. In a meticulous vector auto-regression analysis of the INED mortality series, he identifies only one major subsistence crisis (1693–94) and finds no evidence that marriage rates rose after minor crises, which should have occurred if household formation depended on the availability of ‘places’ liberated by excess mortality. The verdict rendered by cliometrics on the proposition that eighteenth-century France suffered from overpopulation is ‘unproved’.

What about Labrousse’s claim that the Revolution was precipitated by a subsistence crisis? At first glance, the price series seem to support this part of his grand vision. Aftalion (1988) finds that prices on the eve of the
Revolution were three standard deviations higher than the price predicted by autoregressing spring prices on those obtaining in the previous autumn, by which time the harvest was in. The problem is that nothing in the weather of June 1789 could have led dealers to predict a new harvest failure. The pre-Revolutionary spike was probably a speculative bubble provoked by the turmoil at Versailles. The Revolution's alleged proximate cause was thus its first effect.

4. Retardation in the age of industry

4.1. The paradox of the National Product accounts

Although it was generally accepted that French incomes were lower than in England and that they had grown less rapidly than in Germany, the size of the gaps could not be ascertained in the absence of national income estimates for the period before the first World War. To fill the gap, economic historians inferred France's relative performance from indices of production and employment in specific industries. These measures, however, biased the estimate of France's relative economic growth downward, because of the lesser role played by the great nineteenth-century industrial staples such as cotton textiles, ferrous metallurgy and heavy machinery in France as compared with Germany, Britain and Belgium. The first decennial estimates of national output showed how severe this bias was. Commodity output per capita had in fact grown as fast in France as it had in England between 1815 and 1913 (Marczewski 1965). Moreover, the data revealed no 'take-off' marking the passage from pre-modern to modern economic growth (Marczewski 1961b, 1963); France had not 'fallen behind'. These findings were soon confirmed by annual estimates (Lévy-Leboyer 1968, Crouzet 1970, Toutain 1987). That the comparison with Britain was not an artefact of an overvalued exchange rate was shown by recomputing French and British output at purchasing-power parity exchange rates (O'Brien and Keyder 1978, Crafts 1983).

The paradox was not that France's economy had grown more slowly than Britain's or Germany's, which was an obvious consequence of slow population growth; rather, it was that France had grown as fast as England without leaving any statistical trace of an 'industrial revolution'. How could France, which had not experienced the traumatic passage from tradition to modernity, be as economically successful as England, which had? This paradox threw into question the whole modernization paradigm that Kuznets, Gerschenkron, and most other economic historians had taken from the Germanic stages approach to economic development: France had modernized without ever leaving the pre-industrial stage.

One way to resolve this paradox was to place the great transformation back in the pre-statistical age. Roehl (1976) proposed that far from being an industrial laggard, France was in fact the first country to experience modern
economic growth. The proposition rests on the assumption that an economy whose traits are the opposite of the ones that Gerschenkron used to identify countries that were historically relatively backward with respect to a leading economy must be the leading economy. By this logic, features of the French economy that had been interpreted as signs of retardation, such as small firm size and high dependence on informal or local institutions for securing capital, signified early passage into the industrial age. Had the country been truly backward, the pattern of development would have been more like Germany’s or Belgium’s, where firms were larger and investment banks and the state had a larger role in mobilizing industrial capital. There was no growth ‘spurt’ in the nineteenth-century data because like England, but with less dislocation to labour, the critical transition had occurred in the eighteenth century.

While Roehl correctly pointed out the anomaly between the statistical record and the conventional view that France’s economic development was retarded, the validity of his argument depended on whether Gerschenkron’s list of backward traits constitute a logical universal, for only under this condition is its contrapositive true. It is thus not obvious whether Roehl’s syllogism tests the position of France in Gerschenkron’s developmental taxonomy, or the logical validity of the taxonomy itself. That France lacked some of Gerschenkron’s traits of backwardness can either mean that she was not relatively backward, or that Gerschenkron’s model is false. The latter is the more likely. Like all ‘stages’ theories of development, Gerschenkron’s typology was not an economic model but an impressionistic generalization that reformulated the taxonomy employed by nineteenth-century German historical economists to describe western economic development since the early middle ages. Empirical contradiction of this thoroughly discredited approach carries no logical implication.

The real objection to the Gerschenkron gambit is its lack of any economic modelling worthy of the name. There are models that predict economic divergence as a consequence of economic integration that might be used for analysing comparative national growth experiences (e.g. Krugman and Venables 1995). Economic historians have pointed to the high degree of interdependence between European economies in the nineteenth century (Pollard 1973, Cameron 1985). The question to be confronted is whether the ‘retarded’ characteristics of the nineteenth-century French economy reflect optimal adjustments to an emerging international comparative advantage. As Crafts (1989) pointed out, if England was specializing in low-cost cotton manufactures and light engineering between 1780 and 1850, her major trading partners could reasonably be expected to specialize in something else. Differences in product mix and the economic structures associated with them imply no necessary difference in levels of economic development when countries are linked by trade. The degree of complementarity between the French and British economies could be investi-
gated by examining the changing mix of imports and exports along the lines of the Ricardian trade model employed by Temin (1997) to test the sectoral incidence of the British industrial revolution.

4.2. Structural hypotheses

The possibility that France’s economic performance was a reflection of the economic performance of her trading partners is at odds with the view that deep structural forces determined France’s economic response to the opportunities opened up by the industrial revolution. The persistence and stability of the gap between French and British per capita income encourages the structural vision, since a chronic condition often betrays a constant underlying cause. The cause cannot be technology, or resources, or economic institutions, or even institutions for forming human capital, because in these areas France was equally well-endowed with Britain. The reason must therefore be a deeper cause, or what historians call ‘structures’. The ‘structures’ usually alleged to be responsible for French economic retardation fall into three broad categories: (1) interventionist economic policies (‘dirigisme’) restricting the gains from trade; (2) an anti-capitalist social psychology (‘mentalité’); and (3) the predominance of peasant farming.

4.3. Dirigisme

To the Anglo-Saxon mind France’s style of governance has always seemed more authoritarian than Britain’s. While this impression is partly due to the romantic British predilection for likening the wars with Louis XIV and Napoleon to the struggle between the freedom-loving Greeks and the despotic Persians, it drew some of its persuasive power from highly publicized instances of royal interference with the course of justice, and the coercive collection of taxes; the latter does not stand in unfair comparison to the methods employed by English press gangs. That the medieval Estates-General did not evolve into a self-governing Parliament was taken to be a further sign of a deeply seated autocracy that in limiting political liberties also limited economic liberty. This line of argument was especially developed by economists who opposed protection. The economic indictment against France’s government thus boils down to oppressive taxation, overregulation, and excessive protection.

4.3.1. Taxation

The charge of excessive and arbitrary taxation was a recurring theme in eighteenth-century proposals for tax reform, beginning with Boisguilbert’s *Détail de la France* (1707). When Mathias and O’Brien (1976) examined the eighteenth-century budgets, however, they found that France’s fiscal effort in the eighteenth century was distinctly less strenuous than England’s. According to their computations only 10 to 11 per cent of
The value of French commodity output went to pay taxes, as compared with 17 to 22 per cent in Britain. France also devoted a smaller share of her GDP to service the national debt (Weir 1989a, b; Sargent and Velde 1995). While the lower charges for debt service are partly due to French defaulting, the economy was clearly not smothered by taxes. It is always possible that marginal tax rates could have been excessive. Mathias and O'Brien argue that Britain's greater reliance on indirect taxation probably shifted the tax burden on to consumption, whereas direct taxation in France may have discouraged investment in assets that made up the tax base. As an individual share of the land tax (taille) was determined by local tax assessment, the annual tax exercise was in effect a zero-sum game played by local tax-payers. This may well have penalized those who made visible improvements to their farms. Offsetting this tendency, however, was the widespread practice by large farmers of acquiring offices that exempted part of their holdings from taxation. The topic calls for cliometric analysis.

4.3.2. Regulation  J. U. Nef's comparative study of English and French industrial policy in the sixteenth and seventeenth century (1967 [1940]) is often taken as an indictment of French absolutism by scholars who have not closely perused its conclusions. Although Nef thought that on balance French legislation in the late sixteenth and early seventeenth century was less favourable to industrial expansion than England's, his main point was that the religious wars of the sixteenth century were primarily at fault because they prevented the emergence of a class of entrepreneurs who could have resisted the regulatory policies of Richelieu and Colbert and given France an industrial system similar to England's. How much loss or gain Colbert's regulations inflicted on the French economy has not been cliometrically assessed, though the data for doing so are not lacking. The main source is the regular reports of the Inspectors of Manufacturers on the output, employment and intermediate inputs in the regulated industries. Diderot's Encyclopédie and its eighteenth-century clones contain detailed descriptions of the technology. The topic cries out for quantitative analysis, and until it is carried out, the question whether the late seventeenth-century income gap was caused by over-regulation must be considered unanswered.

4.3.3. Protection  The popular belief that France over-protected her economy, thereby encouraging the survival of inefficient firms and outdated technology has been subjected to a careful re-examination by Nye (1991a). He finds that in the first half of the nineteenth century the average French tariff was lower than the British. This finding is robust to a wide range of alternative commodity weightings of individual tariff rates. It can therefore hardly be argued that French economic development was seriously distorted by barriers to trade imposed by France, though it does not eliminate the
Nye (1991b) argues against the ideological explanation of France's conversion to free trade, on the grounds that the rising price elasticity of demand for her exports may well have triggered formation of an effective coalition by exporters in favour of negotiating reductions in the foreign tariffs affecting them. A sectoral examination of the bilateral Anglo-French trade balance by Cadier (1988) shows that France was in fact the big winner by it, obtaining expanded markets for farm produce and woollen textiles, while losing market share only in the relatively minor (for France) sectors of cotton textiles and shipping. These findings point up how critical to subsequent tariff policy was the return to power of the anti-British faction led by Thiers on the morrow of Napoleon III's abdication. The political economy of the retreat from free trade in the 1880s has been strongly influenced by the interest-group approach pioneered by Kindleberger (1951). Game theory can be usefully deployed here to sort out the dynamics of this change in Europe's trade regime. For France, the most important challenge is to make a rigorous quantitative assessment of the consequences of the Meline tariff on agricultural imports, which can presumably be attacked using the techniques of computable general equilibrium employed by Williamson to analyse the English Corn Laws (Williamson 1990). A prerequisite for this exercise is a secure estimate of the agricultural supply function.

4.3.4. Mentalités That a society's social norms or mentalités constitute an inherently rigid 'structure' constraining historical outcomes was a defining element of the 'Annales' paradigm that dominated French economic and social history from the 1930s to the 1990s. It stems from Durkheim's notion that social values can lead individuals to behave differently from the dictates of a market optimization programme. This is probably one of its...
major appeals to social historians. The proposition can be tested by comparing estimated shadow prices with market prices. If ‘mentalite’ matters, shadow prices should exceed market prices when a ‘mentalite’ sets up barriers to entry, and should fall short of them when it creates barriers to exit: returns to working on family farms should be less than market wages; returns on land should be less than the returns on assets of comparable risk; firms owned by families should not exploit the accessible scale economies.

Cliometricians have conducted these tests in a variety of ways. Grantham (1978) calculated the shadow price of fodder crops from input coefficients and the price of final output to show that the diffusion of intensive husbandry in northern France could be explained by profit-maximizing responses to the rising livestock prices. Heffer et al. (1986) estimated an eight-equation model using data from the 1852 agricultural census to test whether market prices were consistent with opportunity costs. Like Grantham, they found the market ‘worked’. Cox and Nye (1989) estimate hedonic wage regressions to demonstrate that women employed in the textile industry were paid their marginal product. Hoffman (1984) analysed the spatial distribution of tenurial contracts around Lyon to show that the mix of sharecrops, leaseholds and direct management can be explained as optimal responses to ex ante differences in transaction costs. In a companion study (1986) he showed that the incidence of property taxes fell on land, indicating that land too was priced competitively. The test of rationality has been extended to the practices of open field farming by Grantham (1980) and Hoffman (1988, 1996); both of whom found that these pre-eminently ‘social’ institutions were cost-minimizing methods of handling the production externalities associated with highly dispensed and intermingled holdings. All these studies demonstrate the essential rationality of French economic agents. This in turn implies that mentalités could not have significantly affected the allocation of resources.

Mentalités are at the root of the charge that French industrial enterprises were too small because their owners refused to dilute control over their enterprises by drawing on external supplies of capital and managerial skills (Landes 1949, 1954). Nye (1987) and Sicsic (1994) examine this hypothesis by estimating firm cost functions from data taken from nineteenth-century industrial censuses. Nye finds little evidence of significant economies of scale in the 1865 industrial census, while Sicsic reports that there were no unexhausted scale economies in the small-scale industries where they existed. These results indicate that the French industrial structure was not irrationally biased towards small firms, and they are supported by the finding that in individual industries French firms were not notably smaller than British firms; differences in average firm size reflect differences in the industrial mix. This leaves open the possibility that France specialized in industries with limited economies of scale because entrepreneurs preferred it that way. A more likely explanation is that the industrial structure was the outcome of endogenous product differentiation by monopolistic competitors who
marketed their output in local or well-defined markets. The topic needs to be investigated at lower levels of regional and industrial aggregation.

5. Peasant farming and agricultural backwardness

The most widely supported structural hypothesis holds that France's economic transformation was held back by peasant agriculture. According to O'Brien, the predominance of small peasant farms in France had two major consequences: the first was to slow the introduction of labour-saving methods in farming, thereby retarding the growth of agricultural productivity; the second was to retard the emigration of the farming population into industrial occupations, thereby slowing industrial expansion. The two effects reinforced each other, since low agricultural productivity meant low incomes and limited domestic markets for French manufactures; high industrial wages, on the other hand, made French exports less competitive abroad. Had France possessed a structure of property-holding like England's system of large farms operated by capitalist farmers employing landless labour, her agricultural productivity would have been higher, and industrial profits and industrial investment would have been higher. The down side of this counterfactual is lower wages for industrial workers.

The notion that 'peasant' farming was largely responsible for France’s economic retardation originated in Parliamentary debates during the 1820s. Conservatives favoured a constitutional monarchy governed by large landholders on the lines of pre-Reform Britain. They argued that the best way to achieve this constitution was to legislate limited primogeniture and strict settlement of estates, which would provide the economic support in landed property for a French house of lords. To buttress a blatantly self-interested proposal, supporters of this revision of the civil code maintained that limiting further fragmentation of large estates and encouraging consolidation of inefficiently small holdings would reverse the damage inflicted on French agriculture by the Revolution (Augé-Laribé 1902). This was neither the first nor last time an undocumented specious economic argument would be advanced to support a political agenda. In an early application of the survivor technique Passy (1846) showed that farm sizes had in fact evolved optimally with respect to products grown and technologies employed. We now know that productivity was rising faster between 1815 and 1870 than at any time prior to the 1950s and 1960s (Grantham 1996). Historiographically, however, the damage was done: the idea that France's economic backwardness was due to the small scale of peasant farms became an unexamined premise of scholarly and popular opinion. This myth of uneconomic smallness was later extended to French industrial enterprises.

As we have seen, the view that France's agricultural regime was overpopulated with small holdings originated in eighteenth- and nineteenth-century criticism by reformers who believed that French agriculture was
undercapitalized. Bloch (1930) conjectured that the differences between French and English patterns of landholding originated in the comparatively greater protection afforded by French royal courts to villein tenure. Other historians have followed Marx, arguing that the divergence between the two agrarian systems occurred in the seventeenth century, when the English bourgeoisie and capitalist landlords defeated attempts by the Stuarts to restrict their right to reclaim land held by tenants at will (Brenner 1985). In both cases, the adverse effects on economic growth of small farms is taken for granted. Cliometric testing of this proposition clusters around three of its manifestations: (1) the effects on migration; (2) the effects on productivity; and (3) the persistence and consequences of open-field farming.

5.1. Migration and agricultural labour markets

The singular propensity of French people to stay at home is economically puzzling, as the difference in real wages between France and other European countries exporting labour to America was insignificant compared with that between Europe and America. In 1890 French real wages diverged from the European average by nine per cent; the gap between those nations and the receiving countries of Australia, Canada and the United States was 71 per cent (Williamson 1995, pp. 181–3). This international immobility cannot have been due to France's low birth rate, because the rate of internal migration from countryside to towns was also low. Since one expects internal migration to be easier than international migration, the evolution of the domestic rural-urban wage gap supplies a test of the extent to which peasant farming retarded the rural exodus.

When Sicsic (1992) performed this experiment on nineteenth-century wage data, he found that, contrary to expectation, the French wage gap was narrower than the English one, which would seem to imply that the French labour market was more perfect than the British! It also implies that the 'full rural wage' that includes imputed returns to working on owner-occupied farms was almost as high as the alternative urban wage. Postel-Vinay and Weir (1993) have carried out this calculation and find that as late as the 1860s the 'full agricultural wage' exceeded the wage paid to unskilled industrial labour. This no doubt explains why French agricultural labourers, most of whom held small parcels of land, were so slow to emigrate. It does not, however, explain why the gap between the rural wage and the industrial wage was so small.

Land holding per se is as likely to encourage as to discourage migration when the urban demand for labour is strong. The value of land realized by sale or mortgage can finance an urban establishment. A large proportion of

29 Sicsic found the gap to be insignificant in 1852 (a period of tightening labour markets), rising to 26 per cent in 1892. The British gap calculated by Williamson (1987) exceeded 40 per cent throughout the century.
the small shops and cabarets that make up the fabric of urban France originated in just this way. Heywood (1981) speculated that the reason was weak industrial demand for labour, which kept industrial wages low despite labour productivity being higher in manufacturing than in farming. This implies that France's industrial market structure was less than perfectly competitive, since the gap between marginal products and real wages would otherwise have been closed by increasing employment. This is not implausible, but the industrial structure cannot be attributed to the structural features of French agriculture.

After 1860 the wage gap widened, reversing the trend towards convergence. Does this mean that the expansion of industry was finally bumping up against a labour supply constraint? Had this been the case, wages in both sectors would have increased, but this did not occur before the twentieth century. The rising gap thus seems to reflect labour market 'disintegration', caused mainly by the collapses of rural wages after 1870 (Postel-Vinay 1991). It is an open question why this did not simulate emigration, as occurred elsewhere in Europe. Part of the explanation may be found in the plummeting birth rate, which restricted the number of hands seeking unremunerative work. The relative importance of demographic and economic factors affecting rural migration and agricultural real wages needs to be sorted out. At present the size of the wage gap does not support the view that the agricultural retention of labour seriously inhibited French industrial development before the First World War.

5.2. Agriculture and industry

That peasant agriculture is the prime structural cause of the Anglo-French productivity gap has been forcefully put by O'Brien (1996). Agricultural labour productivity is conventionally estimated by dividing the share of national output produced in agriculture by the share of agriculture in national employment. By this measure England was 50 per cent more productive than France, and as yields in France were lower, English farming retained fewer workers per hectare of agricultural land. Had this ratio been as low in France, and had half the counterfactual surplus been allocated to industry, French commodity output would have been four per cent higher in 1815 and 18 per cent higher in 1913. O'Brien and Keyder (1978) conclude from this exercise that the growth of the French economy was seriously impeded by the failure of French farmers to adopt English methods, a failure they attribute largely to the small size of French farms.

There is evidence that agricultural inelasticity may have slowed industrial expansion in the 1860s, when demand for farm produce in France was growing faster than supply. Verley (1987, 1988) has constructed an input-output table for the French economy in the 1860s that suggests rising marginal costs of growing farm produce may have halted the Second
Empire's promising economic expansion. Lévy-Leboyer and Bourguignon (1985, 1990) draw a similar conclusion from their macro-economic model of the French economy. They argue that high income elasticity of demand for foodstuffs by French people caused savings to be diverted from investment in manufacturing to investment in farming, thereby slowing industrial expansion. The hypothesis that the income elasticities were high has been confirmed by econometric estimates on cross-section consumption data drawn from the 1852 agricultural census (Postel-Vinay and Robin 1992). The estimates indicate that the income elasticity of meat was high, while its price elasticity was low. They infer from this that meat consumption was subject to a ratchet effect: demand rose when agricultural incomes rose, but when the price of meat rose in consequence of increased demand, consumption did not fall off, which suggests that the demand for rural luxuries like meat was subject to a ratchet effect.

While one should not dismiss these calculations, it is doubtful whether they document a binding agricultural constraint on the growth of manufacturing. Bourguignon and Lévy-Leboyer's model represented an attempt to fit 67 annual time series to Lévy-Leboyer's argument (1971) that agricultural inelasticities and the Anglo-French trade treaty caused the deceleration of France's growth rate after 1870. The model has been criticized on the grounds that the agricultural constraint is imposed on rather than inferred from the estimated model, which mixes the supply side macroeconomics of long-run growth and the demand-side macroeconomics of short-term fluctuations (Straus 1988, Mokyr and Nye 1990, Grantham 1992). As to the notion that rising demand for meat and other alimentary luxuries robbed France of needed capital for industrial expansion, the argument is inconsistent with another part of the structural hypothesis which holds that France's agricultural inferiority lay precisely in her lower stocking levels (O'Brien 1996).

A more fundamental criticism of calculations used to demonstrate France's low agricultural labour productivity is that they are based on labour force estimates that understate the decline in the number of agricultural workers after 1850. This is largely because the estimates covered only full-time male workers. New estimates of the French labour force by Marchand and Thélot (1991) which include females show that the agricultural labour force was falling from the middle of the nineteenth century, in sharp contrast to the series used by O'Brien and Keyder (1978), which has the agricultural labour force rising in the 1880s. Table 1 compares the rates of labour productivity growth implied by the alternative measures of the agricultural labour force. The new series yields a rate of growth four times higher than the one proposed by O'Brien and Keyder. The rate for the whole nineteenth century is equal to the rate of growth of agricultural labour productivity in Britain (Grantham 1996).

The marked differences in productivity attested to by the alternatives in
Table 1. Agricultural labour productivity growth (per cent per annum).

<table>
<thead>
<tr>
<th>Period</th>
<th>O'Brien-Keyder</th>
<th>Marchand-Thélot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1815-1840</td>
<td>0.54</td>
<td>1.12</td>
</tr>
<tr>
<td>1840-1850</td>
<td>0.51</td>
<td>0.86</td>
</tr>
<tr>
<td>1850-1860</td>
<td>0.94</td>
<td>1.45</td>
</tr>
<tr>
<td>1860-1870</td>
<td>3.10</td>
<td>0.68</td>
</tr>
<tr>
<td>1870-1880</td>
<td>-1.25</td>
<td>0.32</td>
</tr>
<tr>
<td>1880-1890</td>
<td>-0.30</td>
<td>0.66</td>
</tr>
<tr>
<td>1890-1900</td>
<td>-1.64</td>
<td>1.56</td>
</tr>
<tr>
<td>1900-1914</td>
<td>1.98</td>
<td>1.31</td>
</tr>
<tr>
<td>1815-1910</td>
<td>0.45</td>
<td>1.08</td>
</tr>
<tr>
<td>1815-1870</td>
<td>1.06</td>
<td>1.15</td>
</tr>
<tr>
<td>1870-1890</td>
<td>-0.77</td>
<td>0.49</td>
</tr>
<tr>
<td>1860-1900</td>
<td>0.49</td>
<td>0.80</td>
</tr>
</tbody>
</table>


Table 1 raise the question why they diverge so widely. The primary source of the divergence is the different treatment of workers who spent only part of their time labouring in the fields. The published censuses from which Toutain and O'Brien and Keyder compiled their estimate of the labour force do not report the incidence of multiple occupations, which means that an unknown proportion of part-time farmers have been arbitrarily assigned to other sectors. The total number of such persons is large. On the basis of occupational designations originally drawn from the tax rolls, Grantham (1993) finds that at the beginning of the nineteenth century, between a quarter and a half of non-agricultural workers in rural départements worked part time in agriculture. The number of seasonal migrants into agriculture rose during the next half century, so that by the early 1860s it comprised 10 to 12 per cent of the French labour force (Grantham 1994, Magnac and Postel-Vinay 1997). Rural women made up a significant proportion of these migrants.

Marchand and Thélot (1991) estimate the floating labour force by extrapolating the number of agricultural workers from the rural working-age population as a constant ratio of the latter. The benchmark for this operation is the population census of 1896, which was more detailed than earlier censuses and employed definitions compatible with those in later censuses. The hypothesis that the ratio was constant over the nineteenth century passed a battery of statistical tests at the national level of aggregation. It remains to be seen whether similar tests hold at the regional or

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30 Multiple occupations are recorded on the original nominative lists. I am currently analysing a sample of approximately 60,000 persons drawn from the 1851 nominative lists of 140 rural communes in northern France.
departmental level. This procedure captures most of the seasonal labour force, which was then overwhelmingly rural (Magnac and Postel-Vinay 1997). The estimated decline in rural populations thus contains a parallel decline in the seasonal labour force. It is likely that the decline in seasonal workers was sharper than that of full-time farmers, some of whom may have been recruited from the ranks of workers in domestic industries that collapsed before the competition of machine-made goods after 1870. Since these workers are picked up by the population census, the reassignment overstates the true extent of the decline in agricultural labour and by extension exaggerates the rate of growth of agricultural labour productivity.

Analysis of the phenomenon of large-scale intersectoral migration throws new light on the way nineteenth-century economies adjusted to the competing demands of an incompletely mechanized agriculture and increasingly mechanized industry. This issue is explored in a series of theoretical and empirical studies analysing temporary migration and plant shut-downs in mid-nineteenth century France by Bompard, Magnac and Postel-Vinay (Bompard et al. 1990a, b; Postel-Vinay 1994, Magnac and Postel-Vinay 1997). A key finding is that the aestival increase in agricultural wages forced many firms to arrest production, because they were unable to meet the wages paid for temporary harvest work. The summer wage premium was especially marked for women, who were disproportionately employed in industries that employed modest amounts of fixed capital and therefore incurred little cost from temporary shut-downs. The same was not true in industries with high capital-labour ratios, and they tended to stay in operation through the summer wage peak. At the same time, however, the introduction of these industries into regions that traditionally supplied seasonal workers to the fields was difficult, as the instability of the work force made profitable investment in capital-intensive techniques difficult, if not impossible (Postel-Vinay 1994). This form of retardation throws an ironic light on the hypothesis that traditional agricultural structures impeded the flow of labour from low- to high-productivity employments, since it implies that the blockage, if in fact there was one, was a consequence of the perfection of the seasonal labour markets.31

Large-scale temporary migration was the sine qua non for regions specialized in growing grain for export to other regions. The emergence of specialized manufacturing districts that simultaneously imported grain and temporarily exported workers is a structural feature of early modern and early industrial economies (Grantham 1993, 1994). The symbiotic evolution of forms of manufacturing that were sufficiently flexible to release a significant proportion of workers into the fields and specialized forms of farming that could achieve high levels of productivity on the condition that

31 The situation is analogous to the deterring effect of a perfect market for slave labour on manufacturing in the ante-bellum South (Wright 1979).
the seasonal supply of labour was large enough to harvest the crop is one of the central characteristics of the development of a more specialized economy between 1500 and 1850. The critical technological constraint was the impossibility of mechanizing reaping and grape-picking, which meant that any increase in the level of local production causing the demand for harvest hands to exceed local supply necessarily involved recruiting workers from other districts. The ease with which these workers were released to the fields in turn lessened the pressure to adopt labour-saving harvest methods. The lack of large intersectoral flows of seasonal labour in the first half of the nineteenth century probably explains the enthusiastic response of American farmers to mechanical reaping. In contrast to Europe, the United States economy never developed a symbiosis of rural manufacturing and specialized grain farming. This is largely owing to its late date of settlement and expansion. By the time American agriculture was becoming specialized (cotton is a special case), the harvest wage premium that might have induced seasonal labour flows and industrial structures permitting them to occur instead stimulated inventors to develop working mechanical reapers, which were all the more quickly adopted because they did not compete with cheap seasonal labour.

What about the movement of labour from agriculture to industry? Magnac and Postel-Vinay (1997) estimate that the elasticity of labour supply from agriculture to industry was approximately 0.5 per cent. This is further evidence that industrial expansion was not seriously limited by the cost of recruiting workers from agriculture. This can be seen from the following computation. Suppose that labour’s share of manufacturing product was 60 per cent, a generous estimate. In this case increasing industrial employment one per cent using labour attracted from farming raises costs by no more than 0.3 per cent. If half of the workers come from other sectors or are supplied by natural increase, the increase in cost is less than 0.15 per cent. Since labour’s share was probably less than half of manufacturing product in the nineteenth century, the agricultural constraint on the industrial recruitment of labour could not have seriously slowed the growth of industry. In summary, the perception that nineteenth-century French industrialization was significantly retarded by the agrarian structure has not been cliometrically confirmed. This does not deny that subtler versions taking into account the life-cycle labour supply of recruits from the farming world might not reveal an effect in the form of high rates of labour force turnover. This investigation requires firm-level data, which until now have not been excavated from the archives.

5.3. The growth of agricultural productivity in the nineteenth century

The traditional charge against French farming in the nineteenth century is that its record in generating productivity growth is poor. As we have seen,
this impression is in large part an artefact of the labour force statistics reviewed above. It also reflects the view, however, that the small farms that were especially numerous in France were inappropriate vehicles for the introduction of productive husbandry. One of the obstacles to verifying this opinion has been the impossibility of estimating total factor productivity in the absence of a reliable series for the agricultural capital stock. This deficiency has been made up by Grantham (1996) who has devised a method for reconstructing the value of agricultural capital invested in permanent farm structures, which comprised the largest part of the agricultural capital stock. He did this by means of backward projection to 1789 of the stock of dated farm structures 1965. The estimates were combined with the other components of the capital stock to make a fixed-price series for agricultural capital between 1789 and 1914. These estimates were then used to estimate total factor productivity, using the new labour force estimates by Marchand and Thelot (1991) and Toutain's most recent revisions of agricultural output (Toutain 1987).

Table 2. Total factor productivity growth in agriculture in the nineteenth century (per cent per annum).

<table>
<thead>
<tr>
<th>Date</th>
<th>Output</th>
<th>Labour</th>
<th>Capital</th>
<th>TFP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1789-1840</td>
<td>0.77</td>
<td>0.24</td>
<td>0.74</td>
<td>0.45</td>
</tr>
<tr>
<td>1815-1870</td>
<td>1.23</td>
<td>0.08</td>
<td>0.72</td>
<td>0.94</td>
</tr>
<tr>
<td>1840-1870</td>
<td>0.98</td>
<td>-0.16</td>
<td>0.98</td>
<td>0.81</td>
</tr>
<tr>
<td>1870-1890</td>
<td>0.34</td>
<td>-0.17</td>
<td>-0.32</td>
<td>0.54</td>
</tr>
<tr>
<td>1890-1914</td>
<td>0.82</td>
<td>-0.59</td>
<td>0.59</td>
<td>0.93</td>
</tr>
<tr>
<td>1815-1914</td>
<td>0.95</td>
<td>-0.001</td>
<td>0.048</td>
<td>0.85</td>
</tr>
</tbody>
</table>

Source: Grantham (1996).

The estimated rates of productivity growth in French farming are comparable with those estimated for nineteenth-century Britain and the United States. According to Gallman (1972), total factor productivity in American agriculture rose annually by 0.5 to 0.6 per cent; British agricultural productivity probably grew 0.5 per cent per year between 1800 and 1850 and 0.4 per cent between 1860 and 1914 (Allen 1994, O'Grada 1994). The only decade in which France's productivity grew less than 0.4 per cent was the 1860s, which is statistically due to the depressing effects on output of the war of 1870, and may possibly also pick up some of the stress on agriculture produced by the industrial boom in that decade. This was the only decade in which agricultural supply was a potential constraint on the rate of economic expansion. Otherwise, agricultural supply seems to have been elastic. Grantham's (1989a) estimates of the supply elasticities of cereals and fodder crops from a cross-section of manuscript census returns
for 1852 show that the supply elasticity for cereals was above unity, whereas that of artificial fodders was about 0.67. It may be, therefore, that the rise in demand for meat and dairy products temporarily reduced the rate of growth of agricultural output, though this slowdown would surely have been repaired in time through higher rates of investment.

The exceptional growth of factor productivity before 1870 may in part be a consequence of depressed investment during the Revolutionary and Napoleonic years, which severely dislocated agricultural markets and created serious labour shortages in consequence of conscription for military service. Time series analysis of the regional convergence of agricultural prices by Chevet and St-Amour (1992) and Chevet (1993b) reveals a distinct break in the trend towards greater market integration at the Revolution. Temporary de-urbanization (Lepetit 1988) further constricted market outlets for produce. There is no unambiguous evidence that output or productivity rose between 1789 and 1815 (Postel-Vinay 1989b, Le Goff and Sutherland 1991). As productivity had been rising since 1750, possibly at an accelerating rate (Hoffman 1996), it may well be that the post-Napoleonic era was a period of catching up. Had the 0.3 per cent growth in productivity in place in the decades before the Revolution been maintained to 1815, agricultural output in that year would have been 14 per cent higher. By extension, the rate of growth of productivity to 1840 would have been roughly 0.35 per cent lower, which implies that between the 1780s and the 1820s the base rate of productivity growth in French agriculture doubled. Why and how this happened is still unknown.

One possibility is the improved balance sheets of most French farmers, who came out of the Revolution in much better financial shape than they entered it. The great inflation allowed them to retire their debt with cheap money, and some farmers were able to buy with assignats the land they had previously rented (cf. Moriceau and Postel-Vinay 1992). Low post-war indebtedness and generally rising farm prices encouraged the farming community to invest in agricultural improvements at unprecedented rates between 1820 and 1870 (Grantham 1996). After 1870 the investments tailed off, as France, like other European nations, was exposed to the huge agricultural supplies coming from newly settled territories abroad. The slowdown was accentuated by the contemporaneous destruction of French vineyards by phylloxera, which was the most important setback to French agriculture in the nineteenth century. Nevertheless, productivity continued to rise even in the worst years.

The TFP calculations are supported by Grantham's (1991) analysis of the growth of labour productivity in wheat production in northern France between 1750 and 1929. Using a technique pioneered by Parker and Klein (1966) he estimated that wheat output per unit of labour input rose approximately 475 per cent. This can be compared with Attack and Bate-

man's (1984) revision of the Parker-Klein study, which estimates a 550 per
cent increase between 1840 and 1910. French growth was slightly later, the most rapid period being between 1900 and 1930. Even so, productivity grew 0.7 per cent per year in the first half of the century, when roughly two-thirds of the improvement was due to improved ploughing. In both countries most of the increase in labour productivity was due to the mechanization of field operations. The similarity in growth rates, despite the great differences in factor proportions and agrarian structure, reflects the dominance of mechanical technology in the development of late nineteenth- and early twentieth-century farming. The slight differences in the introduction of particular applications of this technology hardly warrant the charge of retardation.

5.4. The paradox of pre-Revolutionary productivity

A recent calculation of pre-Revolutionary agricultural factor productivity using the price dual to the production function by Hoffman (1991, 1996) suggests that the long-run rate of agricultural productivity growth in the three centuries before the Revolution was close to zero. These estimates are based on a series of rentals, prices and wages drawn from the region around Paris, which supported the most advanced and capitalistic segment of French agriculture in the early modern era (Moriceau 1994). This secular stagnation, however, masks regional and temporal variation which seem to indicate that factors other than deep-seated structural impediments were depressing the long-run growth rate. In some periods the rate of productivity growth approached half a per cent a year; in others it was negative. Just before the Revolution, productivity was rising annually 0.3 per cent (Table 3). The decelerating phases coincide with domestic and foreign wars, or with extended periods of falling grain prices. The accelerating phases are associated with places and periods of urbanization and rising prices. These patterns suggest that the critical factors affecting productivity growth in French farming during this period were the state of market demand, and the interference of military operations with farming operations.

Yields in pre-Revolutionary France were sometimes extremely high by contemporary standards (Moriceau 1994, Hoffman 1996). Arthur Young noticed that in the Île de France they were as high as in England (Allen and Ó Gráda 1988). The high level of productivity in some parts of France is one of the paradoxes of pre-Revolutionary agriculture. On the one hand, farmers had the proven capacity to achieve English levels of factor productivity; on the other, the capability was not continuously exploited.

5.5. The persistence of the open fields

One possible reason why the performance of French agriculture in the early modern period is so uneven is that improvements in crop rotations and
Table 3. Rates of growth of TFP for selected periods 1500–1789.

<table>
<thead>
<tr>
<th>Region</th>
<th>Years covered</th>
<th>Overall</th>
<th>Late 18th century</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paris Basin</td>
<td>1520–1789</td>
<td>0.13</td>
<td>0.31</td>
</tr>
<tr>
<td>Northeast</td>
<td>1550–1789</td>
<td>0.13</td>
<td>0.13</td>
</tr>
<tr>
<td>Normandy</td>
<td>1520–1785</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>West</td>
<td>1611–1790</td>
<td>−0.16</td>
<td>−0.16</td>
</tr>
<tr>
<td>Southeast</td>
<td>1580–1790</td>
<td>0.21</td>
<td>−0.21</td>
</tr>
<tr>
<td>France</td>
<td>1500–1789</td>
<td>−0.08–0.12</td>
<td>−0.044–0.19</td>
</tr>
<tr>
<td>Paris</td>
<td>1520–1574</td>
<td>0.3–0.4</td>
<td></td>
</tr>
<tr>
<td>Paris</td>
<td>1570–1599</td>
<td>−0.01</td>
<td></td>
</tr>
<tr>
<td>Paris</td>
<td>1600/09–1650/09</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Paris</td>
<td>1650/58–1700/09</td>
<td>−0.3</td>
<td></td>
</tr>
<tr>
<td>Paris</td>
<td>1700/09–1750/09</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

systems of stock management were impeded by the rules of open-field farming, which the conventional historiography took to be an expression of community values, supposedly in conflict with the self-interested capitalism of improving farmers. Cliometric investigations have so far failed to confirm this hypothesis. Grantham (1980) mapped out the temporal and spatial distribution of common farming regulations from a list compiled from legal handbooks employed by justices of the peace to adjudicate disputes about easements and access to private property. He found that, far from expressing communitarian values, open-field practices resolved the practical problems of farming scattered and intermingled plots. The abandonment of ‘common’ rights could be rationally accounted for by their falling net benefit to individual farmers. Moreover, the various regulations were not an indissoluble bundle of linked rights, but consisted of practices that were taken up or abandoned according to their changing net benefit. A regression turned up no evidence that the presence of common pasture affected the rate of agricultural innovation. These findings were confirmed by Hoffman’s (1988, 1996) investigation of the few enclosures carried out in the eighteenth and early nineteenth century.

These findings have been ignored by participants in the debate over the English open fields. Nevertheless, the French case ought to serve as a reminder that the size and lay-out of operating farms were not identical with the size and lay-out of agricultural property. Farm lay-out was more responsive to market forces, because farms could be assembled by exchanging property in the rental market, which was much less costly than transacting in the market for real estate. Where consolidated holdings yielded significant advantages, farmers could achieve efficient lay-outs by
subletting plots to each other, often without the permission or knowledge of their landlords (cf. Moriceau and Postel-Vinay 1992). Since the chief advantage from consolidating parcels into compact fields was the savings in ploughing time, these consolidations were most common where labour costs were highest. Grantham (1989b) analysed the statistics on plot dispersion in open field districts and found that the degree of scattering was inversely related to the extent of commercialized production. Leasing arrangements were flexible enough, and over the very long term the market for land was open enough to permit the agrarian structure to evolve consistently with an optimal exploitation of technological and market opportunities. This is why the open-fields did not deter the growth of agricultural productivity. It was only in the twentieth century that the pace of technological change accelerated to the point where the field system began to be a significant constraint on farming, and when the cost of these constraints rose, they were removed by legislation.

The evolution of the French economy in the eighteenth and nineteenth century was more gradual than in Britain, and it may be that the slower pace of structural change allowed the rental market to adjust farm sizes and layout efficiently without requiring an early recourse to land legislation. More detailed local studies of the effects of scattering and an analysis of French farming in the 1920s and 1930s, when it probably did depress productivity, need to be carried out before the question can be settled.

Rosenthal's (1990, 1992) study of proposed irrigation and drainage projects in the eighteenth century takes up another aspect of institutional obstacles to agricultural change. He argues that drainage and irrigation projects that were profitable before the Revolution were not executed because the cost of rearranging property rights was prohibitive, owing to the chaotic tangle of overlapping legal jurisdictions. It was easy for someone desiring to block a project, or simply to strategically delay its execution in order to receive a greater share of the benefits from it, to appeal the matter of property rights in another jurisdiction. The ease of making such appeals was facilitated by the venality of judicial office, which encouraged judges to hear appeals from lower courts because the appeals were a lucrative source of court fees. Rosenthal shows how this structure created incentives to overturn lower court decisions, which naturally raised expected litigation costs for parties wishing to undertake projects involving the rearrangement of property rights. He argues that the institution of a salaried judiciary by the Revolution put an end to this unproductive strategic game. Whether excessive litigation expense seriously depressed the rate of growth of agricultural productivity nevertheless is doubtful. Reclaimable land constituted a tiny proportion of French agricultural land, so legal impediments to drainage and irrigation could not significantly have affected the level of output.

Rosenthal's method can perhaps be more fruitfully extended to other
spheres, such as the consolidation of plots in open fields. The rate of return to this operation was the same as it was for irrigation (30 per cent), but there were hardly any consolidations carried out before the First World War. The change in the judicial regime and provisions in the Rural Code that expressly limited rights of common had little effect on the agrarian structure. Nevertheless, Rosenthal’s findings are a plausible explanation for the remarkable acceleration in the rate of productivity growth after the Revolution. This is a topic in need of further study, including analyses of other continental legal systems.

5.6. Agricultural demand and economic conjuncture

The possibility remains that conjunctures and not structures can explain the particular pattern of French agricultural and economic development. This approach originated in Simiand’s (1931) study of price trends, in which he argued that the long swings in price movements, which he termed ‘A’ and ‘B’ phases, were correlated with phases of economic expansion and recession. When Lévy-Leboyer (1970) recomputed Simiand’s price indices, however, he found they did not reproduce Simiand’s phasing. There nevertheless is little doubt that the long period of depressed grain prices after 1670 depressed agricultural investment (Meuvret 1977, 1988; Moriceau 1994). Ruttan (1978) suggests that the late nineteenth-century decline in farm prices also depressed productivity growth, by limiting the incentive to invest. Cross-section analysis supports these views. Grantham (1989a) identifies the level of demand as the primary cause of spatial differences in northern France around the middle of the nineteenth century. This finding is supported by Hoffman’s (1991, 1996) estimates of total factor productivity in the Paris Basin before the Revolution. The relation between demand and factor productivity thus appears to be fundamental. A plausible mechanism linking demand to productivity is that high demand prices for produce encouraged farmers to engage in more intensive methods of cultivation, and as the investments required by these methods were often indivisible, the presence of strong demand carried farmers over the threshold of profitability. For example, the diffusion of intensive husbandry in Northern France was sensitive to the price of meat and dairy products (Grantham 1978).

The analytical issue raised by demand-based explanations of French agricultural development is what determines demand, since aggregate demand is not independent of aggregate supply in a closed economy. Grantham (1997b) suggests that the secret source of growing effective demand for foodstuffs was spatially focused external economies in trade and manufacturing. Geographical cross-sections indicate that agricultural productivity was highest around cities and other foci of concentrated demand (Grantham 1989a, Hoffman 1996). The localisation of intensive farming reflected high transport costs and high demand prices for produce in cities.
High demand prices for farm produce in cities stemmed from high incomes of city residents, which in turn stemmed from high productivity. Since high urban factor productivity is a consequence of the market externalities produced by spatial concentrations of skilled labour and other specialized inputs, the development of concentrated populations in the early modern era may account for the parallel development of highly productive farms nearby. The dynamics of increasing returns that underlies these developments may also explain why agricultural productivity went through long swings without experiencing much fundamental change in technology. Economies characterized by indivisibilities giving rise to increasing returns have in general many equilibria, and are likely to experience periods of traverse between them that give rise to cumulative investment and disinvestment (Grantham 1997a).

Were urban external economies limited by agricultural supply? Grantham (1997b) investigates this question by simulating self-sufficient provisioning zones for cities of different sizes using technical coefficients of consumption and production drawn from French sources. This exercise indicates that farmers situated within a 45-kilometre radius – roughly the zone within which they marketed their produce directly – could feed cities of up to 300,000. Since most large medieval and early modern cities had between 20,000 and 50,000 inhabitants, the simulations imply that early urbanization was not constrained by the food supply. The simulations further indicate that when urban populations exceeded 250,000, specialized intermediaries had to be engaged to ensure a stable flow of foodstuffs from the countryside. The resulting extension of urban provisioning zones beyond this point created new organizational constraints. Long-distance trade in subsistence foodstuffs required investments in storage and transport facilities not lightly undertaken, which meant that extensions of the provisioning zone occurred discontinuously. Intermediated supply systems accentuated subsistence problems in the peripheral districts, because the radius of urban provisioning zones in the short run varied with crop yields. The dislocation to local grain markets caused by the episodic incursion of urban merchants into districts unaccustomed to their demand and unprepared for it probably explains why famine was more common in the countryside than it was in towns. It also puts the market regulations of the early modern period in a different light from the liberal caricature of government interference with the benign processes of untrammelled price-making. One reason for regulating the timing of purchases by local and ‘foreign’ buyers was to prevent urban merchants from clearing out local stocks of foodstuffs that were necessary to maintain a supply of subsistence foodstuffs in normally isolated rural districts. In this light the regulations are less a form of resistance to the spread of the market than a necessary accompaniment to it.

The spatial orientation made possible by French agricultural data suggests that the dynamics of early modern development may depend more on
how coordination problems of a decentralized economy were resolved than on the changing balance of population and resources. The Anglo-French productivity gap may reflect England’s greater degree of urbanization. The reasons for the English advance probably owe something to France’s counterproductive attempt in the second half of the seventeenth century to reduce Holland’s commercial role. This depressed the development of specialized manufacturing hitherto encouraged by Dutch traders. This conjecture is supported by the strong growth of French textile manufactures destined for international markets after 1730. Geographical factors may also play a role (O’Brien and Keyder 1978).

6. Conclusions

Despite its late development as a fledged partner in quantitative economic history, French cliometrics has made important contributions to French economic history. The richness of French quantitative data and its accessibility make it possible to ask and answer unresolved questions about European economic development between 1600 and 1900. The study of French economic history is justified not merely by French history or Anglo-French comparisons, but by its capacity to illuminate regions of economic history that have until now resisted analysis for lack of suitable instruments of research. The French economy is a laboratory for uncovering and testing hypotheses about economic evolution. This is its most important promise.

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References


Borglumbert, P. de (1707 [1696]). *Le détail de la France*, n.d, n.pl.


The French cliometric revolution: A survey


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Economies et sociétés. 'Histoire quantitative de l'économie française', 
Série AF, no. 15. Paris: l'Institut des Sciences Mathématiques 
Economiques Appliquées.
années 1860: une simulation économétrique. In P. Fridenson and A. Straus, Le 
années 1860. Annales ESC 43, pp. 73–110.
Economic History 44, pp. 27–47.
WEIR, D. (1989a). Tontines, public finance, and Revolution in France and 
J. Walter and R. Schofield (eds), Famine, Disease and the Social Order in 
46, pp. 917–47.
WEIR, D. (1993). Parental consumption decisions and child health during the early 
demographic transition: A case study of Rosny-sous-Bois. Journal of Economic 
WHITE, E. N. (1989). Was there a solution to the Ancien Régime's financial 
WHITE, E. N. (1990). Free banking during the French Revolution. Explorations in 
Economic History 27, pp. 251–76.
WHITE, H. D. (1933). The French international accounts, 1880–1913. Cambridge, 
MA: Harvard University Press.
WILLIAMSON, J. (1995). The evolution of global labor markets since 1830: 
background evidence and hypotheses, Explorations in Economic History 32, pp. 
141–98.
Press.