The Rise and Fall of Spain (1270-1850)

Carlos Álvarez-Nogal and Leandro Prados de la Escosura
(Universidad Carlos III)

Paper to be presented at the Conference on
Quantifying Long Run Economic Development,
The University of Warwick in Venice,
Palazzo Pesaro Papafava, 22-24 March 2011

The Rise and Fall of Spain (1270-1850)[1]

Carlos Álvarez-Nogal and Leandro Prados de la Escosura
(Universidad Carlos III)

Abstract

Two distinctive regimes can be distinguished in Spain over half-a-millennium. A first one (1270s-1590s) corresponds to a high land-labour ratio frontier economy, pastoral, trade-oriented, and led by towns. Wages and food consumption were relatively high. Sustained per capita growth occurred from the *Reconquista*'s end (1264) to the Black Death (1340s) and resumed from the 1390s only broken by late-15th century political turmoil. A second regime (1600s-1810s) corresponds to a more agricultural and densely populated low-wage economy which grew along a lower path. Contrary to preindustrial Western Europe, where the highest standards of living were achieved by mid-15th century, in Spain were reached in the 1340s. Although its population toll was lower, the Plague had a more damaging impact on Spain and, far from releasing non-existent demographic pressure, destroyed the equilibrium between scarce population and abundant resources. Pre-1350 per capita income was temporarily recovered by 1590 but only overcome after 1820.

Keywords: Preindustrial Spain, Frontier economy, Black Death

JEL Classification: O47, N13, N93

Carlos Álvarez-Nogal
Universidad Carlos III
Departamento de Historia Económica
and Instituto Figuerola
Edificio Foronda, Despacho 7.0.07
Calle Madrid, 126
28903 Getafe (Madrid), Spain
Tel. +34 916249621

canogal@clio.uc3m.es

Leandro Prados de la Escosura
Universidad Carlos III
Departamento de Historia Económica
and Instituto Figuerola
Edificio Foronda, Despacho 7.0.14
Calle Madrid, 126
28903 Getafe (Madrid), Spain
Tel. +34 916249623

leandro.prados.delaescosura@uc3m.es

[1] We thank Bruce Campbell, Hilario Casado Alonso, Regina Grafe, Paolo Malanima, Joan Rosés, and participants at University of Warwick in Venice (April 2009), the 15th World Economic History Congress, Utrecht (August 2009), and to Economic History Society Annual Conference, University of Durham (March 2010), for their comments and suggestions. Maarten Bosker and Joan Rosés kindly shared their unpublished data. Financial support from the HI-POD Collaborative Project (European Commission's Framework Programme for Research FP7 Grant agreement no. 225343), and the Spanish Ministry of Education and Sciences "Consolidating Economics"), is gratefully acknowledged.

The Rise and Fall of Spain (1270-1850)

When and why did Spain fall behind continues being debated and attempts have been made at quantifying Spain's relative position over time (Yun-Casalilla 1994, Carreras 2003, van Zanden 2005a, 2005b, Maddison 2006). Recently it has been suggested that Spain had already attained a significant affluence prior to her American expansion and continued increasing it throughout the 16th century so, by 1590, she was among the top European countries in terms of per capita income (Álvarez-Nogal and Prados de la Escosura 2007). This finding raises the crucial question of when, and why, did Spain achieve such an early affluence

This paper attempts to provide an answer by examining Spain's comparative performance over the half a millennium between the *de facto* end of the *Reconquista* (1264) and the beginning of modern economic growth in the mid-19th century. We proceed, firstly, by estimating trends in output. Specifically, movements in agricultural output are drawn using an indirect demand approach (Section II), while those in industry and services are proxied through changes in urban population not living on agriculture (section III). Thus, trends in per capita output over half a millennium (1280-1850) can be drawn (section IV).[2] A re-examination of Spain' relative position within Western Europe closes the paper.

From our quantitative exercise we conclude that two distinctive regimes appear to exist in preindustrial Spain. A first one (1270s-1590s) corresponds to a high land-labour ratio frontier economy, largely pastoral, trade-oriented, and led by towns. Wage and food consumption levels were relatively high. Sustained per capita growth took place from the 1270s, after the *de facto* end of the *Reconquista*, until the 1340s, when the Black Death (1348) and the Spanish phase of the Hundred Years War (1365-89) interrupted it.[3] Growth resumed, then, only broken by late-15th century political turmoil. A second regime (1600s-1810s) corresponds to a more agricultural and densely populated, low wage economy with growth occurring along a lower path.

[2] In addition to a longer time coverage, the national and continuous series approach is a major difference with Álvarez-Nogal and Prados de la Escosura (2007) regional output estimates at benchmark years over 1530-1850, from which national output figures were obtained through aggregation. Lack of data precludes so far a regional approach for the wider time span considered here.

[3] The *Reconquista* ended definitively with the fall of the Nasrid kingdom of Granada in 1492 but Christian-Muslim boundaries remain stable since 1264.

Thus, Spanish affluence by 1492 can be tracked down to the pre-Black Death era. Contrary to most of Western Europe and the Eastern Mediterranean, where the highest standards of living of the pre-industrial era were achieved after recovering from the plague by the mid-15th century, in Spain, the peak level of output per head was reached in the 1340s. In pre-Plague Spain, Malthusian forces were mostly absent except, if any, for few areas along the Mediterranean coast. Sustained progress took place after the *Reconquista* in the context of a frontier economy, urban expansion, and openness to trade. Although its population toll was lower, the plague had a much more damaging impact in Spain than in Western Europe since, far from releasing non-existent demographic pressure on land, it destroyed the equilibrium between scarce population and abundant resources. Pre-Black Death per capita income levels were temporarily recovered by the late 16th century and only overcome after 1820.

Thus, the fall in output per head in the late 14th century and, then, in the early 17th century represent two major steps in Spain's (absolute and relative) decline. Later, in the early 19th century, although demographic expansion was paralleled by an increase in GDP per head, Spain's relative decline paradoxically deepened.

Output in agriculture: an indirect approach

Agricultural output for Spain as a whole has been estimated indirectly. Given the lack of hard empirical evidence for medieval and early modern Europe, alternative ways of deriving output trends have been put forward.[4] Wrigley's (1985) proposal assumes that, in the long run, food consumption per head is roughly constant. This way output in agriculture evolves as total population adjusted for the agricultural trade balance.[5] The rationale for Wrigley's approach is that in a traditional economy workers try to keep their food consumption per head stable (Lewis 1955). Recent research on developing countries reveals that consumption per head of food staples remains constant in aggregate terms even as per capita income rises (Bouis 1994). In the absence of hard empirical evidence Wrigley's approach provides useful explicit quantitative conjectures for further exploration. Wrigley's hasty procedure has,

[4] An alternative indirect estimate on the basis of tithes is currently under construction.
[5] Such method has been used for late nineteenth and early twentieth century Japan (Nakamura 1965), eighteenth century Britain (Deane and Cole 1967, Overton 1996), nineteenth century Spain (Simpson 1989, 1995) and, more recently, medieval Italy (Federico and Malanima 2004).

nonetheless, some shortcomings. For example, the assumption of constant per capita food consumption can be criticised on the grounds that the values of price and income elasticities of demand for food in developing countries are significantly different from zero (Kaneda 1968, Crafts 1976).

An alternative to estimating agricultural output indirectly is provided by the demand function approach.[6] A recent user of this procedure, Allen (2000), derived agricultural output for a sample of pre-industrial European countries. He firstly estimated agricultural consumption per head that, adjusted for net food imports, allowed him to derive output per head and, then, with population, obtained absolute output. In the demand approach, real consumption per head of agricultural goods (***C***) can be expressed as,

$$\boldsymbol{C = a\, P^{\varepsilon}\, Y^{\mu}\, M^{\gamma}} \qquad [1]$$

in which ***P*** and ***M*** respectively denote agricultural, and non-agricultural prices relative to the consumer price index (CPI), ***Y*** stands for real disposable income per head; $\boldsymbol{\varepsilon}$, $\boldsymbol{\mu}$, and $\boldsymbol{\gamma}$ are the values of own price, income and cross price elasticities, respectively; and ***a*** represents a constant.[7] Taking rates of variation (denoted as low case), we get:

$$\boldsymbol{c = \varepsilon\, p + \mu\, y + \gamma\, m} \qquad [2]$$

Since information on income per head (***Y***) for preindustrial Europe is usually lacking, Allen's suggestion of real wage earnings (***W***) per worker as a second best alternative provides a most convenient solution. The rationale for Allen's (1999: 214) claim is that as proprietors comprise a small share of population and only consume, therefore, a small fraction of total food, workers' returns provide a relevant measure of disposable income. Hence, changes in real wage earnings (***w***) are suggested to proxy changes in real income per head (***y***) in equation [2].[8] However, this supposition ignores

[6] Crafts (1976, 1980, 1985) was the pioneer in the use of the demand approach to derive agricultural consumption and output. The method was later used by for eighteenth century Britain (Jackson 1985, Allen 1999) and nineteenth century Spain (Prados de la Escosura 1988, 1989) and has been recently employed by Álvarez-Nogal and Prados de la Escosura (2007) and Malanima (2011).
[7] Allen (2000) arbitrarily assigned the value of 1 to *a*. It is worth noting that Wrigley's proposal represents a particular case of a demand function for agricultural goods in which price and income elasticities are zero.
[8] Another related debatable issue is the extent to which changes in real wages are representative of changes in workers' real incomes. It is commonly accepted that wages were only a part of household incomes, especially in rural areas (see evidence for mid-19th century Spain in García Sanz (1981)) but the extent to which variations in household income are captured by those in real wage earnings is an

'the contribution of property-income growth to the overall rise of national income' (Hoffman et al. 2002) and implies the improbable assumption that the share of labour in national income remains stable over time.

Moreover, if real wages are used as a proxy for real per capita GDP, deflators matter too. In the case of nominal wages, a consumer price index is usually employed to obtain real wages, while to derive real aggregate output the GDP implicit deflator, which reflects the prices of both consumption and investment goods, is used. As these two price indices do not necessarily evolve alike, another potential bias may be introduced in agricultural output estimates derived with real wages as a proxy for real disposable income per head.[9]

To complicate the situation further the available evidence on wages in early modern Europe usually refers to wage rates (***w***) while what is actually needed is real wage earnings (***W***), that is, wage rates (***w***) times the number of days or hours (***h***) worked per person-year.[10] Changes in work intensity affect yearly wage earnings per economically active person. In the early modern age, workers (and their families) were prepared to increase their work load either to offset the decline in wages rates (van Zanden 1999, Malanima 2007) or because of the higher opportunity cost of leisure resulting from wider consumption choices (de Vries 1994, Voth 1998, Allen 2004b). In fact, a more intense use of land appears to go along declining wage rates, implying a more intense use of labour (Boserup 1987, Malanima 2007, De Vries 2008). The corollary is that long-run changes in real wage rates do not necessarily capture those in real returns to wage labour.[11]

Given the dearth of direct estimates with contemporary data, the choice of values for price and income elasticities to be used in the calibration of the demand for

---

unknown. Nonetheless, the fact that, in times of hardship, authorities usually tried to regulate and control nominal wages suggests that the representativeness of wage labour is higher than commonly accepted (Bois 2000, Sanz Fuentes 1987, Vaca 2001).

[9] The different evolution of consumer price indices for lower and upper social classes constitutes an additional source of inequality in income distribution for early modern Europe (Hoffman et al. 2002).

[10] This procedure implies that using expression (2) with the variation in wage rates as a proxy for those in real disposable income per head provides a measure of changes in daily or weekly per capita consumption, so the challenge is to ascertain the extent to which working time, and, hence, yearly consumption per head varies in the long run.

[11] The improvement of housing, the acquisition of durable goods and the increasing consumption of exotic goods has been pointed as evidence of material progress just at the time real wage rates were declining (Reis 2005: 199).

agricultural goods presents another challenge. Studies on developing countries, not too dissimilar in income per head from most countries in the early modern Europe (Maddison 2006), cast values of 0.7/0.8 for the expenditure elasticity for food (and own price elasticity values of -0.5/-0.6) (Lluch et al. 1977).[12] However, it has been claimed that cross-section estimates of income elasticity tend to be upwards biased as food transfers from high to low income groups are inaccurately recorded in food expenditure surveys (Bouis 1994). A similar conclusion is reached for Britain during the Industrial Revolution by Clark, Huberman and Lindert (1995) who argue that budget studies fail to include high income consumers who, by Engel' law, have lower income elasticities of food demand.

A relevant caveat is that, as an economy grows, the value added of food relative to its inputs (agricultural staple goods) increases by including services –whose income elasticity of demand is higher than that for staple food products- raising the income elasticity of the aggregated demand for food.[13] Thus, the use of income elasticities of food demand for present-day developing countries to calibrate the demand of agricultural goods in the past may lead to an over-exaggeration of the true value of income elasticities.[14] Interestingly, for the income elasticity of agricultural products in Japan over 1878-1940, Kaneda (1968) found values of 0.3/0.4, certainly low but not implausible for the demand of food in developing countries.[15] Time series estimates of income elasticity of demand for Spain over 1850-1913 cast significantly different values for food (0.9) and for agricultural goods (0.4) and tend to confirm our hypothesis. If, in turn, real wage rates rather than per capita GDP are used, the income elasticity for agricultural goods falls to 0.3.[16]

[12] Moreover, direct cross-section estimates for late 1950s Spain still show high absolute values for income (and own price) elasticity of food demand (0.9, and -0.7, respectively) (Lluch 1969).
[13] Clark et al (1995: 234-235) point out, "the value of food and beverage consumption rises relatively to the foodstuff supplies over the course of development", while Kaneda (1968) uses a similar argument to the one employed here to explaining why income elasticity of food demand was higher in the 1950s than in the previous decades.
[14] This does not necessarily mean that the services content of food in early modern Europe was lower than in today's developing countries. Probably the difference, then and now, lies between countryside and town, with lower services content of food in rural areas.
[15] Cross-section estimates of income elasticities for aggregate food staples from household surveys are often in the 0.3/0.6 range (Bouis 1994).
[16] Estimates computed from data in Prados de la Escosura (2003).

For pre-1800 Europe Allen (2000) cautiously assumed values of 0.5 and -0.6 for income and own price elasticities and used the Slutsky-Schultz relation to derive the cross price elasticity of demand, while Federico and Malanima (2004) adopted values of 0.4 and -0.5, respectively, for early modern Italy.[17] Our preference, in the Spanish case, for low absolute values of income ($\mu = 0.3$) and own price ($\varepsilon = -0.4$) elasticities is motivated by the fact that we are addressing the demand for agricultural staple goods, not for food itself that incorporates higher income-elastic services. Moreover, as we discuss below, low values of income elasticity somehow capture the impact on the demand for food staples resulting from variations in working time as a response to changes in real wage rates. In other words, we are explicitly assuming that the daily wage elasticity of demand for foodstuffs is lower than that of yearly disposable income per head.

Let's look now at the evidence available for our case. Real wage rates experienced a rise between the late 13th and mid-14th century, followed by a sharp decline until the end of this century and, then, a recovery in the early 15th century when the highest real wage rates of half a millennium were reached. A long-term decline took place from mid-15th to mid-17th century and, then, a flat long-run trend remained until the early 19th century. Real wage rates, however, did not fall below pre-Plague levels until mid-16th century (Figure 1).

It is unclear, however, that wage rates capture trends in wage earnings, as incentives to work harder increased over time, particularly in the eighteenth century. As population grew and trade expanded, relative prices changed, and a more intense use of land took place with a shift from extensive livestock rearing (sheep) to crops (cereals, vineyards, olives) and also to cash crops (fruit trees, etc) along the Mediterranean coast (Anes 1970).[18] Rising demand from an expanding population contributed to the increase in food prices that led, in turn, to a sustained fall in real wage rates as nominal wages were much more stable. Given the low number of days worked per economically active population, particularly in agriculture, the supply of

[17] The Slutsky-Schultz relation states that for the individual demand of any commodity, the income elasticity, with a negative sign, is the sum of own price and cross price elasticities, so it allows one to derive the value of the cross price elasticity of demand from the assumed values for own price and income elasticities.

[18] In Catalonia, the increase in trade stimulated the use of marginal, unexploited lands for vineyards and olive trees as a growing demand covered the cost of opening up new lands (Vilar 1962).

labour was presumably rather elastic, and workers could make for the fall in daily real wages by increasing the amount of days allocated to work over the year. For example, in the Kingdom of Castile c. 1750 the Cadastre de Ensenada assigned 120 days of work per year to day-labourers (rural and non-rural), 180 to artisans, and 250 to servants (Ringrose 1983)[19] which weighted by each sector's share in economically active population (EAP) cast an average of 168 days per EAP/year, lower than the one suggested for nineteenth century Europe (196 days) by Bairoch (1965, 1989) and the figure of 250 working days per year Allen (2001) accepted for early modern Europe.[20]

However, there is probably some asymmetry in the suggested inverse association between real wage rates and working time. For example, at times of high wages it seems unclear that an increase in real wage rates would lead to a reduction in days of work per active person. This would be the most plausible scenario in Middle Age Spain, a frontier economy with presumably a low number of working days per EAP.

The early nineteenth century provides a new scenario in which real wage rates went up simultaneously to an intensification of work as a result of the wider access to property, following *desamortización* -the disentailment of church and communal lands-, and the increase in the variety of goods and services provided by the market. We know that, by 1850, EAP in agriculture worked an average of 240 days.[21] During the first half of the nineteenth century the area of cultivated land multiplied by 2.4 (Bringas 2000: 86) and employment in agriculture by 1.5 (Álvarez-Nogal and Prados de la Escosura 2007). If we assume that labour effort per hectare (measured in days of work per EAP/year) remained constant over the same period, the number of working days in agriculture by 1800 would have been around 150 (=240*1.5/2.4), a figure consistent with that of 120 working days per year at the time of the Cadastre of

---

[19] See also Vilar (1970: 129) and Santaolaya Heredero (1991). The figure for days worked in agriculture is confirmed by Simpson (1992) for late nineteenth century Andalusia, where labour input requirements implied that agricultural workers were employed for fewer than 120 days per year.

[20] Evidence for the construction industry in seventeenth century Valladolid indicates that most workers were occupied less than 150 days (Gutiérrez Alonso 1989). In late eighteenth Madrid masons only worked, on average, 3.5 days per week during winter while in summer they went up to 4.4 days/week. Thus, assuming a weekly average of 4 days per week would represent 208 days per year (computed from Nieto Sánchez 2006: 428).

[21] Such figure is a weighted average computed from data of labour force and days worked at provincial level in Spain c. 1850 (del Moral Ruiz 1979)

Ensenada (c. 1750), that is, prior to the agricultural expansion of the late eighteenth century.

Furthermore, before accepting changes in real wage earnings as a proxy for those in real disposable income per head, the stability of the share of labour in national income needs to be established. Inequality was deep in early modern Spain. For example, c. 1750, the wealthiest 10 percent outweighed the poorest 40 percent by 15 to 17 times in Old Castile.[22] These ratios are similar to those found for contemporary England (14 times), and France (17 times) (Hoffman et al. 2002).[23] Nonetheless, high inequality can be compatible with the stability of the labour share in national income. Was this the case of pre-industrial Spain? Trends in relative factor returns provide a good test for the stability of income distribution.[24] A measure of income inequality, the land rent/wage ratio, shows a flat long-run trend between the early 14th and 16th centuries, rises from the 1530s to the 1590s and, again, between the 1730s and the 1800s, and declines in the 17th and the early 19th centuries (Figure 2).[25] Thus, it appears that, unless returns to property are included in our proxy for disposable income, in phases of rising (declining) inequality our estimates, in particular, those for early modern Spain, may suffer a downward (upward) bias and, hence, provide a lower (upper) bound of the actual agricultural output.[26]

We have calibrated, then, the demand of agricultural goods using equation [2]. The main challenge is posed by the choice of a proxy for changes in real disposable

---

[22] Computed from Yun-Casalilla (1987).

[23] Gini coefficients for income distribution at different Old Castile towns c. 1750 cast values ranging from 0.39 to 0.56, while similar estimates were obtained for Jerez (around 0.5) (Álvarez-Nogal and Prados de la Escosura 2007). These figures are close to the 0.52 Lindert computed for England and Wales in 1759 (http://www.econ.ucdavis.edu/faculty/fzlinder/Massie1759rev.htm).

[24] As Hoffman, Jacks, Levin, and Lindert (2002: 325) point, real inequality was 'caused by the interaction of population growth with concentrated land ownership and the Engel's law'.

[25] Scattered evidence indicates that the incomes of the middle and upper classes were growing in early modern Spain, while those of the lower classes were stagnant or declining (Nader 1977).

[26] As a test, we have estimated per capita consumption of food for Spain over 1850-1913 with a demand function (and a common data set from Prados de la Escosura (2003)) using real wage rates (Bringas 2000) and GDP per head alternatively as indicators of real per capita disposable income. The results confirm the downward bias introduced when wage rates are employed as a proxy for income per head. Interestingly, when agricultural consumption per head for eighteenth century England is derived with a demand function, the use of per capita income (Crafts 1985) also casts a faster pace of growth than when real wages rates are employed (Jackson (1985) and Allen (1999)).

income per head. One option, following Allen (2000), is to use the variations in real wage rates (Estimate I).[27]

A second option is to assume that, as workers reacted to declining real wage rates by working extra days, real returns to labour remained stable over time. This assumption, that seems particularly plausible for 18th century Spain, does imply that changes in the consumption of agricultural goods per head would depend on the relative price of agricultural and non-agricultural goods weighted by their own- and cross-price elasticities (Estimate II).

A more comprehensive proxy for disposable income per head would result if, in addition to a crude measure of labour earnings, the returns accruing to proprietors were also taken into account. We have been able to construct a crude proxy of real disposable income as a weighted average of real wage rates and real land rents per hectare, in which the shares of labour (0.75) and property (0.25) in Spain's national income during the 1850s are used as weights (Prados de la Escosura and Rosés 2009) (Estimate III).[28] Nonetheless, this alternative estimate suffers from the same weakness as Estimate I since we do not know how the number of days worked and hectares cultivated evolved over time.

As regards the values of demand elasticities, we have explored alternative sets, ranging from -0.7/-0.4 (own-price elasticity, $\boldsymbol{\varepsilon}$) and 0.6/0.3 (income elasticity, $\boldsymbol{\mu}$) with cross-price elasticity ($\boldsymbol{\gamma}$) always equal to 0.1, but finally opted deliberately for low absolute values: $\boldsymbol{\varepsilon}$ = -0.4; $\boldsymbol{\mu}$ = 0.3; $\boldsymbol{\gamma}$ =0.1.[29] The adoption of lower values for income and own price elasticities for preindustrial Spain than those computed for countries at similar levels of development allows for the fact that we are addressing the demand for agricultural staple goods, not for food itself which, by incorporating services, reaches a higher value for the aggregate income elasticity. Furthermore, choosing a

[27] It is worth noting that the use of unskilled wages does not alter our results since most workers were unskilled and the skill premium remained relatively stable. The skill premium -that is, the skilled/unskilled wage ratio-, was computed for masons and carpenters in Catalonia, Valencia, and New Castile over 1500-1800 from data in Felíu (1991).

[28] Lack of long run series for interest rates precluded its inclusion in our proxy for disposable income.

[29] Allen (2000) and Federico and Malanima (2004) used similar values for own price (ε = -0.6 and - 0.5), income (μ = 0.5 and 0.4) and cross price (γ =0.1) elasticities of demand. It is worth mentioning that elasticities should be adjusted over time as income per head changes. However, since per capita income in early modern Spain remained at low levels and its change over time was not dramatic, the range within which expenditure and own price elasticities would fluctuate is rather narrow, and so is the range for the output estimates obtained using alternative elasticities.

low value for income (wage) elasticity allows for the fact that the demand for agricultural food staples was affected by changes in the amount of time EAP allocated to work.[30]

In Figure 3 and Table 1 the three alternative estimates of agricultural consumption per head and their yearly rates of variation are offered and implicitly compared with Wrigley's assumption of a constant consumption per head of agricultural goods (a constant 100 value). It clearly appears that Wrigley's approach proves inadequate since, even when real disposable income is assumed to remain unaltered (Estimate II), the demand for agricultural staple goods reacts to changes in relative prices and, hence, consumption per head is far from stable. In fact, the decline in real per capita consumption observed for the demand estimate which includes real wage rate as a proxy for disposable income (Estimate I) is confirmed, but for a milder slope, in Estimate II. Another interesting finding is that the inclusion of land rent as a proxy for returns to property in our measure of disposable income (Estimate III) confirms the declining trend in per capita consumption of food staples. This suggests that Allen's (1999) point about the primacy of workers in the demand for food is well taken..

Interestingly, Estimates I and II match each other closely after 1550, but not beforehand, in particular, during the 15th century, when consumption is much lower in Estimate II. This raises the issue of the extent to which, at a time of high wages, people forgo food consumption in order to reduce their working time. In a high land-labour ratio economy, with an extensive use of natural resources –mostly, livestock rearing- it seems doubtful that peasants would cut down their already low working days per year. In the urban-led repopulation of the 14th and 15th centuries it seems also improbable that those employed in industry and services would reduce their working effort as their wages increased, particularly since trading networks linking towns within Spain and to the European markets catered for their demand. Therefore, we concluded that the most plausible representation of trends in per capita consumption of agricultural staples is provided, in our view, by Estimate I.

---

[30] The sources for real wage rates, real land rents, agricultural and non-agricultural prices, and consumer price indices are detailed in the Appendix.

The close coincidence between Estimates I and III suggests the decisive role played by relative prices in determining trends in per capita consumption as they offset the differing behaviour of real wage rates and land rent (although the lower weight, ¼, of land rent, in our disposable income proxy in Estimate III also conditions the results). Given the matching of Estimates I and III and the fact that Estimate III only starts in 1320, we have decided to focus on Estimate I for our aggregate output computations.

Our results show two distinctive phases in the consumption of food staples: a first one, up to the 1550s, of high levels of per capita consumption, and a second one, post-1550s, of significantly lower ones, which largely matches the picture provided by real wages. The highest food staples consumption per head corresponds to the pre-Black Death era in all estimates. The recovery of consumption in the early 15th century fell short of the peak levels of the 1330s-1340s. The reason is that the advance of the *Reconquista* in the 13th century made available large tracts of land which were not matched by population growth.[31] In fact, the colonization of new land was far from complete in the eve of the Black Death and migration flows southwards from northern Spain took place (MacKay 1977: 67-71). Consumption levels declined from mid-15th to mid-17th century –although remained still high in the early 16th century- and, then, stabilized until mid-19th century.

Due to lack of data for most of the considered period, we had to assume, as Allen (2000) did for most European countries, that agricultural trade was balanced.[32] Fortunately, the available evidence for the late eighteenth and early nineteenth century indicates that trade represented a small share of agricultural output.[33] Thus,

[31] This occurred even though large numbers of Muslims did not migrate and stayed especially in the east, the Valencia region, in particular. Nonetheless, in areas along the Mediterranean coast the situation was often not too dissimilar from that in Western Europe (MacKay 1977).

[32] The first official computation of trade flows corresponds to 1792 (Prados de la Escosura 1982a), and reconstructions of Spain's trade with her major partners in the eighteenth century (Romano 1957, Prados de la Escosura 1984) do not provide the trade balance for agricultural goods. Nonetheless, it is not the size of exports or imports of agricultural goods what really matters but its balance (that is, net exports) which can be easily assumed to be a small share of total consumption.

[33] It can be reckoned that Spain was a net food importer in the late eighteenth century up to, at most, 5 percent of GDP and no more than 10 percent of agricultural output (Prados de la Escosura 1993: 271-73, 276). By mid-nineteenth century, however, Spain was a net exporter of foodstuffs, though but no more than 5 percent of agricultural output (Prados de la Escosura 1988, 2003). This suggests that the improvement in consumption per head between 1787 and 1857 should be raised by around 15 percent

output per head (***q***) equals, by construction, per capita consumption (***C***), and total agricultural output can be, then, derived with population figures (***N***) as:

$$(Q)_{agr} = q\,N \qquad [3]$$

Output outside agriculture: conjectural estimates

The dearth of data from which to infer trends in industrial and services production in preindustrial Spain is even more dramatic than for agriculture and renders the use of crude indicators necessary. Associating urbanization, for which reliable evidence is available, to the level of economic development is not new.[34] Parallels have been suggested between changes in urbanization rates and per capita GDP growth. [35] Increases in real per capita income have been linked, *ceteris paribus*, to the proportion of the total population living in urban centres in preindustrial economies (Wrigley 1985). More cautiously, we have accepted urban population (excluding those living on agriculture) as a proxy for non-agricultural output and, hence, assumed that trends in the rate of adjusted urbanization -that is, the share of non-agricultural urban population over total population- capture those in per capita output in industry and services.[36]

In early modern Spain, urbanization rates have usually been considered upwardly biased as a result of the existence of 'agro-towns'. Towns provided security and lower transactions costs in a frontier economy during the re-population process that followed the *Reconquista* and after the Black Death. After the third wave of the *Reconquista* in the 13th century, Christian settlers from Aragon, Catalonia and Southern

to represent the increase in agricultural output per head. As a consequence our estimates tend to be downward biased over 1787-1857.

[34] Urbanization represents, according to Kuznets (1966), 'an increasing division of labor within the country, growing specialization, and the shift of many activities from nonmarket-oriented pursuit within the family or the village to specialized market-oriented business firms'. Cf. also Acemoglu, Johnson, and Robinson (2005), Reis (2005), and Temin (2006).

[35] Craig and Fisher (2000: 114). This approach is supported by van Zanden (2001) who claims that "differences in levels of development ... are perhaps best approached via variations in the urbanization ratio".

[36] Malanima (2003: 281-3) suggested a relationship between urbanization and non-agricultural output, regardless whether industrial and services output was produced in town or countryside. With the parameters from a regression between the share of non-agricultural activities in GDP and the urbanization rate over 1861-1938 he predicted the relative size of industry and services at each level of urbanization. Unlike Malanima, we do not impose a 19th and 20th century structural relationship between non-agricultural output and urbanization on the early modern era and assume that changes in adjusted urbanization proxy movements in non-agricultural output. Later, Malanima (2011) has followed a procedure similar to the one used here.

France acquired farms but preferred to live in towns (MacKay 1977: 69). Moreover, the Black Death favoured urban growth in Spain as (southern) towns were more secure and provided better services attracting immigrants from the (northern) countryside (Ladero Quesada 1981, Rubio Vela 1987, Pladevall 1962, Cuvillier 1969, Rodríguez Molina 1978, Santamaría 1969). At the same time, both the acceleration the pace of the reconquest and the Plague favoured the formation of large landholdings (Vaca 1983, Valdeón 1966).[37] Thus, "agro-towns" in southern Spain seem to be the legacy of a highly concentrated landownership which resulted in a large proportion of landless agricultural workers (Casado 2001, Reher 1990).[38]

Notwithstanding the existence of 'agro-towns', a large proportion of urban economic activity was associated to industry and services.[39] In sixteenth century Old Castile, Yun-Casalilla (2004) reckons that agricultural employment represented, on average, 8 percent of the urban labour force. In late eighteenth century Spain most urban day labourers were employed outside agriculture and, according to Pérez Moreda and Reher (2003: 129), farmers (*labradores*) only represented 7.6 percent of the urban population in the 1787 population census.

Although keeping a constant threshold over time, while population grows, is rather questionable (Wrigley 1985), we have adopted the definition of 'urban' population as dwellers of towns of 5,000 inhabitants or more to maintain consistency with Bairoch, Batou and Chèvre (1988) estimates so international comparisons can be

---

[37] Cabrera (1989) qualifies this view and attributes the rise of latifundia to the generalization of the seigneurial regime during the 14th and 15th centuries.

[38] It seems clear that the higher the threshold to be deemed as an urban centre, the lower the probability of including people employed in the agricultural sector. In order to mitigate the inclusion of 'agro-towns', in which most of the population is employed in agriculture, Malanima (1998) proposed a lower limit for being considered urban, 5,000 inhabitants, for the north and centre of Italy, and a higher one, 10,000, for the south of the country.

[39] Different attempts to discriminate between agricultural and non-agricultural employment in towns have been carried out for early modern Spain. Reher (1990) reckoned that, in 1787, half the economically active population living in towns in Spain worked in agriculture, a clearly over-exaggerated figure, since all day labourers were to agriculture while servants were excluded from the labour force. Llopis Agelán and González Mariscal (2006) introduced a more astringent definition: in order to qualify as 'urban', a population centre needs to have a) more than 5,000 (alternatively, they also used 10,000) inhabitants and b) less than half of its economically active population (EAP) occupied in agriculture. This way they estimated, also for 1787, that the conventional rate of urbanization (23.7 percent, according to their own computations) should be cut down to almost half of it (12.7 percent), or 14.5 percent if we accept a less astringent definition of urban population.

carried out.[40] We have used, then, the urban population adjusted downwards by excluding those living on agriculture (See Appendix).[41] Spanish 'adjusted' urbanization rates, at benchmark years over 1000-1857, are presented in Table 2 and their rates of variation have been accepted to proxy those in non-agricultural output per head.

However, efficiency changes resulting from variations in the composition of labour by economic sectors and in the dependency rate could affect our proposed index. We have, then, carried out a sensitivity test by estimating the intersectoral shift effect that results from changes in the shares of industry and services in non-agricultural employment and in the productivity gap between industry and services. Furthermore, we allowed for changes in the potentially active to total population ratio (PAP/N) that could also affect our index. Fortunately trends in the proposed index of output outside agriculture do not appear to be significantly altered by either demographic or output composition changes during the early modern era.[42]

A glance at Tables 1 and 2 and Figure 3 shows for the 16th and 18th centuries an apparent contradiction between a declining consumption of agricultural staples per head and a rising urbanization (adjusted) rate, which implies, under our previous assumption, an increasing consumption of industrial goods and services. How would it be solved? An explanation could be that the decline in the consumption of food staples per head is over-exaggerated by the use of real unskilled wage rates as a proxy for real income per head (Estimate I) since it may introduce a downward bias in the estimates (at least when income inequality increases and work intensifies). However, the

---

[40] Such a definition is arbitrary and alternative thresholds of 10,000 (de Vries 1984) or 20,000 (Flora 1981) inhabitants have been used. Bairoch, Batou, and Chèvre (1988) employed alternatively 2,000, 5,000, 10,000, and 20,000 inhabitants as measures of urbanization.

[41] Details of the estimation of adjusted urban population over 1500-1850 are provided in Álvarez-Nogal and Prados de la Escosura (2007).

[42] Services increased relative to manufacturing in terms of output and employment during the early modern era in Spain (García Sanz 1991a, López-Salazar 1986, Reher 1990) probably as a consequence of the Dutch disease provoked by the inflow of American silver (Forsyth and Nicholas 1983, Drelichman 2005). Given the lack of national data, we arbitrarily assumed that the evolution of the internal composition of non-agricultural employment in Spain was captured by the shares in non-agricultural economically active population (L_{i+s}) of industry (L_i/L_{i+s}) and services (L_s/L_{i+s}) in a New Castile town, Cuenca (Reher 1990). As regards the productivity ratio between industry and services, lack of data forced us to accept a fixed ratio (1.4) derived from the Cadastre de Ensenada for the Kingdom of Castile c. 1750. The resulting intersectoral shift effect [$IS = (L_s/L_{i+s}) + (1.4* (L_i/L_{i+s})$] shows a mild decline over time. If alternatively the productivity gap for the 1850s were used (Prados de la Escosura 2003) the productivity index would rise slightly over 1750-1850. Changes in the potentially active to total population ratio (PAP/N) can also affect our index of output outside agriculture. Alas, we only know the evolution of the PAP/N ratio for the case of New Castile from 1586 onwards which does not exhibit major changes over time.

alternative results obtained by assuming stable real wage earnings per worker (Estimate II) and by using jointly unskilled wage rates and land rents per unit of cultivated land as a proxy for real income per head (Estimate III) do cast similar declining trends. An alternative interpretation would be that the opportunity cost of food staples consumption rose as a result of wider consumption choices and the amount of non-agricultural goods consumed increased at the expense of food staples. This seems confirmed by the steady decline in the prices of industrial goods relative to agricultural goods during the 16th century and, then, in the 18th century (Figure 4). Lastly, it could be argued that such a contradiction evidences the fact that rising urbanization in preindustrial societies fails to capture increases in economic activity outside agriculture as it simply results from rural immigrants expecting to live on charity.[43] However, even if this were the case, feeding an increasing idle urban population implies that a surplus existed to be distributed among the poor. Such a surplus could only result from either a redistribution of income, with the consequence of a decline in inequality, or from an increase in industry and services output. Since the evidence on inequality suggests that inequality raised both during the 16th and 18th centuries (Figures 2 and 7) the surplus necessarily resulted from the increase in non-agricultural production.

Aggregate output

To reach an estimate of aggregate output we need to combine our indicators of agricultural output and economic activity outside agriculture. We have computed a Divisia index for real GDP per capita by weighting yearly variations in output per head in agriculture (Estimate I in Table I and Figure 3, derived with a demand equation using real wage rates as a proxy for real disposable income) and in industry and services (proxied by the 'adjusted urbanization rate) by the average, at adjacent years, of the shares of agriculture and non-agricultural activities in current price GDP and, then, obtaining its exponential.[44] That is,

[43] We owe this hypothesis to Paolo Malanima.

[44] Álvarez-Nogal and Prados de la Escosura (2007) derived aggregate output (***O***) by combining agricultural output (***q N***) and the indicator of economic activity outside agriculture (namely, adjusted urbanization, $N'_{urb\text{-}nonagr\ it}$), expressed in index form with 1857 as 100, with their shares in GDP in 1850-

$$lnQ_t - lnQ_{t-1} = \sum_i [\bar{\theta}_Q (lnQi_t - lnQi_{t-1})] \qquad [5]$$

Where share values are computed as:

$$\bar{\theta}i = 1/2[\theta i_t + \theta i_{t-1}], \qquad (i = agriculture, non-agriculture) \qquad [6]$$

Current price estimates of GDP have been obtained by reflating each sector's real output with its corresponding price index and adding them up. In the case of agriculture, a price index was already available; and in the case of non-agricultural activities, rates of variation for manufacturing prices, the CPI, and nominal wage rates were arithmetically averaged and its exponential computed to obtain a non-agricultural price index.[45] This way current GDP estimates were obtained and the share of each sector derived. A crude estimate of the share of agriculture in national income at current price is presented in Figure 5. These conjectural results tend to confirm our intuition of a relatively small size of agriculture both in the pre-Black Death era and in the 16th century, given the significant role of towns, and commerce in the economy, as well as the "re-ruralisation" of the 17th century.

But do our estimates proxy GDP or just 'market income', leaving aside home, non-marketed production? Our conjecture is that we fall short from covering non-market production and that its inclusion in our output estimates would have a counter-cyclical effect, moderating the intensity of both the decline and rise of output over time that we present here.[46]

1859 –the earliest dates for which national accounts are available (Prados de la Escosura and Rosés 2009)– as weights.

$$\boldsymbol{O_{.t} = Sa_{.1850/59} (q_{.t} N_{.t}) / (q_{.1857} N_{.1857}) + (1- Sa_{.1850/59})*(N'_{urb\text{-}nonagr\,.t} / N'_{urb\text{-}nonagr\,.1857})} \qquad [4]$$

Where $\boldsymbol{Sa_{.1850/59}}$ represents the average share of agriculture in GDP in the 1850s (0.404). However, such an approach to derive output estimates for over half a millennium introduces an index number problem, since relative prices change over time and, consequently, fixed mid-19th century weights are not representative. Furthermore, it also implies the strong and unrealistic assumption that the productivity differential between agricultural and non-agricultural sectors remained stable over time. Malanima (2011) incur in this error.

[45] This amounts to allocating one-third of the weight to industry (the industrial price index) and two-thirds to services (nominal wage and consumer price indices), which is a good approximation to the sectoral shares within non-agricultural output in the 1850s (Prados de la Escosura 2003).

[46] For agricultural output, it is unclear that this is the case in our demand approach estimates. As for output in industry and services, a non-negligible share was contributed by the active population employed in agricultural activities and we fail to capture it, although an early use of the market even for the more remote regions of Spain has been documented (Domínguez 1994). Furthermore, the so called 'agro-towns' tended to facilitate the production for the market.

Trends in product per head are offered in Table 3 and Figure 6. Over the long run, real output per head increased very mildly, over one-fourth between the late 13th and the mid-19th century, which implies a yearly average growth rate around 0.05 percent.

Two clearly differentiated epochs can be distinguished in the economic performance of preindustrial Spain: 1270s-1590s and 1600s-1810s.[47] In the first one, sustained progress -that can be tracked down to the 11th century- was broken by the Black Death and, then, resumed since the 1390s. By the early 14th century, Castile and, to a large extent, Spain, was a high land-labour ratio economy whose primary sector had a relatively small size, repopulation was driven by urban centres, and, helped by the relatively abundance of specie, trade networks linked towns in the Douro valley and *Camino de Santiago* with Andalusia's cities. A commercial society, initiated with the *Camino de Santiago* in the 11th and 12th centuries, developed with Castilian trade expansion and the creation of a Hansa-type network in northern Spain, the spread of Catalan economic interests in the Mediterranean, and the opening of Gibraltar straits to southern trade (MacKay 1977: 74-75 127). All this resulted in a high income society with an expanding population, which was able to defeat Islam and extract large tributes.

The Black Death's demographic impact differed widely from its economic effects. The plague hit Spain in 1348 and most historians agree that its impact was milder than elsewhere in Western Europe. The regional impact of the Plague varied substantially (Doñate 1969, Vaca 2001). In the Kingdom of Castile, despite recurring plague outbreaks, its effects were less devastating than in the Kingdom of Aragon, Catalonia in particular (Verlinden 1938, Pérez Moreda 1988, Sobrequés 1970-71). In Teruel (Aragon), the loss of population reached 35 percent, although part of it represented plague-led emigration (Sobrequés 1970-71) while in Navarre it would have represented between 25 and 40 percent (Monteano 2001). In Castile, the loss of population was probably below 25 percent and partly explained by south-bound migration to southern Spain since Andalusia was the most plague-ridden region of the Kingdom of Castile (Iradiel et al. 1989). However, the economic impact of the Plague

[47] A third epoch of modern economic growth from the early 19th century to the present is outside the focus of this paper (See Prados de la Escosura 2007).

seems to have been much more dramatic than the demographic one (Table 3 and Figure 6). It is our hypothesis that, in a frontier economy -such as was the case of most of Spain- the Black Death's demographic shock destroyed commercial networks and isolated an already scarce population with the consequence of reducing the ability to maintain per capita production levels.

A phase of long-term growth opened after the Black Death and the Spanish phase of the Hundred Years' War (1350-89) and lasted until the end of the 16th century. Economic expansion largely happened on the basis of a staple (wool) whose production adapted well to the relative abundance of land, and on a dynamic trade sector which supplied not only international markets but also domestic ones as increasing living standards stimulated the creation of an urban industry. Declining relative industrial prices over 1390s-1470s reinforced the allocation of resources to livestock rearing taking advantage of the closing of European markets to English wool during the Hundred Years War. Castilian transhumance expanded once Extremadura and La Mancha grass lands were won and the demand for wool grew both internationally, in the Low Countries and Italy and, then, in England (Childs 1978), and domestically, as local textile industry rise (Iradiel Murugarren 1974). American colonization and international trade expansion contributed to stimulate economic activity over 1490s-1590s. Thus, by the end of the 16th century, real output per head presumably recovered pre-Black Death levels, while Spain had built an empire and become an economic centre which connected Europe and the New World.

The second epoch, ranging from the 1600s to the 1800s, had significantly different features and the foundations of growth of the previous epoch: wool, trade, and urban activity, would be no longer in place. A sustained fall in per capita income until mid 17th century opened it. The decline in wool exports after 1570 and the contraction in the purchasing power of American silver since the early 17th century (Flynn 1982) forced an inward-looking re-orientation of the Spanish economy. Low productivity and competitiveness in tradable production was apparently reinforced by the Dutch disease brought by American silver (Forsyth and Nicholas 1983, Drelichman 2005). The rising cost of the empire fell on Castile, its richest and more populated kingdom. Growing taxation since 1575 led towns to increase their indebtedness which affected negatively urban activity, at the time of a decline in wool exports and the disappearance of Medina del Campo fair. As a result, population fled towns. The fiscal system collapsed as cities did.[48] Increasing ruralisation, however, did not imply a significant improvement in agriculture's efficiency. Economic recovery only took place in the late 18th century. Population pressure led to extensive cultivation of land. Crops (cereals, in particular) took the lead over livestock. Population, who lived mostly in interior Castile and the Guadalquivir valley in the 15th century, shifted its balance towards the periphery where a more commercial agriculture developed. When in the early 19th century Spain per capita income reached again the level of the 1590s, she was no longer an empire and a link between Europe and the New World.

These two distinctive regimes also translated into significant differences in terms income distribution. A crude inequality indicator, the ratio of nominal output per head to nominal wage rates, expressed in index form - known as the Williamson index- has been computed. The rationale of such an indicator is that while the numerator captures returns to all factors of production per occupied person -and here we assumed that labour force evolved along total population-, the denominator represents the returns to raw labour, so the bottom of the distribution is compared to its average. It is worth recalling, however, that since wage rates might underestimate wages in the long run -as an increase in working time probably took place in the late 18th and early 19th century-, our index could over-exaggerate inequality for this period. Some interesting results derive from Figure 7. Firstly, In the long run, inequality levels and lower economic inequality go together. Inequality increased from mid-16th to mid-17th century and, again, in the second half of the 18th century, and declined in the late 14th and 17th centuries. It could be suggested that phases of expansion (depression) tend to be accompanied by rising (declining) inequality, but for the early 17th century. This result is largely confirmed by another inequality measure, the land rent-wage ratio (Figure 2). It is also worth pointing out that, in the early 19th century, when population expansion was accompanied by a sustained increase in output per head, inequality stabilized according to the Williamson, while the land rent-wage ratio declined.

[48] Monetary alteration (fiat currency, vellón) and debt default (1635-58), together with war with France and revolts in Catalonia (1640-53) and Portugal (1640-68) help to describe the new situation. It is worth noting that, contrary to the experience of the late 14th and 15th centuries, fiscal revenues fell and the primary sector gained weight while urban centres decline.

Spain's economic performance in European perspective

A comparative perspective on Spain's position is in offered in Table 4 which provides per capita output estimates for a sample of Western European countries (namely, Belgium, France, Germany, Italy, the Netherlands, and the U.K.) over 1300-1850, expressed relative to the U.K. level in 1850.[49] In order to make a consistent comparison aggregate output per head has been computed using a homogenous procedure to the one used to derive the Spanish estimates, namely, a demand approach for agricultural output and employing urbanization to proxy economic activity outside agriculture.[50] Thus, for each country, agricultural and non-agricultural output were expressed in index form with 1850 as 100 and weighted by their relative shares of GDP.[51] Allen (2000) data set provides population, agricultural output derived through the demand approach (using real wage rates as a proxy for real disposable income per head), and urbanization (to proxy output in industry and services) for 1300-1800, that were completed with (Bairoch 1988) urbanization estimates for 1850 and national estimates of agricultural output during the first half of the nineteenth century.[52]

Spain experienced a sustained long-run decline in relative terms. For example, compared to Britain, she fell from a 40 percent higher income in 1300 to only two-

---

[49] Relative levels to the U.K. in 1850 are from Prados de la Escosura (2000). Alternative comparisons can be carried out with direct and presumably better estimates of output for England (Broadberry et al. 2010, Clark 2009) and Holland (van Leuwen and van Zanden 2009) but a common approach and wider country coverage has been preferred here. More accurate estimates for Germany and Northern Italy through a similar approach have been carried out by Pfister (2009) and Malanima (2011) but being still unpublished we have not made use of them.

[50] We opted to choose the U.K. rather than England, as scholars usually do (Allen 2000), (van Zanden 2001) since we are looking at whole countries, not regions, and a major point in our paper is to establish trends in Spain, not just in Castile, and to compare Spain to other nations.

[51] Sector shares in GDP were derived from Horlings (1997) for Belgium, Toutain (1997) for France, Hoffmann (1965) for Germany, Fenoaltea (2005) for Italy (1861), Horlings, Smits, and van Zanden (2000) for the Netherlands, and Feinstein (1998), for the U.K. This is a slightly different and inferior estimate to the one for Spain, since, as it has been shown above, the use of fixed weights over such long time span creates an index number problem. The use of a Divisia index for Spain (Table 3) introduces some discrepancies with the fixed weight index but not substantial ones.

[52] Thus, figures for agricultural output in 1850 were obtained from Allen (2004) for England, Horlings and Smits (1997) for Belgium (assuming that the growth rate over 1800-1850 was identical to that of 1810-50), Horlings, Smits, and van Zanden (2000) for the Netherlands, Tilly (1978) for Germany (proxied by estimates for Prussia over 1816-49), Toutain (1997) for France (1780/90-1845/54), and Federico and Malanima (2004) for Italy 1300-1850 (assuming that per capita consumption in North-Central Italy was representative of the whole country). In the Italian case, population and urbanization for has been drawn from Malanima (1998, 2003, 2005). Total population figures for 1850 were otherwise taken from De Vries (1984).

thirds of British output per head by 1850. During the 17th and early 18th century Spain fell behind, not only to the new leading nations (Britain and the Netherlands), but to Western Europe altogether. Spanish recovery in the first half of the nineteenth century –a significant achievement given that occurred at the time of the loss of empire and a complex institutional transition to a liberal society– fell short of the economic progress that took place in north-western Europe during the first Industrial Revolution. Thus, Spain suffered the paradox of experiencing modern economic growth for the first time while falling behind.

Concluding Remarks: Why was Spain affluent before the American expansion?

During the 14th and 15th centuries, Spain exhibited an opposite behaviour to that of most countries in Europe and the Eastern Mediterranean, in which the recovery from the Black Death is associated to the highest output per head of the early modern era (Pamuk 2007, Clark 2009, Broadberry *et al*. 2010). Contrary to Spanish neo-Malthusian literature (Valdeón Baruque 1969), the forces underlying economic performance in Western Europe, namely, population pressure on increasingly scarce resources after more than two centuries of demographic expansion, with the consequence of diminishing returns and hunger, were not in action in Spain.[53] On the contrary, most of Spain was a frontier economy with manpower shortage and land abundance, which implied high land-labour ratios and, most probably, increasing returns to labour (MacKay 1977). This explains why after the *Reconquista* was over and only the Nasrid kingdom of Granada remained under Islamic control, sustained progress took place. Empty lands, as the Moorish largely escaped from Christian rule, had to be populated and exploited in southern Spain. In achieving relatively high living standards prior to the Black Death, a high land/labour ratio was no doubt an important constituent. However, openness to goods and ideas from abroad also mattered as it allowed Spain to take advantage of her privileged position at the crossroads of the European and African economies. Its combination explains how Spain managed to achieve a relatively affluent position in Europe, only behind the Low Countries and Italy, prior to her expansion in the Americas.

[53] The Malthusian interpretation of 14th century Spain has been rejected by García Sanz and Sanz Fernández (1988) and Casado Alonso (2009).

References

ACEMOGLU, D., JOHNSON, S., and ROBINSON, J. (2005). The rise of Europe: Atlantic trade, institutional change and economic growth. *American Economic Review* **95**, 3, pp. 546-79.

ALLEN, R.C. (1999). Tracking the agricultural revolution in England. *Economic History Review* **52**, 2, pp. 209-35.

ALLEN, R. C. (2000). Economic structure and agricultural productivity in Europe, 1300-1800. *European Review of Economic History* **4**, 1, pp. 1-25.

ALLEN, R. C. (2001). The great divergence in European wages and prices in Europe from the Middle Ages to the First World War. *Explorations in Economic History* **38**, 4, pp. 411-47.

ALLEN, R.C. (2004a). Agriculture during the industrial revolution, 1700-1850. In R. Floud and P. Johnson (eds). *The Cambridge Economic History of Modern Britain*. I *Industrialisation, 1700-1860*. Cambridge: Cambridge University Press, 96-116.

ALLEN, R. C. (2004b). Britain's economic ascendancy in a European context. In L. Prados de la Escosura (ed). *Exceptionalism and Industrialisation. Britain and its European Rivals, 1688-1815*. Cambridge: Cambridge University Press, 15-34.

ÁLVAREZ-NOGAL, C. and L. PRADOS DE LA ESCOSURA (2007). The decline of Spain (1500-1850): conjectural estimates. *European Review of Economic History*, **11**, pp. 319-366.

ÁLVAREZ VÁZQUEZ, J.A. (1987). *Rentas, precios y crédito en Zamora en el Antiguo Régimen*. Zamora: Colegio Universitario de Zamora.

ANES, G. (1970). *Las crisis agrarias en la España moderna*: Madrid: Taurus.

ARGILÉS i ALUJA, C. (1998).*Preus i salaris a la Lleida dels segles XIV i XV segons els llibres d'obra de la Seu*. Lleida: Universitat de Lleida.

BAIROCH, P. (1965). Niveaux de développement économique de 1810 à 1910. *Annales ESC,* **20**, 6, pp. 1091-1117.

BAIROCH, P. (1988). *Cities and Economic Development. From the Dawn of History to the Present.* Chicago: University of Chicago Press.

BAIROCH, P. (1989). Wages as an indicator of Gross National Product. In P. Scholliers (ed.). *Real Wages in 19th and 20th Century Europe. Historical and Comparative Perspectives*. Oxford: Berg, 51-60.

BAIROCH, P., BATOU, J., and CHÈVRE, P. (1988). *La population des villes européennes. Banque de données et analyse sommaire des résultats, 800 à 1850.* Genève: Librairie Droz.

BOIS, G. (2000). *La grande dépression médiévale: XIVe-XVe siècles: le précédent d´une crise sustémique.* Paris: Presses universitaires de France.

BOSERUP, E. (1987). Population and technology in preindustrial Europe. *Population and Development Review* **13**, 4, pp. 691-701.

BOSKER, M., E. BURINGH and J.L. van ZANDEN. (2008) From Baghdad to London. The Dynamics of Urban Growth in Europe and the Arab World. CEPR Discussion Paper 6833.

BOUIS, H.E. (1994). The effect of income on demand for food in poor countries: Are our food consumption databases giving us reliable estimates?. *Journal of Development Economics* 44, pp. 199-226.

BRINGAS GUTIÉRREZ, M.A. (2000). *La productividad de los factores en la agricultura española (1752-1935)*. Madrid: Banco de España.

BROADBERRY, S.N., B.M.S. CAMPBELL, A. KLEIN, M. OVERTON, and B. VAN LEUWEN (2010). British Economic Growth, 1270-1870: Some Preliminary Estimates. University of Warwick.

CABRERA, E. (1989). The Medieval Origins of the Great Landed Estates of the Guadalquivir Valley. *Economic History Review* 42, 4, pp. 465-483.

CARRERAS, A. (2003). Modern Spain. In J. Mokyr (ed.). *The Oxford Encyclopedia of Economic History*. New York: Oxford University Press, 5 vols. 4, pp. 546-53.

CASADO ALONSO, H. (1980). *La propiedad eclesiástica en la ciudad de Burgos el siglo XV. El cabildo catedralicio*. Valladolid: Junta de Castilla y León.

CASADO ALONSO, H. (1985). La construction à Burgos à la fin du Moyen-Age, prix et salaires. *Cahiers de la Méditerranée*, pp.125-149.

CASADO ALONSO, H. (1987). *Señores, Mercaderes y Campesinos. La comarca de Burgos a fines de la Edad Media.* Valladolid: Junta de Castilla y León.

CASADO ALONSO, H. (1991). Producción agraria, precios y coyuntura económica en las diócesis de Burgos y Palencia a fines de la Edad Media. *Stvdia Historica* IX, pp. 67-107.

CASADO ALONSO, H. (2001). La economía en las Españas medievales (*c*.1000-*c*.1450). In F. Comín, E. Llopis, and M. Hernández (eds.) (2002). *Historia Económica de España. Siglos X-XX*, Barcelona: Crítica, pp. 13-50.

CASADO ALONSO, H. (2009). ¿Existió la crisis del siglo XIV? Consideraciones a partir de los datos de la contabilidad de la catedral de Burgos. In M.I. del Val Valdivieso and P. Martínez Sopeña (eds.). *Castilla y el mundo feudal. Homenaje al profesor Julio Valdeón.* 3 vols. Valladolid: Universidad de Valladolid/Junta de Castilla y León, iii, pp. 9-25.

CHILDS, W.R. (1978). *Anglo-Castilian Trade in the Later Middle Ages.* Manchester: Manchester University Press.

CLARK, G. (2009). The Macroeconomic Aggregates for England,1209-2008. University of California, Davis, Economics Working Papers WP 09-19

CLARK, G., M. HUBERMAN and P.H. LINDERT (1995). A British food puzzle, 1770-1850. *Economic History Review* **48**, 2, pp. 215-237.

CORONAS VIDA, L.J. (1994). La economía agraria en tierras de Jaén 1500-1650. Granada: Universidad de Granada.

CRAIG, L. A. and FISHER, D. (2000). *The European Macroeconomy. Growth, Integration and Cycles, 1500-1913.* Cheltenham, UK: Edward Elgar.

CRAFTS, N.F.R. (1976). English economic growth in the eighteenth century: A re-examination of Deane and Cole' estimates. *Economic History Review* **29**, 2, pp. 226-35.

CRAFTS, N.F.R. (1980). Income elasticities of demand and the release of labour by agriculture during the British Industrial Revolution. *Journal of European Economic History* **9**, 1, pp. 153-68.

CRAFTS, N.F.R. (1985). *British Economic Growth during the Industrial Revolution*. Oxford: Clarendon Press.

CUVILLIER, J. P. (1969). La population catalane au XIVe siècle. Comportements sociaux et niveaux de vis d´après les actes privés. *Melanges de la Casa de Velázquez,* **5**, pp. 159-187.

DE VRIES, J. (1984). *European Urbanization, 1500-1800.* Cambridge, Ms.: Harvard University Press.

DE VRIES, J. (1994). The Industrial Revolution and the industrious revolution. *Journal of Economic History* **54**, 2, pp. 249-270.

DE VRIES, J. (2008). *The Industrious Revolution. Consumer Behavior and the Household Economy, 1650 to the Present*. New York: Cambridge University Press.

DEANE, P. AND COLE, W.A. (1967). *British Economic Growth, 1688-1959*. 2nd ed. Cambridge: Cambridge University Press.

DOMÍNGUEZ MARTÍN, R. (1994). La mercantilización de factores en la agricultura española, 1860-1880: un intento de estimación de los contrastes regionales. *Revista de Historia Económica* **12**, 1, pp. 85-109.

DOÑATE SEBASTIÁ, J. M. (1969). Datos negativos, referidos a la Plana de Castellón, en relación con la peste negra de 1348. In *La corona de Aragón en el siglo XIV,* 1, pp. 27-44.

DRELICHMAN, M. (2005). The curse of Moctezuma: American silver and the Dutch Disease. *Explorations in Economic History* **42**, pp. 349-80.

DURAN i PUJOL, M. (1985). L'evolució de l'ingrés senyorial a Catalunya (1500-1799). *Recerques* **17**, pp. 7-42.

FEDERICO, G. and MALANIMA, P. (2004). Progress, decline, growth: product and productivity in Italian agriculture, 1000-2000. *Economic History Review* **57**, 3, pp. 437-64.

FEINSTEIN, C.H. (1998). The United Kingdom in 1851. A quantitative picture of the economy at mid-century. University of Oxford (mimeo).

FELIU, G. (1991). *Precios y salarios en la Cataluña moderna.* Madrid: Banco de España. 2 vols.

FELIU, G. (2004). Aproximació a un índex del cost de la vida a Barcelona, 1501-1807. In *Josep Fontana. Història i projecte social*. Barcelona: Crítica, 1, pp. 151-170.

FENOALTEA, S. (2005). The growth of the Italian economy, 1861-1913: Preliminary second-generation estimates. *European Review of Economic History* **9**, 3, 273-312.

FLORA, P. (1981). Historical Process of Social Mobilization: Urbanization and Literacy, 1850-1965. In S. N. Eisenstadt and S. Rokker (eds). *Building State and Nation*, pp. 213-258.

FLYNN, D.O. (1982). Fiscal Crisis and the Decline of Spain (Castile). *Journal of Economic History* **42**, 1, pp. 139-147.

FORSYTH, P. J. and NICHOLAS, S. J. (1983). The decline of Spanish industry and the price revolution: a neoclassical analysis. *Journal of European Economic History* **12**, 3, pp. 601-10.

GARCÍA SANZ, A. (1981). Jornales agrícolas y presupuesto familiar campesino en España a mediados del siglo XIX. *Anales del CUNEF (1979-80)*, pp. 49-71.

GARCÍA SANZ, A. (1986). *Desarrollo y crisis del Antiguo Régimen en Castilla la Vieja. Economía y sociedad en tierras de Segovia, 1500-1814*. Madrid: Akal.

GARCÍA SANZ, A. (1991). Población e industrial textil en una ciudad de Castilla: Segovia 1530-1750. In J. Nadal Oller (ed). *La evolución demográfica bajo los Austrias*. Alicante: Instituto de Cultura Juan Gil-Albert, pp. 153-168.

GLICK T.F. (1979). *Islamic and Christian Spain in the early Middle Ages*. Princeton: Princeton University Press.

GUTIÉRREZ ALONSO, A. (1989). *Estudio sobre la decadencia de Castilla. La ciudad de Valladolid en el siglo XVII*. Valladolid: Universidad de Valladolid.

HAMILTON, E. J. (1934). *American Treasure and the Price Revolution in Spain, 1501-1650.* Cambridge, MA: Harvard University Press.

HAMILTON, E. J. (1936). *Money, Prices and Wages in Valencia, aragon and Navarre: 1351-1500.* Cambridge, MA: Harvard University Press.

HAMILTON, E.J. (1947), *War and Prices, 1651-1800*. Cambridge, MA: Harvard University Press.

HOFFMAN, P. T., JACKS, D. S., LEVIN, P. A., and LINDERT, P. H. (2002). Real inequality in Europe since 1500. *Journal of Economic History* **62**, 2, pp. 322-55.

HORLINGS, E. (1997). The contribution of the service sector to Gross Domestic Product in Belgium, 1835-1990. Universiteit Utrecht Research Memorandum

HORLINGS, E. AND SMITS, J.P. (1997). A Comparison of the pattern of growth and structural change in the Netherlands and Belgium, 1800-1913. *Jahrbuch für Wirtschaftsgeschichte* **2**, pp. 83-106.

IRADIEL MURUGARREN, P. (1974). *Evolución de la industria textil castellana en los siglos XIII-XVI*. Salamanca: Universidad de Salamanca.

IRADIEL, P., S. MORETA, S., and E. SARASA (1989). *Historia medieval de la España cristiana*. Madrid: Cátedra.

IZQUIERDO BENITO, R. (1983). *Precios y salarios en Toledo durante el siglo XV (1400-1475)*. Toledo: Caja de Ahorro Provincial de Toledo.

JACKSON, R.V. (1985). Growth and deceleration in English agriculture, 1660-1790. *Economic History Review* **38**, 3, pp. 333-51.

KANEDA, H. (1968). Long-term changes in food consumption patterns in Japan, 1878-1964. *Food Research Institute Studies* **8**, 1, pp. 3-32.

KUZNETS, S. (1966). *Modern Economic Growth : Rate, Structure, and Spread.* New Haven: Yale University Press.

LADERO QUESADA, M. A. (1981). Población, economía y sociedad, in *Historia General de España y América,* vol. 5, Madrid: Rialp, pp. 3-105.

LEUWEN, van B. and J.L.van ZANDEN (2009). The Origins of Modern Economic Growth? Holland between 1500 and 1800. University of Warwick and IISG, Amsterdam

LEWIS, W.A. (1955). *Theory of Economic Growth*. London: George Allen and Unwin.

LLOPIS AGELÁN, E., JEREZ, M., ÁLVARO, A., AND FERNÁNDEZ, E. (2000). Índices de precios de la zona noroccidental de Castilla y León, 1518-1650. *Revista de Historia Económica* **18**, 3, pp. 665-84.

LLOPIS AGELAN, E. and GONZÁLEZ MARISCAL, M. (2006). La tasa de urbanización en España a finales del siglo XVIII: el problema de las agrociudades. AEHE Documentos de Trabajo 0602.

LÓPEZ-SALAZAR, J. (1986). *Estructuras agrarias y sociedad rural en la Mancha (siglos XVI-XVII).* Ciudad Real: Instituto de Estudios Manchegos.

LLUCH, C. (1969). C. Elasticidades de Engel y de precios para los grandes categorías de bienes de consumo en España, *Moneda y Crédito* **108**, pp. 47-94.

LLUCH, C., POWELL, A.A., and WILLIAMS, R.A. (1977). *Patterns in Household Demand and saving.* New York: Oxford University Press for the World Bank.

MACKAY, A. (1977). *Spain in the Middle Ages. From Frontier to Empire, 1000-1500*. Houndsmill, Basingstoke: Palgrave Macmillan.

MACKAY, A. (1981). *Money, Prices and Politics in Fifteenth-century Castile*. London: Royal Historical Society.

MADDISON, A. (2006). *The World Economy.* París: OECD Development Centre.

MALANIMA, P. (1998). Italian cities, 1300-1800. A quantitative approach. *Rivista di Storia Economica,* **14**, 2, pp. 91-126.

MALANIMA, P. (2003). Measuring the Italian economy 1300-1861. *Rivista di Storia Economica* **19**, 3, pp. 265-95.

MALANIMA, P. (2005). Urbanization and the Italian economy during the last millennium. *European Review of Economic History* 9, 1, pp. 97-122.

MALANIMA, P. (2007). Wages, productivity and working time in Italy (1270-1913). *Journal of European Economic History* **36**, 1, pp. 127-171

MALANIMA, P. (2011). The long decline of a leading economy: GDP in central and northern Italy, 1300–1913. *European Review of Economic History*

MONTEANO, P. J. (2001). La Peste Negra en Navarra. La catástrofe demográfica de 1347-1349. Príncipe de Viana, 62, 222, pp. 87-120.

MORAL RUIZ, J. del (1979). *La agricultura española a mediados del s. XIX (1850-1870).* Madrid: Ministerio de Agricultura

MORENO LÁZARO, J. (2002). ¿Fomentó el capitalismo agrario la desigualdad? Salarios y niveles de vida en Castilla la Vieja, 1751-1861. In J.M. Martínez Carrión (ed). *El nivel de vida en la España rural, siglos XVIII-XX*. Alicante: Universidad de Alicante, pp. 75-112.

NADER, H. (1977). Noble income in sixteenth-century Castile: The case of the Marquises of Mondejar, 1480-1580. *Economic History Review* **30**, 3, pp. 411-28.

NAKAMURA, J. (1965). Growth of Japanese agriculture, 1875-1920. In W.W. Lockwood (ed). *The State and Economic Enterprise in Japan. Essays in the Political Economy of Growth*. Princeton: Princeton University Press.

NIETO SÁNCHEZ, J.A. (2006). *Artesanos y mercaderes. Una historia social y económica de Madrid 1450-1850*. Madrid: Fundamentos.

OVERTON, M. (1996). Re-establishing the agricultural revolution. *Agricultural History Review* **44**, I, pp. 1-20.

PAMUK, S. (2007). The Black Death and the Origins of the 'Great Divergence' across Europe, 1300-1600. *European Review of Economic History* 11, 3: 289-317.

PÉREZ MOREDA, (1988). La población española. In M. Artola (ed.), *Enciclopedia de Historia de España* **1.** *Economía y sociedad*, pp. 345-431

PÉREZ MOREDA, V. AND REHER, D.S. (2003). Hacia una definición de la demografía urbana: España en 1787. *Revista de Demografía Histórica* **21**, 1, pp. 113-40

PFISTER, U. (2009). German Economic Growth, 1500-1850. Historisches Seminar, Westfälische Wilhelms-Universität Münster.

PLADEVALL, A. (1962). La disminució de poblament a la Plana de Vich a mitjans del segle XIV, in *VI Asamblea d´Estudis Comarcals*, Vich, pp. 23-35.

PONSOT, P. (1986). *Atlas de Historia Económica de la Baja Andalucía (Siglos XVI-XIX)*. Sevilla: Editoriales Andaluzas Unidas.

PRADOS DE LA ESCOSURA, L. (1982a). Comercio exterior y cambio económico en España (1792-1849). In Anes, G., Artola, M., Fontana, J., and Tedde, P. (eds.), *La economía española al final del Antiguo Régimen*. 4 vols. Madrid: Alianza, iii, pp. 171-249.

PRADOS DE LA ESCOSURA, L. (1984). El comercio hispano-británico en los siglos XVIII y XIX. I. Reconstrucción. *Revista de Historia Económica* **2**, 2, pp. 113-162.

PRADOS DE LA ESCOSURA, L. (1988). *De Imperio a nación. Crecimiento y atraso económico en España (1780-1930).* Madrid: Alianza.

PRADOS DE LA ESCOSURA, L. (1989). La estimación indirecta de la producción agraria en el siglo XIX: réplica a Simpson. *Revista de Historia Económica* **7**, 3, pp. 703-718.

PRADOS DE LA ESCOSURA, L. (1993). La pérdida del imperio y sus consecuencias económicas. In L. Prados de la Escosura and S. Amaral (eds.), *La independencia americana: consecuencias económicas*. Madrid: Alianza, pp. 253-300.

PRADOS DE LA ESCOSURA, L. (2000). International comparisons of real output, 1820-1990: An Alternative Data Set. *Explorations in Economic History* **37**, 1, pp. 1-41.

PRADOS DE LA ESCOSURA, L. (2003). *El progreso económico de España, 1850-2000*, Madrid: Fundación BBVA.

PRADOS DE LA ESCOSURA, L. (2007). Growth and Structural Change in Spain, 1850-2000: A European Perspective. *Revista de Historia Económica / Journal of Iberian and Latin American Economic History* 25, 1, pp. 147-181.

PRADOS DE LA ESCOSURA, L. and ROSÉS, J.R. (2009). The Sources of Long-run Growth in Spain, 1850-2000". *Journal of Economic History* 69, 4, pp. 1063-1091.

REHER, D. S. (1990). *Town and Country in Pre-industrial Spain.* Cambridge: Cambridge University Press.

REHER, D. S. (1991). Dinámicas demográficas en Castilla la Nueva, 1550-1900: un ensayo de reconstrucción. In J. Nadal Oller (ed). *La evolución demográfica bajo los Austrias*. Alicante: Instituto de Cultura Juan Gil-Albert, pp. 17-75.

REHER, D. S. and BALLESTEROS, E. (1993). Precios y salarios en Castilla la Nueva: la construcción de un índice de salarios reales, 1501-1991. *Revista de Historia Económica* **11**, 1, pp. 10151.

REIS, J. (2005). Economic growth, human capital formation and consumption in Western Europe before 1800. In R.C. Allen, T. Bengtsson, and M. Dribe (eds). *Living Standards in the Past. New Perspectives on Well-being in Asia and Europe*. Oxford: Oxford University Press, pp. 195-225.

RINGROSE, D. R. (1983). *Madrid and the Spanish Economy, 1560-1850.* Berkeley: University of California Press.

RODRÍGUEZ MOLINA, J. (1978). *El Reino de Jaén en la Baja Edad Media: aspectos demográficos y económicos*. Granada: Universidad, Secretariado de Publicaciones.

ROMANO, R. (1957). Documenti e prime considerazioni intorno alla 'Balance du Commerce' della Francia dal 1716 al 1780. In *Studi in Onore di Armando Sapori*. 2 vols. Milano, i, pp. 1265-1300.

RUBIO VELA, A. (1987). Crisis agrarias y carestías en las primeras décadas del siglo XIV. El caso de Valencia, *Saitabi,* **37**, pp. 131-147.

ROSÉS, J.R., K.H. O'ROURKE, and J.G. WILLIAMSON (2007). Globalization, Growth and Distribution in Spain, 1501-1913. National Buereau of Economic Research Working Paper 13055.

SANTOLAYA HEREDERO, L. (1991). *Una ciudad del Antiguo Régimen: Toledo en el siglo XVIII*. Madrid: Universidad Nacional de Educación a Distancia.

SANTAMARÍA ARÁNDEZ, A. (1969). La peste negra en Mallorca, en *La corona de Aragón en el siglo XIV,* 1, pp. 65-70.

SANZ FUENTES, M. J. (1987). El ordenamiento de precios y salarios otorgado por Pedro I en 1351. Cuaderno de la villa de Écija. Estudio y edición, en *Homenaje al profesor Juan Torres Fontes,* II, Murcia, pp. 1563-1574.

SEBASTIÁN AMARILLA, J. A. (1990). La renta de la tierra en León durante la Edad Moderna. Primeros resultados y algunas reflexiones a partir de fuentes monásticas. *Revista de Historia Económica* **8**, 1, pp. 53-80.

SIMPSON, J. (1989). La producción agraria y el consumo español en el siglo XIX. *Revista de Historia Económica* **7**, 2, pp. 355-88.

SIMPSON, J. (1992). Technical change, labour absorption and living standards in rural Andalucía 1886-1936. *Agricultural History* **66**, 3, pp. 1-24.

SIMPSON, J. (1995). *Spanish Agriculture: The long siesta (1765-1965)*. Cambridge: Cambridge University Press.

SMITS, J.P., HORLINGS, E., and VAN ZANDEN, J.L. (2000). *Dutch GNP and Its Components 1800-1913***.** Groningen Growth and Development Centre, Monograph Series, #5. http://www.ggdc.net/index-dseries.html#top

SOBREQUÉS CALLICÓ, J. (1970-71). La peste negra en la Península Ibérica. *Anuario de Estudios medievales,* 7, pp. 67-102

TEMIN, P. (2006). The economy of the early Roman empire. *Journal of Economic Perspectives* **20**, 1, pp. 133-51.

TILLY, R. (1978). Capital formation in Germany in the nineteenth century. In P. Mathias and M. Postan (eds) *Cambridge Economic History of Europe*. VII, 1, pp. 382-441

TOUTAIN, J.C. (1997). Le produit intérieur de la France de 1789 à 1994. *Economies et Sociétés, XXXI. Série AF Histoire quantitative de l'Economie francaise* (Cahiers de l'ISMEA).

VACA LORENZO, A. (1983). Una manifestación de la crisis castellana del siglo XIV: la caída de las rentas de los señores feudales. El testimonio del monasterio de Sahagún, *Studia Historica. Historia medieval,* 1, pp. 157-166.

VACA LORENZO, A. (2001-2002). La peste negra en Castilla: la primera et grande pestilencia que es llamada mortandad grande, *Fundación,* 4, pp. 19-49.

VALDEÓN BARUQUE, J. (1966). *Enrique II de Castilla: la guerra civil y la consolidación del régimen (1366-1371)*. Valladolid: Universidad de Valladolid.

VALDEÓN BARUQUE, J. (1969). Aspectos de la crisis castellana en la primera mitad del siglo XIV. *Hispania,* **29**, 111, pp. 5-24.

VAN ZANDEN, J. L. (1999). Wages and the standard of living in Europe, 1500-1800. *European Review of Economic History* **3**, 2, pp. 175-98.

VAN ZANDEN, J. L. (2001). Early modern economic growth. A survey of the European economy, 1500-1800. In M. Prak (ed). *Early Modern Capitalism, Economic and Social Change in Europe 1400-1800*. London: Routledge, pp. 69-87.

VAN ZANDEN, J. L. (2005a). Cobb-Douglas in pre-modern Europe. Simulating early modern growth. International Institute for Social History Working Paper IISH.

VAN ZANDEN, J. L. (2005b). Una estimación del crecimiento económico en la Edad Moderna. *Investigaciones de Historia Económica* **2**, pp. 9-38.

VERLINDEN, Ch. (1938). La grande peste de 1348 en Espagne. Contribution a l´étude de sus conséquences économiques et sociales. *Revue Belge de Philologie et d´Histoire* XVII, 1/2, pp. 103-146

VILAR, P. (1962). *La Catalogne dans l'Espagne moderne. Recherches sur les fondements économiques des structures nationales*. 3 vols. Paris: SEVPEN.

VILAR, P. (1970). Estructures de la societat espanyola cap al 1750. *Recerques* **1**, pp. 9-32.

WRIGLEY, E. A. (1985). Urban growth and agricultural change: England and the Continent in the Early Modern Period. *Journal of Interdisciplinary History* **10**, 4, pp. 683-728.

VOTH, H.J. (1998). Time and work in eighteenth-century London. *Journal of Economic History* **58**, 1, pp. 29-58.

YUN-CASALILLA, B. (1987). *Sobre la transición al capitalismo en Castilla. Economía y sociedad en Tierra de Campos (1500-1830).* Valladolid: Junta de Castilla y León.

YUN-CASALILLA, B. (1994). Proposals to quantify long-term performance in the Kingdom of Castile, 1550-1800. In A. Maddison and H. van der Wee (eds.), *Economic Growth and Structural Change. Comparative Approaches over the Long Run*. Milan: Università Bocconi, pp. 97-110. (Updated version).

YUN-CASALILLA, B. (2004). *Marte contra Minerva. El precio del Imperio Español, c. 1450-1600.* Barcelona: Crítica.

ZULAICA PALACIOS, F. (1994). *Fluctuaciones económicas en un período de crisis. Precios y salarios en Aragón en la Baja Edad Media.* Zaragoza: Institución Fernando El Católico.

Appendix: Data sources and procedures

All prices, wage rates, and land rents used are quoted in silver. Original regional series have been converted into grams of silver with the silver content of coins from Casado Alonso (1991), MacKay (1981), Hamilton (1934, 1936, 1947) and Felíu (1991).

Unweighted Divisia indices were derived for agricultural and industrial goods and the CPI for the Kingdoms of Castile and Aragon. Aggregate indices for Spain were obtained by assigning weights of two-thirds and one-third to the price indices of the Kingdoms of Castile and Aragon, respectively, as a crude way to capture their relative size in terms of population.

The index for agricultural prices was constructed on the basis of local indices built with original data from the following sources: for the pre-1500 era, Lérida, 1361-1500, Argilés (1998); Aragon, 1276-1429, Zulaica (1994), and 1429-1497, Hamilton (1936); Valencia, 1413-1501, Allen (2001); Toledo, 1401-1475, Izquierdo (1983); and Burgos, 1352-1501, Casado Alonso (1985, 1991, 2009) and MacKay (1981). For the period 1501-1800 price indices were constructed from the following sources: Felíu (1991), for Catalonia; Hamilton (1934, 1947), for New Castile, Andalusia, and Valencia; Llopis et al. (2001) and Moreno (2002), for Old Castile. Lastly, for the years 1800-1850, Bringas (2000) index for Spain has been used.

An index of manufacturing prices for 1276-1500 was constructed on the basis of those we previously built on the basis of original data for Aragon, 1276-1429, Zulaica (1994) and 1429-1500, Hamilton (1936); Toledo, 1401-1475, Izquierdo (1983); Burgos, 1390-1500, MacKay (1981) and Casado Alonso (1985, 1991). For the period 1501-1860, we used the aggregate manufacturing price index in Rosés, O'Rourke and Williamson (2007) kindly supplied by Joan Rosés.

A CPI for 1276-1501 was constructed as weighted average of agricultural (0.75) and industrial (0.25) Divisia price indices, except for Valencia, taken from Allen (2001). For 1501-1860, a Divisia index was derived from regional CPIs: Catalonia, 1501-1807, Felíu (1991), and 1830-1860, Maluquer de Motes (2005); Valencia, 1501-1785, Allen (2001); New Castile, Reher and Ballesteros (1993); Old Castile, 1518-1650, Llopis et al. (2001), and 1751-1860, Moreno (2002).

Divisia indices for nominal wage rates were computed from the following sources: Aragon, 1277-1423, Zulaica (1994), and 1423-1497, Hamilton (1936); Lérida, 1361-1500, Argilés (1998); Valencia, 1413-1500, Allen (2001); Toledo, 1401-1475, Izquierdo (1983); Burgos, 1390-1500, Casado Alonso (1985, 1991) and MacKay (1981). For 1501-1860, the sources used were: Catalonia, Felíu (2004) and Maluquer de Motes (2005); New Castile, Reher and Ballesteros (1993); Old Castile, Moreno (2002); Valencia Allen (2001).

Unweighted Divisia indices for land rents were built from data in the following sources: Aragon, 1318-1416, Zulaica (1994); Burgos, 1320-1520, Casado Alonso (1987, 2009); Andalusia, western, 1504-1845, Ponsot (1986), and Jaen, 1520-1672, Corona (1994); Old Castile, Leon, 1569-1835, Sebastián Amarilla (1990); Segovia, 1651-1690, 1780-1817, García Sanz (1986); Avila, 1790-1841, Llopis (personal communication); Zamora, 1683-1840, Álvarez Vázquez (1987); Catalonia, Gerona, 1520-1800, Duran (1985).

Urbanization rates: Spanish urban population, adjusted to exclude population living on agriculture, at benchmark years over 1530-1857, from Álvarez-Nogal and Prados de la Escosura (2007), was projected backwards to 1420, 1300, and 1000 with an estimate of urban population on the basis of the data base in Bairoch et al. (1988: 15-21), corrected for 1000 and 1300 with estimates by Glick (1979) and Bosker et al (2008), respectively. Adjusted urbanization rates, namely, the ratio of adjusted urban population to total population were, then, computed. Population estimates are taken from Pérez Moreda (1988) and Álvarez-Nogal and Prados de la Escosura (2007).

Table 1

Growth of Agricultural Goods Consumption per Head (%)

	(I)	**(II)**	**(III)**
Real per capita income proxied by:	wage rates	stable wage earnings	wage rates and land rent
1280/9-1340/9	0.22	-0.03	
1340/9-1370/9	-1.33	-0.71	-1.29
1370/9-1590/9	-0.13	-0.11	-0.08
1590/9-1670/9	-0.13	-0.12	-0.21
1670/9-1790/9	-0.11	0.00	-0.06
1790/9-1850/9	0.22	0.02	0.12
1280/9-1850/9	-0.09	-0.08	

Sources: See the text and Appendix.

Table 2

Adjusted Rate of Urbanization* (%)

1000	8.0
1300	8.8
1400	7.5
1530	9.9
1591	14.5
1700	11.1
1750	13.5
1787	17.4
1857	23.2

***** Share of population in towns of 5,000 and over, excluding those living on agriculture
Sources: post-1530, Álvarez-Nogal and Prados de la Escosura (2007); pre-1530, see the text and Appendix

Table 3

Real Output per Head Growth (%)

1280/9-1340/9	0.12
1340/9-1370/9	-0.69
1370/9-1590/9	0.15
1590/9-1670/9	-0.18
1670/9-1790/9	0.11
1790/9-1850/9	0.33
1280/9-1850/9	0.04

Sources: See the text.

Table 4

Output per Head in Western Europe (U.K. in 1850 = 100)*

	Belgium	**U.K.**	**France**	**Germany**	**Italy**	**Netherlands**	**Spain**
1300		34.9			79.7		50.2
1400	89.7	44.4	52.2	51.8	68.2		48.3
1500	62.4	45.6	50.0	41.9	68.7	62.2	49.2
1600	67.8	40.3	50.0	36.8	65.8	67.0	50.4
1700	67.7	58.2	53.6	32.9	65.2	73.1	47.1
1750	54.7	72.1	55.2	35.5	73.6	72.7	45.2
1800	51.5	73.4	55.8	39.2	64.3	68.4	52.3
1850	74.2	100.0	78.1	60.9	66.0	79.1	63.8

Note: * Relative levels to the U.K. in 1850, Prados de la Escosura (2000). For Italy the level in 1850 was assumed to be that of 1861. Agricultural consumption per head computed using real wage rates as a proxy for real per capita income.

Sources: For Spain, as in Table 3; For other countries, the following sources have been used: Population, agricultural output, and urbanization for 1300-1800, Allen (2000); urbanization for 1850, Bairoch (1988)
Agricultural output in 1850, Allen (2004), England; Horlings and Smits (1997), Belgium; Horlings, Smits, and van Zanden (2000), Netherlands; Tilly (1978), Germany; Toutain (1997); and Federico and Malanima (2004), Italy 1300-1850.
For Italy's population and urbanization, Malanima (1998, 2003, 2005). Population figures for 1850, de Vries (1984).
Sector shares in GDP, derived from Horlings (1997), Belgium; Toutain (1997), France; Hoffmann (1965), Germany; Fenoaltea (2005), Italy (1861); Horlings, Smits, and van Zanden (2000), Netherlands; Feinstein (1998), U.K.
See also the text.

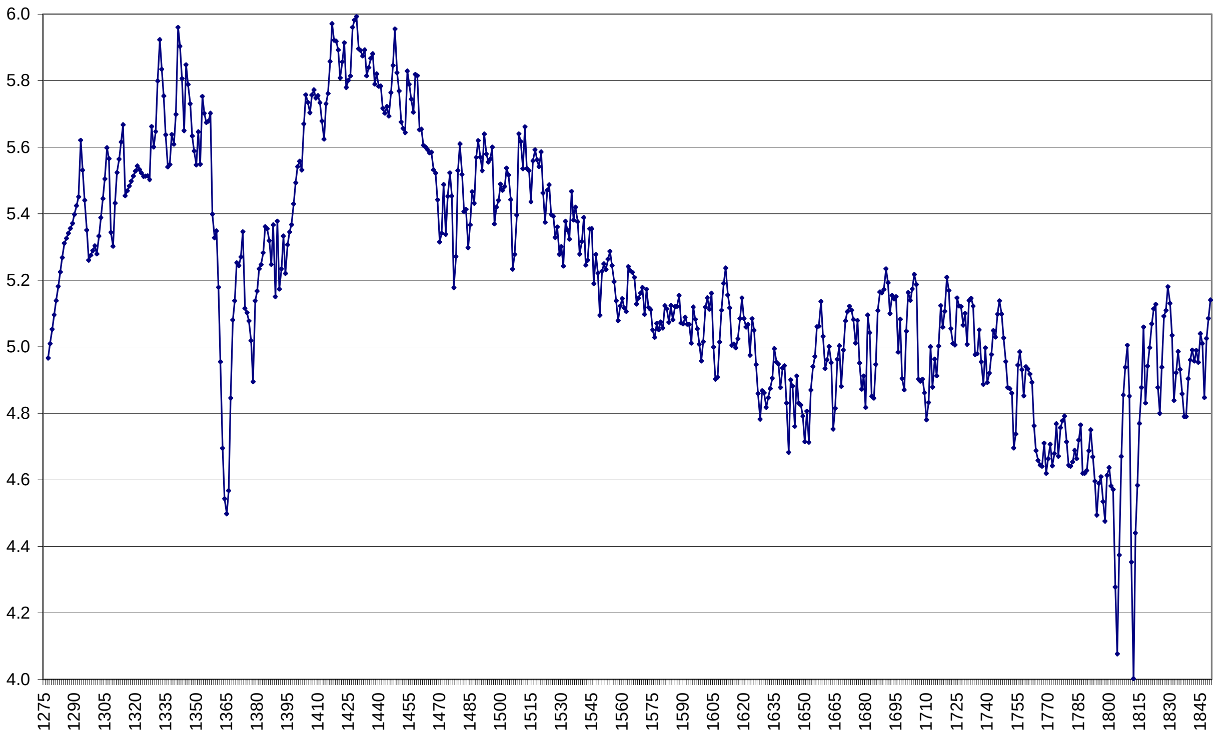

Figure 1 Real Wage Rates, 1277-1850 (1790/99 = 100) (logs)
Sources: See Appendix

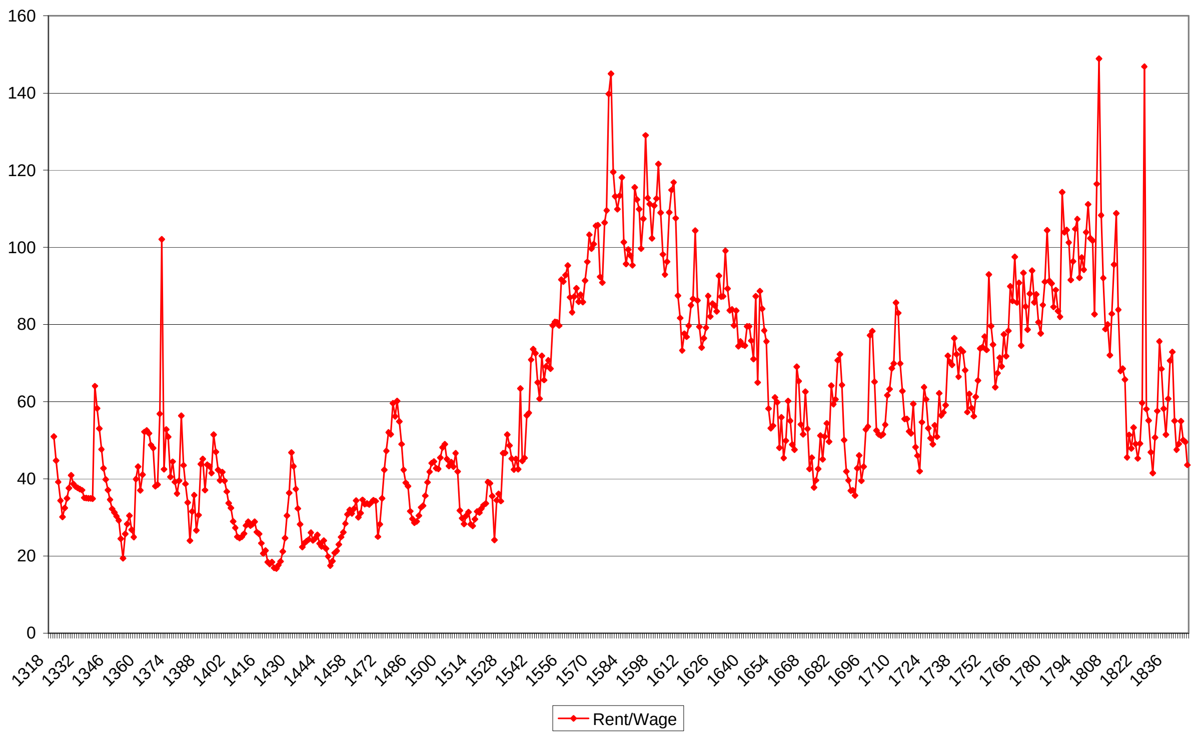

Figure 2 Land Rent- Wage Rate Ratio, 1320-1845 (1790/99 = 100)
Sources: See Appendix

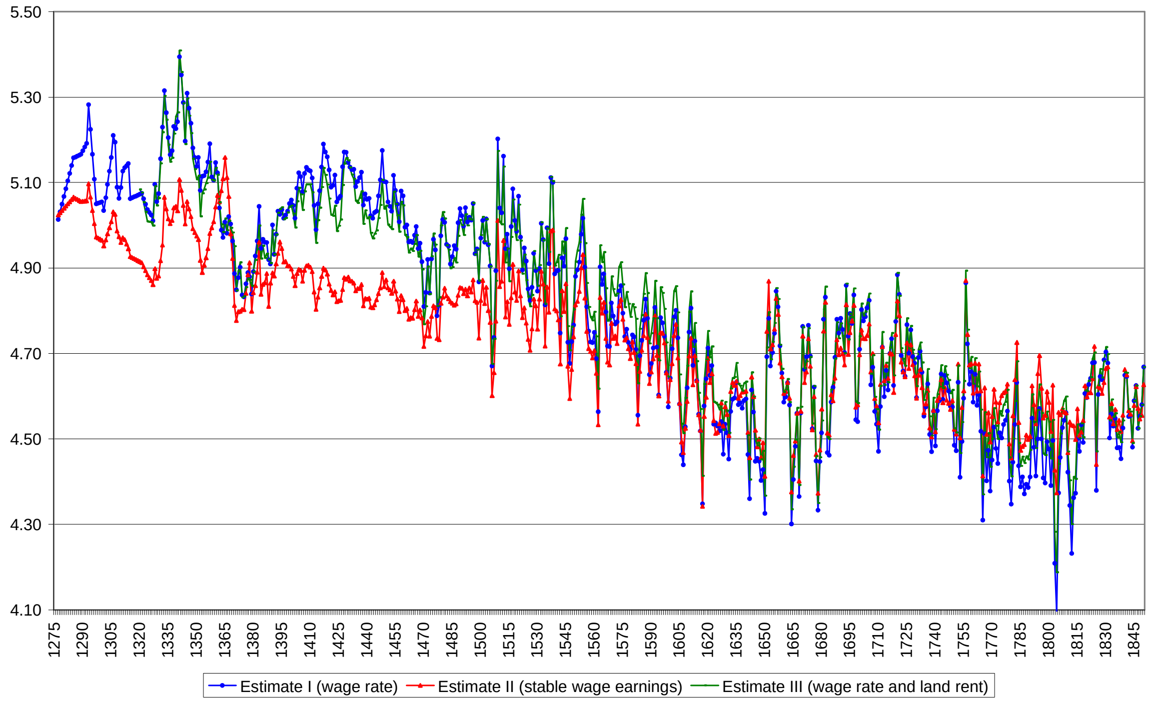

Figure 3 Real Consumption per Head of Agricultural Goods, 1277-1850: Alternative Estimates (1850/59 = 100) (logs)

Sources: See the text.

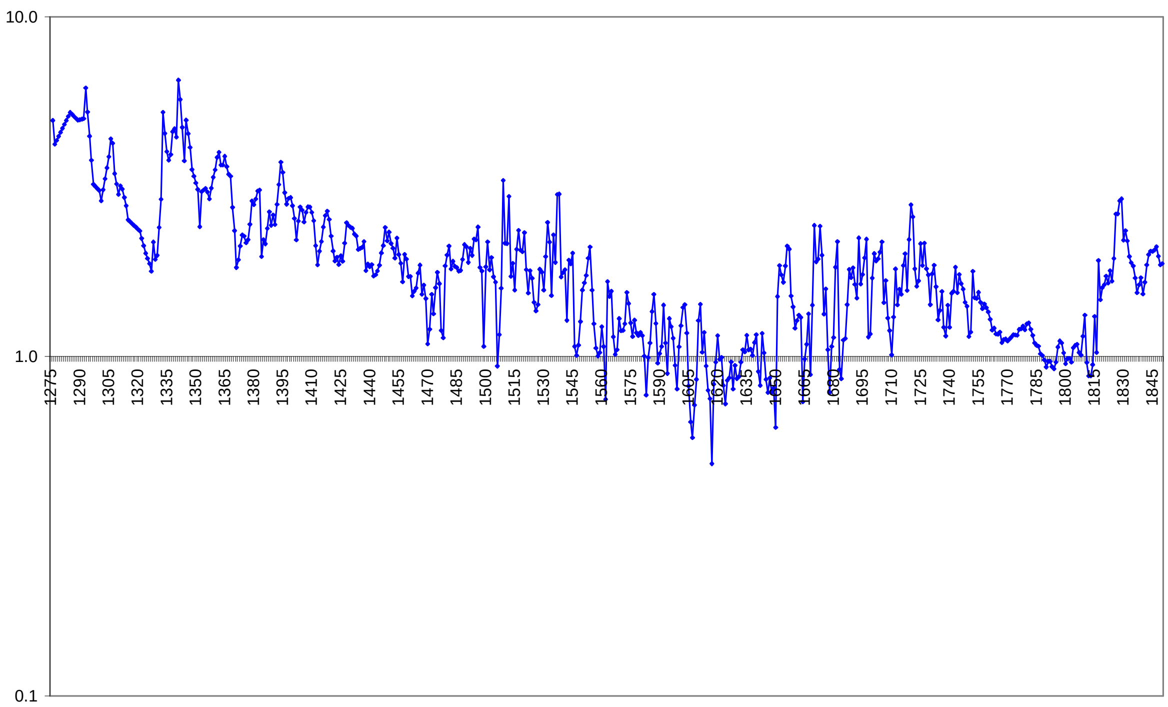

Figure 4 Ratio Industrial to Agricultural Prices, 1277-1850 (semilog)

Sources: See the text

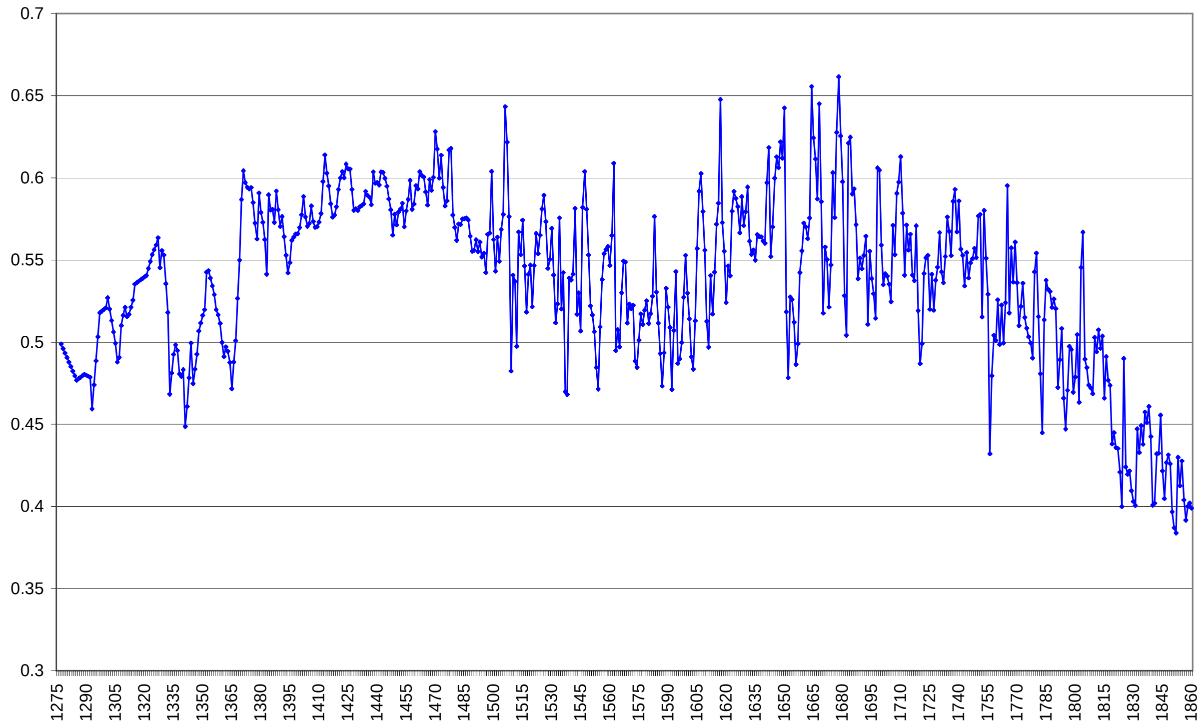

Figure 5 Share of Agriculture in GDP, 1277-1850 (current prices) (%)
Sources: See Appendix

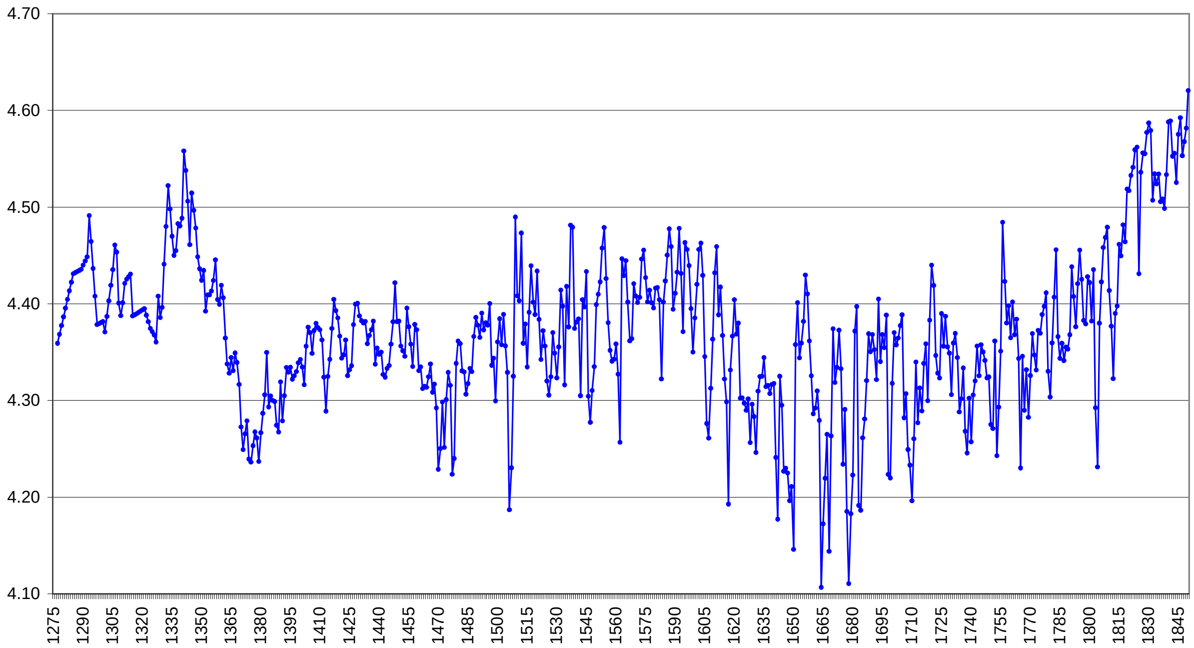

Figure 6 Real Output per Head, 1277-1850 (logs) (1850/59 = 100)
Sources: See the text

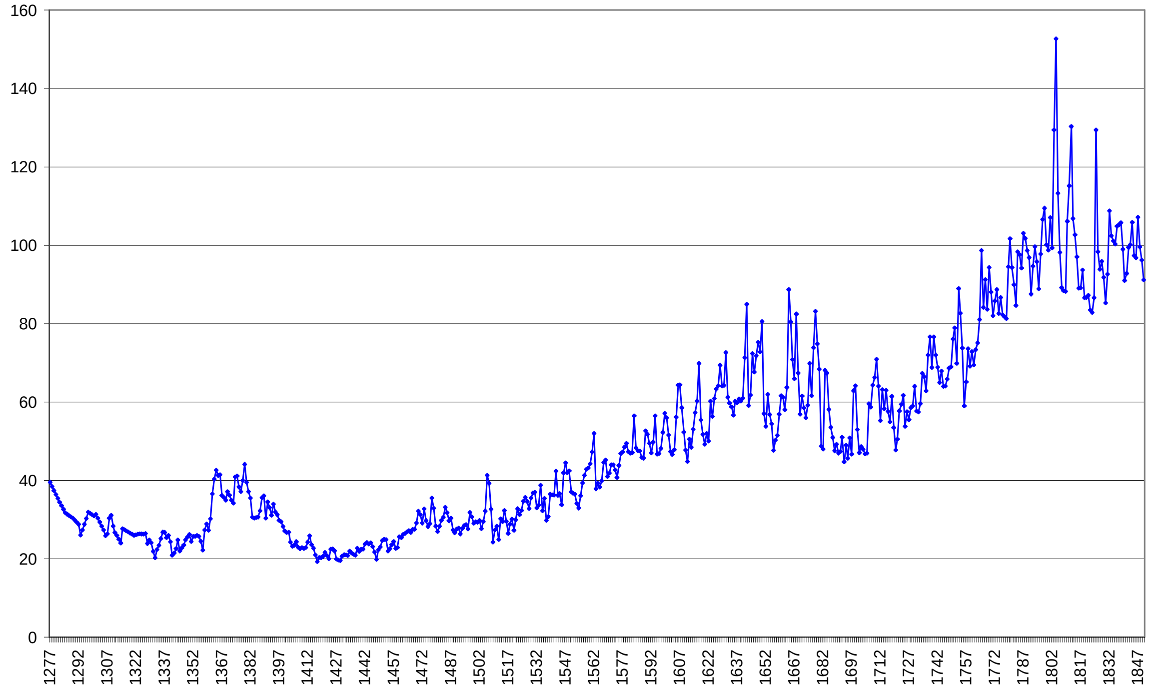

Figure 7 Inequality, 1277-1850 (1850/59 = 100)

Sources: See the text