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ORIGINAL PAPER

French revolution or industrial revolution? A note on the contrasting experiences of England and France up to 1800

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Abstract At the end of the eighteenth century, England and France both underwent revolutions: France the French Revolution, England the industrial revolution. This note sheds new light on these contrasting experiences in the histories of England and France by looking at the evolution of real consumer prices in London and Paris in the centuries leading up to 1800. Whilst in London, building workers were facing low and stable consumer prices over the period, leaving plenty of scope for a demand-driven consumer revolution (in particular after 1650), their Parisian counterparts had to engage in a year-long grind to maintain a decent living, and often had to cut consumption to make ends meet. The exercise conducted in the present paper gives a quantitative and economic underpinning to the notion that the French revolution did not arise out of nowhere, but rather had its roots in centuries of hardship amongst working class people as they struggled to make a living.

Keywords Consumer revolution · French revolution · Great divergence · Industrious revolution · Industrial revolution · Labour input

JEL Classification J2 · N1 · O1

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1 Introduction

One of the perennial themes in economic history is why the Industrial Revolution first occurred in England rather than France. The traditional view of England as ‘a beacon of progress’ whilst France was ‘mired in backwardness’ seemed strange in the light of empirical work showing respectable growth rates in France for most of the eighteenth century (Marczewski 1961) and was brought into question by Nicholas Crafts (Crafts 1977). Since then, scholars have repeatedly pointed to the *lack of* differences between England and France in the run up to the Industrial Revolution, adding further to the mystery as to why England went before France. Indeed, Hans-Joachim Voth and Nico Voigtländer, in support of Crafts, recently argued that ‘chance played a role in the timing and speed of Britain’s initial surge’, maintaining that France could in fact have moved into manufacturing faster than England, had it not been for a number of random factors, based on the simulation of a probabilistic model¹—they thus do not believe that this outcome was predetermined.

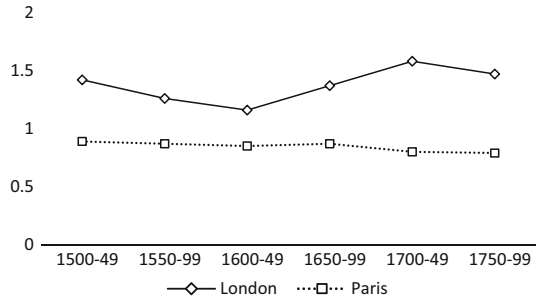
Bob Allen’s illuminating computation of his so-called ‘welfare ratios’ across Europe was probably the first study to indicate that Londoners were well beyond their Parisian counterparts in terms of purchasing power in the run up to 1800 (Allen 2001). Allen was able to draw this conclusion by designing a basket of everyday consumer goods (food, clothing, housing, heating etc.); he then calculated the number of times an average-sized family (consisting of two adults and three children) was able to buy the basket given prevailing prices and wages, computed on the assumption that a labourer worked 250 days per year. Figure 1 below compares the welfare ratios of London building labourers to those of their Parisian counterparts between 1500 and 1800. It is evident from the graphs that, whilst the French were barely able to afford one basket, the English, with a labour input similar to that of the French, were capable of buying between 1.2 and 1.6 baskets.

Two important points seem to have escaped Allen’s attention. The first has to do with the fact that he groups observations in blocks of 50 years. This means that any year-to-year price and wage variation is hidden from the reader. The second point has to do with the fact that workers may have varied their working year in response to economic circumstances, for instance so as to maintain a constant standard of living in the face of real wage volatility. Indeed, independent estimates of labour input, which will be discussed below, suggest that Allen’s assumption of a flat 250 days of work per year was at the lower end of the scale.

In this paper, therefore, we expand the analysis of Allen (2001) along two dimensions. Firstly, by looking at year-to-year fluctuations in real consumer prices it becomes immediately apparent that, whilst in London building workers were facing low and stable consumer prices in the three centuries leading up to 1800, the French were subject to huge variations in the cost of living throughout the period. Secondly, we follow the computational exercise in Allen and Weisdorf (2011), which fixes consumption rather than labour input and then calculates the working year required to obtain exactly one consumption basket. We show based on this calculation that,

¹ See Voth and Voigtländer (2006, pp. 320–21).

Fig. 1 Allen's 'welfare ratios' for London and Paris, 1500–1800 (Source: Allen 2001, Table 6)



whilst the English worked twice as much as they had to in order to buy the basket, the French often had to cut consumption in order to make ends meet, especially in the century leading up to the French revolution. The struggle for subsistence amongst Parisian workers, on the one hand, and the industrious behaviour of London labourers on the other (supporting de Vries' (2008) twin hypotheses of an 'industrious revolution' and a 'consumer revolution' feeding the industrial revolution), jointly suggest a new reason as to why France was driven towards the French revolution, whilst England experienced the industrial revolution.

2 The literature to date

Crouzet (1967) seems to have been the first to ask the poignant question as to why England experienced the industrial revolution before France, and led to a large volume of literature giving qualitative reasons as to England's superiority. This was, however, roundly attacked in a book by Milward and Saul (1973), where they stressed the difficulty of finding English exceptionalism in comparison to such a great diversity of continental economies, and in particular in comparison with France.

One of the most thought provoking and provocative contributions came from Crafts (1977) who likewise failed to identify crucial differences between the two countries. More importantly, he argued that the question was irrelevant and unanswerable, since the event was unique, meaning that statistical inference cannot be used to answer the question. However, already in the same edition of the *Economic History Review* as Crafts published his work, Rostow (1978) argued against this, stating that it was still possible to attempt to identify factors that might have made the Industrial Revolution more likely to appear in England before France.

Landes reopened this debate in his Tawney Lecture (Landes 1994), and suggested that Crafts was really being provocative rather than seriously saying the question should be neglected. In his classic work, *The Unbound Prometheus* (Landes 1969), he had earlier argued that certain cultural traits in particular led to France being unable to compete with the UK until about 1850, most notably a form of entrepreneurialism too dependent on family firms and non-profit maximising strategies.

Recently, Horn (2006) has taken a different path, following in a tradition popular amongst French scholars (but by his own admission largely ignored in the English language literature). He argues that the French industrialisation process might have been different from Britain's but was, in the long run, just as successful: France was unable to follow the 'liberal' British route to industrialisation, so instead 'evolved a longer-term institutional model of industrial development', which eventually led to levels of per capita income comparable to those of Britain. This is of course an important point, but we follow the 'Anglo-Saxon' literature in believing that the uniqueness of Britain's industrial revolution deserves special consideration, and that the comparison with France is interesting and important.

In doing so, we are not alone. Voth and Voigtländer (2006) take inspiration from unified growth theory, which describes how economically stagnant societies eventually escape the Malthusian trap through parents choosing to invest in the quality of their offspring by limiting the quantity of children they have. They use simulations to show that the fertility regime and the use of differentiated capital inputs drove technological progress in England and made the Industrial Revolution likely, if not inevitable. However, running the same simulations for other countries, they find that although it was extremely unlikely to happen in China, it actually had a reasonable chance in France. In fact, they support something suggested in Crafts' original article—that 'France's failure' might simply have been due to bad luck.

Since 'chance' seems a somewhat uninteresting answer to a fascinating question, we take up the debate again, and in particular focus on a hitherto somewhat neglected angle: the economic hardship that fed the French Revolution for this period of history.

3 A comparison of working years in London and Paris

An industrial revolution is contingent on growth in the demand for industrial goods. Prior to 1800, and even more so before 1750, international trade was miniscule by modern standards. Hence, any increase in demand which was to stimulate industry in this period would have had to come from domestic consumers. Since real wages in London and Paris showed no rising trends before after 1800 (Clark 2005, 2007), a demand-driven industrial revolution would have had its origin in an 'industrious revolution', i.e. an expansion of the working year in order to earn surplus money so as to be able to buy more goods (de Vries 2008).

Industrious behaviour implies that the actual working year exceed that required to obtain the basic consumption basket of a representative family (as for example that specified and applied by Allen 2001). We thus look for such behaviour amongst London builders and compare that to those in Paris. For this, we follow the computational exercise of Allen and Weisdorf (2011). Their basic idea is to calculate the number of days of work necessary per year to buy a fixed consumption basket, and then compare it to independent estimates of the actual working year found in the existing literature. To account for the fact that workers would typically provide not just for themselves but for an entire family, they compute the annual days of work required to support a representative household. They assume that a

Table 1 Basket of goods

Items	Quantity/person/year
Bread	182 kg
Beans/peas	52 l
Meat	26 kg
Butter	5.2 kg
Cheese	5.2 kg
Eggs	52 each
Beer	182 l
Soap	2.6 kg
Linen	5.0 m
Candles	2.6 kg
Lamp oil	2.6 l
Fuel	5.0 million BTU*

Source: Allen (2001, p. 421)

* One BTU is the amount of energy required to increase the temperature of one pound of water by 1 ° Fahrenheit. Five per cent is added to total consumption expenses to account for the cost of housing

household consists of two adults and two and a half children, and that children consume half as much as adults. That means a household contains the equivalent of 3.25 adults.

The computational exercise performed in order to calculate the working year required to buy the fixed basket relies on two main components: annual consumption expenditures of a typical household and day wages of workers. The wages used in London and Paris are day wages of building workers. For London, these come from Boulton (1996), Rappaport (1989) and Schwartz (1985). For Paris, these come from Baulant (1971), Durand (1966) and Rougerie (1968). Annual consumption expenditures are computed based on prices, which for London come from Allen (1992), Beveridge (1939), Bowden (1967, 1985), Mitchell (1971) and Rogers (1866–1892), and for Paris from Hauser (1936).²

In order to compute annual consumption expenditures, Allen (2001) relies on a pre-modern consumption basket comprising daily consumption goods, such as food, clothing, housing and heating. Since an expansion in the working year could reflect a desire to consume new and more luxurious goods, no novelties (like sugar, tobacco, potatoes, tea, coffee, books, clocks etc.) are included in the basket. An industrious revolution intended to expand consumption then ought to reveal itself through a growing gap between the *actual* working year and the working year required to buy the basket (henceforth the *implied* working year). The consumption goods included in the fixed basket, as well as the amounts consumed per adult, are detailed in Table 1.³

The implied working year necessary to obtain the basket specified above is then calculated using the following formula:

$$\text{days per year} = \text{annual costs of baskets of household/day wage.}$$

The next step is to add independent estimates of the actual working year. From around 260 working days per year at the beginning for the sixteenth century (Clark

² See Allen (2001, Appendix 1) for further details on wages and prices.

³ For a discussion of the design of the basket, see Allen (2001).

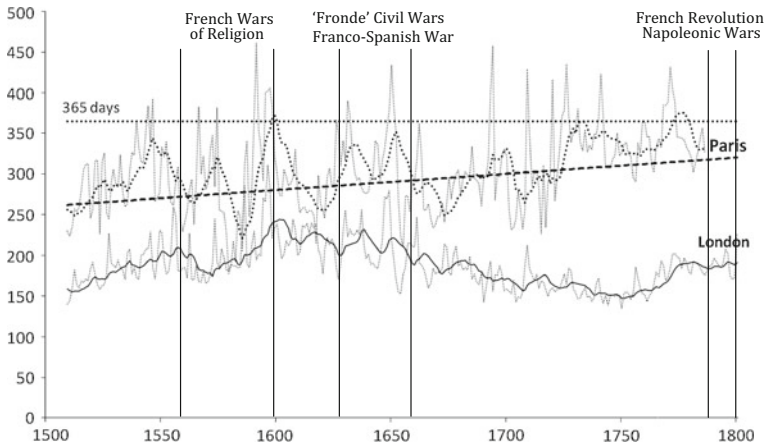


Fig. 2 The Actual working year (*dashed line*) and the implied working year for building labourers in London (*solid line*) and in Paris (*dotted line*), 1500–1800 (Sources: Allen 2001, Appendix 1. The data used for Figs. 2 and 3 are downloadable from <http://www.nuffield.ox.ac.uk/General/Members/allen.aspx>. Because of the French Revolution data after 1786 is not available for Paris)

and Van Der Werf 1998), the working year gradually increased up to some 320 days per year by 1800 (Voth 2001). The latter number is computed on the assumption that London workers toiled on average 10 h per day. The bold, upward-sloping, dashed line in Fig. 2 illustrates the length of the *actual* working year in London. According to Baulant's (1971) estimates, the Parisians worked 275 days per year in 1549; 287 days in 1666; and 280 in 1673. These figures seem to correspond well with those of the Londoners. Figure 2 also shows the *implied* working year (10-year moving average) of London building labourers (solid line) and those in Paris (dotted line), with the surrounding dashed lines illustrating the year-by-year estimates. Finally, the vertical dotted line marks a full working year of 365 days.

What can be learned from Fig. 2? Three observations spring to mind. Firstly, London labourers had absolutely no difficulty supporting their families by putting in between 260 and 320 days of work per year, except for a few years of extreme misery shortly before 1600 (the spikes following the solid line).⁴ In fact, the basic basket merely needed between 150 and 200 working days per year for it to be affordable. This conclusion seems to go against the notion often forwarded in the literature that pre-industrial England was subject to *Malthusian* pressures in the sense that workers were forced down to a 'subsistence' income in the literal sense of the word.⁵ By contrast, Parisian labourers were rarely able to support their families even when putting in more than 300 working days per year. Indeed, Parisians often had to cut consumption, because the working year needed to maintain the basics

⁴ It is also worth noting that the period prior to the English Civil Wars of the 1640s and 1650s was associated with historically high costs of living for the English, and indeed Allen's welfare ratios are declining up to this time (see Fig. 1 above). This might lend some extra support to the notion that poverty breeds revolution. We are grateful to an anonymous referee for making this point.

⁵ See Sharp et al. (2011) for more on the meaning of subsistence income in a Malthusian setting.

detailed in Table 1 often exceeded 365 days (the flat, dotted line in Fig. 2). This, by contrast to the English, looks unmistakably like a society exposed to *Malthusian* constraints.

It is worth noting that in the analysis above the dependency structure of the family is assumed to be constant over time. As is demonstrated in Allen and Weisdorf (2011), the increased dependency burden of the English from 1750 onwards meant that by 1800 women and children had to supply nearly 20 per cent of household earnings to maintain basic consumption, a number which is consistent with estimates provided by Horrell and Humphries (1995). For France, which started its fertility decline earlier than the English, the dependency burden was probably declining in the run up to 1800. However, the crude birth rate in France was higher than that of England up until around 1800 (Andorka 1978). Going back in time from 1800, therefore, the increasing dependency burden of the French would push the implied working year in Paris upward relative to that illustrated in Fig. 2, hence putting even more pressure on the Parisians than the figure suggests.

Secondly, the rising gap, especially after 1650, between what we assume to be the actual working year (the upward-sloping, dashed line) and the implied working year of the Londoners (the solid line) supports de Vries' notion of an 'industrious revolution' acting as a stimulus to the industrial revolution. The French experience was in stark contrast to that. If the working year of Parisians was in fact on par with that of Londoners, as the numbers produced by Baulant (1971) seem to suggest, the gap between the actual and the implied working year—with the implied working year frequently far in excess of actual labour input—left no scope for a demand-driven consumer revolution based on industriousness, at least not in the Paris basin, which is believed to have been the most dynamic region in France at the time (Hoffman 1991).

Finally, the huge slumps caused by the many declines in French real wages, and the cut in consumption that Parisians were often forced to make as a result (when the implied working year exceeded 365 days) was not only an impediment to industrial production due to high price volatility (Sandmo 1971), but seems a likely contributor to the popular unrest, especially as the costs of living remained at incredibly high levels after 1725. This of course ties into an important debate as to the origins of the French Revolution, which we do not want to dwell on here, although an excellent survey is given by Grantham (1997). The suggestion that declining French real wages were behind the Revolution in France goes back at least to Labrousse (1944), but has been hotly debated since. Our work lends support to the economic interpretation of the Revolution.

The differences in real wage volatility between London and Paris are illustrated in Fig. 3. It is clear that the French were much more subject to real wage uncertainty than were the English, especially at the end of the sixteenth century (a period associated with the French Wars of Religion) and in the first half of the eighteenth century. The relatively strong year-to-year variations in the real wages of the French, not least compared to those of the English, are perfectly consistent with Hoffman's hypothesis that exogenous shocks, as well as religious wars and disorder, interrupted the French process of growth (Hoffman 1996). It is also consistent with the notion that the organisation of agricultural markets in England versus France

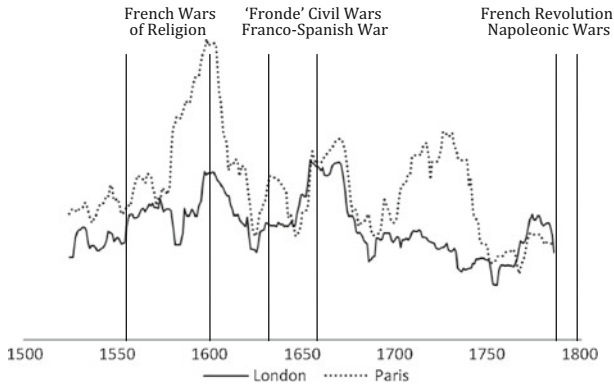


Fig. 3 Volatility in real wages, 25-year SD from the mean, 1500–1800 (Sources: Allen 2001, Appendix 1)

during the seventeenth century were different, a point noted by French contemporaries, *les économistes*, who argued that the large swings in prices endured by France as opposed to England were due to the relatively closed nature of the French economy which made it much more susceptible to local shocks (Persson 1999). Another factor might have been the widespread system of poor relief in England which dampened swings in the nominal wage in that country (Solar 1995).

4 Conclusion

None of the above should ignore the fact that the Revolution if anything only delayed French industrialisation, which might in fact in the end have been facilitated by the modernisation of institutions and the economy which the Revolution brought in. That said, the question as to ‘why England, not France’ remains a fascinating question, although we do not pretend that we have provided in this note the full answer to this. We do believe, however, that we have provided some important pointers towards future research.

First, it seems that there are good reasons to believe that economic conditions are one of the main reasons for political unrest. In this context, the hardships faced by the French workers seem as convincing an explanation as any—an impression which is only made stronger through the contrast with England. In particular, the role of the great volatility in real wages endured by the French seems particularly ripe for further investigation. Second, perhaps more attention should be paid to failures on the French side when explaining the reasons why England experienced the first industrial revolution and making the obvious comparison with France, rather than stressing the similarities, or simply looking for signs of English exceptionalism. There were important differences between the French and English economies in the run up to their respective revolutions, only a few of which have been highlighted in this note.

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