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L'histoire immobile? Six centuries of real wages in France from Louis IX to Napoleon III: 1250 - 1860

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L'histoire immobile?

Six centuries of real wages in France

from Louis IX to Napoleon III: 1250 - 1860[1]

Abstract

This paper presents new series of real wages for male farmers and construction workers in France from 1250 to 1860. Between the first half of the thirteenth century and the mid-nineteenth century real wages displayed no substantial trend improvement. Even in the post-Black Death period, after a sharp temporary rise in real wages, there are few traces of a French "golden age" of labour especially during the worst phases of the Hundred Years War. In addition, consistently with the Malthusian interpretation, we find evidence of a long lasting inverse relationship between real wages and population.

Key-words: Real wages, Living standards, France

JEL codes: I30, J3, N33, O10

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INTRODUCTION

In 1955 Édouard Perroy described the problem of wage labour in medieval France in these terms: "It seems a very rash thing indeed to try to track down that most elusive person, the French medieval wage-earner."[2] At the time, the shadowy personality of the French worker was a trait shared even by his early modern heirs as well as his European counterparts. Today, thanks to the systematic research efforts that have unveiled key developments in the history of wages and prices, the pre-industrial wage earner appears somewhat less mysterious.

Following the seminal contribution by Robert Allen (2001), the study of the relationship between wages and prices has grown in one of the liveliest research streams in economic history. Notably, this strand of literature has been characterized by a remarkable advancement in terms of geographical and temporal coverage, making important forays in areas outside Western Europe like Northern and Latin America (Abad et al. 2012 and Allen et al. 2012), Asia (Allen et al. 2011; de Zwart and Van Zanden 2015), Southeastern Europe and the middle east (Özmucur and Pamuk 2002). In this way, not without criticism,[3] real wages have been progressively acknowledged as very versatile indicators of economic performance deserving a place of eminence in the economic historian's tool-kit.

First, real wages have been used to enhance international comparisons of economic performance and support claims of convergence or divergence in the various debates concerning differences in living standards across leading European cities and between Europe and other areas of the world.[4] At the same time, real wages have been widely employed as proxy for income per capita in several exercises on historical reconstruction that estimated agricultural output and GDP per capita from the consumption-side before the industrial revolution.[5] Nevertheless, the construction of new series of real wages has revealed strengths and weaknesses of the estimates and highlighted several important methodological issues.

The first regards the interpretation of real wages as indicators of material living standards. It should be kept in mind that the real wage is first and foremost a measure of real labour earnings per capita while typically it

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[2] Perroy (1955, p.232).

[3] See, for example, Hatcher (2011).

[4] See Allen (2001) on the divergence of European wages and prices; Broadberry and Gupta (2006) on the great divergence between Asian and European real wages as well as Allen et al. (2011) for a comparison between Europe, China, India and Japan.

[5] See for example, Allen (2000), Malanima (2011) and Alvarez-Nogal and Prados de la Escosura (2013).

represents just an approximation of real incomes per capita which might include indeed other sources of remuneration such as capital and land rents as well as various forms of nonmarket income. Thus, the real wage can be suitably interpreted as an adequate measure of living standards to the extent that the share of non-labour earnings in total income is negligible or trends in real wages approximate the patterns of change of total incomes. While this was generally the case for regular workers in the construction sector and landless wage labourers, farmers holding small parcels of land usually derived only a limited fraction of their incomes from wage labour, so that their per capita incomes were relatively less affected by changes in real wages.[6] Moreover, while literature concentrated on the construction of long series of prices and nominal day wages, less attention has been devoted to the study of the other determinants of household incomes, including the occupational structure, the labour intensity, the household size and the possible changes in the patterns of consumption.[7]

The second issue is the representativeness of the series. While most research has focused on the evolution of real wages in large cities, the evidence concerning small urban agglomerates and rural areas is still fragmentary for the pre-industrial period. With few notable exceptions (Clark 2005; 2007), existing series cannot be defined as "national" in any sense. As a consequence, most cross-national comparisons of living standards and the related conclusions cannot be supported without assuming, implicitly or explicitly, that the series of large urban centers are representative of national trends.[8] Ultimately instead, if we are to reach any broad conclusion at country level, we must resort to some form of comprehensive national measure. In this respect, the estimation of aggregate series of prices and wages would be a further necessary step to stimulate the cross-national study of living standards in the past.

Furthermore, while it is certainly true that our knowledge of real incomes in Western Europe is broader and deeper as compared to other parts of the world, still a little more probing reveals that there is much that remains mysterious. The case of France is a telling example. Stretching North to South from the English Channel to the Pyrenees and the Mediterranean Sea, and from West to East from the Atlantic Ocean to the

[6] Perroy (1955) and Feller (2006) discuss the main issues related to the treatment of wages in medieval and early modern France. See also Hatcher (2011) and de Zwart and Van Zanden (2015, pp. 216-17) for analogous considerations outside the French context.

[7] Exceptions mostly regard England. For example, Allen and Weisdorf (2011) review the literature on working time in England between 1300 and 1830 and discuss household size and labour market participation.

[8] For the principle of national representativeness and its application, see Allen (2011) and Allen (2000), respectively.

Rhine, France was the largest economy and the most populous region of Western Europe[9] including almost invariably about 30 per cent of its population between the thirteenth and the eighteenth centuries. Even if famously stylized as a société immobile by Annales historians such as Emmanuel Le Roy Ladurie, France represents a fascinating historical laboratory. Quite surprisingly, notwithstanding a long research tradition emerging from the Annales group, there has been very little research devoted to a comprehensive reconstruction of trends in real wages for France.

In this respect, it is useful to reconstruct the evolution of real wages by adopting a framework which allows to consider the French experience in comparative international perspective.[10] Indeed, previous statistical studies of real wages in France were characterized by major differences in the treatment of the wage deflator and the underlying assumptions made to construct the reference consumption bundle.[11]

This paper tackles these issues by estimating new series of real wages for French male workers of different occupations from 1250 to 1860.

Starting from a narrow interpretation of real wages as measures of real labour earnings, we explore the potential implications of a broader characterization of real wages as general indicators of economic performance in the past. In doing so, we add three elements to the current debate.

First, our estimates rely on a large dataset of prices and wages that allows us to extend considerably the spatial and temporal coverage of the series. This approach, which extends across the Channel the methodology originally applied by Clark (2004; 2005) to England, holds the promise to provide a quite detailed picture of national trends, and shed some light on the previously unknown dynamics of the wage history from the early stages of state formation to the Second French Empire.

[9] By western Europe, we mean Austria, Belgium, England, France, Germany, Italy, Netherlands, Poland and Spain. Population data were taken from Allen (2000).

[10] In this respect, Allen (2001) represents a widely acknowledged benchmark and following his lead, in recent years, many studies have used the same approach.

[11] For a general discussion see Allen, (2001, pp. 419-20). In previous studies of real wages in France, wage deflators ranged from the mono-product (cereals) bundles of the medieval and early modern periods (Bois 1976; Rouzet 2005) to the Singer-Kérel (1961)'s 213-item index for Paris by 1840.

Second, we complement our analysis with a study of the patterns of change of time-use and consumption in pre-industrial France looking at the experience of construction workers on site and examining several alimentary budgets.

Finally, using the methodology pioneered by Allen (2001), we estimate new aggregate series of real wages that are consistent over time and can be easily evaluated in international comparative perspective.

The rest of the paper is structured as follows. First we provide a detailed description of methods and materials, followed by a presentation of the consumer price index and the series of real wages. Finally we discuss the "stylized facts" of the French wage history in the pre-industrial period. The last section concludes.

METHODS AND MATERIALS

The price and wage history of France has received considerable attention by historians since the first half of the eighteenth century. This precocious interest, pioneered by the seminal contribution of Dupré de Saint-Maur (1746), was instigated by the existence of an unusually large body of evidence documenting the evolution of prices and wages in different places of the country since the eighteenth century. Indeed, the rise of centralized institutions and the advent of "dirigisme" in the economy multiplied the production of official statistics.[12] Yet, these enquiries did not describe the evolution of prices and wages before the eighteenth century. Large part of our knowledge of trends in wages and prices during the medieval and modern periods is instead the result of the vast research efforts undertaken by historians since the end of the nineteenth century. From the first investigations of Léopold Delisle and Charles de Beaurepaire on Normandy in the nineteenth century, to the ambitious research project launched by the International Scientific Committee on Price History in the 1920s, passing to the classic works of the second and third generations of scholars linked to the Annales School in the 1960s-1970s, French economic historiography abounds with references to prices and wages. Much of this research had an eminently localized character focusing on the experience of specific regions or what might be called "local economics",[13] and still to date, despite some pioneering efforts, there

[12] Gille (1964) provides a survey of the statistical sources of France from the seventeenth century to 1870. See also Perrot and Woolf (1984) for the role of the state in the production of official statistics.

[13] The definition is borrowed from Hoffman (2000).

is no consolidated understanding of the long-term development of wages and prices from a broader national perspective.[14] Georges d'Avenel was the first historian to attempt a wide national reconstruction.

The seven volumes of his Histoire économique virtually represented the first attempt to write an extensive economic history of France relying on a large body of quantitative evidence, although without providing aggregate indices of consumption prices and real wages. Subsequently, Ernest Labrousse (1932) partially filled the gap establishing new series of real wages for to the period 1726-1789, while other contributions, following the lead of François Simiand (1932), concentrated on the construction of national indices since the late eighteenth century (Bayet 1997; Kuczynski 1944; Lhomme 1968, Sicsic 1995).

Nevertheless, though fundamental in many respects, all these contributions are still too sparse and heterogeneous to permit the formulation of even tentative conclusions about long-term developments in living standards.

WAGES

The empirical analysis carried out in this study is based on the construction of an entirely new dataset of nominal day wages covering several types of occupations in the agricultural and building construction sectors.[15] Since most French urban wages are recorded for workers in the building industry, this study focuses on skilled and unskilled male construction workers whose salaries are assumed to be representative of urban wages.[16] Data were retrieved from classic histories of wages and prices and a wide array of secondary and printed primary sources comprising manorial accounts and the published records of several building projects between the thirteenth and the seventeenth centuries (the complete list of sources is

[14] For example, for real wages in Paris see Allen (2001), Hoffman et al. (2002) and Singer-Kérel (1961); for the series of nominal and real wages in Strasbourg and Alsace see Allen (2001) as well as Geloso (2017).

[15] Only about 1.2 percent of the observations were referring to weekly or yearly wages. These data have been converted to daily rates assuming a 250-day working year and a 5-day workweek.

[16] It appears that the nominal wages registered in the building accounts of our sample were not inflated by contractor margins This is notably different from the case of seventeenth century London, where the widespread use of sub-contracting and the emergence of large-scale building contractors affected the real pay received by construction workers (Stephenson 2017).

provided in appendix). By the late eighteenth century these data were complemented with a fairly large set of local and national enquiries.[17]

Overall, the dataset includes 22,723 wage observations for the period 1250-1860 derived from more than 150 sources. The printed primary sources are especially important prior and immediately after the Black Death phase and help covering the gaps in the sample during the later Middle Ages and the post-revolutionary era (Figure 1a). Between 1250 and 1329 observations average 132 per 20-year windows, although there are only few observations for the period before 1290. Between 1330 and 1860 wage observations never fall below 300 (slightly less in the last period).

Despite our efforts to ensure a comprehensive temporal coverage, the distribution of data over time shows two distinct peaks. The first peak in the period 1370-1549 reflects the high concentration of building projects and the extensive contributions offered by the French medieval historians. The second (1710-1809) coincides in time with the rise and diffusion of official statistics by the seventeenth century. Over these years the average number of wage observations per period is well above 800. By the 1810s, one observes a drop in the wage observations per period, as we directly use the national averages derived from the official enquiries, while retaining the raw data to fill the gaps in the series (especially between 1814 and 1830).

Geographical Coverage of Wages

The resulting sample of wages contains observations that come from several places, represent many professions and are expressed in different local units of account. The dataset has a wide spatial coverage drawing information from c. 300 locations belonging to 20 regions. In the course of six centuries, about 45 percent of wage observations come from Northern France and Île-de-France, about 43 percent from the Center and the East while the South is somewhat underrepresented supplying about 12 percent of the total

[17] Much of the raw data on day wages in agriculture come from Crebouw (1986) that builds upon les enquêtes du maximum of 1793 (also named Garat’s enquiry) and 1795; les statistiques de prefets and les comptes annuels between year IX and 1814; la statistique agricole de 1814; les statistiques annuelles and the great enquêtes decennales of 1852 and 1862. In addition, some data were retrieved from the statistical yearbooks of various departments and from the Statistique Générale de la France, tome XII.

(Figure 1b).[18] Nevertheless, the dataset is characterized by a consistent spatial coverage as observations are systematically drawn from the five regions in each time period.

Figure 1 around here

Occupations

Occupational heterogeneity is a major issue. To deal with the complexities of the occupational structure, observations were first classified as "urban" if the wage regarded building craftsmen or labourers and "rural" if the worker was employed in the agricultural sector. On the whole 41 percent of observations regard skilled construction workers, 24 percent concern unskilled labourers and about 35 percent belong to workers employed in agriculture. Occupational heterogeneity was significant even controlling for the degree of specialization. Indeed, among the building craftsmen we identified seventeen different professions even though masons and carpenters are the workers whose wages are the most frequently recorded (Figure 2a). Similar considerations apply to the building labourers (Figure 2b). Most of the rural day wages regard vinedressers, day-labourers and workers paid for threshing, reaping and mowing (Figure 2c).

Overall, the evidence collected here points to the existence of two sources of occupational heterogeneity. One is intimately related to the specific nature of the task accomplished. The other relates to the existence of a hierarchy of specializations even for the same typology of work and skill. Indeed, beyond the vertical (skill-driven) structure of employment and the temporary fluctuations of the demand and supply of labour, there existed a complex array of forces that determined the daily wage of workers on site including "le contrôle permanent du travail par l'employeur, les qualités personnelles de l'ouvrier ou de l'artisan, force physique, habilité manuelle, expérience du métier, capacité de décision."[19]

Figure 2 around here

[18] The North corresponds to the Paris Basin as defined by NUTS 1 code (excluding Burgundy and Center) plus Brittany and Nord-Pas-de-Calais; the Center corresponds to Center-East (NUTS 1), West (NUTS 1 excluding Brittany), Burgundy, Center and Limousin; the South includes the South-West (NUTS 1 excluding Limousin) and Mediterranean (NUTS 1 excluding Corse). Île-de-France and the East are the areas defined by NUTS 1 code.

[19] Feller (2006 p.24).

Working days

To get from the mass of heterogeneous observations a set of comparable data, day wages were all expressed in local currency (sous tournois per day) and converted to annual incomes assuming 250 days per year which is the same standard assumed by Allen (2001).

One may wonder whether this assumption can be suitably applied to the French context. First attempts to estimate the length of the actual working year date back to Sébastien Le Prestre de Vauban (1843), which indicated 180 days per year as a plausible figure for French workers in the seventeenth century. In recent years, using the evaluation of Lavoisier, Labrousse (1932) estimated that the working year was about 200 days in France in the seventeenth century. Although these sources contain valuable information, they are fraught with difficulties (Morineau 1985). First, because they are indirect estimations whose accuracy depends on the various assumptions that are made to quantify the number of holidays or assess the average duration of activities that are typical of rural occupations such as threshing and mowing. To overcome such difficulties it is necessary to compare these results with direct observations. However, while we rarely have precise information on work intensity for workers employed in agriculture before the great Enquiry of 1852,[20] some material is currently available for construction workers. The analysis of several published records of fourteenth, fifteenth and early sixteenth century building projects suggests that the average number of days worked per year was about 250 among regular construction workers in France. Between 1505 and 1550 the craftsmen and labourers regularly employed on the construction site of the castle of Gisors toiled about 250 days per year (Hamon 2008) while about 36 per cent of recorded craftsmen hired at the Hopital-de-Dieu in Bourg worked more than 70 per cent of the time in the second semester of 1511 (Hamon 2003, p.19).[21]

[20] The results of this enquiry, summarized by Crebouw (1986, p.731), suggest that the actual number of days worked per year by day labourers in agriculture was c. 220 in 1852 (unweighted average). While the actual working year was c. 240 days in the Centre and the North, and 210 days in the South, it was comparatively shorter in the East (c.175 days) where day wages were relatively higher. Similarly, Chabert (1949, vol. 2, p.196) reports an average working year of 215 days referring to the Agricultural Enquiry of 1852.

[21] If applied to the year, a rate of 70 percent corresponds to c. 250 days. Similar rates were observed among regular construction workers in Aix-en-Provence in 1411 (Bernardi 1995, p. 256), Chartres in 1415 (Merlet 2010) and Amboise in 1496 (Grandmaison 1912) as well as Avignon (Piola Caselli 1981) during the construction of the Papal palace.

Yet, by the mid sixteenth century one may detect some traces of an "industrious revolution" and a mild increase in the length of the actual working year. For example, Bronislaw Geremek (1968) and Micheline Baulant (1971)'s studies revealed that the days of work varied between 251 and 274 among regular construction workers in Paris between the fourteenth and the eighteenth centuries. Moreover, the series of the annual number of hours worked in industry and building by Marchand and Thélot (1991, p.190) would imply that the actual working year could have approached 300 days between the 1830s and the 1860s.[22]

Nevertheless, in pre-modern times employment was intermittent and highly discontinuous. Indeed, evidence from the construction sites reveals that only a limited share of workers enjoyed the privilege of stable employment while the overwhelming majority experienced short-term and discontinuous working. For example, the 22 carpenters recorded on site at the bateau of Jean Duke de Berry in Poitiers between 26 September 1384 and 2 February 1385, averaged c.30 days per 20 weeks, ranging from 93 days of carpenter Adam de Villette to 3 days of Jean and Etienne de la Ratonniere (Rapin 2010, p.530). If this average supply of labour would have been applied to the year, these workers would have toiled about 81 days, an implausibly low amount. Relatively short working times are also observed for some workers in the building projects of Riom in 1388 (Rapin 2010, pp.542-543) and Troyes in 1529 (Galletti 2010, p.712). It is thus possible that in such cases, working days are not revealing of the actual working year and other sources of income existed that integrated household earnings. These might include land holdings, day labour in agriculture (Beutler 1971), as well as work on several building projects.[23] Indeed, while employment on multiple sites was fairly common among specialized occupations (Hamon 2006), unskilled workers often spent part of the year working in the countryside. For example, Beutler (1971) found that the labour supply curve of the labourers employed on the construction site of Saint-Germain-des-Près between 1644 and 1646, presented a decreasing trend between May and October when labour demand from the countryside was

[22] The benchmark year estimations presented by Marchand and Thélot (1991, p.128) for regular workers employed in agriculture rest on the conventional assumptions of a 10-hour working day and a 300-day working year. The situation for construction workers is more uncertain and one can provide only a plausible range of variation. Following Kuczynski (1944, p.72) if one assumes that after 1820 the working day of construction workers lasted 12 hours excluding 2 hours rest, the actual working year passed from c.270 to 265 days between 1831 and 1866. If one retains instead a standard workday of slightly more than 10 hours (Allen and Weisdorf 2011, p.721), the working year averaged more than 300 days over the same period.

[23] See on this Bernardi (1995, p. 257).

typically higher.[24] Whether employment behavior reflected the presence of large outside options or resulted from structural turnover and technical requirements, geographic mobility and seasonality were distinctive features of the labour market of construction workers in pre-industrial France. Nevertheless, one may observe a certain degree of regularity in the rhythms of work on different building sites once allowance is made for religious observances, Saturdays and special contingencies including economic fluctuations and weather conditions. Indeed, from the building projects of Duke Jean de Berry (1340-1416) in the fourteenth century, to the late medieval projects in Provence and Normandy, or the Renaissance' ones in Bourg and Strasbourg, one observes that the number of days worked per week was about 5 and the working day lasted between 8 and 12 hours (Bernardi 1995; Beutler 1971; Galletti 2010; Hamon 2006; Lardin 1998; Rapin 2010). All in all this evidence suggests that the assumption of an average working year of 250 days was approximately correct for regular workers in the construction sector. Again, in the absence of precise information about labour intensity in agriculture, for the sake of international comparability, we retain the standard duration of 250 days introduced by Allen (2001), aware of the fact that it probably represents a slight overestimation of the actual working year experienced by the agricultural population at large.[25]

Methodology

The dataset has been used to construct series of nominal day wages for male craftsmen, labourers and farmers for the period 1250-1860. The reconstruction of a wage series from such different sources requires great care. As we saw, geographical, seasonal, and occupational heterogeneity must be properly treated to ensure consistency in composition. To reach a wide but consistent spatial coverage, we drew on several sources per time period and treated observations from the Paris region separately to avoid oversampling from an area that presented a distinctive high wage labour market.[26] Wage trends in France and Île-de-France were

[24] See Perrot (1975) for a discussion about seasonality of employment in Caen at the end of the eighteenth century.

[25] It is worth noting that cross country differences in days worked per year do not affect the international comparison of trends in real wages, while these become relevant in the comparison of incomes.

[26] The pattern of change of nominal wages in the rest of France was broadly similar across space.

estimated by controlling for spatial, occupational and time differences, using the following OLS regression model for each of the three basic categories of workers:[27]

$$\ln(w_{ijt}) = \alpha_j + \varphi' D_t + \delta' \mathbf{X_{ijt}} + \varepsilon_{ijt}$$

In this specification, the nominal wage i, in location j, at time t (w_{ijt}), is regressed on a fixed wage premium α_j for each location j, a set of indicator variables D_t for each of the years with a wage observation and a matrix of controls ($\mathbf{X_{ijt}}$) including source, currency, location, occupation and skill. The skill dummy was included since master craftsmen, reapers and wine growers consistently show distinct high wages compared to other occupations.[28] Table A1 of the appendix reports the series of nominal day wages constructed using this approach.

PRICES

Most of the price data used in this study were retrieved from secondary sources and classic accounts whose detailed description is provided in appendix. These sources have been supplemented with observations from the published records of several building's projects between the thirteenth and the seventeenth centuries. This typology of source is particularly useful to reconstruct the price history of such items as construction materials, candles, wood and firewood that are rarely registered in institutional records (Mercuriales des prix). Furthermore, construction accounts provide some relatively homogeneous information about bread and wine, two fundamental items of the consumption basket whose treatment is often made difficult by the lack of data (bread) and the presence of huge quality differences (wine).

A potential concern is that a consistent share of the data comes from the accounts of large institutions and regard wholesale rather than retail prices. It is thus possible that the extensive use of such material may underestimate the cost of living experienced by ordinary consumers. Yet, while the dearth of direct information on retail prices prevent us to tackle this issue in a more systematic way, the scattered comparison

[27] Due to the lack of sufficient information, we do not present a series of farm wages for Île-de-France. For the use of regression analysis in the treatment of price and wage data see for example Clark (2005) and Allen et al. (2011).

[28] Wage observations of nourished workers were not included in the estimations due to the lack of compelling evidence on the value of non-cash benefits in total remunerations.

made between retail and wholesale quotes does not suggest the existence of mark-ups large enough to overturn the general conclusions of this paper.

On the whole, the dataset comprises more than 46,600 price observations of 12 commodities. As Figure 3a demonstrates, the number of price observations by 20-year windows decreases as one goes back in time. Before 1389, price quotes average slightly above 160 by 20 year-windows whereas from 1390 to 1860 these are never below 500 per 20 year-windows. The distribution of the price observations over time reveals that there are two periods of sustained growth in the overall availability of sources. The first, by the start of the sixteenth century until the 1590s, corresponds to the beginning of the first price series derived from several market price-lists.[29] The second period (1690-1789) coincides in time with the rise and diffusion of the official statistics. Over these years, the average number of price quotes passes from about 2,400 in the 1680s to circa 4,400 at the end of the eighteenth century.

Geographical Coverage of Prices

Figure 3b shows the distribution of price quotes across space. The Center and the South together supply most of the price data (about 47 percent) while c. 31 percent of observations come from the North and Île-de-France.

Figure 3 around here

Methodology

The individual component price series of the consumer price indices for France and Île-de-France have been computed running OLS regression models of the following form:[30]

$$\ln(p_{it}) = \varphi' D_t + \delta' \mathbf{X_{it}} + \varepsilon_{it}$$

[29] For a more extended analysis of the price-lists, see Dupâquier et al. (1968) and Frêche (1979).

[30] This particular aggregation is justified by the fact that prices in the rest of France displayed a similar behavior over time and across space. The only partial exception was given by Artois, Cambrésis and Flanders where grain prices (as well as cereal production) remained relatively high even in the post-plague phase because the demand of the Flemish cities sustained the quotations of cereals. This point was also noted by Le Roy Ladurie (1969, p.829) studying trends in grain tithes. To check whether this particular pattern determined an upward bias in the general level of prices, the series of wheat was re-estimated excluding the observations originating from these regions. However, the differences between the series were negligible.

where p_{it} is the price of good i at time t; D_t is a set of time dummies; $\mathbf{X_{it}}$ is a matrix of control variables that includes categorical variables for source, location, quality and the unit of measurement of the commodity.

Bread was treated differently. Due to the absence of sufficient information, bread prices were obtained following the procedure originally proposed by Allen (2001). We assembled a dataset including 1869 observations (matched triples) on the prices of bread, wheat and craftsmen's wages (assumed as representative of baker's income) for the period 1250-1820. The coefficients of the bread equation were obtained regressing bread prices in kilogram on wheat prices in liters, craftsmen's day wages expressed in local currency, a set of time-period indicator variables and a dummy variable for Île-de-France to capture differences in tax and regulatory regimes between Paris and the rest of France (Table 1). The coefficient on wheat price is 0.75 while the Paris dummy reveals that, ceteris paribus, bread prices were 13 percent higher in Île-de-France than in the rest of France.[31] The time dummies are positive and strongly significant, with the coefficients measuring deviations from the base period 1250s-1540s.

The coefficients of the bread equation were used to construct a continuous series of bread prices for France and to fill in missing values in Île-de-France before 1700.[32] The resulting series are broadly consistent with the bread prices estimated by Allen (2001) for Paris, with the national averages reported by d'Avenel (1898, vol. 2, p. 912) and with the scattered observations of the price of bread by the kilogram.

Analogous procedure was followed to derive meat prices. Typically few of the price quotes before 1500 regard meat by the kilogram. Thus animal prices were used to estimate the movement of meat prices. However, instead of assuming a constant or variable weight for cattle over time, we used regression analysis and estimate a meat equation.[33] As animal quotes regarded both cow and calf whose weights vary by about 2:1 over the years 1250-1789, we first reduced variability extrapolating calf prices using cow prices. The meat price by the kilogram was then regressed on the animal price and the craftsmen's wage that captures the

[31] The coefficient on wheat is lower than the one predicted by Allen (2001) because of the inclusion of time-period dummies in the model, in order to capture specific time effects and take into account the rise of distinct high price and wage markets in Paris by the mid-sixteenth century.

[32] To predict bread prices, we used the series of craftsmen wages presented above. Wheat prices were estimated using regression analysis, as shown in the methodological section. By 1726, we used the national price of wheat from Labrousse (1970). The small gap during the "Terror" years was interpolated linearly.

[33] For Île-de-France, we do not use the meat equation, and construct a series of beef prices by the kilogram since 1649.

income of the butcher (Table 2). A Paris dummy as well as time dummies were also included to control for time, city effects and variations in tax regimes across space. The resulting estimates are broadly consistent with the series of beef price by the kilogram constructed using direct observations.[34] Beef prices were finally obtained as an arithmetic average of the two series.

Among alimentary products, portions of the time series for cheese were extrapolated using butter.

The lighting component of the basket includes oil light, firewood and candles. Oil light prices were drawn from lower quality oils as olive oil was used for consumption.

Firewood was sold in various forms including the price in sous tournois per stere and per hundred bundles of faggots. Whereas all data were expressed as price by the cubic foot (stere), to increase the sample dimension, some prices per stere were obtained extrapolating from the price by the unit (hundreds, thousands etc). Following Allen (2001), firewood prices were finally converted in local unit of account per millions of BTUs. Some of the observations regarding candles and soap were obtained extrapolating from tallow, the main input in making these items.[35]

Table 1 around here

Table 2 around here

THE CONSUMER PRICE INDEX

Nominal wages and prices are deflated using a consumer price index that reflects Allen (2001)'s barebones basket. The consumption bundle provides 1940 calories per day, sufficient proteins and implies some expenditure for lighting, lodging and clothing (Table 3). The quantities consumed per person per year of each item are those originally proposed by Allen (2001). The resulting weighting scheme represents a reasonable starting point that facilitates the international comparability of the series. Nevertheless, based on the examination of 116 French alimentary budgets for the period 1343-1787 and a set of nineteenth century consumption bundles, in the appendix we depart from the benchmark index and show the robustness of this specification to changes in the formulae and weights used for construction (Figure 4a).

[34] Beef prices by the kilogram are also consistent with the 25 year-averages reported by d'Avenel (1898, vol. 4, pp. 586-87).

[35] Missing values in the series of prices and wages were interpolated linearly. The resulting series are not provided here due to limitations of space. They are available upon request from the author.

Table 3 around here

As one goes back in time the prices of some of the commodities included in the basket become unavailable. Prior to 1300 there is no indication on the prices of dairy and textiles products. As a consequence, we constructed a partial cost of living index using the prices of available goods. However, the spending shares of missing items are rather stable during the Middle Ages. We thus assume that the resulting partial cost represented, in percentage terms, the total minus the average expenditure share of missing items computed in the first overlapping decade. The consumer price index is finally obtained dividing partial expenditure by the estimated share it represented in total cost.[36] Even though this procedure is prone to errors, it has little impact on final results. Indeed, by 1303 we were able to estimate at least 95 percent of total expenditure while for earlier decades this percentage never falls below 56 percent.

Figure 4b shows the resulting consumer price indices for France and Île-de-France and compares their evolution with the level of prices in Paris estimated by Allen (2001). Overall, the series predict similar evolutions, with a typical U-shaped trend between the 1340s and the 1420s[37] and two significant waves of inflation between c.1500-1650 and by the beginning of 1700. Nevertheless, the figure reveals that by the 1550s the rate of growth of consumption prices in Paris and the rest of France started to diverge significantly. From a long term perspective it is clear that this process was deeply entrenched with demographic changes as well as local fluctuations in the migration flows to the capital.[38] Indeed, while the French population soared by c.40 per cent from 1500 to 1700, Paris witnessed a truly demographic boom, with population raising by c.150 per cent.[39] Over the same years, consumption prices increased fourfold in France but almost sevenfold in Paris.

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[36] We tried different computational schemes varying the number of decades on which computing the averages and taking into account the economic trend. These changes have little bear on final results.

[37] The first peak after the Black Death was followed by a phase of falling prices, replaced by the end of the 1400 by a new wave of inflation peaking in the 1420s during the phases of greater political and monetary instability owing to the war.

[38] For example, Biraben and Blanchet (1998) noticed an upsurge in births in Paris during the Wars of Religion and the Fronde when large inflows of refugees from the suburbs looked for protection within the city walls.

[39] Following Bairoch et al. (1988), Paris passed from circa 200.000 inhabitants in 1500 to about 500.000 in 1700. This demographic growth is also consistent with the population curve estimated by Biraben and Blanchet (1998, p.243). For the data of the French population see the notes to Figure 9.

Focusing on the period 1750-1860, we see that the consumer price index proposed here is also broadly consistent with Lévy-Leboyer and Bourguignon (1985)'series and Bayet (1997)'s index (Figure 4c). This corresponds to the budget of a labourer and builds upon Kuczynski (1944)'s series from 1820 to 1840 and the Singer-Kérel index (1961) for Paris between 1840 and 1914.[40]

Figure 4 around here

TRENDS IN REAL WAGES

Following Allen (2001), nominal wages and prices are used to construct welfare ratios. These are versions of real wages obtained dividing annual income of a notional family of four components (woman, man and two children) by the cost of maintaining it. Computations of annual income rest on the assumptions that the adult male worked 250 days per year and no other member of the family earned income. Total expenses are set equal to 3.15 times the price of the basket of goods so as to include a housing cost of 5 percent of total expenditure and support the entire family at the same standard of living of the male breadwinner. While these assumptions are debatable, they ease interpretation and are useful to set up international comparisons of living standards. In what follows we present the results and discuss some "stylized facts" of the history of real wages in France between 1250 and 1860.

Patterns of relative prosperity by occupation

Figure 5a shows the welfare ratios of craftsmen, labourers and farmers constructed using Allen (2001)'s barebones basket with the weights defined in Table 3. In the course of more than six centuries, the situation of skilled workers was always more favorable as compared to unskilled labourers. The skill-premium of construction workers, namely the ratio between nominal wages of craftsmen and unskilled labourers, displays a long-term development that is analogous to that observed in several northern European cities with a rapid decline between the 1350s and the 1550s, and then relative stability up to the French Revolution. Over this long period France was characterized by a very low skill premium, (fluctuating between 50 and 60 percent) that was similar to those observed in Western Europe.[41]

[40] Our index tracks closely the general evolution of bread prices and this explains why it is relatively more erratic.

[41] Van Zanden (2009).

Overall, craftsmen's welfare ratios averaged c. 40 per cent above the threshold 1 between 1250 and 1860, meaning that the basic needs of the family were granted and some extra income was still available to afford to buy additional items. Farmers and labourers' condition was instead bleaker. Their earnings were not sufficient to ensure a decent standard of living since welfare ratios on average were c.20 percent below the implicit poverty line indicated by a welfare ratio equal to one. Nevertheless, with few differences between skilled and unskilled workers and urban and rural occupations, welfare ratios experienced similar trend improvements. Between the 1250s and 1348 they followed a typical U-shaped trend (Figure 5a).

A classic Malthusian stance would regard this pattern as the direct consequence of population changes preceding the epidemic disease of 1348-1352. Although fragmentary, the population statistics at our disposal appear to confirm this view. Indeed, while the relatively high wage economy of the 1250s was seemingly the reflex of demographic stagnation and low population density, the mounting population and economic expansion of the last phase of Louis IX' reign, played a key role in shaping the downward course of real wages since the 1270s (d'Avenel 1894, p.180, vol.I). Again, the subsequent rise of welfare ratios suggests that "le monde plein",[42] as Pierre Chaunu defined the high population density of the early fourteenth century France (Higounet-Nadal 1980, pp.196-8; Lot 1929), was already giving way to a new phase of demographic contraction before the arrival of plague.[43]

By 1348, the Black Death and the successive strikes of plague (Dupaquier 1988, p.324), opened the door to a new era of real material prosperity for wage-earners that ushered in a phase of sharp and generalized increase of real wages culminated in the 1390s. The first half of the fifteenth century was characterized by substantial stagnation of living standards and intense real wage volatility especially during the worst phases of the Hundred Years War. However, when by the second half of the fifteenth century, the population started to recover (Higounet-Nadal 1980, p.200), welfare ratios began gradually trending downwards. Yet, between the 1490s and the 1550s, mild decrease left the pace to a sharp drop that eventually brought real wages back to their pre-plague levels. Thus, the hyperinflation of the early modern period, coupled with the ongoing

[42] Le Roy Ladurie and Goy (2008, p.73). Yet, there existed local exceptions. For example, Dupaquier (1988, pp.219-20) suggests that, differently from Northern France, the population of Bas-Languedoc and Provence remained fairly stable before 1348. Similarly, the various contributions in Drendel (2015, pp. 225-338) challenge the received wisdom about demographic crisis in Southern France before the Black-Death.

[43] This appears to be confirmed also by the great agrarian crisis that hit the country between 1315 and 1318 (Dupaquier 1988, p.219).

nominal wage rigidity well into the thirties and forties of 1500, were at the origin of the rapid deterioration of living standards for all the categories of workers examined here.[44] However, between the 1550s and the end of the sixteenth century, nominal wages followed the general increase of prices, and welfare ratios stabilized. Again, the temporary rise in real wages after the Thirty Years War, can be linked to the incomplete adjustment of wages to falling consumption prices. By the 1720s, the trend towards stagnating or falling prices came to an halt and, as part of a more general European tendency, was replaced by a new wave of inflation. As nominal wage growth did not keep pace with prices, real wages trended downward until up the 1789.

The Revolutionary and Napoleonic phase was marked by intense price and wage volatility other than fragmentary sources and a quasi-complete disappearance of monetary transactions especially between 1793 and 1800. Overall, while real wage growth was stronger in Paris than the rest of France, and for skilled rather than unskilled occupations, it is possible to argue that the fruits of the revolution were seemingly less abundant than implied by Chabert (1949, vol.2, p.228) and Kuczynski (1944, vol.4 p.65)'s series. Our results would be consistent instead with a gradualist interpretation of the economic effects of the French Revolution on labour earnings (Postel-Vinay 1989, pp.1028-29). Nevertheless, during the years of the Restoration, as prices and wages fell by about the same rate, previous gains were maintained but not improved and real wages stagnated until up the 1860s. This is a conclusion that seems to be shared by all of the real wage series compared here (Figure 5b).

Overall, in the course of more than six centuries, welfare ratios had experienced little or no trend improvement in France.

In what follows we concentrate on two aspects of this evolution that deserve closer inspection, namely the comparison of real wages between France and the other European countries and the relationship between real wages and population.

Figure 5 around here

[44] For example, a similar dynamics explains the fall of real wages in England over the same period (Brown and Hopkins 1981, p. 11). Yet, workers suffered comparatively lower welfare losses when nominal wages were more flexible and closely tracked price changes, like in Stockholm (Söderberg 2010, p. 460).

French and European real wages

One of the most notable features of the history of real wages in France emerging from our study is perhaps the evolution in the post-plague era, between the 1340s and the 1550s. Figure 6 documents the Malthusian response of real wages to the mortality shock with the rise of labour earnings when population dropped and the subsequent decline back to the pre-crisis levels as population recovered by the mid-fifteenth century. Yet, while the process seems Malthusian in nature, the overall dynamics might actually differ from a "classic Malthusian" response, working through variations in labour supply.

In France, between the 1340s and the 1450s, real wages grew less (c.50 per cent) than elsewhere in Europe where the welfare gains indeed averaged 100 per cent and remained around that level almost until up the first half of the fifteenth century, declining afterwards.[45] The overall result was a sort of "dampened" Malthusian cycle in France as opposed to the "full" Malthusian cycle experienced by England and other European leading cities (Figure 6). Provided that no other country exhibits a similar evolution, this evidence raises several questions.

One relates to the comparability of real wages as differences in the geographic scope of the series may suggest different conclusions. Allen argued that proper international comparisons should be made between cities occupying similar levels in the urban hierarchy. To limit the size effect we compare the welfare ratios of French building labourers to real wages in England from Clark (2005). Results reassuringly confirm that the wage gap was not influenced by differences in the geographic scope of the series (Figure 6b). In parallel, by comparing welfare ratios for Île-de-France to real wages in Paris from Allen (2001) we find broad agreement between the series and compelling evidence that, after the shock to the labour market owing to the Black Death, the early fifteenth century was a time of profound crisis and falling incomes (6a).[46]

A second question relates to the geographic and social characterization of the divergence.

Was the real wage gap an inherently urban phenomenon or regarded rural workers as well?

Figure 6b provides answers to this question clearly suggesting that real wages of French farmers followed a trend comparable to that of urban workers. Our results echoed the hypothesis originally formulated by Perroy

[45] See Alfani and Murphy (2017, pp.330-36) for an analysis of the income and distributional consequences of the Black Death.

[46] For a characterization of the crisis in the Paris district during the first half of the fifteenth century see Fourquin (1964, pp.290-335) as well as Bois (1976, pp.284-308) for the crisis of 1410-1422 and the so called Hiroshima' phase in Normandy.

(1955), and suggest that the long fifteenth century, far from being the fabulous "golden age" of labour,[47] was a protracted phase of stagnation in real labour incomes for a large share of the French wage-earners.

In this respect, we can decompose the change in real wages in terms of the relative contribution of prices and nominal wages and investigate their evolution with respect to England. The empirical evidence suggests that between the 1330s and the 1450s, consumption prices decreased in France as well as England (Figure 7b). However, provided that the deflationary trend was comparatively stronger in France than England, ceteris paribus, French real wages should have soared even more than English ones. Yet, over the same period, while silver day wages in England rose almost 60 percent, French wages increased by less than 20 percent (Figure 7a). Prior to the Black Death silver day wages were higher in France than England. The Black Death produced consistent wage gains in both countries and seemingly did not alter the gap in favor of France. Nevertheless, by the beginning of the fifteenth century nominal wages started to converge as the rise in English salaries was paralleled by the contemporaneous decrease of French wages. By the second half of the fifteenth century the nominal wage gap between France and England was virtually disappeared and the welfare gains produced by the Black Death were consolidated in England but, in large part, they were eroded in France.

From a more disaggregated perspective we detect an analogous dynamics by comparing Paris to London: consumption prices fell at about the same rate between the 1340s and the 1450s, while the pattern of change of nominal wages was different in the two cities.

Indeed, London silver wages rose almost invariably between the 1340s and the 1400s, and then embarked upon a phase of relative stability during the first half of the fifteenth century. French wages instead, after the spikes of the Black Death, experienced a protracted phase of stagnation replaced by sharp decline since the 1410s-20s.[48] Thus, it appears that the origin of the gap has to be primarily looked for into the market of labour and its relationship with demographic changes, institutional factors and economic performance.

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[47] Hatcher (2011) reviews the literature and provides a critical appraisal of the idea that the long fifteenth century was a "golden age" of labour for the English population at large.

[48] The wage sources for Paris are highly fragmentary between the 1360s and the 1390s. Despite that, one can argue that nominal wages decreased, after having peaked immediately after the Black Death.

For example, Perroy (1955, pp.238-39) described in these terms the reasons laying behind real wage stagnation: “Scholars have certainly laid too great an emphasis on both the depletion of the labour market owing to the Black Death and subsequent epidemics, and on currency debasements, two factors that ought to have sent prices and wages soaring.” And continued arguing that “wages were low because trade and industry were in decadence,” a situation that ultimately depended on the fact that, “in France, the economic disruption due to wars and other as yet unknown factors was so complete as to limit production faster than population.” Perroy’s argument is particularly suggestive because next to changes in labour supply, it stresses the importance of the connection between war, destructions and declining production that reduced the aggregate demand of labour and tended to keep wages low.

Between the 1340s and the 1360s, silver wages soared by about the same amount in France as well as England. However, between the 1370s and the 1450s, the progressive decline of French silver wages (or in other terms “la stagnation séculaire” of nominal wages coupled with currency debasements)[49] could be either the result of contractions in labour demand (Perroy 1955), or it could reflect a temporary demographic recovery between the 1360s and the 1400s.[50] The absence of precise information about population changes precludes any firm conclusion.

At this stage of our knowledge we can tentatively say that, after the spikes of the post-plague era, French real wages had a limited growth between the 1360s and the 1400s because, in spite of falling prices, nominal wages were declining as well. Yet, over the same period English real wages increased at a faster pace either because the growth of nominal wages and the sharp deflationary trend pushed welfare ratios up. Roughly from the 1410s to the 1450s, during the worst phases of the Hundred Years War, real wages remained approximately constant in France or even temporary came back to their pre-plague levels in Paris. Over the same years, welfare ratios were instead peaking in England and London. Provided that the French population was apparently stagnant or declining (Higounet-Nadal 1980) and French prices were falling more rapidly

[49] This great stability of pay was observed also in Toulouse (Wolff 1954) and the Paris district (Fourquin 1964) while in Bordeaux where currency was pegged to sterling, wages took a strong rise from 1410 to 1430 (Boutruche 1947). Similarly, in Southern England over the same period nominal wages in local currency remained constant but the pound sterling did not experience such a devaluation.

[50] For example, see Bois (1976, pp.277-78) on Normandy.

than the English ones, it was the sharp decline of silver wages vis a vis the contemporaneous increase of English salaries, that seemingly explain the dampened Malthusian cycle of real wages in France.

Finally, this evidence gives rise to a last question. Was the wage gap also an income gap? To answer this question we should distinguish between different professions and analyze the main variables involved in computations. Following Allen, we assumed that household size, labour market participation by women and children and work intensity were constant over time and across space. While large enduring differences in one or more of these variables have the potential to reduce the scope of the gap, there are good reasons to believe that this was not indeed the case. Plenty of evidence suggests that the days worked per year by regular workers in the construction sector were about 250 in England in the fifteenth and sixteenth centuries.[51] Furthermore, as regular workers in the building industry received only a comparatively small fraction of their total earnings in the form of non-market incomes, variations in the standards of living were largely affected by changes in real wages.[52] Similar considerations hold true if we use the series of real farm wages to characterize changes in living standards of landless or near landless male labourers for whom daily wages were the main source of income. Yet, while the absence of precise information preclude any firm conclusion, the sharp drop in tithe incomes and real land rents after the Black Death and especially during the hardest stages of the Hundred Years War, would suggest that the real incomes of the French landholding majority could have declined even more than those of their English counterpart till about 1450.[53]

Figure 6 around here

Figure 7 around here

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[51] Allen (2001, p.425) and Allen and Weisdorf (2011) review the literature. For example, see the patterns of employment of regular construction workers on the building projects of Exeter (Findlay 1939), York (Raine 1859) and Ely (1907, vol. 1)'s cathedrals as well as the London Bridge's account rolls (Harding and Wright 1995).

[52] For the cultural, historical and geographic contiguity between England and France we doubt that differences in household size and labour market participation by women and children were large enough over this period (but not in others) to overturn the conclusion of this section. On the female high rates of participation to the labour market in medieval England see Penn (1987), and Goldberg (1992).

[53] For the fall in land rents in the Paris district, Normandy and Bordelais see Forquin (1964), Bois (1976) and Boutruche (1947), respectively. Using tithe incomes to study the evolution of farm produce, Le Roy Ladurie and Goy (2008, pp.73-74) reached similar conclusions.

In a broader time frame, Figure 8 compares the evolution of real wages of labourers in France, England and Florence-Milan. This picture establishes an important result of this paper: the evolution of real wages in France seemingly represented an intermediate case between the decline experienced by Florence and Milan and the pattern of growth of England. Indeed between the 1330s and c.1800 real wages of labourers and farmers remained approximately constant in France, rose by about 50 percent in England and decreased by almost the same amount in Northern Central Italy. This finding provides quantitative support on a national scale to the qualitative accounts and to the scattered statistical evidence of the classic regional works of the French historiography (Goubert, 1960; Le Roy Ladurie,1966): globally, the real wage history of France was one of overall stagnation and the condition of the French wage-earner at the end of the 18th century was not much different than five centuries earlier.

Figure 8 around here

Real wages and population

Borrowing from mechanical engineering, Michael Postan and John Hatcher compared the built-in mechanism laying behind the Malthusian model to the two phases of a piston in an engine with the first phase of "increasing population and falling incomes automatically succeeded and counterbalanced by the phase of falling population and rising incomes."[54]

If this dynamics could be roughly measured,[55] ceteris paribus, by plotting population against real wages, one should expect to find an inverse relationship (Clark 2005, pp 1310) also in the case of France.

Although population data before 1550 are not completely established and have to be handled with special care, overall, as population expanded real wages decreased when population dropped wages increased (Figure 9). Nevertheless, while this mechanism appears to hold in general, at least by the mid-seventeenth century one can detect a sort of structural break in the relationship, so that the period before 1600 seems to be characterized by a "strong" Malthusian effect, while the subsequent phase by a "weak" Malthusian dynamic. Indeed, beyond some differences between city and the countryside (Figure 9a and 9b respectively) and between skilled and unskilled workers, the long phase of demographic expansion that brought population almost to triple between the 1600s and the mid-nineteenth century, was paralleled by a mild decrease or a

[54] Postan and Hatcher (1985, p. 69).

[55] Roughly because we approximated incomes and productivity with real wages and we did not consider capital.

substantial stagnation of real wages. By the 1600s, these were higher than would be predicted from the pre-1600 relationship.

Admittedly, while the inverse relationship between real wages and population represents one of the basic tenets of the Malthusian theory, this hypothesis should be jointly tested with the remaining set of testable predictions of the Malthusian model (the presence of preventive and positive checks for example), a task that is out of the scope of this paper.

Nevertheless, the few studies that tried to assess empirically the validity of the Malthusian hypotheses in France are consistent with the broad picture depicted here. Indeed, these works seem to share the idea that at least from the mid-eighteenth to the late nineteenth century although some components of the model were still present in France (existence of positive and preventive checks), overall, however, the “Malthusian world” was progressively fading away (Weir 1984; Murphy 2010).

Figure 9 around here

CONCLUSIONS

Using a new dataset of prices and wages, this paper presents new series of real wages for male agricultural and construction workers in France from 1250 to 1860. The analysis highlighted three important issues.

First, our series suggest that real wages were trendless between the thirteenth and the first half of the nineteenth century, and thus offer little support to the argument that there were appreciable long run improvements in living standards before the Industrial Revolution.

Second, our estimates reveal that the period 1350-1550 saw the rise and consolidation of a real wage gap between France and England as well as other leading European cities. Still in the decade prior to the Black Death the real wage differential between French and English workers of the construction sector was remarkably low. A century later, in the 1450s, French building labourers had between about 25 and 40 percent less of the income of their European counterparts. Comparing real wages of French farmers to those of their English counterparts we found a similar pattern and few traces of a French “golden age” of labour. Indeed, after a first phase of rapid expansion following the Black Death, by the1370s real wages grew less and for a shorter period than elsewhere in Europe where the welfare gains consolidated almost until up the 1450s. At a more disaggregated level, similar trends are discernible by comparing Paris to London.

As a first step, we decomposed the proximate causes of this gap between prices and wages. We found that while France and England witnessed similar deflationary trends between the 1370s and the 1450s, it was the decline of silver wages (apparently driven by falling production and reduced labour demand especially by the 1410s) and the contemporaneous increase of English salaries, that seemingly explain the dampened Malthusian cycle of real wages in France and the gap with English real labour earnings.

Finally, despite the fundamentally empirical nature of the claims being made in this study, this work has also important implications for the theory of growth in pre-industrial Europe. Indeed, the French case provides a fascinating laboratory to test the validity of the neo-Malthusian theory. Referring to the English economy, Postan identified "the inexorable effects of rising and declining population"[56] as the great objective forces explaining the process of growth. Overall, although demographic data become ever scarcer before the 1550s, it is possible to argue, consistently with the Malthusian interpretation, that the dynamics between wages and population was characterized by a long-lasting inverse relationship.

Still, the theory that population growth (decline) "inevitably" erodes (sustain) living standards needs some qualifications in the case of France. Thus, there is strong evidence that the large population drop owing to the Black Death turned real wages up because the labour market was suddenly depleted while in the short-term demand in manual labour apparently did not vary. Yet, it looks as if the slow progression or even local decline of welfare ratios by the 1390s and particularly by the 1400s, occurred despite falling population ought to have sent them soaring. Contrary to prevailing views, this occurred because the declining labour supply was more than compensated by both contractions in the labour demand caused by war and falling production that kept wages fixed at low levels (la stagnation séculaire), and by currency debasements that temporary rose the general level of prices. Similarly, the sustained demographic expansion of the 1550s-1770s ushered in a period when real wages did not rise as in the leading cities of the North Sea Area, but they did not fall either as in Southern Europe because prices and wages grew at about the same rate. This evidence points to a weakening of the pre-1600 inverse relationship.

Overall, being neither a southern country nor a northern one, the evolution of real wages in France seems to reflect this geographic heterogeneity.

[56] Postan (1972, p.72).

Appendix

As pointed out in the text, the consumer price index was constructed using Allen (2001)'s barebones basket of goods as it made possible to set up international comparisons. To check the consistency of our benchmark, here we present two alternative specifications that differ in terms of weights and methods used for construction. First, as different formulae may suggest opposite conclusions we constructed a geometric price index setting the spending share of bread at 0.5 and reducing those of the others goods proportionately according to their daily caloric intake (Allen 2001). In the geometric index, the spending shares are constant while quantities are left free to vary over time (first column of Table 4).

Second, to heighten any contrast, we constructed a geometric price index looking at the patterns of change in consumption in the French economy. Weights were suggested by examining the expenditure shares of 116 family budgets for the period 1343-1787 and a set of nineteenth century consumption bundles (Chabert 1949, vol.2, p.226; Lévy-Leboyer and Bourguignon 1985, pp.23-42). Most of the budgets examined here detail food expenditure and do not provide information about lighting and clothing especially for earlier periods. The weights for these categories are thus derived from the eighteenth century records. Disposable evidence indicates that energy and clothing accounted for about 20 per cent of total expenditure excluding rents but this share was relatively higher for city dwellers and urban occupations rather than rural workers. The remaining 80 per cent was spent on food even if this proportion was declining in the course of the nineteenth century (Lévy-Leboyer and Bourguignon 1985, p.32 and p.40). Overall, the preferred weighting scheme is very close to Allen (2001)'s spending shares and reflects a very low standard of living (second column of Table 4). As Figure 4a demonstrates, the differences between the series are negligible.

Table 4 around here

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TABLE 1
BREAD EQUATION

	Bread price
Wheat price	0.753***
	(27.04)
Wage	0.041***
	(9.93)
Île-de-France's dummy	0.129***
	(2.85)
16th century's dummy	0.156***
	(2.58)
17th century's dummy	0.623***
	(9.68)
18th century's dummy	1.410***
	(15.39)
Post-Revolution's dummy	0.886***
	(4.33)
Constant	0.061*
	(2.00)
Observations	1869

* = Significant at the 5 percent level.
** = Significant at the 1 percent level.
*** = Significant at the .05 percent level.
Notes: t statistics in parentheses. Sources: See the text. The time dummies correspond to the following spells of time: 1250s-1540s;1550s-1590s;1600s-1690s; 1700s-1780s;1790s-onwards.

TABLE 2
MEAT EQUATION

	Beef price (kg)
Beast price	0.007***
	(8.38)
Wage	0.156***
	(7.39)
Île-de-France's dummy	7.161***
	(8.28)
Modern era' dummy	0.581
	(1.15)
Post-Revolution's dummy	0.140
	(0.20)
Constant	-0.016
	(-0.04)
Observations	170

* = Significant at the 5 percent level.
** = Significant at the 1 percent level.
*** = Significant at the .05 percent level.
Notes: t statistics in parentheses.
Sources: See the text. The time dummies correspond to the following spells of time: 1250s-1540s;1550s-1780s;1790s-onwards.

TABLE 3
CONSUMER PRICE INDEX: BASKET OF GOODS

Good	Unit (metric)	Weight	Calories per unit	Calories per day	Proteins per unit	Proteins per day
Bread	kg	182	2450	1221.6	100	49.9
Beans/peas	liter	52	1125	160.3	71	10.1
Beef	kg	26	2500	178.1	200	14.2
Butter	kg	5.2	7286	103.8	7	0.1
Cheese	kg	5.2	3750	53.4	214	3
Eggs	each	52.0	79	11.3	6.3	0.9
Wine	liter	91.0	850	211.9	0	0
Soap	kg	2.6				
Linen	meter	5.0				
Candles	kg	2.6				
Oil light	kg	2.6				
Firewood	BTU (Millions)	5.0				
Total				1940.4		78.2

Source: Allen, "Great Divergence."

TABLE 4
CONSUMER PRICE INDEX: DIFFERENT WEIGHTING SCHEMES

Good	Scheme I	Scheme II
Bread	50.0	30.0
Beans/peas	3.6	6.0
Beef	8.4	14.0
Butter	3.0	5.0
Cheese	2.4	4.0
Eggs	0.6	1.0
Wine	12.0	20.0
Soap	2.0	2.0
Linen	6.0	6.0
Candles	3.0	3.0
Oil light	4.0	4.0
Firewood	5.0	5.0
Total	100.0	100.0

Sources: Scheme I: Allen, "Great Divergence."
Scheme II: Between 1343-1787: Bernard (1969), Boehler (1995), Charbonnier (1975), Chevalier (1968), Couperie (1963), Endres (1968), Frijhoff and Julia (1975), Le Roy Ladurie (1966), Morineau (1985), Piponnier (1974), Stouff (1970), Vedel (1975), Villemon (1971) Thereafter, Chabert (1949, vol. 2, p.226); Lévy-Leboyer and Bourguignon (1985, pp.23-42).

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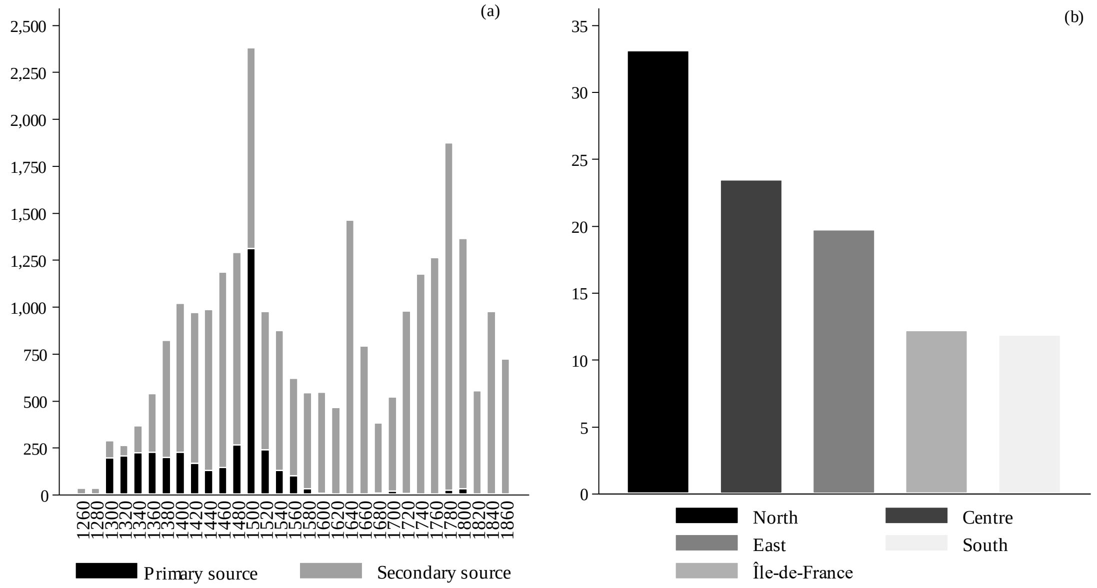


FIGURE 1

NOMINAL DAY WAGE OBSERVATIONS BY SOURCE TYPE (a) AND PERCENTAGES BY REGION (b)

Notes: Observations in Figure 1a are computed on 20-year windows. For example, 1260 includes the observations from 1250 to 1269.

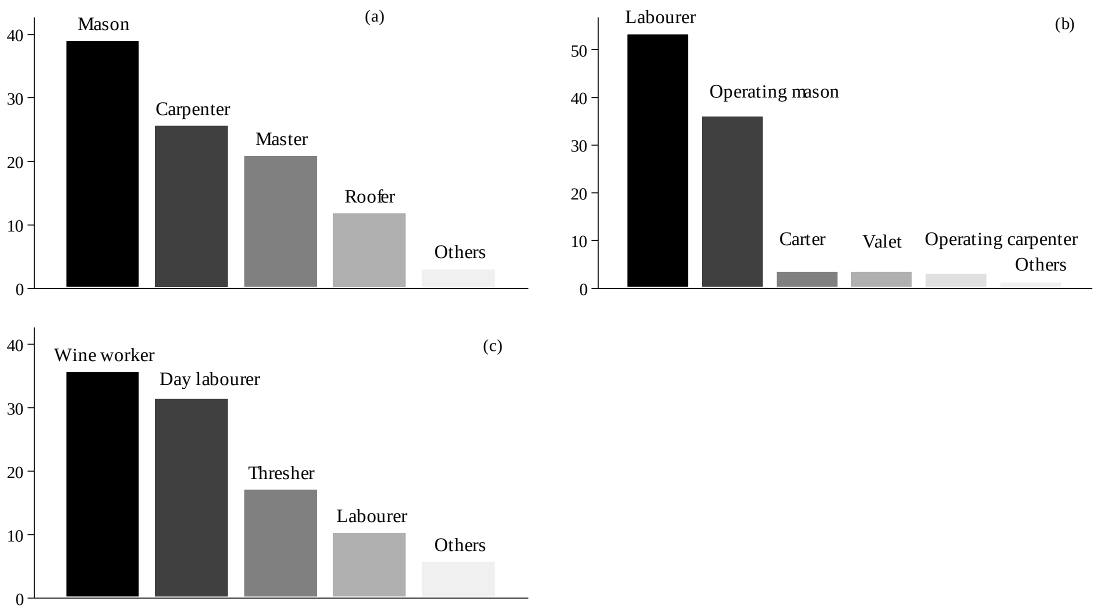


FIGURE 2

NOMINAL DAY WAGES BY OCCUPATION (PERCENTAGES): CRAFTSMEN (a), LABOURERS (b) AND FARMERS (c)

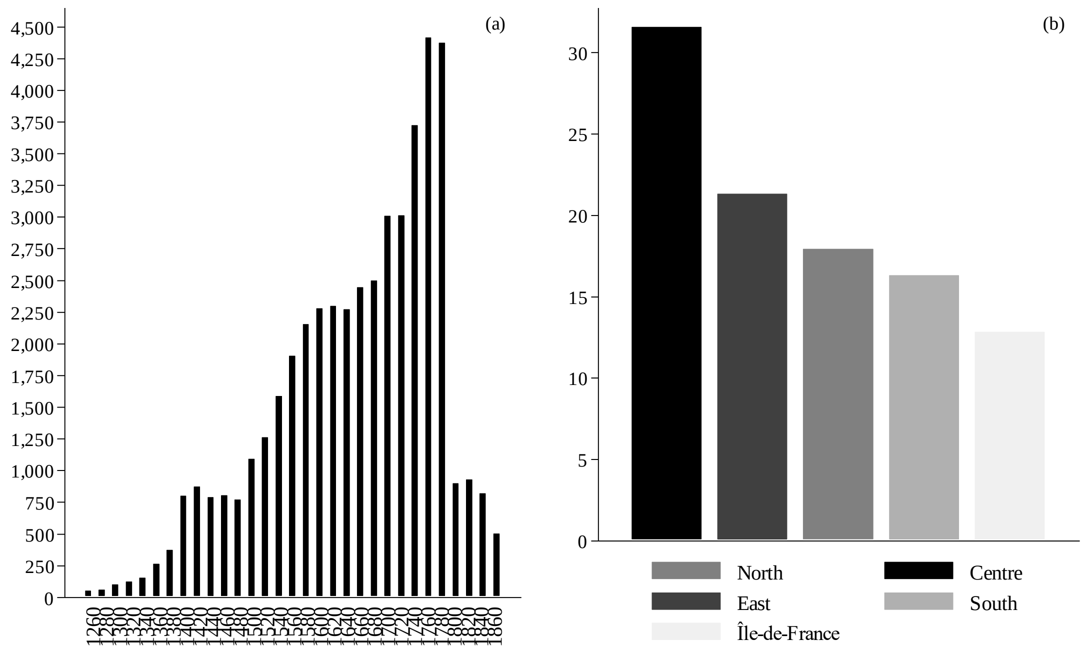


FIGURE 3

NUMBER OF PRICE OBSERVATIONS OVER TIME (a) AND PERCENTAGES ACROSS REGIONS (b)

Notes: Observations in Figure 3a are computed on 20-year windows. For example, 1260 includes the observations from 1250 to 1269.

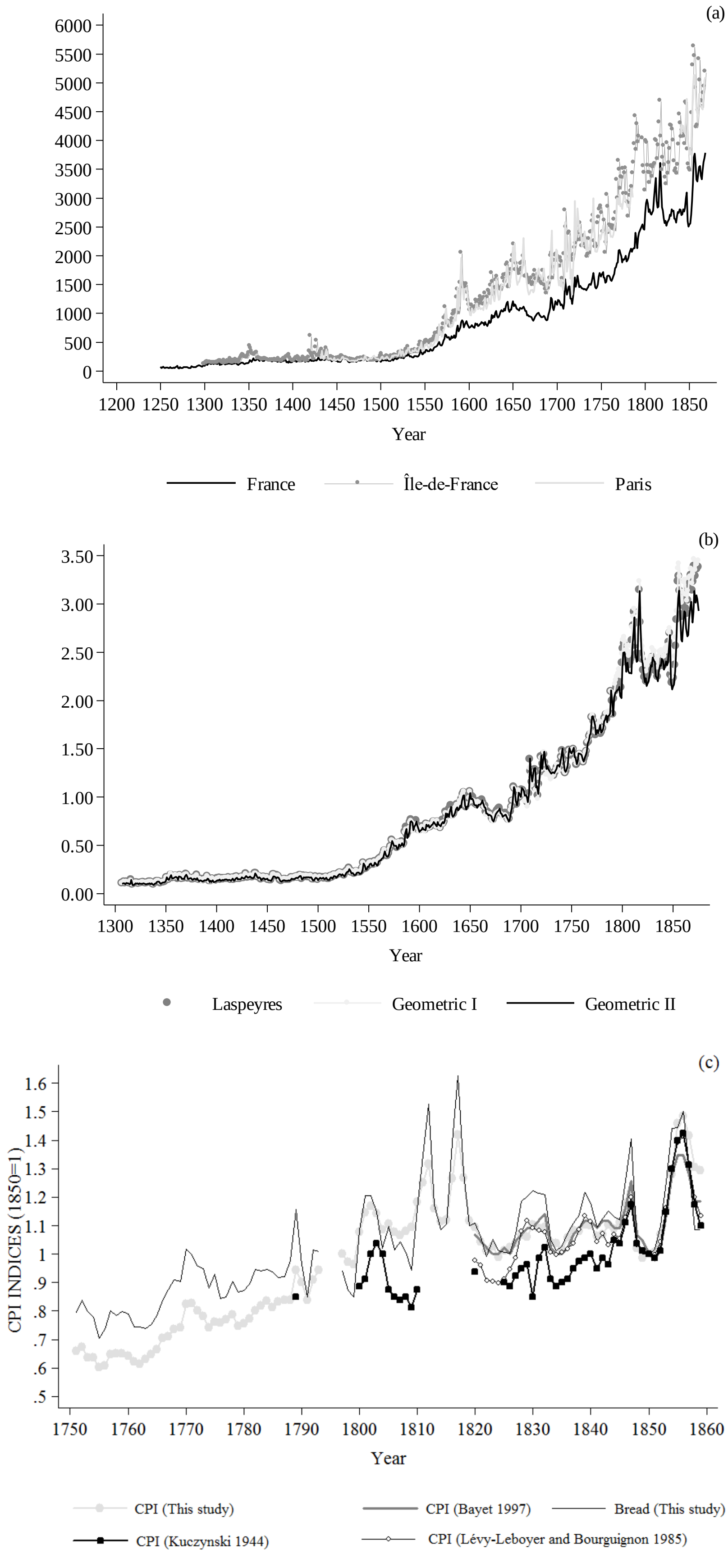


FIGURE 4

CONSUMER PRICE INDICES: FRANCE and the PARIS DISTRICT (a). DIFFERENT TYPES OF INDICES FOR FRANCE (b). DIFFERENT NATIONAL PRICE INDICES FOR THE 18^{th} - 19^{th} CENTURIES (c)

Sources: Fig. 4a: France and Île-de-France this study; Paris: Allen, "Great Divergence." Fig. 4b: This study. Fig. 4c: Bayet "Deux siècles"; Kuczynski "Short History"; Lévy-Leboyer and Bourguignon "Économie française"; This study: benchmark index with weights of Table 3.

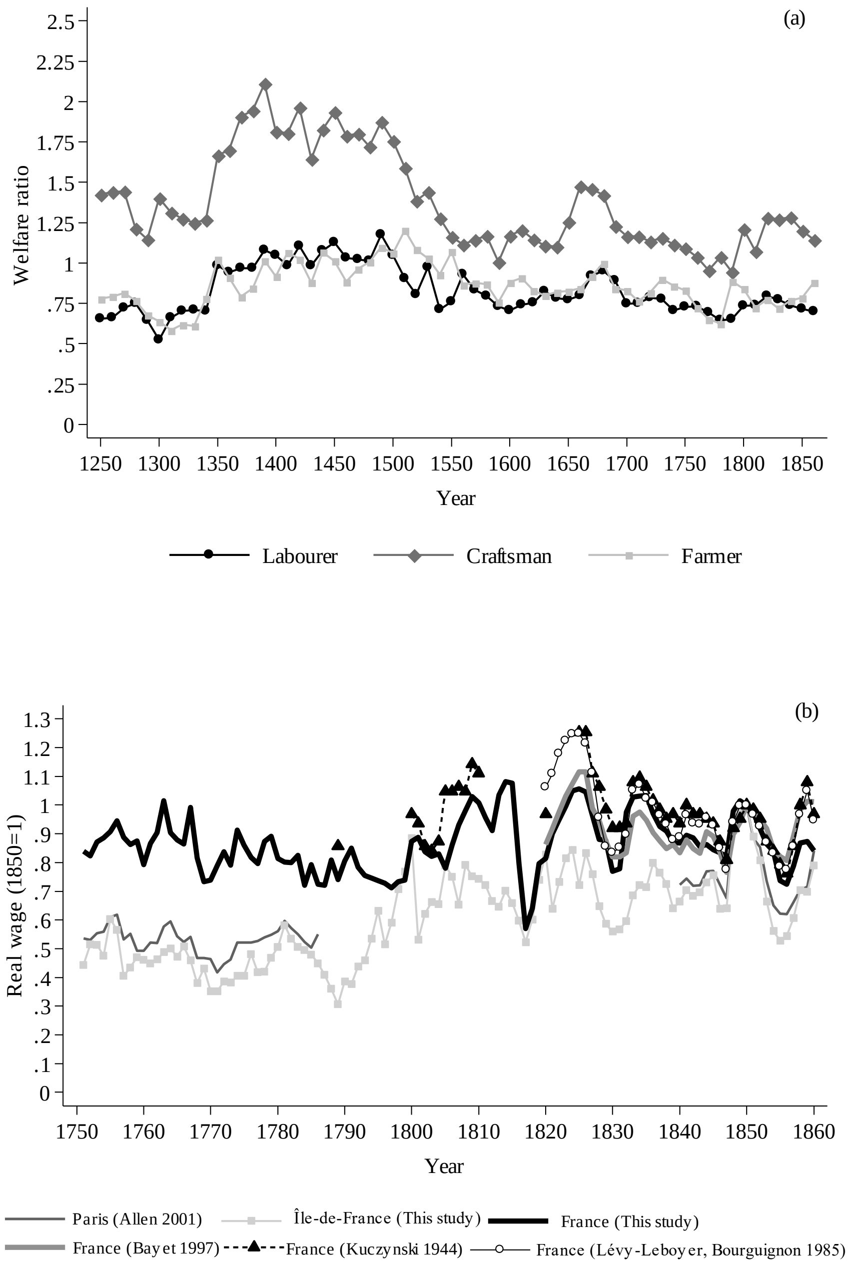


FIGURE 5

FRENCH WELFARE RATIOS BY OCCUPATION (a). COMPARISON BETWEEN REAL WAGES (18th - 19th CENTURIES) (b)

Sources: Fig. 5a: This study. Fig. 5b: France, Bayet "Deux siècles", Kuczynski "Short History", Lévy-Leboyer and Bourguignon "Économie française." Paris: Allen, "Great Divergence." Notes: The series of Fig. 5a are decadal averages for France without Paris.

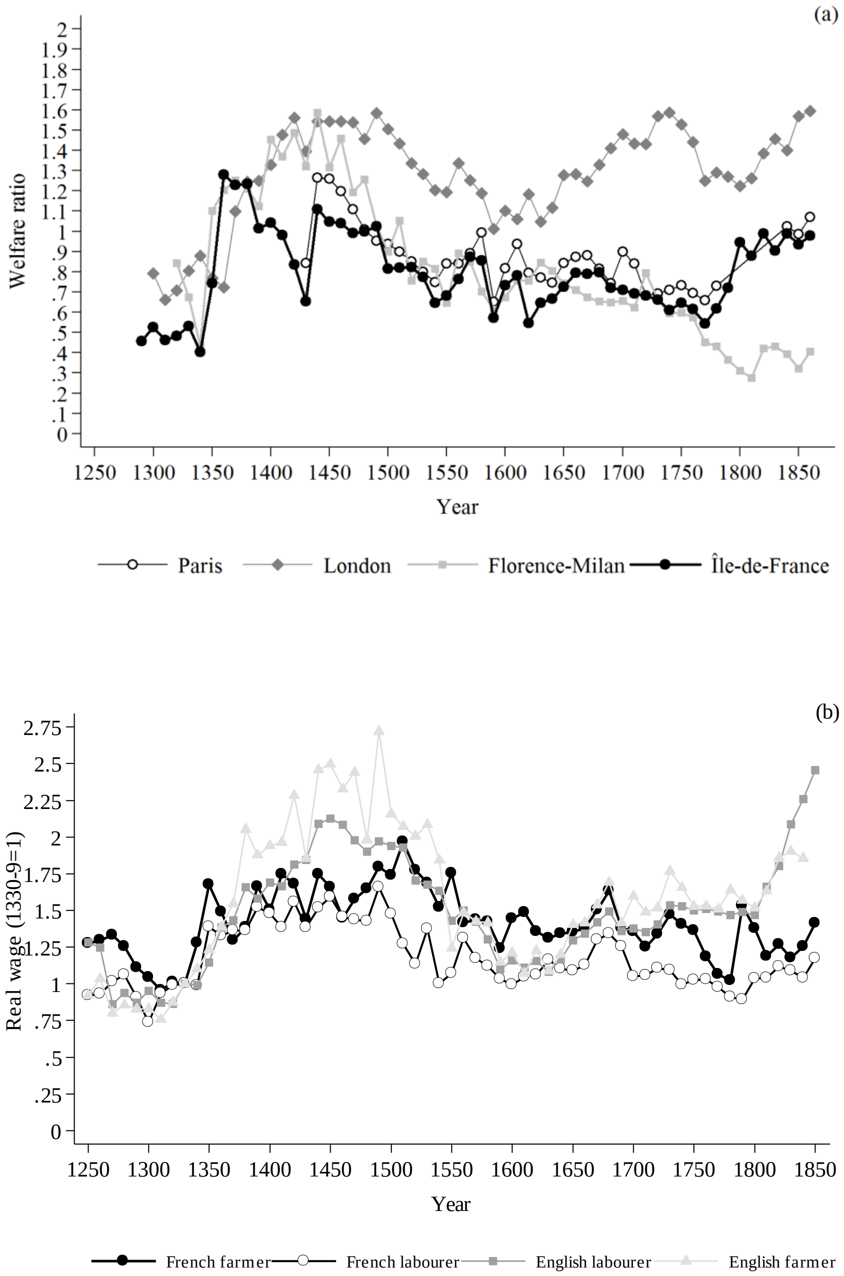


FIGURE 6

THE GAP BETWEEN FRENCH AND EUROPEAN REAL WAGES: THE WELFARE RATIO OF LABOURERS ACROSS LEADING EUROPEAN CITIES (a) AND BETWEEN ENGLAND AND FRANCE (b)

Sources: Fig. 6a: Île-de-France, this study. Other cities: Allen, "Great Divergence."

Fig. 6b: France, this study. England: Clark, "The condition" and Clark, "The long march."

Notes: The series are 10-year averages. Florence between 1326 and 1623, Milan afterwards.

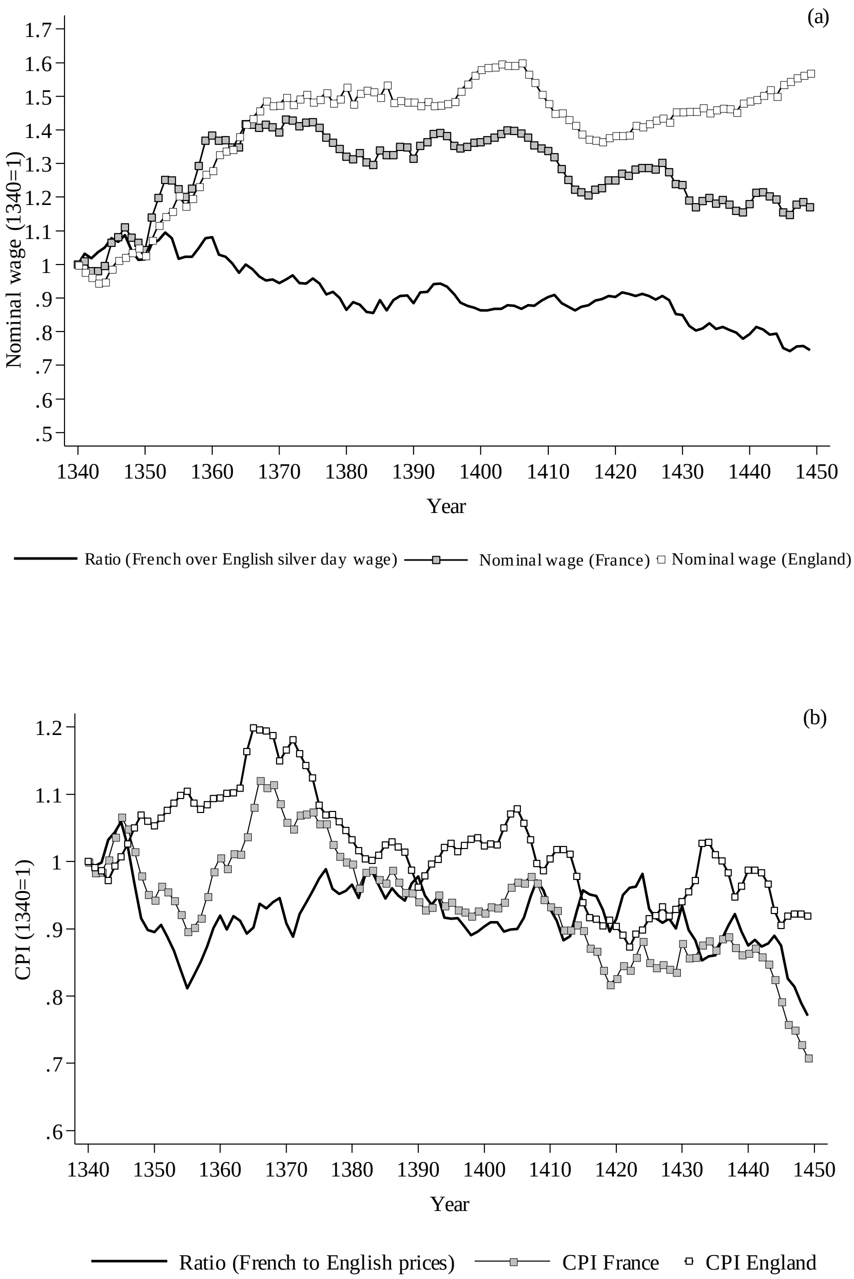


FIGURE 7

EXPLAINING THE REAL WAGE GAP BETWEEN FRANCE AND ENGLAND: LABOURERS'NOMINAL DAY WAGES (a) AND PRICES (b)

Sources: Fig. 7a: France, this study. England: silver day wages from Clark, "The condition." Fig. 7b: France, this study. England: London silver prices from Allen, "Great Divergence" discounted by 20 per cent. On the plausibility of this assumption see also Allen and Weisdorf "Industrious revolution," p. 718. Notes: The series of prices and wages are 10-year moving averages. Those of France were converted in grams of silver using the conversion' table of Natalis de Wailly, "Memoire." The ratios are computed on these series.

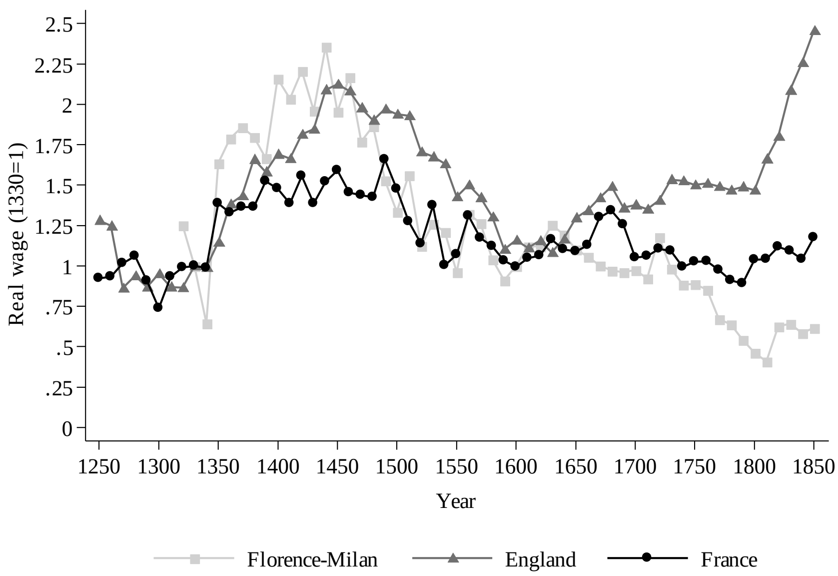
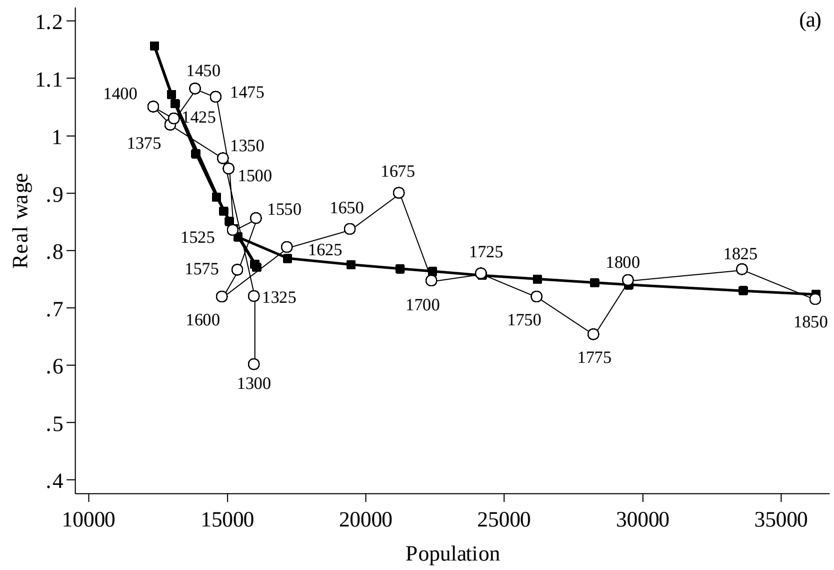


FIGURE 8

LABOURERS' WELFARE RATIOS ACROSS COUNTRIES: THREE DIFFERENT PARADIGMS OF GROWTH

Sources: France: see the text. England: Clark, "The condition." Florence-Milan: Allen, "Great Divergence."

Notes: The series are 10-year averages. Florence between 1326 and 1623, Milan afterwards.



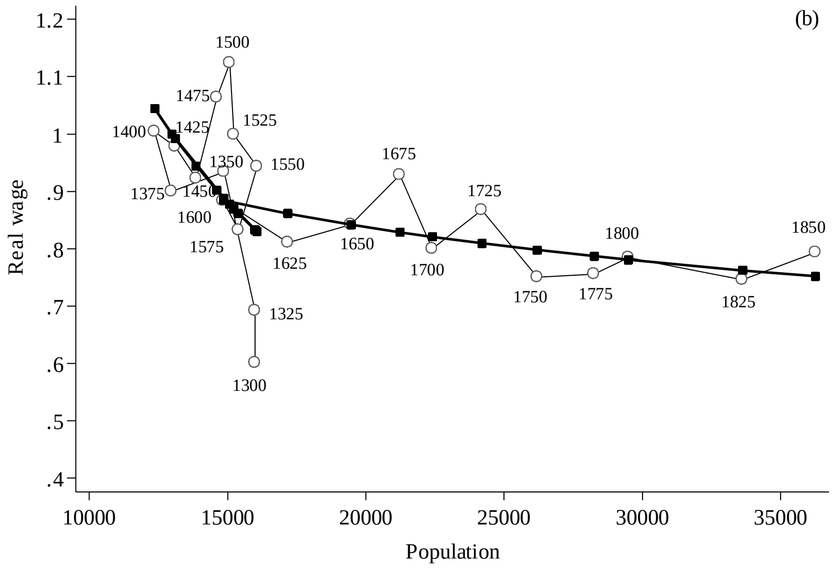


FIGURE 9

REAL WAGES AND POPULATION: LABOURERS (a) AND FARMERS (b)

Notes and Sources: Real wages, see the text. Population: between 1300 and 1500, Malanima Pre-modern European economy, table 6. We assumed population remained constant at the 1300's value until 1347. Since 1550, we use the 5-year averages of Rouzet, "Évolution," table C.2. This series builds upon Dupâquier, "Histoire" and Henry and Blayo, "Population." Intervening values were interpolated linearly. Real wages and population data were finally expressed as 25-year averages. As a consequence, for example, the label 1300 indicates the period 1300-1324. The black lines summarizing the trade-off between real wages and population are obtained from regressing the logarithm of the real wage on the logarithm of population for the period 1300-1599.

Appendix

(TABLE A1)

PRICES AND WAGES IN FRANCE AND ÎLE- DE-FRANCE, 1250 -1860 (1770-1779=1)

	CPI		Nominal Wage					Welfare ratio				
	France	Île-de-France	France	France	France	Île-de-France	Île-de-France	France	France	France	Île-de-France	Île-de-France
Period			Craftsman	Labourer	Farmer	Craftsman	Labourer	Craftsman	Labourer	Farmer	Craftsman	Labourer
1250-1259	0.03		0.05	0.03	0.04			1.49	0.95	1.20		
1260-1269	0.03		0.05	0.03	0.04			1.51	0.96	1.22		
1270-1279	0.03		0.04	0.03	0.04			1.51	1.04	1.25		
1280-1289	0.03		0.04	0.03	0.04			1.27	1.09	1.18		
1290-1299	0.04	0.04	0.05	0.04	0.05	0.05	0.03	1.20	0.93	1.04	1.23	0.84
1300-1309	0.06	0.04	0.09	0.05	0.06	0.04	0.04	1.47	0.75	0.98	0.93	0.97
1310-1319	0.06	0.05	0.09	0.06	0.06	0.05	0.04	1.37	0.96	0.90	1.10	0.85
1320-1329	0.06	0.05	0.08	0.06	0.06	0.06	0.04	1.33	1.02	0.95	1.28	0.89
1330-1339	0.06	0.05	0.08	0.06	0.06	0.05	0.05	1.31	1.03	0.94	1.11	0.98
1340-1349	0.07	0.07	0.09	0.07	0.08	0.07	0.05	1.33	1.01	1.20	0.90	0.74
1350-1359	0.09	0.10	0.16	0.13	0.15	0.13	0.13	1.75	1.42	1.58	1.36	1.37
1360-1369	0.10	0.06	0.17	0.13	0.14	0.12	0.15	1.78	1.36	1.40	1.93	2.36
1370-1379	0.10	0.06	0.19	0.13	0.11	0.12	0.13	2.00	1.40	1.22	2.10	2.27
1380-1389	0.09	0.06	0.18	0.12	0.11	0.12	0.13	2.04	1.40	1.30	2.08	2.27
1390-1399	0.08	0.07	0.18	0.13	0.13	0.15	0.13	2.21	1.56	1.56	2.14	1.87
1400-1409	0.09	0.06	0.17	0.13	0.12	0.11	0.11	1.90	1.52	1.41	1.88	1.92
1410-1419	0.09	0.06	0.17	0.13	0.15	0.13	0.11	1.89	1.42	1.64	2.02	1.80
1420-1429	0.10	0.10	0.20	0.15	0.15	0.13	0.15	2.06	1.60	1.58	1.45	1.54
1430-1439	0.10	0.10	0.18	0.15	0.14	0.13	0.11	1.72	1.42	1.35	1.38	1.20
1440-1449	0.10	0.06	0.18	0.15	0.16	0.13	0.13	1.91	1.56	1.64	2.06	2.04
1450-1459	0.10	0.07	0.19	0.15	0.15	0.13	0.13	2.02	1.63	1.56	1.91	1.93
1460-1469	0.09	0.06	0.16	0.13	0.12	0.13	0.12	1.87	1.49	1.36	2.19	1.92
1470-1479	0.09	0.06	0.17	0.13	0.14	0.13	0.11	1.89	1.48	1.48	2.19	1.83
1480-1489	0.10	0.06	0.18	0.15	0.16	0.13	0.11	1.80	1.46	1.55	2.20	1.84
1490-1499	0.10	0.06	0.19	0.16	0.16	0.13	0.11	1.96	1.70	1.69	2.27	1.89
1500-1509	0.09	0.07	0.17	0.14	0.15	0.13	0.11	1.84	1.51	1.63	1.83	1.50
1510-1519	0.10	0.08	0.17	0.13	0.19	0.14	0.11	1.66	1.31	1.85	1.83	1.51
1520-1529	0.12	0.09	0.18	0.14	0.20	0.15	0.14	1.45	1.17	1.67	1.68	1.52
1530-1539	0.13	0.10	0.20	0.18	0.21	0.16	0.15	1.51	1.41	1.58	1.59	1.42
1540-1549	0.15	0.12	0.20	0.15	0.21	0.19	0.14	1.34	1.03	1.43	1.57	1.19
1550-1559	0.18	0.15	0.22	0.20	0.30	0.26	0.19	1.22	1.10	1.65	1.73	1.26
1560-1569	0.22	0.19	0.26	0.30	0.30	0.32	0.27	1.17	1.34	1.33	1.68	1.41
1570-1579	0.29	0.26	0.34	0.34	0.38	0.47	0.41	1.20	1.20	1.35	1.86	1.61
1580-1589	0.33	0.31	0.40	0.38	0.43	0.57	0.49	1.23	1.15	1.34	1.82	1.57
1590-1599	0.41	0.45	0.43	0.44	0.48	0.54	0.47	1.05	1.06	1.17	1.22	1.05
1600-1609	0.39	0.33	0.48	0.40	0.53	0.54	0.45	1.22	1.02	1.36	1.62	1.35
1610-1619	0.41	0.36	0.52	0.44	0.58	0.55	0.52	1.26	1.07	1.40	1.51	1.44
1620-1629	0.44	0.41	0.53	0.48	0.56	0.55	0.41	1.20	1.09	1.28	1.34	1.01
1630-1639	0.50	0.44	0.59	0.60	0.62	0.56	0.53	1.16	1.19	1.23	1.27	1.19

1640-1649	0.55	0.50	0.64	0.63	0.70	0.57	0.61	1.15	1.13	1.26	1.14	1.23
1650-1659	0.56	0.55	0.74	0.63	0.71	0.60	0.73	1.32	1.12	1.27	1.09	1.33
1660-1669	0.52	0.51	0.80	0.60	0.67	0.64	0.75	1.54	1.15	1.30	1.27	1.46
1670-1679	0.48	0.47	0.73	0.63	0.68	0.68	0.69	1.53	1.33	1.41	1.43	1.45
1680-1689	0.47	0.46	0.70	0.65	0.72	0.70	0.67	1.49	1.38	1.54	1.55	1.47
1690-1699	0.57	0.53	0.73	0.72	0.73	0.73	0.70	1.29	1.29	1.30	1.39	1.33
1700-1709	0.61	0.58	0.74	0.65	0.77	0.76	0.74	1.22	1.08	1.28	1.34	1.31
1710-1719	0.68	0.63	0.83	0.73	0.80	0.79	0.80	1.22	1.09	1.18	1.27	1.28
1720-1729	0.76	0.69	0.90	0.86	0.96	0.77	0.87	1.19	1.13	1.26	1.12	1.26
1730-1739	0.74	0.66	0.89	0.82	1.02	0.77	0.80	1.21	1.12	1.38	1.18	1.22
1740-1749	0.79	0.74	0.92	0.81	1.04	0.85	0.83	1.17	1.02	1.32	1.16	1.12
1750-1759	0.82	0.76	0.94	0.86	1.05	0.92	0.90	1.14	1.05	1.28	1.22	1.19
1760-1769	0.86	0.79	0.93	0.91	0.96	0.92	0.90	1.09	1.06	1.11	1.17	1.13
1770-1779	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1780-1789	1.06	0.99	1.15	0.99	1.02	1.13	1.10	1.09	0.93	0.96	1.15	1.14
1790-1799	1.21	1.15	1.16	1.10	1.75	1.51	1.51	0.96	0.91	1.44	1.32	1.33
1800-1809	1.42	1.05	1.79	1.51	1.83	1.82	1.82	1.27	1.06	1.29	1.74	1.74
1810-1819	1.57	1.17	1.75	1.66	1.74	1.99	1.88	1.12	1.07	1.11	1.71	1.62
1820-1829	1.33	1.10	1.78	1.52	1.58	2.03	1.99	1.34	1.15	1.19	1.85	1.82
1830-1839	1.37	1.14	1.83	1.53	1.52	1.94	1.89	1.33	1.12	1.11	1.70	1.66
1840-1849	1.40	1.23	1.88	1.49	1.65	2.15	2.22	1.34	1.07	1.18	1.75	1.82
1850-1859	1.60	1.34	1.98	1.63	1.92	2.48	2.24	1.26	1.03	1.21	1.90	1.72
1860-1869	1.73	1.34	2.07	1.75	2.34	2.66	2.62	1.20	1.01	1.36	1.97	1.94

Notes and Sources: See the text. The decade 1860-69 is based on the sole value of 1860.

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