The contribution of empires to early modern economic growth: The case of Portugal

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Abstract

Newly assembled macroeconomic statistics for Portugal reveal one of Europe’s least successful records during the early modern period at the same time as one of the most vigorous colonial traders in per capita terms. Using an estimated dynamic model in the spirit of Allen (2003, 2009), we conclude that this trade had a substantial and increasingly positive impact on economic growth. In the heyday of colonial expansion, eliminating the economic links to empire would have reduced Portugal’s national income by roughly a fifth. This was not sufficient, however, to annul the tendency towards decline in relation to Europe’s advanced core which set in from the 17th century onwards. We conclude that the explanation for Portugal’s long-term backwardness must be sought to a large extent in domestic conditions.

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1. Introduction

What new disaster dost thou here design?
What horror for our realm and race invent?
What unheard dangers or what deaths condign,
Veiled by some name that soundeth excellent?
What bribe of gorgeous reign, and golden mine,
Whose ready offer is so rarely meant?
What Fame has promised them? what pride of story?
What palms? What triumphs? What victorious glory?
(Camões/Burton 1572 [1880], 171)

Thus spoke the ‘old man of Restelo’, an apocryphal character in The Lusiads, Portugal’s national epic by Luis Vaz de Camões, concluded around 1556. In this fulmination against Fame and Glory, he gave voice to those who, in the early years of Empire, doubted the success of Portugal’s overseas expansion and believed it would be detrimental to the development of the metropolis. His diatribe has not been forgotten since and resonates and still resonates throughout the historical literature.

In this paper, we test the ‘old man’s’ proposition with a study of the impact of Portugal’s colonial trade on its economy throughout the Early Modern period. Our aim is to come up with a quantitative answer to the question posed by O’Brien and Prados de la Escosura (1998, 36), as well as many others: just how important were colonies for the development of their home economies?

Our starting point is an extensive new database which includes estimates of Portugal’s real wage, in addition to other variables, over three centuries. Its development from scratch is necessary here since earlier estimates are unsatisfactory in their methodology and insufficient in terms of the empirical evidence needed for the exercise. Our conclusions are that the impact of the empire on Portugal’s economy was quite small in the early fifteen hundreds, grew steadily over time and reached a substantial level around 1800; that Portugal in this respect was a consistent leader among Early Modern colonial powers; but that in spite of this boost, at no time was it able to converge in macroeconomic terms to the leading nations of the time, that is, Britain and the Netherlands, themselves great colonizers.

It has been widely accepted, ever since the sixteenth century, that overseas empires were set up by Europeans principally with a view to material gain, a subject which has spawned a vast literature (Engerman 1998; Findlay and O’Rourke 2007). In particular, the part of it which focuses on their economic consequences for the mother countries has yielded a remarkable empirical harvest. Nevertheless, it has had limited success in establishing a consensus regarding the true nature of the relationship. Even in terms of the scale and direction of this effect, conclusions range widely, from negative to positive, and from small, or insignificant, to large and even critical to the economic performance of the colonizing nations.

According to the Marxist-inspired analyses of the 1960s and 1970s, the outcome for the world’s core economies of their colonial ventures was both large and beneficial. It enabled them to amass immense resources at the expense of colonies or of other
parts of the periphery, and then to channel them into long term growth and industrialization. For the lesser powers, it was small and possibly harmful. (Wallerstein 1974; Frank 1978; Braudel 1980). The cliometric response was to marshal an abundance of data in order to demonstrate that trans-oceanic commerce was at best modest and that colonies were largely irrelevant as sources of raw materials, investment capital and demand for home manufactures (Thomas and McCloskey 1981; O’Brien 1982).

Lately, the pendulum has swung back significantly, towards recognition of the fact that colonies may have made a significant and positive difference after all. The once ‘discredited’ notion (Mokyr 1985, p. 74) of a strong association between overseas and home economic expansion has had its credibility restored thanks to the rediscovery that ‘the intercontinental trade boom was a key development that propelled North-western Europe forwards’ (Allen 2003, p. 432).

From the standpoint of what matters most in this causality, a good deal of disagreement exists too. A political economy approach has emphasized the differential role of empire in the institutional development of the metropolis and the contrasting long run repercussions of this for the respective home economies (Davis 1973; Acemoglu et al. 2005). A related line of work has stressed the value of colonies in terms of the influence they conferred upon imperial nations in the European theatre of military and political competition (Findlay and O'Rourke 2007). On the other hand, cliometricians have focused on the direct linkages, mainly through trade, taxation and finance, between colonial and home economies, when they come to estimate the counterfactuals which are the kernel of their analyses. A recent strand within this has paid particular attention to the role of the entrepôt trade and its domestic ramifications in driving structural change in the home countries (Daudin 2006).

The present case-study of Portugal contributes in several ways to the ‘economics of empire’ literature. A great deal of this research has concentrated on the Netherlands and England, typically seen as success stories. To correct the imbalance, this article provides a needed counterweight to the predominance of north-western European examples (O'Rourke, Prados de la Escosura and Daudin 2010). In the second place, this study places itself firmly in the cliometric camp. To measure the impact of the empire on growth, however, it uses a dynamic model based on a system of simultaneous equations, instead of the more commonly employed static, partial equilibrium counterfactual method. We believe this to be sounder methodologically and to yield better results. Thirdly, our new and extensive macroeconomic database enables us to carry this assessment, for all relevant countries, all the way back, over several benchmarks, to 1500, rather than focus only on a short period in the late 18th century, as usually occurs in similar explorations. This allows us to grasp the long-run dynamics of empire far better than if we relied on a single historical snapshot.
2. Portuguese economic performance: past interpretation, new data

The first requirement for a study of this kind is an accurate picture of Portugal’s economic growth between 1500 and 1800. Unfortunately, the existing historiography is not helpful in this respect. Few modern studies have focused explicitly on Portugal’s long-term economic growth before the nineteenth century. Fewer still have used standard quantitative indicators, such as the real wage or GDP per capita, for this purpose. Notwithstanding, a consensus has gradually emerged which considers that throughout the Early Modern period Portugal was chronically in the grip of economic stagnation and any gains in per capita economic growth were ephemeral and quickly dissipated. Godinho, the late doyen of Portuguese economic historians, has stated that ‘the notion of decadence has shaped the great majority of historical studies on Portugal written during the nineteenth and twentieth centuries’ (1968, IV, 232).

Explanations for Portugal’s lacklustre performance fall into three main categories.¹ One focuses on the country’s relegation, after 1500, to a semi-peripheral role in the international division of labour of the Modern World-System (Wallerstein 1974, 1980). This imposed an onerous and excessive reliance on foreign capital and commercial services (Mauro 1983, 1990), shipping (Rau 1953), and imports of manufactures (Sideri 1970), which inevitably stunted the most dynamic sectors. The second was its archaic and technically stagnant agricultural sector which struggled in vain to overcome the Malthusian trap and kept the mass of the population at the lowest levels of consumption (Justino 1981; Oliveira 1980). This was fostered by incomplete property rights in land and an excessive concentration of income in the hands of a rentier class, both of which seriously distorted the incentives for increasing output and productivity (Magalhães 2010). The third was the empire.

For many, the colonial system has been indubitably the most important determinant of long-term economic backwardness. Successive booms in the overseas diverted resources and entrepreneurship from home manufacturing and held back the diversification of country’s economy (Godinho 1955; Macedo 1963). Agriculture languished due to the persistent drain of its labour force caused by the attraction of employment conditions in the empire or in the major port cities which serviced it (Sêrgio, [1927] 1984). Meanwhile, the riches which flowed from the colonies made foreign foodstuffs more accessible, which crowded out domestic agriculture and prevented its improvement (Pedreira 1994). The inflow of colonial wealth had further deleterious effect: it promoted the emergence of a bloated, parasitic tertiary sector. This discouraged the rise of a strong, development-minded national bourgeoisie which might have spearheaded a thrust for structural change based on manufacturing and not on intermediation (Godinho 1978).

Several recent revisions have suggested a less sombre portrayal. Among them, Serrão (2010) has argued that during the seventeenth and eighteenth centuries agriculture expanded and became more market integrated, and this increased specialization,

¹ For the most recent and up-to-date survey of Portuguese economic history, see Costa et al. (2011).
internationalization, and technical progress. With regard to manufacturing, Pedreira (2004) has similarly claimed significant expansion and technical change in both its large scale and proto-industrial sectors, particularly from the 1770s, under the impulse of rising colonial demand. The same author (1995) has drawn attention to the rise, in the late 18th century, of a dynamic new merchant class characterized by unprecedented levels of wealth and technical sophistication. While the net macroeconomic impact of these changes may be presumed positive, an overall assessment has not yet been attempted.

In the meantime, two efforts to quantify long run per capita GDP have challenged traditional ideas thanks to results which imply a rejection of the prevalent stagnationist stance. Maddison (2001) estimated an increase of 52 per cent between 1500 and 1820 in this variable and, more recently, Valério (2010) has obtained an even higher figure for this – a rise of 72 per cent for the period 1500-1800.

Both findings are problematic, however, and this for two reasons. One is the weakness of the empirical support. In Maddison’s study, an estimate of Castille’s long run GDP by Yun (1994) is used to represent the whole of Spain and, by extension, of Portugal. Despite undeniable resemblances among these economies, we have no evidence for how close the parallel was. In the case of Valério’s quantification, one indicator alone – urbanization – is used to proxy GDP. This ignores the fact that long-run changes in economic structure or in sector productivity might have had a significant impact on the result of the exercise.

The second problem has to do with the plausibility of the results. A recent study of Holland (van Zanden and van Leeuwen 2012) has shown that during roughly the same four centuries, between 1510-14 and 1807-8, GDP per capita grew to a similar extent, that is, by 60 percent. How likely is it that the macroeconomic performance of this ‘first modern economy’ (De Vries and van der Woude 1997), with one of the highest levels of capitalist development of the Early Modern period, would have been similar to that of Portugal?

To circumvent such difficulties we propose a new indicator of macroeconomic performance. It is derived from an entirely new data set comprising prices and wages and drawn from a variety of archival sources. To ensure their homogeneity and international comparability, they are expressed in grams of silver and standardized in the metric system. The vast majority of these observations represent individual market transactions, and this allows us to obtain from them purchasing-power-parity adjusted real wage series. The great advantage is that Portugal’s long run growth can now not only be measured with reasonable accuracy, but also be compared to that of other European nations.

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2 Santos (2003) has argued the same for the large scale, commercialized farming of southern Portugal and Oliveira (2002) has done so too for the Beira Alta, a northern region of micro-farming.

3 These data have been collected and processed in the context of the project ‘Prices, Wages and Rents in Portugal, 1300-1910’ funded by the Portuguese Fundação para a Ciência e Tecnologia. The methodology followed and the original figures can be consulted at http://pwr.dev.simplicidade.com.pt/000000/1/index.htm.
Of the possible options for our purpose, ideally a national product series is the best since GDP, if properly quantified, captures the economic activity of all factors of production in all sectors of the economy. In spite of this, for present purposes we prefer the real wage. There are two reasons for this. The most important is coverage. The data set we shall be using to estimate our model (sections 4 and 5) should not be too small. In the present case, it is based on the nine countries in Allen’s original sample plus Portugal. While complete real wage series are available for all ten, thorough and up to date estimates of GDP have yet to be undertaken for four of them: Poland, Austria, France and Belgium.4

The second reason is that while there is a wide consensus regarding the best way to calculate real wages in the Early Modern period, the same cannot be said for GDP.5 Estimating the latter calls for a larger and more important number of assumptions and consequently multiplies the degree of discretion involved in the process.6 Finally, as Williamson has pointed out, the deflators for these two yardsticks can diverge appreciably and this ‘may matter a great deal’ (1995, p. 143), an argument echoed by Allen, when he concludes that, all things told, in this epoch ‘income ... is best measured by the real wage’ (2003, p. 406).

We construct real wage series for skilled and unskilled labour following the *modus operandi* which is widely adopted in the literature (Allen 2001; Malanima 2010). Nominal wages, which are mainly from the building sector, are drawn from Portugal’s leading city - Lisbon - and deflated by a CPI constructed on the basis of a constant basket of consumables. The latter includes both foodstuffs and manufactures. To ensure comparability, we use Strasbourg prices for the decade 1745-1755 as the standard throughout the exercise. We have also kept the consumption basket proposed for all European countries by Allen (2001). This means that the results for Portugal in figures 1 and 2 are comparable to those for the other countries represented there since they are all based on the procedures used to construct Allen’s (2003, 2009) data set.

Figure 1 displays a real wage indicator for Portugal from 1500 to 1800. The most salient point is the pronounced decline in the standard of living in Portugal during the Early Modern period. Skilled labour performed slightly better than unskilled but severe deterioration - of the order of 50 percent - was experienced in both cases. This came about in three stages. The first occurred during the initial one hundred and fifty years. It was followed by a recovery from the mid-seventeenth to the mid-eighteenth centuries. Finally, in the last half century under consideration a sharp decline took

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4 The remaining countries in this set are England, the Netherlands, Italy, Spain and Germany.
5 The collective effort to produce comparable Early Modern real wage data on an international scale was launched by Allen (2001). It then comprised fifteen cities in ten different countries. The list has been much increased since then but the procedures have remained remarkably stable. The main methodological variations to date relate to the consumption baskets employed to deflate nominal wages.
6 Examples of this discretion are the choice of food demand elasticities; whether to include or not income from rents in the agricultural demand function; the different ways of interpolating a non-agricultural output proxy.
place again. A second point is the corroboration these data lend to the historiographic tradition of ‘decadence’ which has been the hallmark of the Portugal’s macroeconomic evolution during this era. The third is that although the skill premium is not constant over time, it has no trend. This means that using one or the other wage series to represent the economy makes little difference. We adopt the skilled labour wage since the international data set on which we base our estimates below does the same.

FIGURE 1 HERE

Figure 2 shows how the Portuguese economy fared relative to the international context. The country emerges as part of the group of Early Modern ‘less successful’ economies – along with Italy, Spain, Austria, Germany, Poland and France – which suffered substantial real wage decline, of around 50 per cent over the course of these three centuries. The ‘successful’ ones – England, the Netherlands and possibly Belgium – underwent stagnation instead and by 1800 were enjoying the relatively high wage levels which had characterised an earlier epoch, four centuries before, when Malthusian pressures were relatively weak in Europe.

FIGURE 2 HERE

In a European mirror, Portugal’s Early Modern economy was thus hardly a case on its own in terms of comparative performance and contrary to what national historians have thought. Where it differed was in combining a common low income level with a significant colonial system. The issue this raises is whether the latter was a help or a hindrance in keeping up economically with others. Should we find that the contribution of the colonies to the home economy was positive, this would mean that without colonies and solely on the strength of its domestic resources, Portugal would have been considerably worse off than the ‘backward’ nations of Europe. Should we conclude the opposite, we would then have to presume that without overseas possessions, Portugal would have been better off, as so many historians have claimed.

3. How should we measure the contribution of empires to economic growth?

In this section we consider two methodological choices. The first regards the best way of measuring the direct material benefit accruing to European powers from having empires. The second concerns establishing the appropriate model for estimating the quantitative nature of the relationship between these gains and national income.

3.1. The choice of metric

Colonies were beneficial to the home country in many ways. They allowed the mobilization of unused natural resources overseas (‘ghost acres’ and minerals) for productive ends, and thus created some slack in Europe’s Malthusian constraint. They helped to reallocate underutilised domestic resources overseas – chiefly manpower – and thus enhanced their productivity. They created overseas markets to serve as outlets for domestic production and thereby promoted scale economies and the division of labour. Thanks to their use of political and military might, imperial powers
were also able to earn rents by distorting price mechanisms in the markets strung out along the chains of supply which connected them to their colonies.

To encompass all this diversity within a simple metric is no easy matter. One solution is to calculate separately the gains and losses from all the many relevant types of activities, and then weight and aggregate them using appropriate prices. The alternative is to employ a value index of each country’s total trans-oceanic trade and deflate it with a suitable set of commodity prices.

In order to cohere with the specifications of Allen’s model (2003), we opt for the latter and define our yardstick as total exports of products of the mother country to the colonies plus the commodities sent by the colonies to the mother country. Consequently, we exclude two items of trade: exports to the colonies of goods produced in countries other than Portugal, and Portugal’s re-exports of colonial commodities, whether processed or not in the home economy. The assumption which underlies this choice is that inter-oceanic trade was the principal conduit through which the material benefits of empire were funnelled to the home country and is therefore a reasonable proxy for them. Although this supposition does not appear far-fetched, it is important nevertheless to assess what such a preference entails.

This approach has the advantages of being simple, easy to construct and of requiring relatively small data inputs. On the negative side, two aspects have to be weighed. One is the exclusion of re-exports, which entails disregarding the profits of both the entrepôt trade and of processing of these commodities before re-export. Since both were high, the distortion might be large. Including re-exports, however, would be distortive in the opposite direction, as it would mean double-counting on a similarly sizeable scale. We thus conclude that, altogether, the difference between the two scenarios would not be large.

The second drawback of a ‘simplified’ trade-based proxy for the gains from empire is that it ignores non-trade items such as remittances and investment. While these are pertinent, direct evidence regarding them is not easy to come by. Given the nature of mercantilist relations and the close integration of home and colonial markets, it seems probable that colonial development varied commensurately with the flows of capital and colonisers arriving from the mother country, as well as with the earnings of these factors of production. It makes it likely that these invisible flows would have been correlated with trans-oceanic trade and therefore reasonably proxied by it too.

At this point and in view of the decision to treat trans-oceanic trade flows as a key variable in our research strategy, it seems useful to examine its main dimensions.

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7 For the late eighteenth century Portugal, Pedreira (2004, 273) estimates that the mark up on the prices of colonial imports for the three most important Brazilian re-exports – sugar, hides and cotton – was around 50 percent. In terms of the share of imports from Brazil which were re-exported, the order of magnitude was, for sugar, at least 80 per cent and, for tobacco, circa 70 per cent (Mauro 1983; Macedo 1963).

8 Empirical corroboration for this hypothesis for the Early Modern period is hard to come by but some is provided in the analysis of British economic relations with its colonies in the late eighteenth century by Cuenca Esteban (2004, 48-9).
Figure 3 marshals the available data for Portugal and the four other principal colonial nations – England, France the Netherlands and Spain – and presents their values at 1700 prices for five different benchmarks. Observations are standardized by the respective metropolitan populations. In the case of Portugal and Spain, we display two versions of this variable, one including precious metals (#1) and the other without them (#2). Recognition is thereby given to the importance of these items in overseas trade, while allowing for the point of view that American gold and silver perhaps should be treated as ‘loot’ (Allen 2003, p. 414; O’Brien, 2005 ) and, by implication, as not representing productive activity.9

FIGURE 3 HERE

Several conclusions can be drawn from these data. The first is that over the Early Modern period, trans-oceanic trade volumes varied considerably across time and from empire to empire. The second is that these variations do not fit well the logic either of population size or degree of economic development. A strong presence of colonial trade was not necessarily the appanage of either the more developed or of the larger nations. The third finding is that before 1800 the per capita commodity trade of Portugal with its colonies was consistently one of the most significant among the ‘Atlantic traders’. It trended upward from the dawn of empire to the mid-18th century by a factor of 300 per cent (or 200 per cent without gold), and declined slightly (23 or 4 per cent) in the last fifty years of the period. In the sixteenth century, when Spain was its only rival, it far outdistanced it. From the late seventeenth to the early eighteenth centuries, it was overtaken by the Netherlands but stayed ahead of England, Spain and France. It led all the colonial nations again in the mid-1750s and only fell behind England in the second half of the century.

3.2. The choice of model

Estimating the impact of colonies on imperial economies has normally been carried out by means of counterfactuals. There are two basic ways of doing this. One is a static, partial equilibrium approach. The other is a dynamic, general equilibrium one.

The first dates back to the early stages of the cliometric revolution. It compares the income of the mother country at a given historical moment with that of a hypothetical situation in which the empire did not exist. Once this has been standardized by a macroeconomic yardstick - for example, GDP - the differential measures the empire’s contribution to the welfare of the metropolis (O’Brien and Prados 1999). Two

9 It is a moot point whether precious metals should be considered ‘loot’. They were not looted but extracted, and came from large and complex enterprises which mobilized vast investments and coerced labour, just like most other production for export from the New World. Silver and gold were subsequently hoarded, transformed into luxury articles which were comparable to many in the China and India trades, or converted into means of payment. The last of these probably helped raise productivity by facilitating transactions and being available for settling balance of payments deficits. Gold and silver might also provoke inflationary pressures. The suggestion of a ‘Dutch disease’ has been raised in the case of imperial Spain (Drelichman 2005; Forsyth and Nicholas 1983) but not yet in that of Portugal.
procedures have been used to implement this strategy. One estimates the return from the actual investment made by the home country in the colony and contrasts it with the yield that would be normally obtained elsewhere with the same stock of capital plus an appropriate risk premium (Thomas 1968). The other is more akin to a ‘natural experiment’. It establishes parallels between the economic achievement of two actual historical situations: a time when the empire flowered, and a time, shortly afterwards, when it had succumbed (Pedreira 1994; Prados de la Escosura 1993).

The literature based on the static approach has concluded that empires contributed modestly to the economic development of their respective mother countries. Indeed, O’Brien and Prados have warned that ‘arguments that reify European expansion overseas into the engine of economic progress should be strongly qualified’ (1999, p. 5). In the case of Spain between 1784/1796 and 1815/1820, the end of the empire allegedly entailed a loss of between 3.0 and 8.4 per cent of GDP (Prados de la Escosura 1988, 1993). In the case of Portugal, the loss of GDP in the interval 1796/1806 to 1827 was in a range from 3.4 to 8.0 per cent (Pedreira, 1994). Results of a similar order of magnitude have been found for Britain (Floud and McCloskey, 1981).

The alternative procedure, which we espouse here, is suggested by Allen’s recent work on the factors of economic success or failure in Early Modern Europe (Allen 2003, 2009). It uses a system of four simultaneous equations which are solved recursively over a succession of periods, in order to explain the endogenous variables which characterize the structure and performance of these economies. These variables interact with each other but also have as ‘prime movers’ a number of exogenous variables. Of particular interest to us is the fact that trans-oceanic trade is included among the latter. It thus provides the opportunity for quantifying the link between the home economy and that of its overseas possessions at any benchmark and on a country by country basis.

A comparative evaluation of the two approaches suggests the superiority of the latter (O’Rourke, Prados and Daudin 2010, 109-10). The most important reason is that it is explicitly dynamic and takes into account a variety of causal factors. On the other hand, its rival is static, based on partial equilibrium and disregards explicit causal mechanisms. Consequently, the former takes external and inter-temporal effects into consideration, and this causes it to generate results which are not only different but systematically larger than those obtained from the partial equilibrium, static cost-benefit methodology.

The comparative static cost-benefit accounting is does not consider how unutilized resources would be employed in a situation of no-empire. It hence unable to quantify a probably substantial part of the impact of trade on growth (Findlay and O’Rourke 2007, 337). Suppose a trade boom raises wages and higher wages then induce the

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10 These large intervals are the result of the dispersion of GDP estimates at the time when these studies were undertaken. In the case of Portugal, the reduction due to the emancipation of Brazil would have been between only 1.0 and 2.4 per cent, according to Lains (1991), owing to the adoption of a considerably larger estimate for GDP.
rapid development of labor-saving technological change. This growth-enhancing effect is absent from static calculations, which would wrongly conclude that without trade GDP would only decrease by the amount of that trade. The counterfactual of ‘what would happen to a given economy without trade’ ought not to correspond simply to wiping out trade and assuming all else equations stays unchanged, and in particular when we consider a hypothetical no-empire situation. 

Finally, the static cost-benefit analysis is at a comparative disadvantage because it requires a greater amount of empirical knowledge concerning the relations between the components of the imperial system, as well as between the sectors of the colonial and domestic economies. As a consequence, followers of this approach seldom present findings for more than one point in time, given the highly onerous nature of the task. They often find that ‘the evaluation of the benefits of Empire is difficult both to describe and measure’ (Engerman 1998, p. 216).

For these reasons, we proceed by estimating a dynamic general equilibrium model, using the well know Allen (2009) model. This model is not without limitations. The most obvious one is that even if internally consistent, its external validity is open to question. Are the countries and periods which did not have colonial trade adequate control groups? In our estimation below, we do estimate the model using panel data methods, which should help attenuate omitted variable problems as long as the sources of idiosyncrasy are approximately constant in time. Another question related to the model’s identification is that some of the exclusion restrictions which identify the model could be incorrect.\footnote{For example, Allen (2009) argues that fast TFP growth was endogenous to England’s high wage economy. Other countries, such as Spain, had land-saving biased technical change as an endogenous response to different relative prices of capital and labor. This is inconsistent with assuming that enclosure is exogenous to the system, as Allen himself does in the model’s estimation. International trade, itself, may have an endogenous component, as richer empires may be able to generate additional resources which may eventually lead to further riches. It may also be difficult to accept land-labor ratio as exogenous in the benchmark estimation. In pre-modern economies and assuming a Malthusian scenario, the size of the population should respond to the real wage and hence the denominator of the land-labor ratio should be eventually affected by this as well. A counterbalancing argument is that in the model each period is never less than 50 years, which attenuates the danger of reverse causation. Indeed, Allen (2003) briefly considers an additional equation for population growth and shows the main result is not affected.}

While we are aware that these limitations qualify our results, we believe that the advantages of using a dynamic model clearly outweigh its disadvantages. The best way to think about our results is that they are conditional on Allen’s model for the early modern European economy, which is maintained throughout our analysis. We have shown that our results are robust to a wide choice of estimation methods, but other than in the choice of the estimators, we have followed Allen’s methodology and identification strategy. Our strongest assumption is the choice of endogenous variables and their instruments (Allen 2003, p. 416). We did not perform tests of over-identifying restrictions, since econometric theorists argue these tests, while common, in fact cannot be used to test for instrument validity (Parente and Silva 2012)\footnote{In addition, some other instruments could be weak, that is, not strongly correlated with the endogenous variable of interest. Allen (2003) does not show first stage estimates or discuss the...}.
4. Estimation and simulation

In Allen’s original sample estimation, Portugal was absent. In this section we re-estimate Allen’s model including newly minted data for Early Modern Portugal\(^\text{13}\). Using the coefficients thus obtained, we then calculate two scenarios – the no-intercontinental trade counterfactual and the model’s simulation for the historical situation.

The model considers a sequence of periods in which the real wage, agricultural productivity, urbanization and the share of labor in proto-industry are endogenous variables. These are complemented by a number of variables which are held to be exogenous, in accordance with Allen’s model, such as the land-labor ratio, manufacturing productivity, the extent of enclosure, real energy prices, the volume of colonial trade, and lagged urbanization, and a ‘prince’ dummy for institutions. Lagged urbanization serves as the model’s state variable. It tells us all we need to know about the past in the beginning of a new period. These variables are listed in table 1.

TABLE 1 HERE

The model is linear and further identified by a series of exclusion restrictions which apply to the endogenous variables. The wage is assumed not to affect proto-industry or urbanization directly (notice it can still do so indirectly through its effect on agricultural productivity). Proto-industry is assumed to influence only agricultural productivity directly. Urbanization is allowed to have an effect on both the wage and agricultural productivity directly, but not proto-industry. Finally, agricultural productivity can directly affect all three other endogenous variables.

It is important to notice that all such restrictions are *contemporaneous* identification assumptions. With a one period lag, every variable can affect every other through its effect on past urbanization. For example, for each country in the sample Allen assumes that enclosure in 1500 affects urbanization in 1500 only through the manufacturing productivity of 1500. Combined with the effect of other variables, both exogenous and endogenous, the urbanization rate of 1500 is thus calculated. When it comes to estimating the system in 1600, lagged urbanization enters as an exogenous variable.

Estimation

We begin to implement this part of our strategy by replicating the 2SLS model employed in Allen (2003). This gives us the four equations which describe the possibility of a weak IV problem, but we include an “IV robust F-statistic” row in each of the regression tables. Using the cut-offs suggested by Stock and Yogo (2005) we conclude a weak instrument problem in the real wage equation does not exist. We recognize that under some specifications the possibility of weak IV cannot be rejected for the urbanization equation at standard levels of significance (this could be simply a matter of low power).

\(^{13}\) One critical feature about Allen’s model is that ultimately the coefficients correspond to a type of average of all the countries in the sample. Hence by including Portugal we not only update Allen’s estimates but also access their external validity.
evolution of, first the nine, and then the ten countries under consideration during the period 1500-1800. The results for the wage and urbanization are in columns (1) and (2) of tables 2 and 3. As an alternative, we use a 3SLS procedure. This is more efficient as it estimates all endogenous equations simultaneously and hence utilizes all available information, taking into consideration the fact that the equations can be related through their error terms. The results are in columns (3) to (6) of the same tables. In two of them – columns (5) and (6) – we use population weights, so as to allow for the large differences in the size of the countries observed.

TABLE 2 HERE

TABLE 3 HERE

A second way to improve the estimation takes advantage of the panel data structure of the data. For this, we consider the fixed effects estimator\(^{14}\). This estimator (also known as the ‘within estimator’) takes into account the possibility of unobserved heterogeneity about each individual country. This allows controlling for time-invariant unobserved country-specific idiosyncrasies, something which the previous pooled estimates may be missing. This means we can check, for instance, if England boomed in the 18\(^{th}\) century because of the actual combination of exogenous factors or simply because there was something special about being ‘England’.

Using the fixed effects estimator means we cannot use lagged urbanization as a dependent variable in the urbanization equation (Nickell 1981). In keeping with the spirit of Allen’s model, we include lagged urbanization as a covariate in the equation for urbanization, which means that we are in the context of a dynamic panel-data model\(^{15}\). Consequently, we use the well-known Arellano-Bond estimator, which is a consistent GMM estimator for ‘short’ panels, and make allowance for the fact that the unobserved panel-level effects are by construction correlated with the lagged dependent variables. This estimator allows for idiosyncratic heteroskedastic errors which are correlated within countries, but not across countries.

Columns (1) and (2) of tables 4 and 5 present OLS estimates. These have no causal interpretation, but show partial correlations which are of interest for comparative purposes. Column (3) in the same tables displays the results of the fixed effects IV estimation as just discussed, and column (4) contains the Arellano-Bond GMM estimation.

TABLE 4 HERE

TABLE 5 HERE

\(^{14}\)The Hausman test strongly rejects the random effects model in favor of the fixed effects model.

\(^{15}\) The model additionally contains potentially unobserved panel-level fixed effects.
Simulation

Inspection of the results above shows that the various estimated coefficients and standard errors do not change much, when either Portugal is included in the original sample, or when alternative methods are used. Moreover, the more significant differences which occur do so in the expected direction. For instance, a comparison between columns (1) and (2) of table 2 reveals that when Portugal is included in the sample (column (2)), the estimated coefficient for urbanization rises, thus increasing the ‘all else constant’ impact of urbanization on the real wage.

To simulate real wage levels for Portugal, we employ historical data for the different explanatory variables. We input land per agricultural worker, the urbanization rate, agricultural TFP, the share of labour in proto-industrial activities, energy prices, a dummy for institutional quality and the volume of trans-oceanic trade. The next step is to repeat the exercise, with the same historical values, except that this time the volume of colonial trade is changed to zero. The difference between the two outcomes is the counterfactual measure of the impact on the economy of the home country of having colonies, as opposed to not having them. This is carried out for every benchmark in the three centuries considered and gives us the time line for the economic impact of empire.

Since the model is dynamic, the exercise can be followed through also with the remaining endogenous variables – agricultural total factor productivity, urbanization and proto-industrialization. Again, the equations are calculated with the appropriate historical values of the exogenous variables and those obtained for the endogenous ones for each temporal sequence.

5. Results and implications

In this section, we go over the results of the simulations described above. We start by looking at their implications in terms of the specific issues of Portuguese long term economic performance. We then broaden the perspective, placing them alongside the experiences of other Early Modern colonizers, to obtain fresh comparative insights.

Figure 4 gives us a time line for the direct impact on the Portuguese economy of the country’s imperial endeavour. The upper line (intercontinental trade inclusive of gold) refers to the simulated real wage generated by the model when all its variables assume their respective historical values, that is, trans-oceanic trade comprises gold as well as commodity exports and imports. The next line down (simulation) reflects the counterfactual values of the real wage in the benchmark scenario when precious metals have been removed but all else stays as historically observed. The lowest line

---

16 Using a series of F tests we do not reject that at most standard levels of significance the coefficients of the model with Portugal are equal to that for Allen’s original estimation. Even the few for which the formal test fails to reject a difference have a similar magnitude in economic terms. We only perform the test for the same estimation methods since tests of equality of coefficients can only be performed either for the same estimation method, or if the models can be nested under a more general model.

17 This data comes from the PRW project described in footnote 3.
(no intercontinental trade) represents the real wage in the event of a complete shut-down of colonial trade.

FIGURE 4 HERE

Four major findings emerge, all of which challenge widely-held views on the empire’s contribution to Portuguese economic growth before 1800. The first is that the colonies were consistently beneficial to domestic outcomes throughout these three centuries. In other words, the real wage differential associated with having an empire was positive throughout the period.

The second is that, instead of running out of steam, over time the trend of this impact never ceased to escalate. At the dawn of the sixteenth century, when the empire was concentrated on the Indian Ocean and the China sea, the disparity between national income with and without colonies was a mere one per cent, an indication that the legendary riches from the Orient were exaggerated by contemporaries (Pedreira 1998). The gradual retreat from Asia, following the initial expansion and the ensuing repositioning to Brazil, changed Portugal’s colonial vocation, from trade and navigation to tropical slave plantations and mineral extraction. It also increased relative gains from overseas activity significantly. By 1600, these had risen four-fold relative to the 1500 level and seven-fold by 1700. By 1800, the ‘historical’ real wage was twenty four per cent higher than if the empire had not existed.18

The third is that in spite of this positive contribution, the empire did not prevent the country’s sustained long run economic decline. During the first two centuries the gains from overseas were insufficient to overcome the secular contraction of domestic per capita income. During the seventeen hundreds, notwithstanding a significantly increased boost, they were just enough to neutralize the negative impact of Malthusian pressures on the home economy.

The fourth outcome is of a methodological nature. It confirms our initial expectation that a static model would lead to systematic underestimation. For 1800, the only benchmark which at present allows a precise comparison, the dynamic approach reveals gains from Empire which are three times those reached by Pedreira (1994) for the same period with a static approach. The suggestion is that earlier cliometric efforts systematically missed significant effects.

These results suggest the empire contributed significantly to the positive part of Portugal’s economic performance. They still leave unanswered, however, questions regarding the relative magnitude of this relationship, something which can only be dealt with in a comparative framework. This has two dimensions. If other colonial powers were analysed using the same procedures, would Portugal’s imperial effort still seem as impressive? If it passed this test, how successfully would its colonies be in promoting convergence with the leading economies of the time?

18 If gold is left out of the picture, the difference is about 20 per cent. This result helps to clarify the considerable importance for Portugal’s eighteenth century economy of Brazil’s mining sector.
In this branch of comparative economic history, a well-established consensus claims that colonial systems influenced metropolitan economies in ways which diverged quite a lot. Britain and the Netherlands gained ‘disproportionately’ from overseas expansion, while Spain and Portugal did poorly and France was somewhere in between (O’Brien 2005, 12). Several reasons have been adduced for this, namely the ‘late comer’ status of the Anglo-Dutch ‘free riders’ in the 18th century (O’Brien 2005); their superiority in terms of institutions (Acemoglu et a. 2005) or of social development (Rei 2011); and the heavy investment costs endured by the Iberian ‘early starters,’ probably beyond their reach (O’Rourke et al. 2010).

To test this assertion, we compare the impact of the colonial powers’ inter-oceanic trade on their respective per capita incomes. Table 6 displays the complete set of these estimates for the period 1500-1800 and for the main imperial nations. It was assembled using the procedure employed above to obtain the same variable for Portugal when constructing figure 4. It constitutes the first accurate and consistent picture of how, over the course of the Early Modern period, these metropoles transformed the inputs accruing from their respective possessions into increments of national income.

**TABLE 6 HERE**

Remarkably, this portrayal of the economic results of colonization represents a sharp contrast with the current mainstream view, particularly as concerns the 18th century, the high-tide mark of colonial mercantilism. Although Britain still appears as one of the most effective colonial powers, the Netherlands, one of the richest economies in the world, have now been replaced by Portugal. Indeed, Portugal has not only abandoned the tail end of the traditional distribution but emerges, in every century, ahead of all ‘Atlantic traders’. Despite the grand image of their overseas expansion, France and Spain reveal a consistently weak imperial performance, whichever century is considered.19

In table 7, we show the empire extraction premium20 (in real wage units), and in parenthesis, the empires’ contribution to convergence towards England21.

**TABLE 7 HERE**

These results confirm that, with the possible exception of the eighteenth century, the Empire only explains a small fraction of the real wage. They further suggest that, relative to England, the Empire helped Portugal converge when it was poorer and helped increase the divergence when it was richer, around 1600.

---

19 In the estimates for figure 5 trans-oceanic trade never includes precious metals.
20 This is calculated, for each country and period, as the share of the real wage attributable to the empire multiplied by the real wage.
21 This is calculated, for each period t and country i, as

\[
\text{Empire extraction premium}_{it} = \frac{\text{Real wage}_{England,t}}{\text{Real wage}_{England,t} - \text{Real wage}_{i,t}}
\]

Notice the empire effect is always positive, so negative values correspond to periods when the country’s real wage was higher than England’s.
6. Conclusion

In this paper we have considered the benefits to the economic development of Early Modern nations with seaborne empires of having colonies. We have addressed the case of Portugal, which had one of the oldest, most varied and far flung of overseas enterprises. The starting point and the puzzle arise from the revision of the macroeconomic statistics for this country. This reveals one of Europe’s least successful records during these three centuries but, at the same time, one of the world’s most vigorous colonial trades in per capita terms.

We conclude that in the long run Portugal’s empire exhibited a considerable degree of dynamism. This which contradicts the belief in a “long-term stagnation of the [Iberian] colonial economies” (Coatsworth 2005, 237). It hence also contradicts the idea that “Long run macroeconomic gains from investment in oceanic trade, maritime outposts, and colonial possessions overseas accrued “ultimately” and “disproportionately” to Protestant powers – primarily to Britain but to the Netherlands as well (O’Brien, p.11-2, 1996). The Portuguese empire was never a drag on the home economy, as some Portuguese historiography has claimed (Macedo 1982, Godinho 1995).

Our results support part of the Wallerstein thesis, since in fact a handsome return could indeed be had from overseas colonization. On the other hand, semi-peripheral Portugal, at the pinnacle of overseas expansion was able to gain as much or more from the empire as the emerging leaders of the Early Modern core.

Why did Portugal’s strong hand on the colonial front did not translate into some degree of economic convergence to its colonial rivals, England and the Netherlands? The answer is that though the positive effect of globalization was undoubtedly significant, it was only one among several factors contributing to growth. In the sixteenth and seventeenth centuries, when the differential in real wages between England and Portugal was small, the contribution of empire to Portugal’s real wage was diminutive too. In the eighteenth century, when England started to pull away from the less developed powers, Portugal’s advantage from having colonies increased, but was never more than about five percentage points greater than the gains which accrued from the same source to England, and the empire extraction premium was always smaller. By this time, the wage differential between the two countries was more than twenty five percentage points, a gap that no amount of additional colonial expansion could possibly have erased. Had Portugal lost its empire then and England not, the real wage gap between them would have become much larger.

While intercontinental trade had a substantial impact on Portuguese economic growth, it was not sufficient to annul the divergence which began to set in between Portugal and the advanced economies of Europe during the 17th century, and which deepened during the 18th. The problem lay elsewhere – on the internal front.
Acknowledgements

We owe particular thanks to Bob Allen for discussion and providing us with replication files. We have also benefitted from comments received in the course of seminars at the Universities of Oxford and Jyvaskylla and of meetings of the Portuguese Association for Social and Economic History (Lisbon, 2012) and the European Historical Economics Society (London, 2013). We are grateful to the colleagues associated with the Prices, Wages and Rents in Portugal, 1500-1910 project. Without this database this paper would not have been possible. Our thanks also go to the Fundação para a Ciência e Tecnologia for financing the enterprise.

References


Camões, Luís de (1572) [1880]. *The Lusiads, engished by Richard Francis Burton (edited by his wife Isabel Burton)*. London: Bernard Quaritch.


Figures and tables

Fig 1. Real wages in Portugal, 1500-1800. Sources: see text.

Fig 2. Real Skilled Wages in Europe, 1500-1800 Sources: for Portugal, see text; for the other countries, see Allen (2003, 2009)

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Table 1. List of variable abbreviation and types
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Table 2. The wage equation. Standard errors are robust and small sample adjusted. 25LS standard errors are robust. Population weights in specifications (3) and (4) are 1 million individuals equals unit weight. Trade volume for Portugal is exclusive of gold. The four endogenous variables are instrumented by the two exogenous variables plus Allen’s nine excluded instruments (Allen 2009). Sources: see text

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Table 3. The urbanization equation. Standard errors are robust and small sample adjusted. Population weights in specifications (3) and (4) are 1 million individuals equals unit weight. Trade volume for Portugal is exclusive of gold. The four endogenous variables are instrumented by the two exogenous variables plus Allen’s nine excluded instruments (Allen 2009). Sources: see text
Table 4. Alternative estimation methods for the wage equation, 1500-1800. Trade volume for Portugal is exclusive of gold. Fixed effects $R^2$ refers to overall $R^2$. In column (3), LNAGTFP was instrumented by Allen’s two exogenous variables plus Allen’s nine excluded instruments (including TRADEPOP, see Allen 2009).

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Table 5. Alternative estimation methods for the urbanization equation. Trade volume for Portugal is exclusive of gold. Fixed effects $R^2$ refers to overall $R^2$. In column (3), LNAGTFP was instrumented by Allen’s two exogenous variables plus Allen’s nine excluded instruments (including TRADEPOP, see Allen 2009).

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Figure 4. Simulated wage rates for Portugal, 1500-1800

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Table 6. Share of real wage attributable to empire (%), 1500-1800

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<th>England</th>
<th>Holland</th>
<th>France</th>
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<td>with precious metals</td>
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Table 7. Empire extraction premium in real wage units, 1500-1800. In parenthesis, empires’ contribution to convergence towards England. (*) Assuming invariance of real quantities to precious metal imports.