

NEW ESTIMATES OF PORTUGAL'S GDP PER CAPITA, 1500-1850

Jaime Reis (ICS, Universidade de Lisboa)
Conceição Andrade Martins (ICS, Universidade de Lisboa)
Leonor Freire Costa (ISEG, Universidade Técnica de Lisboa)

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Address for correspondence: jaimereis@ics.ul.pt

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1. Introduction

The subject of Early Modern economic growth has enjoyed a certain vogue for at least a decade now. The focus has been essentially on European countries, though extra-European situations have been considered as well.¹ This interest in long run quantitative macro history has been largely motivated, *inter alia*, by a desire to set in a new perspective the study of the Industrial Revolution and of the industrialised economies of the 19th and 20th centuries as it has been conducted in the past. One of the questions arising has been the extent to which their evolution, between 1500 and 1800, influenced subsequent developments. Hence the considerable effort by scholars to determine long run rates of change in GDP, GDP per capita and in gross agricultural product, and to grasp thereby the degree of dynamism in pre-industrial economies, comparing these results with subsequent achievement. From the start, a particular concern has been to “liberate” this new area of research in European economic history from the traditional historiography’s firm belief in an inevitable stagnation during this period. This has clearly been achieved by now but not without divergence. Some studies have led to the conclusion that long term growth actually reached appreciable figures in Europe, others have found that though all economies grew over these centuries, in per capita terms long term gains were rare. In any case, all seem to agree that stasis can no longer be seen as the norm, and that the economic development of certain parts of Northwest Europe went so far as to prepare them for previously unheard of processes of change (Allen, 2009).

The crucial point in all of these recent efforts is the Kuznetsian relationship between structure and long term growth, now firmly adopted by Early Modern economic historians. This has meant their having to pay special attention to the study of the principal sectors of the economy and their interrelations and ceasing therefore to treat it

¹ For a good selection of examples of this wave of research on Early Modern European macro history, see the recent crop of papers at the 2009 World Economic History Congress, in Utrecht (session E4), which included papers on Britain, Italy, Spain, Germany, Turkey, the Netherlands, Belgium and Sweden.

as a block. A second paradigmatic shift has been the data-intensity of this field of research. A prior condition for any estimation of long term GDP before 1800 is now a massive effort at data gathering. This assumes of course that markets for goods and services must have been fairly developed by the time of their observation and that using prices as a yardstick for relative scarcity is meaningful. These two basic requirements have led this “informal international research program” to become remarkably homogeneous, in terms both of assumptions and methods. As a result, an attractive potential for comparative work has emerged, which provides in addition an opportunity, for the future, to move up from the country study level to that of broader regional analysis, or even to pan-European perspectives.

Before this should happen, however, some gaps in the map of Europe still need to be filled. The oil slick of Early Modern quantitative macro history has extended inexorably but unevenly. In some places, it is very dense but in other it is thinly spread, if at all. Portugal is one of the latter, although its contribution to a general European analysis of the period 1500-1800 is promising. It was one the two earliest cradles of European overseas expansion, yet paradoxically suffered a pronounced decline subsequent. This raises interesting issues concerning much debated relationships such as those between empire and economic performance, or between windfall colonial riches and under-development. Portuguese historiography has long portrayed it as a nation in permanent decline, though to what extent and why is something which still remains unresolved. Recent international comparisons have placed it among the “unsuccessful” economies of this era, those which failed to follow the steps of England and the Netherlands, never experiencing significant structural change, increased urbanisation or a contraction in the share of agricultural labour (Allen, 2000). But they also tend to lump Portugal together

with Spain and Italy too readily, stressing only the similarities, and neglecting the significant differences which also exist between these countries.

The aim of this paper is to fill this void with a data-intensive, up-to-date study of Portuguese long run macro economic performance. This should allow us to resolve the issue of its “decadence”, provide a more balanced view of the factors that determined its growth profile, and draw interesting contrasts and comparisons, particularly with countries of the Mediterranean region (Spain, Italy and Turkey). The results obtained thus far fit plausibly with the general picture of European economic evolution during these 350 years. Portugal experienced a low rate of structural change, a rapid growth in population and kept a stable urbanization rate. Nevertheless, gross domestic product grew about 2.5 times, mostly sustained by agricultural output. A sustained long run fall in welfare per person reflected the 30% reduction in GDP per capita, which over the entire period only had one 50-year period of growth (1700-1750). The contribution of non-agricultural economic activity (including the colonial sector) to GDP showed considerably variation. At times it played a substantial role, but never a consistent or lasting one. Like most of Europe, agricultural productivity declined, in this case by about the same amount as GDP per capita. One may want to question whether this was such a great reduction considering the concomitantly strong rise in the population-per-hectare ratio and the relative weak technological progress of the period.

Regarding Iberian comparisons, we can now assert that Portugal, like Spain enjoyed a similarly good standard of living at the time it was constructing its colonial domain (Alvarez-Nogal and Prados, 2007). Thus both empires were built not only on the bravery and character of conquerors and mariners, the traditional narrative, but also on a good resource availability. But Spain’s performance thereafter was superior. Over the next three centuries, its output per head performed better, both in the long and in the

medium term, though its agricultural productivity suffered a decline similar to that of Portugal. This suggests that, despite the “curse of Moctezuma” (Drelichman, 2005), Spain probably enjoyed a relative advantage in its non-agricultural sector which drove the wedge separating the two economies, a fact corroborated by the much faster rise of Spanish urbanization.

This paper follows on with a critical examination of the available quantifications of Portugal’s Early Modern economic effort, and evaluates them against recently calculated findings on the country’s standard of living. The third part presents the data – demographic and prices and wages – which will be employed to estimate our new version of the standard macro economic variables for Portugal. The fourth and fifth parts implement the two different procedures currently in use for such estimations. The sixth discusses the results obtained. It begins by assessing the outcomes generated by the two competing methodologies. It then goes on to establish international comparisons between Portugal’s performance and that of the Southern countries, especially Spain. Finally, it confronts the conventional view of Portuguese historiography regarding this period with this fresh approach to the great issues of Portugal’s long term economic evolution. The last section concludes.

We organize our account by using the set of benchmark years commonly adopted in the Early Modern growth literature. These are 1500, 1600, 1700, 1750 and 1800, to which we have added, as further intermediate points, 1550 and 1650 and the terminal date of 1850, to permit scrutinizing the transition to industrial society in Portugal.

2. What do we know about Portugal’s economic performance 1500-1850?

Portugal is a relative late newcomer in this field and unfortunately has failed to attract much attention from this point of view. In contrast with Spain, for example, it has never

been the object of the vigorous debates which to date have yielded already the eight different estimates of this country's long run GDP prior to the 19th century.² Instead, at present two studies only are available for Portugal, respectively by Angus Maddison (2001 and 2007) and Nuno Valério (2010).³ Although they represent significant progress in a scarcely ploughed field, much remains to be done to bring this knowledge up to the level of the current state of the art, as will become apparent when we consider the robustness of these conjectures.

Two main differences distinguish these approaches. That by Maddison (2010) is a tiny part of a much larger project, in fact of global proportions, while Valério's (2010) is a single country case study. Their degree of attention to detail is therefore hardly the same. Secondly, they differ quite sharply as to methodology. Maddison takes an estimate of Castille's long run GDP by Yun (1994) and assumes that it is representative of Spain as a whole. He then considers, without any historical or logical justification, that at this time Portugal had the same profile. Not surprisingly, it emerges that between 1500 and 1820 real GDP per capita grew in the two countries evolved at exactly the same rate, i.e. 0.13% a year, a finding that challenges plausibility. Given the weakness of his empirical base, Valério, on the other hand, makes do with a single proxy to arrive at a series for this variable.⁴ For reasons which are unclear, he uses the evolution of the urbanization rate to obtain directly the rate of change of real GDP per capita, and then anchors this to an 1850 benchmark in order to derive magnitudes at current prices for his various benchmarks. The advantage is that it introduces an element of structural determination in the exercise, which is an improvement over its predecessor. On the negative side, it ignores the possibility of the impact on GDP per capita of changes in

² They are compiled in Alvarez Nogal and Prados (2007).

³ In 1994, a pioneering paper on Portugal by Valério was presented at the Milan World Economic Congress in 1994 in a session chaired by Angus Maddison and Herman van der Wee. The first effort in this domain by Maddison in this direction dates from 1995 but was revised several times afterwards.

⁴ In the absence of alternative, richer data, this is a reasonable option. See De Long and Shleifer (1993).

the general level of productivity, or of structural modifications other than urbanization, e.g. proto-industrialization.

The two studies also bear some interesting resemblances to each other. Both are hampered by quite serious problems of data insufficiency - in terms of quantity and quality - and this, as we have seen, limits the scope for using more sophisticated methods.⁵ Secondly, neither attempts to verify the robustness of the results obtained. Maddison neglects this altogether. Valério checks whether his time line for GDP is confirmed by the current conventional historiographical wisdom and obtains a positive answer. He fails, however, to analyse the economic implications of his findings, or whether the model might suffer from biases caused by unidentified structural changes. Moreover, the historical narrative used to validate Portugal's macro performance is drawn in terms which are too narrow. It is based essentially on two factors which influence the course of per capita GDP: wars and imperial success or failure. The circumstances of the domestic economy are scarcely referred to and agriculture, the principle sector, remarkably, is never mentioned.

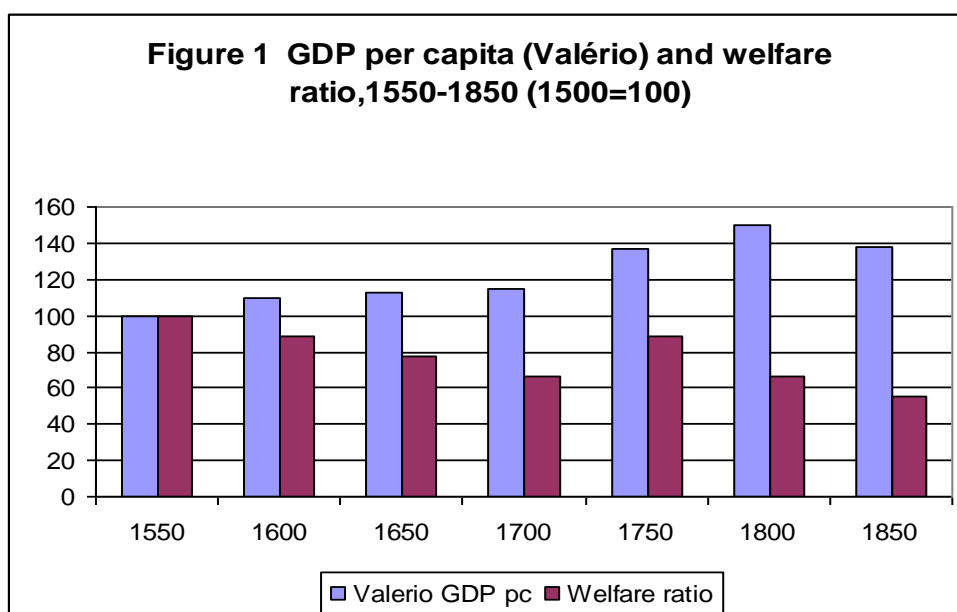
The two papers come close in their results too. Of particular interest is the fact that they coincide in the conclusion that Portugal's real per capita GDP in the long term followed a clear upward trend which exceeded the world's average performance. Between 1500 and 1820, according to Maddison this indicator gained 52% overall (0.13% a year), while in Valério's estimation this reached 71 % (0.17% a year). This not only contradicts the traditional perception of persistent "decadence" served up by the literature, but also goes against the majority of current early modernist opinion which favours a "pessimistic" view involving, in most cases, a downward trend instead. Given

⁵ Valério's exclusive reliance on the urbanization rate as a proxy for GDP per capita is also problematic, given the considerable uncertainty surrounding the quantification of Portuguese demographic variables. See below, section 3.2.

the fragile nature of the two conjectures, an independent test of their plausibility thus seems necessary.

A reasonable approach to this is to compare the figures for real GDP per capita with a standard of living indicator, such as the “welfare ratio” pioneered by Allen (2001). In the long run, it seems unlikely that they should diverge substantially from each other, particularly in the absence of great technological changes and unless there was reason to believe that a major redistribution of income had occurred.

Table 1 displays the two time series in question. It reveals that a considerable gap built up over time between Valério’s real GDP per capita variable and a newly estimated measure of a welfare ratio based on data collected for the capital city, Lisbon.⁶ Thus, except for an outlier in 1750, the Portuguese standard of living dropped persistently during 1550-1850, by some 40 %, which is clearly incompatible with a contemporaneous rise of similar magnitude in the proposed real per capita GDP variable. There is no obvious explanation of how this could have occurred.



Sources: Valério (2010) for GDP per capita and text for welfare ratio.

⁶ For a discussion and a more detailed presentation of this welfare ratio, see Costa and Reis (2009). The data used is described in section 3.1 below.

3. Data

3.1 Information from the market

Like its counterpart studies in other countries, this one also presupposes that markets in the Early Modern era played an important role in economic activity. Market signs therefore should be important for the production and consumption behaviour of economic agents and for understanding the outcomes of such decisions. Given this assumption, prices and wages are a highly relevant part of the present exercise.

Quantitative history in Portugal has a long and respectable tradition, which goes back to the 1950s and has yielded a considerable stock of data on prices. In its present state, this result suffers from several shortcomings, however, which render it unsuitable for purposes like the present one. Coverage is patchy over space and time. Data have been collected using different and not always the best procedures (sometimes without revealing these procedures at all). Sometimes, sources are difficult to track and results can therefore not be verified. In keeping with the times and the influence of the Annales school, hardly any information on wages or rents has been gathered.

In 2007, a consistent effort was launched to produce a single prices, wages and rents data base for Portugal, which would be exempt from these faults and would cover the period 1500-1910. By now more than 300,000 observations have been gathered from 3 different locations – Lisbon, Porto and Coimbra – and have yielded homogeneous and consistent time series for prices of a large number of items and for wages for a variety of manual and non-manual occupations. Residential and land rents have also been collected, though to a lesser extent. They come chiefly from the accounts of religious foundations, the University of Coimbra, charitable institutions, municipalities and also the royal palaces. All of them concern actual market situations and refer on the whole to transactions of small quantities. Thus, prices are retail, not wholesale, and are not

administered. Observations of each kind of price or wage have been taken at three or four points in the year and averaged to avoid the effects of seasonal fluctuation. In all the most important cases and with the exception of the 16th century, remaining gaps are not numerous and a certain amount of cautious interpolation has been possible. Prices have been normalized to correspond to metric units and wages rates are those paid by day exclusive of any non-monetary additional remuneration.⁷

In what follows and in order to simplify, only information from Lisbon has been used. The assumption that prices and wages from the country's main city – Lisbon - can represent the whole country may be justified on different grounds, including the fact that it is currently followed by many scholars. Portugal is a small country (89,000 square km) and Lisbon is located more or less in the middle. It had reasonable communications by sea and river with most of the country's regions and their markets. By European standards (Federico 2010), the integration of markets for basic food products at least in the 18th century was already fairly high (Justino 1988; Santos ???). In the case of labour, restrictions on its mobility were non-existent and qualitative evidence regarding internal labour migration during this period is plentiful. (Reis 2005b; Silbert, 1986).

The items for which we have constructed price series to use here fall into two groups: agricultural and non-agricultural. The first comprises wheat, beans, meat, wine, olive oil, eggs and hens. This corresponds to what might be called a “Lisbon diet” and is not representative of what people ate in the northern half of the country. If we replace wheat with maize in order to erase this difference, the result remains the same, however. The second group includes charcoal, linen, candles, soap and olive oil (used for lighting).

Wages are from the building sector and refer to craftsmen (masons and carpenters) and

⁷ For information on the “Prices, Wages and Rents in Portugal, 1500-1910” project, which is the origin of these historical statistics, see our unpublished paper “The Evolution of Prices and Wages in Lisbon over Three Centuries and a Half, 1500-1850” (2010).

unskilled workers. The rates of pay of the latter have been considered as representative of the unskilled labour force as a whole, those of the former constitute the “skilled labour” segment of the economy.

3.2 Demography and occupations

The second major item in our empirical base consists of the basic demographic series required for estimating GDP per capita in the Early Modern period, namely global population, urban population and how the population was distributed among economic activities. At the level of generalization employed here, the last of these requirements contemplates no more than the division between the agricultural and the non-agricultural sectors, the second of which in turn encompassed manufacturing, transport, trade and administration, wherever these were carried out. For lack of information, we shall not however follow these finer distinctions here.

Estimates for total and urban population can be easily obtained from the current literature on Portuguese demographics, which bases itself entirely on population counts, since no population census was ever taken during this period. We thus dispose of a sufficient number of benchmarks but, given the scarcity of archive-based demographic research, with little possibility of comprehending population movements between them and thus of testing the reliability of individual benchmark values. This would not be a serious problem, were it not for the lack of consensus among historical demographers of Portugal about how to interpret most of the available population counts. The consequences of this quite significant disparity of criteria - for example, regarding how many inhabitants to assume per hearth – is compounded by the fact that only rarely do their studies cover the whole of our period. Much of the literature concentrates on regions and sub-periods and complete overviews are few. Such patchiness means that to

construct a time series from 1500 to 1850, we may have to combine information from incongruent sources, which raises the probability of biases and error.

In order to establish a coherent data set for total and urban population, we resort to the figures advanced respectively by Serrão for global population, (1993) (with a linear interpolation of our own for 1550) and, for urbanization, by Bairoch (1988). Both sources have the advantage of providing a good number of benchmarks, complete coverage of the entire period and suggest an evolution which stands up reasonably to a critical appraisal of its plausibility. While we take the former series as it appears in the original, in the case of Bairoch's statistics some additional manipulation is necessary.⁸ Bairoch included in his estimate all urban centres that appeared in his sources irrespective of their size, and added them up to obtain "urban population". Since we want to exclude from this category all towns having less than 5,000 inhabitants, we have left out all the locations which did not satisfy this requirement. On the other hand, we have recovered the residents of all the towns which Bairoch dropped from his count every time they were not mentioned in the original source for a particular benchmark, though they are known to have continued to exist. When this happens, we assume that it was due to an error or omission, and not to a contraction of the population in question to a figure below our stipulated minimum. We have therefore interpolated the "missing" inhabitant at the level observed in the count of the previous benchmark, as long as this was not less than 5,000.

Tables 2A below displays these two series, respectively in columns 1 and 2, and is complemented by table 2B, where these data are converted into population shares. By simple arithmetic, we can also show in column 3 direct quantification of the size and share of the rural population. Altogether, this provides the foundation for the rest of this

⁸ For different reasons, Alvarez-Nogal and Prados (2007) have established urbanization data for Spain which also departs from Bairoch's. Our correction is smaller than theirs, however.

section and enable us to track how the broad economic and locational distribution of the population varied over these three and a half centuries

Two difficulties are raised by these figures. One is whether, in this historical context, we can necessarily take “urban” to be equivalent to “non-agricultural”. The other is whether it is warranted to identify “rural” with “agricultural”. These are important clarifications to make in that the estimation below of gross domestic and agricultural products will rely on knowledge of these proportions.

Table 2A- Portugal’s population by sector, 1500-1850
(millions)

	total	urban	rural	agric	rural non agric	total non agric
	1	2	3	4	5	6
1500	1,000	0,155	0,845	0,676	0,169	0,324
1550	1,363	0,192	1,171	0,807	0,389	0,582
1600	1,727	0,242	1,485	0,959	0,584	0,826
1700*	2,200	0,293	1,907	1,008	0,899	1,192
1750	2,400	0,429	1,971	1,271	0,700	1,129
1800	2,900	0,476	2,424	1,798	0,626	1,102
1850	3,471	0,607	2,864	2,315	0,549	1,156

Sources: col. 1 from Serrão (1993); col. 2 from Bairoch (1988), revised; col.4 derived from Reis (2005), Sá (2005) and interpolations from the Spanish case using Alvarez-Nogal and Prados (2007).

Note: * =1706

Table 2B- Portugal: sector ratios of total population
(except col.

	urban	rural	agric	rural non agric	total non agric	urban/tot non agric
	1	2	3	4	5	6
1500	0,155	0,845	0,676	0,169	0,324	0,478
1550	0,141	0,859	0,592	0,285	0,427	0,331
1600	0,140	0,860	0,555	0,338	0,478	0,293
1700*	0,133	0,867	0,458	0,409	0,542	0,246
1750	0,179	0,821	0,530	0,292	0,470	0,380
1800	0,164	0,836	0,620	0,216	0,380	0,432
1850	0,175	0,825	0,667	0,158	0,333	0,525

Sources: same as table 2A

As regards the first, both Allen (2000) and Van Zanden (2005) have argued that prior to 1800 a part of the agricultural labour force in Europe lived in urban units with a

population of more than 5,000, and not in the countryside. They have also claimed however that it represented only a tiny proportion of the total urban population. They have assumed, therefore, as a reasonable simplification, that in practice this segment can be taken as equal to zero. More recently, Alvarez-Nogal and Prados (2007) have claimed that, in the case of Spain's urban network, there was a significant presence of "agro-towns", in which agriculturalists were a large share of the population. This would invalidate that assumption and require the much more complicated treatment of the data so as to separate out the "urban agricultural" component. In the case of Portugal, agro-towns were present only in Alentejo, which represented only a small proportion of the national population and we have chosen to ignore this problem.⁹ In the second place, studies by Sá (2005) and Macedo (1982) have shown that the largest agglomerations in the 18th century, i.e. with more than 5,000 inhabitants, had few agriculturists in their midst.

Having solved this doubt on the basis of our definition of "urban", we now turn to the decomposition of the "rural population" (i.e., non-urban) into its "agricultural" and its "non-agricultural" segments. An immense body of evidence leaves us in no doubt that in Early Modern Portugal, as in the rest of Europe, a considerable number of residents of the countryside or small towns were involved in non-agricultural occupations. In this respect, proto-industrial activity springs immediately to mind, but transport, trade and public administration also absorbed significant amounts of labour. Taken together, these groups seem to have constituted a substantial proportion of both total and rural population and one which could vary considerably across time and space.

⁹ An unpublished study on the 18th c. population of Alentejo by Martins (...) reveals the large presence of agriculturists among the inhabitants of the "urban agglomerations" in that region. In 1801, the Alentejo represented less than 10 percent of the population of Portugal. Agro-towns existed already during the Middle Ages. See Mário Viana (2007) on Santarém, and Hermenegildo Fernandes (1991, thesis) on Beja. **Problem of Termo vs. Vila.**

To estimate the numbers of those involved in respectively agricultural and non-agricultural occupations we use the following two expressions:

$$R_{\text{nonAP}} = RP - AP \quad (1)$$

$$T_{\text{nonAP}} = UP + R_{\text{nonA}} \quad (2)$$

in which R_{nonAP} denotes the rural non-agricultural population, RP and AP stand for respectively the rural and agricultural populations, T_{nonAP} is the total non-agricultural population and UP signifies the urban population.

In order to pursue this calculation, the next requirement is to obtain reliable information on the agricultural population (AP). In the case of Portugal, it is available for only three benchmark years. One is 1500 and rests on the assumption reasonably made by Allen (2000) that, at the dawn of the Early Modern period, the occupational structure of all European countries was roughly the same. This further presumes that agriculture occupied some 80 percent of the rural population, with the remaining 20 percent corresponding to the rural non-agricultural population.¹⁰ Since we have the figure for the urban population in this year we are able to estimate from this the three basic segments of the occupational structure.¹¹

The second and third benchmarks are 1800 and 1850¹². They rely on a compilation by Reis (2005) of the country's main occupational groups during the 19th century derived from a variety of contemporary sources.¹³ In order to fill the remaining data gaps

¹⁰ These proportions are confirmed by the scarce evidence available for late medieval Portugal. According to Godinho (.), in Alenquer, a small provincial centre, at the end of the 15th century those engaged in agriculture represented 74 % of the entire population. We have excluded from this count the nobility and other privileged persons. Rodrigues (1989: 22) presents the case of Torres Vedras, a small town and its hinterland, in 1381, where the “non-agricultural population” came to 33% of the whole, again after excluding those exempt from taxes.

¹¹ Since we know the share of the urban population in this year (15.5 %), we can infer that the rural population in 1500 amounted to 845,000, given that total population was one million. Splitting the latter according to the “Allen rule”, we get an agricultural population of 656,000 (80% of the rural population) and 189,000 rural non-agricultural inhabitants.

¹² In fact, the figures for 1850 are a mean for 1841 and 1862 statistics in Reis (2005)..

¹³ A second, less plausible formulation for 1800 puts these shares at 14.9 %, 33.5 and 47.4% (Reis, 2005). A third, provided by Balbi (1822), gives these shares as 14.9%, 27.4% and 57.7%.

between 1500 and 1800, we use information on total population for these other benchmarks, as well as their respective urbanisation rates and shares of the rural population engaged in non-agricultural activities. This has been done in different ways. For 1750, we can extrapolate from direct evidence presented in the compilation of occupational statistics from tax and parish records by Sá (2005), in the cases which refer to years close to that date. This allows us to form a sample of some 110,000 non-urban individuals and to assign them to agricultural, manufacturing, trade, transport or other activities. Given that their provenance is spread widely across the country, we consider them to be reasonably representative and this permits an estimate of the “agricultural” and “non-agricultural” shares of the rural population at that time.

Unfortunately, adequate data of this type are not forthcoming yet for our earlier benchmarks (1550, 1600, 1650 and 1700). We have assumed therefore that the agricultural population of Portugal varied along the three intervals 1500-1550, 1550-1600, 1600-1700 in parallel fashion to what occurred in neighbouring Spain during the same intervals. The figures in columns 4 and 3 of, respectively, tables 2A and 2B have been adjusted accordingly, using data from Alvarez-Nogal and Prados (2007).¹⁴

The first two of these guesstimates - for 1550 and 1600 – are reasonable by the light of the accepted historiography. On the other hand, the last one, concerning 1700, may seem less plausible, as it would imply an increase of 50 % of the rural non-agricultural population over the whole of the 17th century and almost no increase in the agricultural population. If correct, this would certainly entail a significant increase in proto-industrial manufacturing, trade and transport, and a rise in agricultural productivity of the order of 30 %.

¹⁴ Consequently, we accept the procedure made explicit by these authors, i.e. linear interpolation. It is generally recognized that slaves imported from the African conquests were used to a certain extent in agriculture and non-agriculture. The totals for these sectors have been increased in accordance with the estimates by Saunders (2010) for 1500 and 1550 and assumed thereafter to have been stable to 1750, after which they disappeared. The effect of this correction is negligible.

How plausible is this? In the case of agricultural productivity, it should be noted that this was the time when maize cultivation spread vigorously in the northern part of the country (Nunes, 1990). It was an imported crop which gave much higher yields per hectare, was more capital intense (due to the need for irrigation) and its cultivation required a greater human effort than other grains. The late 17th century was also the time when wine production began to expand in anticipation of its 18th century boom. Vine was again a crop requiring heavy investment and greater work effort from the population engaged in it. As regards, rural manufacturing activities, this was an area which, starting in the 1670s, the Crown made determined efforts to stimulate, with a probable result of more labour being drawn into it. It is not unlikely that this would have shown up in the occupational aggregates for 1700 which are under discussion.¹⁵

Direct evidence for this does exist for 1700 but is very incomplete and we are reluctant to use it until the picture is filled in more. Occupational distribution statistics exist for this benchmark but only for two small rural counties – a total of 2,100 adults - in Alentejo, namely Montemor-o-Novo and Avis (Sá, 2005). Accepting them as representative of the whole country would be a brave assumption, since Alentejo at the time was exceptionally under-populated, as well much more “agricultural” than the rest of the country.¹⁶ In the second place, Table 2C, which displays the result of incorporating these data, reveals an even less convincing picture for the period in question. The agricultural population now rises significantly, by about 50%, from 1600 to 1700, thereby eroding agricultural productivity. At the same time, there is no shift out of agriculture and into other rural activities. The loss in the relative importance of the

¹⁵ As argued by Costa (forthcoming).

¹⁶ The proportion of the population of these counties which was engaged in agriculture was 75 percent, the remaining 25% were associated with non-agricultural pursuits. Only 2,100 adult inhabitants were observed in the two counties, which is a slender basis for extrapolation to the national level.

urban labour force in the non-agricultural sectors is a surprise and calls for corroboration before we can accept this reformulation of table 2A.

Table 2C Portugal: population by sector, 1500-1850
in
millions

	total	urban	rural non agric	agric
1500	1,000	0,155	0,194	0,676
1550	1,363	0,193	0,389	0,807
1600	1,727	0,242	0,584	0,959
1700	2,200	0,293	0,464	1,443
1750	2,400	0,429	0,700	1,271
1800	2,900	0,476	0,626	1,798
1850	3,471	0,607	0,549	2,315

Sources: same as for Table 1A with additional information from Sá (2005).

Instead of the total population series supplied by Serrão (1993), we can also resort to a competing one recently supplied by Rodrigues (2008), which also gives coverage for the entire period we are studying. The outcome presented in Tables 2D and 2E replicates the preceding exercise but is less satisfactory than its earlier version. One problem is the unusually slow growth of total population in the 16th century in contrast with a remarkably faster one in the next 100 years. This flatly opposes the consensus concerning global population movements in these two centuries, and, in particular, the population stagnation or decline usually associated with the 17th century. A second difficulty is posed by the decline in the rural non-agricultural population during the 16th c. and its hardly believable seven-fold rise during the period 1600-1700. The implication would be a sharp contraction in rural manufacturing at a time of imperial and domestic expansion, which is not impossible – demand could have been satisfied by an increase in exports – but unlikely; and an utterly implausible growth of the same between 1600 and 1700 of which there is no trace in the literature. A third objection comes from the substantial downward movement in the share of agricultural labour

during the same period which would entail an implausible rise in agricultural productivity.

Table 2D Portugal: population by sector, 1500-1850
in millions

	1	2	3	4
	total	urban	rural non agric	agric
1500	1,000	0,155	0,169	0,676
1550	1,100	0,193	0,156	0,752
1600	1,200	0,242	0,110	0,848
1700	2,050	0,293	0,749	1,008
1750	2,276	0,429	0,655	1,192
1800	2,900	0,476	0,626	1,798
1850	3,471	0,607	0,549	2,315

Sources: col. 1 from Rodrigues (2008: 519); col. 2 from Bairoch (1988) revised; col.3 derived from Reis (2005), Sá (2005) and interpolations from the Spanish case using Alvarez-Nogal and Prados (2007); col. 4 = col.1 – col. 2 – col.3.

Note: * =1706

Table 2E Portugal: population by sector, 1500-1850
(share of total population)

	rural		agric ratio	non agric ratio	urban/ total non agric ratio
	urb ratio	non agric ratio			
1500	0,155	0,169	0,676	0,324	0,478
1550	0,175	0,141	0,684	0,316	0,553
1600	0,202	0,092	0,707	0,293	0,688
1700	0,143	0,365	0,492	0,508	0,281
1750	0,188	0,288	0,524	0,476	0,396
1800	0,164	0,216	0,620	0,380	0,432
1850	0,175	0,158	0,667	0,333	0,525

Sources: same as for table 2D

These contradictions with established historiographic positions make it difficult to subscribe to any interpretation based on the Rodrigues (2008) data, particularly as the latter are not supported by any new demographic evidence but apparently on conjecture only. On the other hand, the findings presented above in tables 2A and 2B reveal a good fit with major turning points in the history of Portugal during these three centuries,

both in demographic and economic terms, which is reassuring.¹⁷ The period of vigorous growth from 1500 to the early sixteen hundreds matches the great overseas and economic expansion of this period, while the slowing down of the 17th century is in keeping with European general conditions and the difficulties faced by Portugal too. The demographic upswing of the first half of the 18th century can be seen as the result of the Brazilian gold rush, great public investments, the increased commercialization of agriculture and the absence of war after 1712. The urban decline after 1750 can be attributed to the Lisbon earthquake, the contraction in the extraction of gold and an agricultural crisis which lasted until the end of the Napoleonic wars and is a subject of debate. Between 1800 and 1850, the decline of Portuguese manufacturing is reflected in the fall of the non-agricultural labour ratio and the weak increase in the urban ratio.

When it comes to the broad economic categories into which the Portuguese population can be divided, the long term evidence in tables 2A and 2B can also be more easily reconciled with established views than their alternatives. In particular, the structural persistence displayed by this economy over three centuries and revealed by both a scant change in the agricultural population ratio and the stability of the urban ratio, conforms strikingly with historiographical tradition.

In international comparative terms, this also comes as no surprise. Portugal appears indeed as simply one more case to add to the group of countries which saw “little change over the period”, as noted by Allen (2009). A far cry from the dynamism of England, the Netherlands and Belgium, it was also falling behind economies of middling success like Germany, France and Austria-Hungary (Allen, 2003). It is interesting to note in this connection that like the other members of this “retarded”

¹⁷ The literature has made much of the presence of African slave labour during the 16th century both in agriculture and out of it. The totals for all relevant sectors have been increased in accordance with the estimates by Saunders (2010) for 1500 and 1550 and assumed thereafter to have been stable to 1750, after which they disappeared. The effect of this correction is negligible.

group, Portugal improved structurally in the 16th century, and then failed to keep on this course during the next two hundred years. Two indicators of structural change can be used here. One is the relative size of the non-agricultural labour force (rural + urban). This expanded quite vigorously during 1500-1600, in response to the already noted economic forces liberated by overseas expansion; fell in the 17th century, as the country's fortune waned; then rose again sharply during 1700-1750, apparently in consonance with overseas and domestic economic resurgence. After this, however, progress ceased, as it returned to earlier levels and was, in 1850, lower than at any previous time. The other is urbanisation, which signals the role of the more dynamic sectors in the Early Modern economy and in Portugal never changed significantly. Indeed, it fell steadily from 1500 to 1700, then rose to a slightly higher plateau in 1750, but stagnated there for the next one hundred years.

4. Estimating GDP per capita – the van Zanden approach

The van Zanden (2005) approach to the indirect estimation of GDP per capita during the Early Modern period is less demanding of data than alternative methodologies, yet equally simple in terms of the economic intuition and the calculations required. It is a good starting point therefore for the present exercise, and can serve as a yardstick for comparing the results of the more complex calculations carried out in the next section of this paper.

The method is based on a number of direct estimates of GDP made at different times independently from each other, by different scholars for a variety of countries and for different benchmarks. By means of linear regression, a model is estimated in which GDP per capita is explained by two variables, as well as by dummies for time and space. The notion is that the underlying economies had a common structure in terms of

these interactions, which remained stable across space and time. This makes it possible to extrapolate, with an acceptable degree of error, new values for the dependent variable for countries or periods in which such direct estimates are missing but there are values for the independent variables. The latter are far easier to obtain than any new direct estimate of GDP.

This intuition is inspired by the Kuznetzian idea of long term growth with structural change (so-called Modern Economic Growth), which it extends back to the Early Modern period. It recognizes that in this period, rates of economic growth were very small, particularly over the long run, but non-negligible. Moreover, they were accompanied by detectable changes in the structure of the economy which can be quantified and constitute one of the main sources of information employed in this model for predicting GDP levels.

In the model propounded by van Zanden, the structural variable is represented by the natural logarithm of the (percentage) share of the population engaged in agricultural activity. Given the usually observed connection between it and the extent of urbanization and industrialization, the expectation is that its coefficient will be negative. It is based on the presumption that the greater the degree of structural change (and the smaller the share of agricultural population), the higher will be the per capital level of GDP.

The second independent variable aims at capturing the impact on GDP of the efficiency of the labour force. This allows us, for example, to distinguish between two economies with the same degree of structural development but with different productivity levels, a situation which is far from uncommon in this period. A popular way of proxying this efficiency is by means of the real wage of unskilled labour in the country's main city (van Zanden, 2005; Pamuk, 2009; Pfister, 2008). This is obtained by dividing the

unskilled wage, in grams of silver, by the cost of a basket consumer goods purchased in the same locality, also in grams of silver. Several circumstances justify this procedure. The choice of the main city is due to the fact that this was normally the largest centre of wage labour and food market of the country. The preference for unskilled labour is that it reflects the remuneration of the labour force as a whole better than other indicators, given the preponderance of unskilled labour over its other forms, e.g. skilled, white collar. The focus on the real remuneration of labour is that it captures a disproportionate share of national income compared to the other factors of production. According to Malanima (2011), one can assume that in the weakly capitalised and labour-intensive economies of the Early Modern era labour took 70 % of all income, whilst capital and rent claimed, respectively, 10 and 20 %.

In the present exercise, instead of the real wage referred to above, we employ Allen's (2001) welfare ratio. It is obtained by dividing the annual earnings of unskilled labour (assumed to have worked 250 days in a year) by "a poverty line consumption bundle for a family" (p. 425). The reason for the preference is that these data were found to be easier to compile from the available sources for our benchmarks than the real wage.¹⁸ The equation we employ is based on a sample of six countries – the Netherlands, England, Belgium, Italy, Spain and Poland - and a total of thirty observations of their respective per capita gross products at different points in time between 1500 and 1820.¹⁹ The share of the population in agriculture (Part) is calculated in the manner described in the section 1 above. The equation takes the form

$$\text{GDP pc} = c + \alpha \text{ Part} + \beta \text{ Welfare ratio} + \delta G \quad (3)$$

¹⁸ The source for all countries in the sample, except Portugal, is www.iisg.nl/hpw/data.php.

¹⁹ The independent direct GDP per capita estimates are from van Zanden (2001). The structural variable (Part) is from Allen (2000).

where **Part (PT)** is the share of the agricultural population variable, **Welfare ratio (WR)** is the proxy for real income, **G** is a country dummy and ε is an error term. All variables, except the dummy, are in logs.

After running the OLS regression, expression (3) becomes

$$\text{Log GDPpc} = 3.498 + 0,359 \log \text{WR} - 1.002 \log \text{PT} + \varepsilon \quad (4)$$

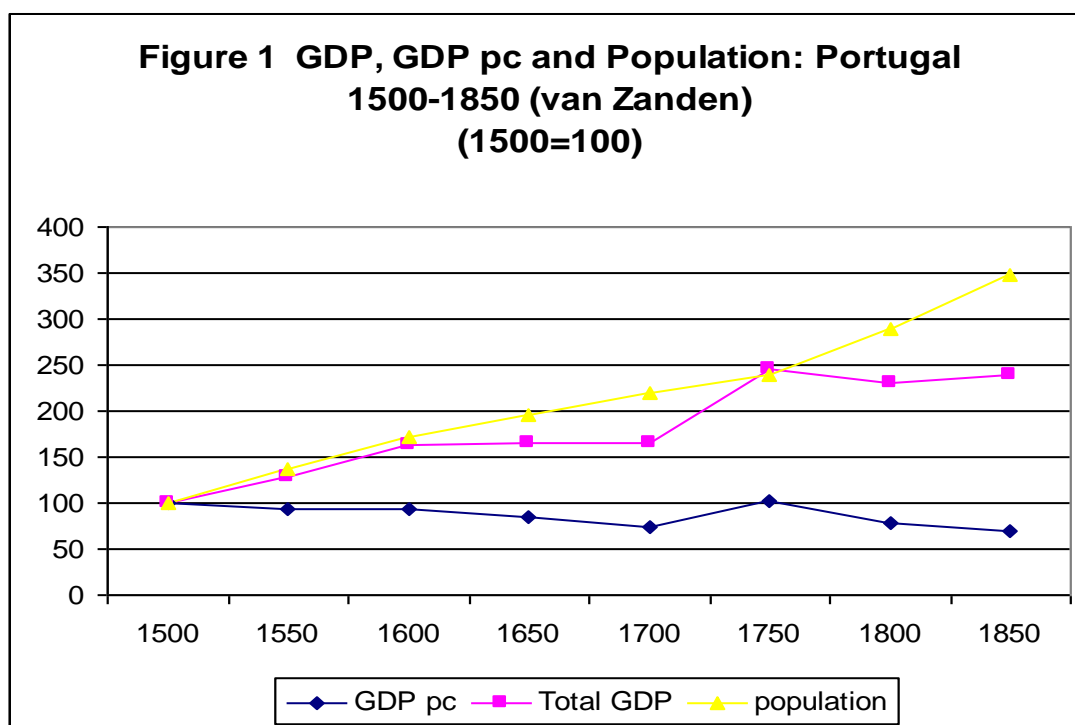
The coefficients of the two principal explanatory variables are significant and have the expected signs. The adjusted R2 is fairly high (0.755) and some, but not all, of the country dummies are significant.²⁰

We can now use this expression to estimate the magnitude of GDP and GDP per capita for Portugal on the basis of the values of the independent variables at the different benchmark years. Those for the variable **Part** are drawn from table 2B above. The **welfare ratios** of unskilled labour in Lisbon are calculated from the original data recently compiled from a variety of primary sources – hospitals, charitable institutions and royal establishments.²¹ The mid-18th century Strasbourg basket of goods pioneered by Allen (2001) and widely used in other studies served to weight the components of the consumption basket. Given the similarities between the two Iberian countries, we adopted, for Portugal, the coefficient of the Spain dummy (0.08752).

Figure 1 displays the real GDP, population and GDP per capita series estimated for Portugal between 1500 and 1850 using expression (4) above:

²⁰ The countries whose dummies are non significant are the Netherlands, Belgium and Poland. England is the default.

²¹ See section 3.1 above.



Sources: see text

Notes: the population for 1650 was obtained by linear interpolation.

Several conclusions can be drawn from here. In the first place, one should note that population experienced unusually rapid growth over the long run. The more than three fold expansion, at a rate of 0.36% a year (1500-1850), was exceeded by England and parts of Scandinavian countries, but equal to Spain and greater than all other major countries.²² Portugal was fortunate to have escaped the worst hardships of both external and internal wars and to have avoided severe visitations of contagious disease.²³ On the other hand, demographic losses associated with the development of a widely-flung empire may not have negligible.²⁴ There are reasons to suppose that although territorially a small country, Portugal's population in 1500 was small enough to have left a good deal of room for subsequent demographic expansion for a long time. An

²² A comparison based on data from Allen (2000). The recent revision by Alvarez Nogal and Prados (2007) still leaves Spain considerably behind.

²³ There is no record of epidemics such as that in Italy of 1629-30 in which 1.3 million people died, representing about 10 % of the population. See Malanima (2003)

²⁴ Population losses from empire, in the form of emigration, were of the order of 2-5,000 a year in gross terms in the 16th century, but there is no record of how many returned. See Pedreira (...: 161).

indication of the likely weakness of the Malthusian constraint posed is given by the land-population ratio (Pfister, 2008), which at the beginning of the 16th century was one of the highest in Europe.²⁵

A second conclusion is the fact that during these three hundred and fifty years gross domestic product increased by 229%, an annualized growth rate of 0.27%.²⁶ This flatly contradicts any notion of overall economic stagnation (or “decadence”) entertained by some as an enduring characteristic of this era. In contrast, GDP per capita declined during the same time span, altogether by about 30 % (0.1 of a percent a year during 1500-1850), a sign that the relative abundance of natural resources was not sufficient to enable the nation grow both in numbers and in well-being.

In the third place, it is of interest to break down this evolution by phases and consider them in the light of current trends in Portuguese economic historiography. The first of these is the sixteenth century, the great moment of Portugal’s overseas expansion, of the establishment of a seaborne empire focused on the profits of trade and piracy in the Orient, and of great riches. In fact, it now emerges as a time of strong growth in population and GDP, but not of rising GDP per capita, and therefore hardly as an unqualified age of prosperity. By 1550 GDP per capita had fallen by 6%, a level at which it stagnated until 1600.

The decline of empire in the East, much longer periods of war, against the Dutch and against Spain, and the general contraction of Europe apparently make a fall of 25% in Portuguese GDP per capita between 1600 and 1700 seem hardly far fetched. The first half of the 18th century contrasts sharply with this depiction. A colonially driven burst of prosperity, this time in Brazil, a colony by then in the throws of a gold and diamond extraction boom, pushed up per capita GDP up by a hefty 36 %. This was probably

²⁵ Calculated from the FAO 1958 Yearbook and Allen (2000).

²⁶ The 1500 benchmark poses data problem and cannot be considered totally reliable with respect to the real wage. It may be an underestimate.

helped also by an expansion of the export-oriented domestic wine sector. An inversion of this trend marks the years from 1750 to 1800, when gold supplies from South America dwindled to a trickle, an earthquake/tsunami destroyed a considerable part of the capital city (1755), and signs of problems at the resource margin became visible in agriculture (Fonseca and Reis, 2011; see rising fuel relative prices). Despite claims to the contrary by some historians regarding agricultural success and an alleged proto-industrial spurt in the heavily populated northern part of the country (Pedreira; Pereira, Serrão), the inversion of the trend is unmistakable. By 1800, the gains in macroeconomic performance of the “Golden Age of Brazil” had almost been wiped out. GDP per capita had retreated to where it stood in the middle of the seventeenth century. Table 3 presents the international context for Portugal’s economic performance in the form of GDP estimates for three other countries, namely Spain, the Netherlands and England. This allows a comparison with a country with a reputation for decline – Spain and - and with the two rising economies of the period - the Netherlands and England. Several conclusions can be drawn from it. In the first place, during the 16th c. no significant difference separated the two Iberian countries. Moreover, it reveals them as reasonably well off for the time, on a par with England throughout these 100 years.²⁷ By then the leadership of the Netherlands was already very marked, as indeed it was to remain all the way down to 1800 according to these estimates. In the second place, the Portuguese economy (as happened also with Spain) began to fall behind the English one during the 17th c., a gap which rose to around 35% by 1700 and widened during the 18th century, reaching by 1800 a differential of 52 %. Portugal and Spain, however, in the meantime continued close to each other and it was not until the first half of the 19th c. that Spain began to seriously draw away. Thus the origin of the Iberian GDP gap which

²⁷ This confirms the earlier finding by Alvarez Nogal and Prados (2007) on Spain.

has been noted already by Maddison (2001) and others lies in this turbulent half century and according to table 3 amounted by 1850 to a substantial third.²⁸

Table 3

GDP per capita of England, Netherlands, Portugal and Spain 1500-1850 (van Zanden)
(England 1800 = 100)

	England	Netherlands	Spain	Portugal
1500	54,9	82,8	52,7	Na
1550	53,5	80,8	na	53,1
1600	53,6	90,1	51,2	54,1
1700	70,2	106,5	49,4	45,3
1750	85,0	106,7	51,6	58,0
1800	100,0	105,5	47,6	47,6
1850	na	na	58,8	42,9

Sources: for Spain, the Netherlands and England, van Zanden (2005); for Portugal, authors' own calculations using data from the PWR project

5. An alternative estimation – Wrigley's and others contribution

Although these results are on the whole plausible, the method of estimation raises some doubts. One of them is its reliance, for the extrapolation of new values, on a set of GDP estimates - those proposed by Maddison - which have been disputed on a variety of grounds (Federico, 2002). A second is its assumption of a degree of structural stability in Early Modern economies over a period of three centuries which may be open to question, even though this was hardly a time of rapid structural change. In particular, two of these six economies - England and the Netherlands – experienced significant alterations in the relationships between fundamental macroeconomic variables which clash with this supposition. In the third place, the underlying model postulates the urban sector as the principal motor of economic development. This flies in the face of the evidence on important developments in proto-industrialization and agricultural

²⁸ Maddison (2001) puts the difference at 10% in 1820 and 38% in 1870. Prados de la Escosura (2000), using a different methodology, finds a value of 29% for this in 1850, which was to diminish in the next decades. Reis (2000), following yet another approach, found this to be about 10% in 1850.

productivity in some of these economies and thus calls into question the appropriateness of the coefficients obtained above from expression (4).

To counter these difficulties, a different approach has been tried in several recent revisionist country estimates, namely of Italy (Malanima, 2011), Spain (Alvarez-Nogal and Prados, 2007) and Germany (Pfister, 2008). It entails two steps. The first, inspired by Wrigley (1985) and significantly revised by Allen (2000), involves employing a demand-for-food function from which it is possible to derive agricultural output. This function takes into account the impact on consumption of fluctuations in the prices of food and non-food goods, real income and their respective elasticities. Income data is based on real wage data. Prices are obtained as described above in section 3. and are used to deflate wages also in the manner described in section 4. Elasticities are guestimates adopted from examples drawn from development economics. So that output may be derived from consumption, the method further requires information on agricultural exports and imports. Ideally, it also calls for knowledge about the share of non-food agricultural production, such as raw materials for industry, although in most cases they have been found to be too small to have much effect on the final result.²⁹ Agricultural output (Q_a) is treated here as being equal to consumption on the still to be verified assumption that exports and imports of food are equal, and is given by the expression

$$Q_a = P^\alpha I^\beta M^\chi N \quad (5)$$

where P is the real price of agricultural products, I is real income per capita, M is the real price of other consumer goods and N is population; while α , β and χ are respectively the price elasticity of demand, its income elasticity of demand and the

²⁹ Non-marketed food production can be presumed to form a part of total consumption given that although not bought or sold, its producers and consumers were in contact with the market and adjusted their decisions to changes in the market's parameters. Pfister (2008:22) makes the same point.

cross elasticity of demand. In keeping with the literature, their values are assumed to be $\alpha = -0.5$, $\beta = 0.4$ and $\chi = 0.1$. The results of this estimation are shown below in figure 2, along with agricultural output per head, to obtain which we had to assume that the ratio of the labour force in this sector was always a constant proportion of the population “in agriculture”.

Once agricultural output has been estimated in this manner, the second step is to reckon the contribution of the non-agricultural sectors, in other words, manufacturing, trade, transport and government. Estimating a demand function for any of these outputs in the same fashion as above is an impossibly complex task. A solution for this (Pfister, 2008; Alvarez-Nogal and Prados, 2007) has been to assume that the inter-sectoral productivity gap (p), between agriculture and the rest of the economy, when it can be known for a given benchmark, is time invariant throughout the period considered. This is a strong assumption which is hard to verify empirically. Thus, we can track agricultural productivity over time reasonably well, but the same is certainly not true for non-agricultural activity³⁰. Since we know, for each benchmark, the values of agricultural output and of the share of agricultural-to-total labour, we are able to derive aggregate real output, for each of those years, according to Pfister’s (2008) expression

$$\text{GDP} = Q_{a_i} / p * L_{a_i} / L_i \quad (6)$$

in which Q_{a_i} is agricultural output and L_{a_i} and L_i are agricultural and total labour, all of them at time i .³¹ The constant p is the ratio obtained by

³⁰ There is some comfort however in the fact that in the 1850s the values for p in Spain and Portugal were of the same order of magnitude (respectively 0.661 and 0.68-0.72). On the other hand, both Pfister (2008) and Malanima (2011) obtain a value for $p = 0.81$, a sign of a higher productivity of agriculture relative to the other sectors in Germany and Italy, respectively. The p estimates for Portugal were estimated from data in Reis (2000 and 2005) and Lains (2003).

³¹ Alvarez-Nogal and Prados (2007) use, in this stage of the same exercise, as an indicator of non-agricultural activity an “adjusted urbanisation” indicator, which in fact is the same as total population minus agricultural population, a procedure is therefore identical to ours.

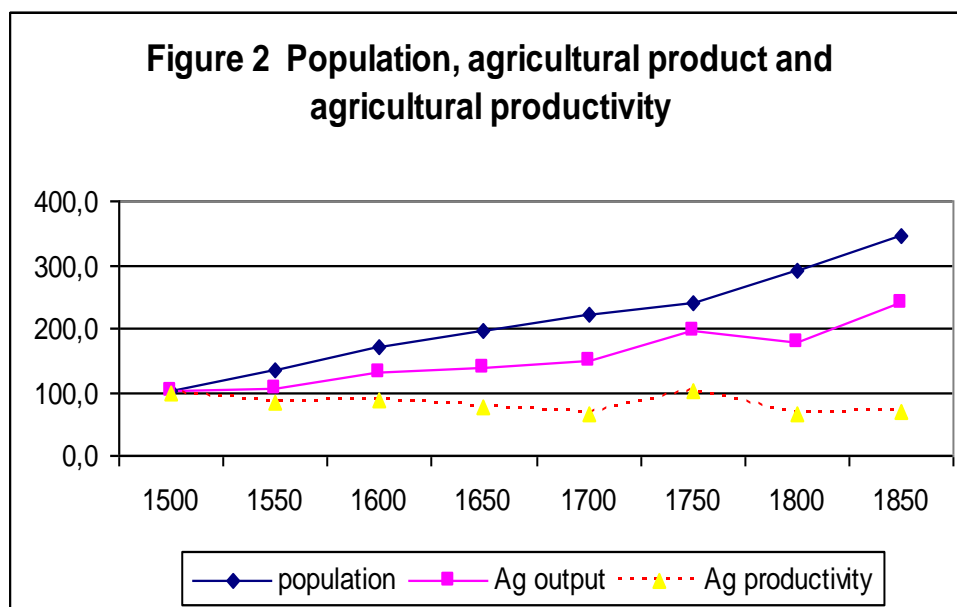
$$p = (Q_{a1850} / Q_{1850}) / (L_{a1850} / L_{1850}) \quad (7)$$

in which the first term is the ratio of agricultural-to-total output in 1850, the only benchmark for which this is known; and the second is the contemporaneous ratio of agricultural-to-total labour.

A different solution but with some similarities has been tried out by Malanima (2011: 13). This involves estimating a univariate linear regression for the period 1861-1936 in which the independent variable is the urbanisation rate and the dependent one is the ratio of non-agricultural to total output. Values for the latter are then retropolated with the coefficients thus obtained, all the way back to 1300, on the basis of decadal information regarding the Italian labour force engaged in non-agricultural pursuits. The results do not diverge dramatically from those achieved using the methodology above but as Malanima points out could be liable to two objections. One is that it underestimates the role of proto-industrialisation because of its non-urban character. The other is that the rise in manufacturing productivity during the decades between 1861 and 1936 is likely to have been more intense than in earlier centuries and this would distort the outcome of the extrapolation. We have decided not to employ this alternative.

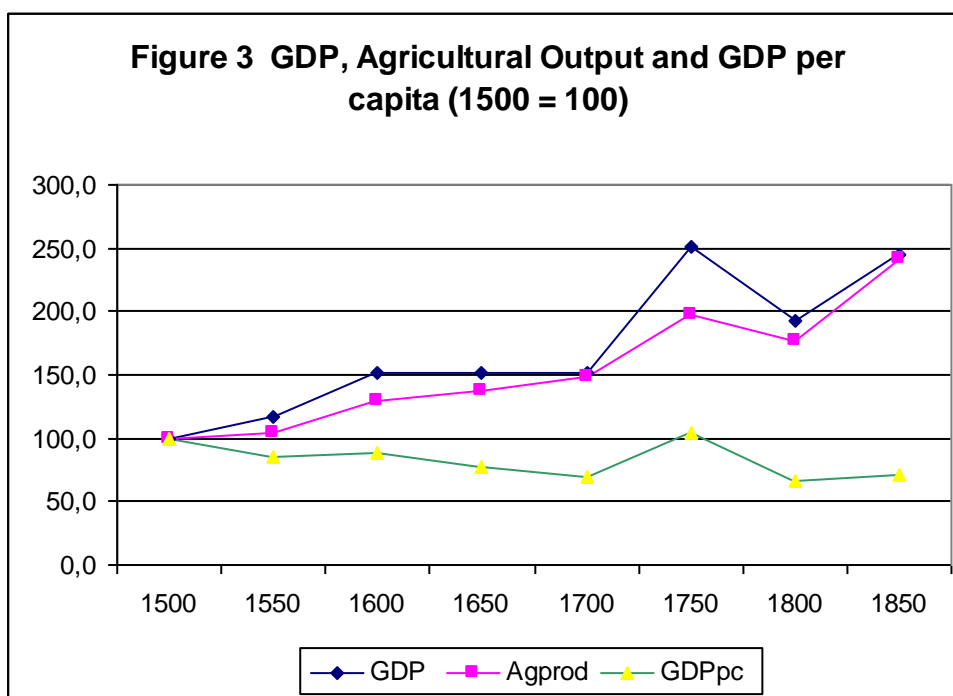
The results generated from the data described in section 3. and using the method just described are presented in figures 2, 3 and 4. Figure 2, corresponds to the first step in our methodology and displays the evolution of Portuguese agriculture and agricultural productivity over three and a half centuries, from 1500 to 1850, alongside that of the country's population. Three findings stand out clearly. The first is the rapid overall demographic growth (350%) by contemporary European standards already noted in the previous section. The second is a steady and substantial rise in agricultural output

(240%), with only a break in 1750-1800 which was followed by a good recovery in the ensuing half century. Again, this hardly fits the image of long term “decadence”, associated with a lack of capital and a flight of labour from the land, which has been present in so much of the literature since the 16th century.³² The third is a downward sloping productivity trend reaching a level in 1850 which was 30% below that of 1500. Although this was briefly interrupted by a remarkable recovery during the interval 1700-1750, it soon dropped back to the point reached in 1700, at which it stabilized until the end of the period we are considering. The implication seems to be that, by 1700, Malthusian forces and a by now overcrowded countryside were reaching an acute stage and could only be overcome, if population pressure was significantly weakened as a result, for instance, of rural out-migration caused by exogenous forces. This happened during the first half of the eighteenth century when the Brazilian gold rush drew large amounts of labour away from the home country.



Sources: see text

³² See the references to authors from the 16th to the 18th centuries and even beyond who eloquently bemoaned these problems in Santos (...).

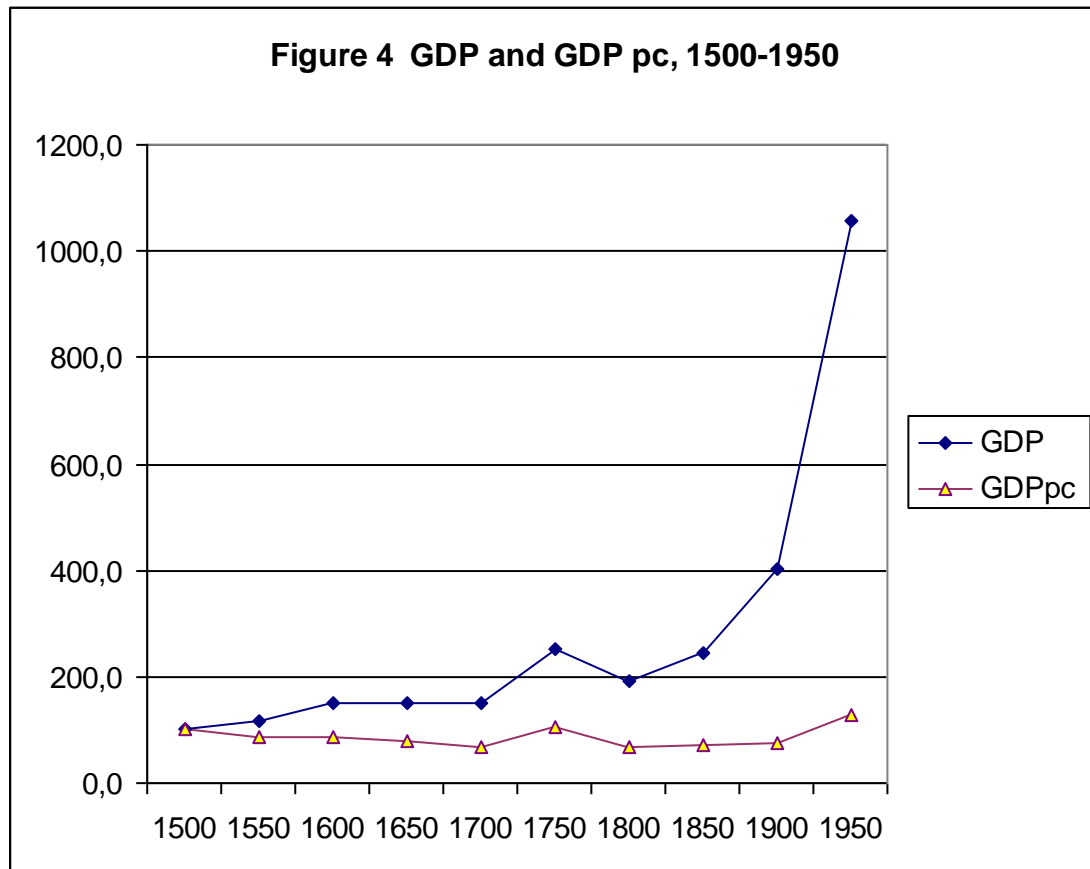


Sources: see text

Figure 3 corresponds to the final step in our methodology. It presents the evolution of Portuguese GDP, GDP per capita and gross agricultural product for the period 1500-1850. Three comments can be drawn from this figure. The first is to emphasize the positive long run macroeconomic performance of Portugal. This yielded an overall growth of GDP of 250% over three and a half centuries, in other words, an annual rate of 0,26%, even though it tapered off around 1750 and failed to exceed this level again for another century. This contradicts once again the entrenched vision of the country's Early Modern "decadence", but is hardly surprising given the similar achievement of the agricultural sector and the perennially central role of the latter in this economy. The second is the way in which the gap between total and agricultural output varied over time. In the 16th century, it grew (reaching 22.9% in 1600); during the 17th, it narrowed (4.5% in 1700); between 1700 and 1750, it rose sharply (54.4% in 1750); and by 1850 had fallen to almost nothing (3.2% in 1850). This reveals a pattern which matches with reasonable closeness the ebb and flow of the fortunes of Empire. It is hard to escape the

implication that for much of the time the colonial contribution to national welfare must have been far from negligible, even though it was never predominant. The third is the steady downward trend in real GDP per capita, leading to a loss by 1800, the trough of the entire trend, of a third of the starting level, although it recovered slightly (6%) in the course of the last fifty years. Apparently, despite significant periodic gains from empire, they were neither enough to make up for the unrelenting losses of agricultural productivity, nor did they conduce to structural changes in the economy that would have led to a permanent shift of labour out of agriculture and into non-agricultural activity.

Finally, figure 4 completes this preliminary presentation of our results by setting them in an even longer run of macroeconomic evolution for Portugal than that set out for this paper. The aim here is to compare how this economy fared in the Early Modern period with the subsequent century and a half, before Portugal entered its much vaunted Golden Age of the 1950s to 1970s. To do so, we have linked the series constructed for GDP and GDP per capita from 1500 to 1850 with the estimates of Pedro Lains (2003) for the same variables at 1958 prices between 1850 and 1950. GDP exhibits for the first time a sharp and rise, starting in the 1850s and gathering speed especially at the turn of the century, in contrast with the period we are studying here. Until 1900 most of the increase has to be ascribed to demographics, however. The 19th century emerges in this view as a period of quasi stagnation, with an upward movement at a steady and insignificant rate of 0.1% a year both before and after 1850. An acceleration in the movement of this indicator only happened in the early 20th century, particularly after World War I, when modern economic growth seems finally to have set in, at an annual rate of 1.1 %. Only then can one say that the centuries old macroeconomic profile of Portugal had ceased to be that which prevailed since the Discoveries.



The following are the unwritten parts of this paper

5. Discussion of results

5.1 van Zanden vs. the others –Do results differ much? Which one has the best results?

5.2 Portugal in the European mirror

5.3 Portugal in the mirror of Portuguese economic history

6. Conclusion

Bibliography (new)

Acemoglu, Daron, Johnson, Simon and Robinson, James (2005), “The Rise of Europe: Atlantic Trade, Institutional Change and Economic Growth”, *American Economic Review*, 95, pp.546-79.

Allen, Robert C. (2000), “Economic Structure and Agricultural Productivity in Europe, 1300-1800”, *European Review of Economic History*, 4, pp. 1-25.

Allen, Robert C. (2001), “The Great Divergence in European Wages and Prices from the Middle Ages to the First World War”, *Explorations in Economic History*, 38, pp.411-447.

Allen, Robert C. (2003), “Progress and Poverty in Early Modern Europe”, *Economic History Review*, 3, pp. 403-443.

Allen, Robert C. (2009), *The British Industrial Revolution in Global Perspective* (Cambridge: Cambridge University Press).

Alvares-Nogal, Carlos and Prados de la Escosura, Leandro (2007), “The Decline of Spain (1500-1850): Conjectural Estimates”, *European Review of Economic History*, 11, pp. 319-366.

Bairoch, Paul, Batou, Jean and Chèvre, Pierre (1988), *La Population des Villes Européennes, 800-1850* (Geneva: Librairie Droz).

Balbi, Adrien (1822), ...

Bardet, Jean Pierre e Dupaquier, Jacques (1997), *Histoire des Populations de l'Europe* (Paris: Fayard, 2 vols).

Costa, Leonor Freire and Reis, Jaime (2009), “A New Look at Portugal’s Macroeconomic Performance: Wages and Prices In Lisbon, 1500-1910”, unpublished paper presented at the APHES conference, Porto.

De Long, J. Bradford and Shleifer, Andrei (1993), “Princes and Merchants: European City Growth before the Industrial Revolution”, *Journal of Law and Economics*, XXXVI, pp.671-702.

Drelichman, Mauricio (2005), “The Curse of Moctezuma: American Silver and the Dutch Disease”, *Explorations in Economic History*, 42, pp.349- 80.

Federico, Giovanni (2002), “The World Economy 0-2001 AD: A Review Article”, *European Review of Economic History*, 6, pp.111-20.

Ferro, João Pedro (1995), *A População Portuguesa no Final do Antigo Regime*, Lisboa: Presença).

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, pp.601-10.

Godinho, Vitorino Magalhães (.), *Ensaio de História de Portugal* (.).

Lains, Pedro (2003), *Os Progressos do Atraso. Uma Nova História Económica de Portugal* (Lisboa: ICS).

Macedo, Jorge Borges de (1982), *Problemas de História da Indústria Portuguesa no Século XVIII* (Lisboa: Quercus, 2nd edition).

Maddison, Angus (1995), *Monitoring the World Economy, 1820-1992* (Paris: OECD).

Maddison, Angus (2001), *The World Economy. A Millennial Perspective* (Paris: OECD).

Maddison, Angus (2007), *Contours of the World Economy, 1-2030* (Oxford: Oxford University Press).

Magalhães, Joaquim Romero de (1980), “As Descrições Geográficas de Portugal, 1500-1800”, *Revista de História Económica e Social*, 5, pp.15-56.

Malanima, Paolo (2002), *L'Economia Italiana. Dalla Crescita Medievale all Crescita Contemporânea* (Bologna: Il Mulino).

Federico, Giovanni and Malanima, Paolo (2004), “Progress, Decline, Growth: Product and Productivity in Italian Agriculture, 1000-2000”, *Economic History Review*, 3, pp.437-464.

Malanima, Paolo (2011), “The Long Decline of a Leading Economy: GDP in Central and Northern Italy, 1300-1913”, *European Review of Economic History*, vol.15, (forthcoming).

Malanima, Paolo (2009), *Pre-Modern Economy. One Thousand Years (10th-19th Centuries)*, (Leiden and Boston: Brill).

Medeiros, Carlos Alberto (1991?), “Environnement, Agriculture et Élevage au Portugal à l'Époque des Découvertes Maritimes”, in Robert Durand et al., *L'Homme, l'Animal Domestique et l'Environnement du Moyen Âge au XVIIIe Siècle* (Nantes: Ouest Éditions).

Oliveira, João Nunes de (1990), *A Produção Agrícola de Viseu entre 1550 e 1700* (Viseu: Câmara Municipal de Viseu).

Oliveira, João Nunes de (1990), *A Beira Alta de 1700 a 1840: Gentes e Subsistências* (Viseu: Palimage).

Pamuk, Sevket (2009), “Estimating GDP per Capita for the Ottoman Empire in a European Comparative Framework, 1500-1820”, mimeo.

Pedreira, Jorge M. (...), “Mercadores e Formas de Mercantilização”, in Diogo Ramada Curto (ed.), *O Tempo de Vasco da Gama* (Lisboa:..).

Persson, K. Gunnar (2010), ...

Pfister, Ulrich (2008), “German Economic Growth, 1500-1850”, unpublished paper.

Phillips, Carla Rahn (1990), “The Growth and Composition of Trade in the Iberian Empires, 1450-1750”, in James D. Tracy (ed.), *The Rise of Merchant Empires. Long Distance Trade in the Early Modern World 1350-1750* (CUP, Cambridge).

Pinto, Maria Luís Rocha (...), “A Base Demográfica” in A.H. Oliveira Marques (eds.), *Portugal da Paz da Restauração ao Ouro do Brasil* (Lisboa: ...).

Prados de la Escosura, Leandro (2000), “International Comparisons of Real Product, 1820-1990: An Alternative Data Set”, *Explorations in Economic History*, 37, pp. 1-41.

Prados de la Escosura, Leandro (2003), *El Progreso Económico de España (1850-2000)* (Madrid: Fundación BBVA).

Reis, Jaime (2000), “How Poor was the Periphery before 1850? The Mediterranean versus Scandinavia” in Jeffrey Williamson and Sevket Pamuk (eds.) *The Mediterranean Response to Globalization before 1950* (London: Routledge), pp.17-44.

Reis, Jaime (2005), “O Trabalho”, in Lains, Pedro and Silva, Álvaro Ferreira da (eds), *História Económica de Portugal 1700-2000. Volume II. O Século XIX* (Lisboa: ICS).

Reis, Jaime, Costa, Leonor Freire and Martins, Conceição Andrade (2010), “The Evolution of Prices and Wages in Lisbon over Three Centuries and a Half, 1500-1850” (2010) (unpublished).

Rodrigues, José Albertino (1970), “Ecologia Urbana de Lisboa na Segunda Metade do Século XVI” *Análise Social*, VIII, pp. 96-115.

Rodrigues, Ana Maria (1989), “A População de Torres Vedras em 1381”, *Revista de História Económica e Social*, 25, pp. 15-46.

Rodrigues, Teresa (ed.) (2008), *História da População Portuguesa: Das Longas Permanências à Conquista da Modernidade* (Porto: Afrontamento).

Sá, Isabel dos Guimarães (2005), “O Trabalho”, in Lains, Pedro and Silva, Álvaro Ferreira da (eds), *História Económica de Portugal 1700-2000. Volume I. O Século XVIII* (Lisboa: ICS).

Santos, Rui (...), “A Sociedade Rural” ,in Diogo Ramada Curto (ed.), *Tempo de Vasco da Gama* (Lisboa:..).

Saunders, A. C. de C. M. (1982), *A Social History of Black Slaves and Freedmen in Portugal 1441-1555* (Cambridge: Cambridge University Press).

Serrão, José Vicente (1993), “O Quadro Humano”, in Mattozo, José (ed.) *História de Portugal* (Lisboa: Circulo de Leitores, 8 vols.).

Serrão, José Vicente (2010), “Land Management Responses to Market Changes. Portugal 17th to 19th Centuries”, in Vicente Pinilla (ed.), *Markets and Agricultural Change in Europe from the 13th to the 20th Centuries* (Brepols...).

Silva, Álvaro Ferreira da (1997), “..”, *Análise Social*, .., pp.

Valério, Nuno (2010), “Portuguese Economic Performance”, in Juan Hernandez Andreu, José Luis Garcia Ruiz, José Morilla Critz and José Manuel Ortiz-Villajos (eds), *Las Claves del Desarrollo Economico. Ensayos en Homenaje al Professor Gabriel Tortella* (Madrid: Universidad de Alcalá), pp. 431- 44.

Wrigley, E.A. (1985) , “Urban Growth and Agricultural Change: England and the Continent in the Early Modern Period,” *Journal of Interdisciplinary History*, 15, pp.683-728.

Yun, Bartolome (1994)...

Zanden, Jan Luiten van (2005),”Una Estimativa del Crecimiento Economico en la Edad Moderna” (2005), *Investigaciones de Historia Económica*, N° 2, pp. 9-38.

Appendix 1: Unravelling demographic statistics

Appendix 2: how robust our estimates?