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# The great escape? The contribution of the empire to Portugal's economic growth, 1500–1800

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Newly assembled macroeconomic statistics for early modern Portugal reveal one of Europe's most vigorous colonial traders but one of its least successful growth records. Was the empire a blessing or a drag to the economy? Using an estimated dynamic model, we conclude that intercontinental 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 per capita income by at least a fifth. While the empire helped the domestic economy, it was not sufficient to annul the tendency of the latter toward decline in relation to Europe's advanced core, which began to set in from the seventeenth century onward, but only became definite after 1800. We conclude that the explanation for Portugal's long-term backwardness must be sought primarily in domestic conditions.

## I. 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?

(de Camões/Burton 1572 [1880], p. 171)

Thus spoke the “old man of Restelo”, an apocryphal character in *The Lusíads*, 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 still 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 fresh answer to the question posed by O'Brien and Prados de la Escosura (1998a, p. 33), as well as many others: just how important were colonies for the development of the home economies?

Toward this goal, we use an extensive new database for Portugal, which includes three centuries of estimates of variables such as the real wage, urbanization rate, and intercontinental trade. Its development from scratch is necessary since previously available estimates are unsatisfactory in their methodology and insufficient in terms of the evidence on which they are based. Our first conclusion is that Portugal was a consistent leader among Early Modern colonial powers in terms of the value of per capita trade with its colonies. The second is that the impact of the empire on Portugal's economy was small in the early fifteen hundreds, grew steadily over time and reached a substantial level around 1800. The third is that, nevertheless, this boost to growth was insufficient for Portugal to converge to the leading nations of the time—Britain and the Netherlands—themselves great colonizers.<sup>1</sup>

It has been widely accepted, ever since the fifteenth 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). The part of this literature, which focuses on the 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 Marx-inspired analyses of the 1960s and 1970s, the outcome for the world's core economies was both large and beneficial.<sup>2</sup> This enabled them to amass immense resources at the expense of their colonies and to channel them into long-term growth and industrialization. For the lesser powers, however, the return was small and possibly harmful (Wallerstein 1974). The cliometric response was to assemble an abundance of data and demonstrate that the value of transoceanic commerce was at best modest and 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 toward recognition that colonies may have made a significant and positive difference. The once "discredited" notion (Mokyr 1985, p. 74) of a strong association between overseas and home economic expansion has had its reputation restored thanks to the rediscovery that "the intercontinental trade boom was a key development that propelled North-western Europe forwards" (Allen 2003, p. 432).

Yet from the standpoint of what were the ultimate causes, a good deal of disagreement remains. 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; Braudel 1980; 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 theater of military and political competition (Findlay and O'Rourke 2007). Cliometricians, on the other hand, have focused on the direct linkages between colonial and home economies when they 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 ramifications in driving structural change in the home countries (Daudin 2006).

The present case-study contributes in several ways to the "economics of empire" literature. First, while a great deal of research has concentrated on the Netherlands and Britain, typically

<sup>1</sup> For an overview of Portuguese imperial history, see Bethencourt and Curto (2007). In the case of the British Isles, the data used in the present study covers only England and Wales, here designated as "England". We refer to "Britain" whenever this is the political unit used by the author(s) we are discussing.

<sup>2</sup> This debate goes back to Eric William's vindication of Marx's primitive accumulation (Williams [1944] 1994).

seen as success stories, with Portugal we provide a much needed counterweight to this predominance of north-western European examples (O'Rourke *et al.* 2010). Second, we place ourselves firmly in the cliometric camp, but measure the impact of the empire on growth with a dynamic model, instead of the habitual static, partial equilibrium method. Third, our new and extensive macroeconomic database enables us to carry out this assessment for all the relevant countries all the way back to 1,500, over several benchmarks. This is better than concentrating only on a short period in the late eighteenth century, as usually occurs, since it allows us to grasp the long-run dynamics of empire better than if we relied on a single historical snapshot.

## 2. Portuguese economic performance: past interpretations, new data

The first requirement for a study such as this is to establish an accurate picture of Portugal's economic performance between 1500 and 1800. Unfortunately, few modern studies have focused explicitly on the country's long-term economic growth before the nineteenth century. Fewer still have used standard quantitative indicators, such as the real wage or gross domestic product (GDP) per capita, for this purpose. Notwithstanding, a consensus has 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 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, p. 232).

Explanations for this lacklustre performance fall into three categories.<sup>3</sup> One emphasizes the country's relegation, after 1500, to a semi-peripheral role in the international division of labor of the Modern World System (Wallerstein 1974, 1980). This imposed an excessive reliance on foreign capital and commercial services (Mauro 1983, 1990), shipping (Rau 1954), and imports of manufactures (Sideri 1970), which inevitably stunted the most dynamic sectors. The second was the 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; de Magalhães 2010; Oliveira 1980). The third was the empire.

The colonial system has been for many the most important determinant of long-term economic backwardness. Successive overseas booms diverted resources and entrepreneurship from home manufacturing and held back the diversification of the economy (Godinho 1955; de Macedo 1982). Agriculture languished due to the drain of its labor caused by the attraction of employment conditions in the empire or in the major port cities which serviced it (Sérgio, [1927] 1984; Azevedo [1928] 1973). Meanwhile, the riches which flowed from the colonies made foreign foodstuffs more accessible, and crowded out domestic agriculture, thus preventing its improvement (Pedreira 1994). The inflow of colonial wealth had a further deleterious effect. It promoted the emergence of a bloated, parasitic tertiary sector. This discouraged the rise of a development-minded national bourgeoisie, which was capable of spearheading a change in structure based on manufacturing rather than on intermediation (Godinho 1978).

Revisionist studies have lately suggested a less sombre portrayal. Serrão (2009) has argued that during the seventeenth and eighteenth centuries, the expansion and market integration of agriculture increased its specialization, internationalization, and technical progress.<sup>4</sup> Pedreira (1994) and Madureira (1997) have similarly claimed significant extension and

<sup>3</sup> For the most recent and up-to-date survey of Portuguese economic history, see Costa *et al.* (2011).

<sup>4</sup> Santos (2003) has argued the same for the large-scale, commercialized farming of southern Portugal and de Oliveira (2002) has done so for the Beira Alta, a northern region of micro-farming.

technical change in manufacturing, particularly from the 1770s, under the impulse of rising colonial demand. Pedreira (1995) has also drawn attention to the rise, in the late eighteenth century, of a dynamic new merchant class characterized by unprecedented levels of wealth and technical sophistication.

This approach has been reinforced by two recent efforts to quantify long run per capita GDP, which have challenged traditional views on Portuguese economic stagnation. Maddison (2001) has estimated an increase of 52 percent in this variable between 1500 and 1820 and Valério (2010) has obtained an even higher figure—a rise of 72 percent for the period 1500–1800. Both findings are problematic, however. One reason is the weakness of their empirical support. Maddison’s study uses an estimate of Castille’s long run GDP to represent the whole of Spain and, by extension, of Portugal. Valério’s employs one indicator alone—urbanization—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 regards the plausibility of such a dynamic portrayal when it is compared with other nations. In particular, the study of Holland (van Zanden and van Leeuwen 2012) shows that during roughly the same period (1510–1514 to 1807–1808), GDP per capita grew to a similar extent, that is, by 60 percent. How likely is it that 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 had a similar growth performance to that of Portugal?

To overcome these problems and implement our model, we need to consider new indicators of Portuguese economic performance (the real wages of skilled and unskilled labor) which we derive from our latest compilation of prices, wages, and rents (PWR).<sup>5</sup> We construct the two series following a widely adopted methodology (Allen 2001; Malanima 2013). Nominal wages, which are mainly from the building sector, are drawn from Portugal’s leading city—Lisbon. In order to make them comparable across space and time, they are deflated by means of a consumer price index based on a constant basket of consumables including both foodstuffs and manufactures. The standard of reference is the consumption pattern of Strasbourg working families in the decade 1745–1754. As other authors have also done, we have adjusted the original basket to Portugal’s consumption pattern.<sup>6</sup> Its components are valued at Lisbon prices.<sup>7</sup>

Figure 1 displays these indicators for Portugal from 1500 to 1800. The most salient feature is the decline in the standard of living in Portugal during the Early Modern period. Skilled labor performed slightly better than unskilled but 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 place again. A second point is that these data amply corroborate the traditional view of an era of “decadence” in Portugal’s macroeconomic fortunes. The third is that although the (implicit) skill premium is not constant over time, it has no trend. This suggests that using

<sup>5</sup>To ensure homogeneity, data are expressed in grams of silver and standardized in the metric system. The data have been compiled in the project “PWR in Portugal, 1300–1910” funded by FCT. The original figures can be consulted at [http://pwr-portugal.ics.ul.pt/?page\\_id=56](http://pwr-portugal.ics.ul.pt/?page_id=56).

<sup>6</sup>For examples, see Malanima (2013) and Álvarez-Nogal and Prados de la Escosura (2013). For further information on the Portuguese basket adjustment, see the Supplementary Material, Appendix, Section A.1.4., and Palma and Reis (2014).

<sup>7</sup>We follow the procedure outlined in Allen (2001, p. 420) and Allen (2003). One basket of goods in Lisbon in 1500 cost 232.494 g. This is standardized by dividing it by the cost of the basket in Strasbourg prices of 1745–1754 (414.899 g of silver). The result is 0.560. The real wage in 1500 is then obtained by dividing the nominal wage (of 5 g of silver per day) by this cost of living indicator. The operation is repeated for each benchmark up to 1800.

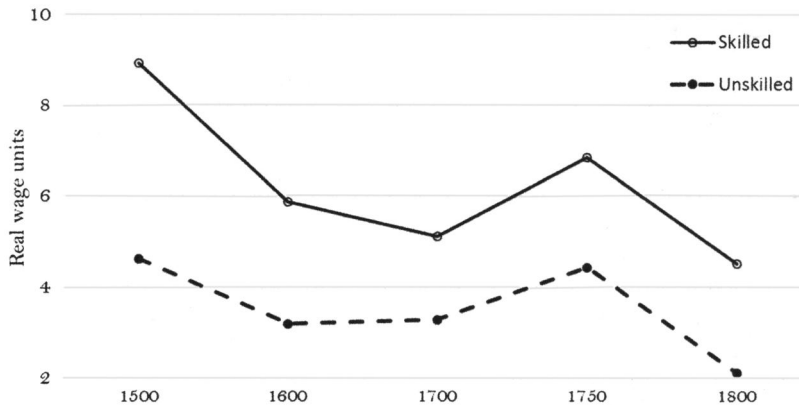


Figure 1. *Real wages in Portugal, 1500–1800.*  
Source: *See text.*

one or the other wage series to represent per capita income makes little difference. We adopt the skilled labor wage for the sake of consistency with the international data set which we shall be using below.

Figure 2 shows how the Portuguese economy fared in comparison with the international context. The country emerges as a member of the group of Early Modern “less successful” economies—along with Italy, Spain, Austria, Germany and France—which underwent substantial real wage deterioration, of around 50 percent over the course of these three centuries. The “leading” ones—England and the Netherlands—failed to grow overall but withstood Malthusian pressures and consistently experienced relatively high wage levels (Allen *et al.* 2012). In a European mirror, Portugal’s Early Modern economy was thus hardly a case of unusual backwardness. What makes it stand out is that it combined a low level of income with a significant colonial system and this raises the issue of whether the latter was a help or a hindrance to its long-term economic performance.<sup>8</sup>

Among options for a metric to gauge macroeconomic performance, arguably a per capita GDP series would have been better. If properly quantified, it would capture the economic activity of all factors of production throughout the economy. The reason why we have chosen nevertheless to use real wages as a proxy for real per capita income is of a pragmatic but unavoidable nature. In order for the econometric exercise (Section 4) to be meaningful, it is critical that the sample size not be too small. There are four countries in our sample for which no GDP data are at present available: Poland, Austria, France and Belgium. Choosing per capita GDP over real wages would require dropping them, and in turn this would mean our sample would be reduced to 30 observations only. In the context of multiple regressions, this would lead to an unacceptable number of degrees of freedom and a dangerously small test power.

<sup>8</sup> One possibility is that the paradox of an expanding empire combined with low and stagnant real wage levels could be explained by increasing inequality, in analogy with the Spanish case (Álvarez-Nogal and Prados de la Escosura 2007, 2013). We thank an anonymous referee for making this point. At the same time, there is an alternative explanation, which is that Malthusian pressures at home meant that growth was to a large degree extensive. This possibility gains traction when we recognize that Portugal’s early modern population more than tripled over this period. The two explanations are not mutually exclusive, but in order to assess their relative importance, we conduct an exercise in the Supplementary Material, Appendix in which we conclude that the Malthusian motive was at least as important: keeping population constant after 1600 has the same effect on the real wage as a shut-down of colonial trade (Supplementary Material, Section A.4.)

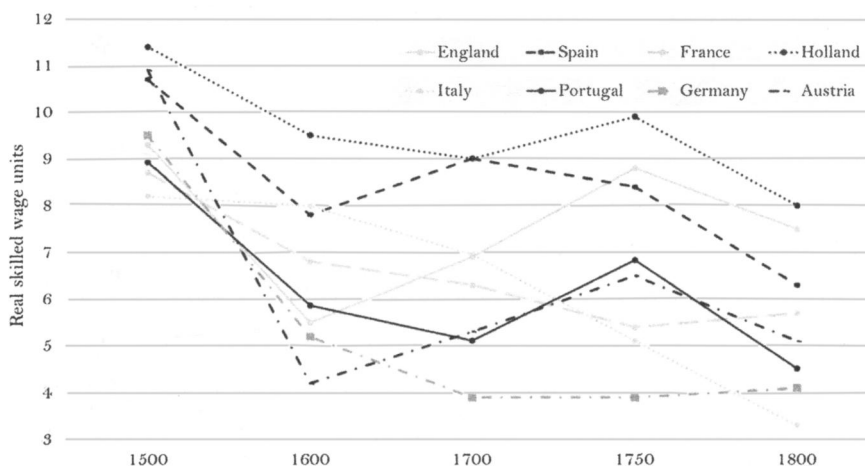


Figure 2. *Real skilled wages in Europe, 1500–1800.*

Source: For Portugal, see text; for the other countries, see Allen (2003).

A further problem with preferring real wages instead of GDP per capita is that we ignore the possibility of changes occurring over time in income distribution, the intensity of supply of labor, and relative prices (Angeles 2008). Any or all of these together could influence the relationship between those two variables and bias the results of our study. We therefore need to determine its nature over the long run in order to assess the degree of distortion. We do this by means of a scatterplot of real wages and real per capita GDP for the five countries for which both are known. Figure 3 shows that the two variables tend to move together.<sup>9</sup> Combined with the arguments given above, this suggests that real wages are, in the context of our exercise, a passable proxy for real GDP per capita. Given the structural similarity between all ten countries under consideration we consider that it is not unreasonable to extend this finding to all of them.

This in turn suggests that if we employ real wages we are merely estimating a lower bound for the total wealth generated by empire, especially toward the final periods, in which the ratio of real GDP to real wages is higher.<sup>10</sup> Our use of the latter, on the other hand, has the advantage of allowing us to estimate directly this effect with respect to the welfare or standard of living of the vast majority of the population, who failed to accumulate significant amounts of capital.

### 3. The contribution of empires to economic growth: how should we measure it?

In this section, we consider two methodological choices. The first regards the best way to measure the material benefits accruing to European powers from their possession of

<sup>9</sup> The  $p$ -value for the null of a zero slope in the regression is 0.055, and all countries are within the 95% confidence interval bands (which are derived under admittedly strong assumptions). In this figure, we have excluded the Netherlands in 1500 and England in 1800 as outliers, but although the slope of the regression is reduced if they are included, the relationship remains significant.

<sup>10</sup> The immediate reason which suggests that by focusing on the real wage we are merely estimating a lower bound is that any capital gains from the empire are thus being ignored. A second reason is that the measured real wage corresponds to a daily wage, but it is possible that empire-generated spillovers stimulated an “industrious revolution” in which people worked more days as a response to the new opportunities.

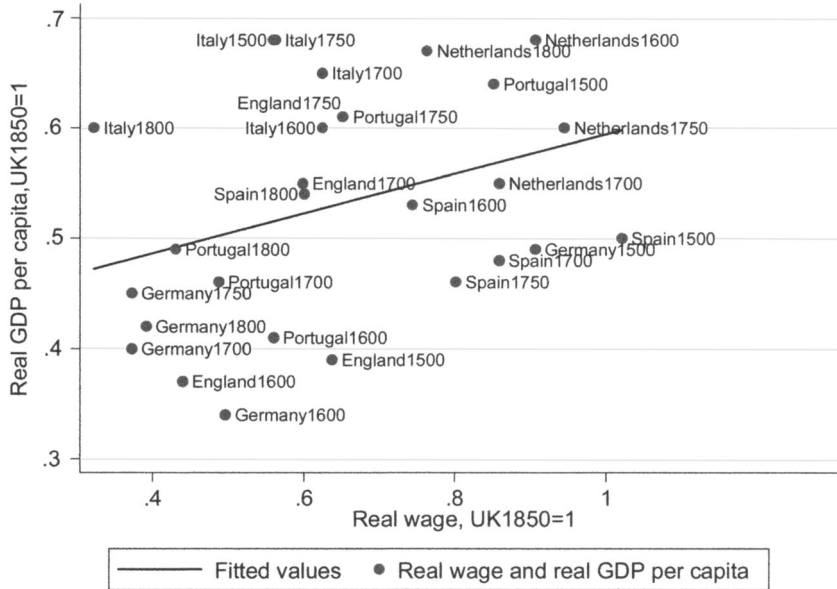


Figure 3. Scatterplot of real wages and real per capita GDP for a panel of European countries. Source: For wages, Allen (2001); for GDP series, Alvarez-Nogal and Prados de la Escosura (2013), and for the case of Portugal, Reis (2013).

empires. The second concerns the most 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 situated overseas, thereby creating some slack in Europe's Malthusian constraint. They helped to reallocate underutilized domestic resources to the same destination and thus enhanced their productivity.<sup>11</sup> They created new markets to serve as outlets for domestic production and as a result promoted scale economies and the division of labor. Thanks to the 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 ultramarine possessions.

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

In order to cohere with the specifications of the model of our choice (to be discussed below), we opt for the latter. This leads us to 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, it excludes two major items of trade: exports to the colonies of goods

<sup>11</sup> This would be consistent with the existence of a Smithian vent-for-surplus (Myint 1977, O'Brien and Engerman 1991).



produced in countries other than the metropolis and re-exports of colonial commodities whether processed or not in the home economy. The assumption underlying this choice is that inter-oceanic trade was the principal conduit through which the material benefits of empire were funnelled to the home country. Although this supposition does not appear far-fetched, it is important nevertheless to assess what it entails.

Our preferred approach has several advantages. It is simple, easy to construct and requires relatively small data inputs. On the negative side, two aspects have to be weighed. One is the exclusion of re-exports, which implies disregarding in the calculation of our trade proxy the gains from the entrepôt trade, in particular those associated with trade services performed under the protection of the colonial pact. This would entail a non-trivial underestimation. On the other hand, if we were to opt for the alternative and add the value of re-exports (to the colonies and to Europe) to the other items, we would end up with a possibly even larger overestimate caused by two biases. One is the double counting of the share of imported colonial merchandise, which was subsequently re-exported from the metropolis. The other is due to entering the value of foreign exports to the colonies as a component of the trade proxy, when these in fact brought no gain to the home economy other than that earned through the trade services of imperial trade. Both approaches thus involve distortions in the calculation of our intercontinental variable but on balance it is likely that the second one would produce a worse result.

The second drawback of a “simplified” trade-based proxy for the gains from empire is that it ignores non-trade items such as remittances, investment, and income from capital. While these are pertinent, direct evidence regarding them is not easy to come by. Given the nature of mercantilist relations and the consequent close integration of home and colonial markets, it seems probable that colonial development varied commensurately with the flows of capital and colonizers arriving from the mother country, as well as with their earnings. This makes it likely that these invisible flows would have been highly correlated with transoceanic trade and therefore reasonably proxied by it (Cuenca Esteban 2004, pp. 48–9).

In view of the decision to treat transoceanic trade flows as a key variable in our research strategy, it is important at this point to examine comparatively its main features. Figure 4 assembles the available data for Portugal and the four other principal colonial nations—England, France, the Netherlands, and Spain—and displays their respective values at 1700 prices for five different benchmarks. Observations are standardized by the respective metropolitan populations, to render them comparable. In the cases of Portugal and Spain, we show two versions of this indicator, one including precious metals (#1) and the other without them (#2). Recognition is thereby given to the importance of these items in their overseas trades. It also allows us to take into consideration the respective impacts of these two opposing points of view, of those for whom American gold and silver should be treated as “loot” (Allen 2003; O’Brien 2005) and therefore left out of these calculations; and of those who would treat it simply as merchandise.<sup>12</sup>

Several conclusions can be drawn from these data. The first is that over the early modern period, transoceanic trade volumes varied considerably across time and from empire to empire. The second is that variations in the size of per capita intercontinental trade do not fit well into any simple logic either of metropolitan population size or of degree of economic development. The third is that before 1800 the per capita trade of Portugal with its colonies was consistently one of the most significant among the “Atlantic traders”. It trended upward

<sup>12</sup> In fact most of these imports were not *looted* but *extracted*. They often came from large and complex enterprises which mobilized vast investments and coerced labor, just like most other production for export from the New World.

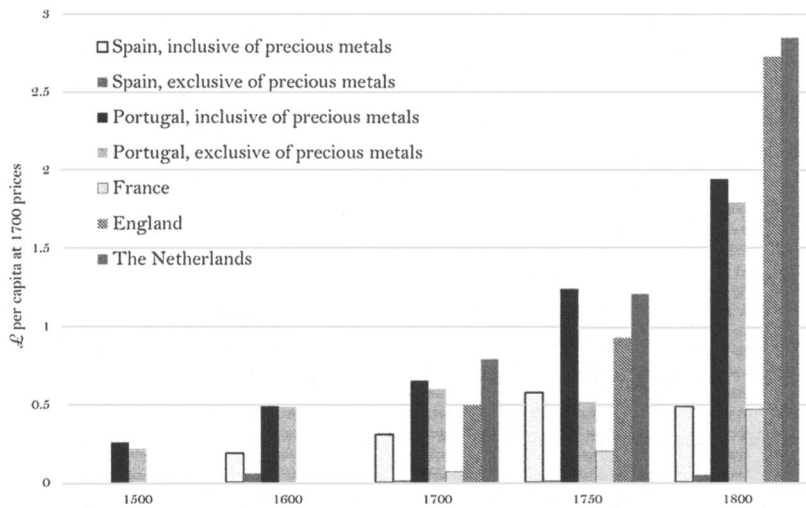


Figure 4. *Intercontinental trade per capita, 1500–1800. 1800 trade values for France correspond to 1788 and those of the Netherlands to 1780.*

Source: For Portugal, *Supplementary Material, Appendix A1*; for France 1788, data kindly supplied by Guillaume Daudin and converted at the exchange rate of 1/25th of a pound sterling per livre tournois; for the Netherlands 1780, van Zanden and van Leeuwen (2012), converted at the exchange rate of 10.5 guilders per pound. For all others, Allen (2003).

from the dawn of empire to the mid-eighteenth century by a factor of 300 percent (or 200 percent without gold), and declined slightly (24 percent) in the last fifty years of the period. In the sixteenth century, when Spain was its only rival, it far outdistanced it. At the turn of the seventeenth to the 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 fell behind England and the Netherlands in the second half of this century.

### 3.2 The choice of model

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

The use of 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 situation in which the empire hypothetically did not exist. Two procedures have been used to implement this strategy. One compares the social rate of return from the actual investment made by the home country in the colony with the yield obtainable elsewhere with the same stock of capital plus or minus an appropriate risk premium (Thomas 1968). The other follows the lines of a “natural experiment”. It contrasts the economic achievement of two historical situations: a moment when the empire functioned normally, and another, shortly afterward, when it no longer existed (Pedreira 1994; Prados de la Escosura 1993).

The literature based on the static approach has concluded that empires contributed only modestly to the economic development of their respective mother countries. Indeed,

O'Brien and Prados de la Escosura have warned that "arguments that reify European expansion overseas into the engine of economic progress should be strongly qualified" (1998b, p. 5). In the case of Spain, between 1784/1796 and 1815/1820 the end of the empire entailed a loss of between 3.0 and 8.4 percent 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 percent (Pedreira 1994).<sup>13</sup> Results of a similar order of magnitude have been found for Britain (Thomas 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). Four equations are solved recursively over a succession of periods, in order to explain the dynamics of four endogenous variables which characterize the structure and performance of early modern economies. The variables interact with each other but also have as "prime movers" a number of exogenous variables, including transoceanic trade. This provides the opportunity for quantifying the link between the home economy and that of its overseas possessions at each benchmark and on a country-by-country basis.

A comparative evaluation of the two approaches suggests the superiority of the latter (O'Rourke *et al.* 2010, pp. 109–10). The most important aspect is that it is explicitly dynamic and takes into account a variety of causal factors, in contrast to its rival that is static, and based on partial equilibrium. Consequently, the dynamic model takes external and intertemporal effects into consideration, and this causes it to generate results which are larger than those obtained from the older methodology.

The static cost–benefit analysis is also at a practical 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).

This is not to say that our own model has no limitations. The most obvious danger is that some of the identification assumptions may not be valid and if so the model's external validity can be open to question. In this paper, we go beyond Allen's method and estimate the model using panel data methods. This should help attenuate omitted variable problems as long as the sources of idiosyncrasy are approximately constant in time.

#### 4. Estimation and simulation

As Allen (2003) notes, Portugal is a notable absence from his study. In this section, we re-estimate several versions of his model of the early modern economy, now including newly minted data for Portugal. Using the coefficients thus obtained, we calculate two scenarios—the no-intercontinental trade counterfactual and the model's simulation of 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, such as the

<sup>13</sup> These large intervals are the result of the dispersion of the GDP estimates available at the time when these studies were undertaken. According to Lains (1991), in the case of Portugal the reduction due to the emancipation of Brazil would have been between only 1.0 and 2.4 percent, had he adopted of a considerably larger estimate for GDP.

Table 1. *List of variables*

Variable	Abbreviation	Type	Construction method	Sources
Natural log of the real wage	LNWAGE	Endogenous	As in Allen (2001)	PWR
Natural log of the urbanization ratio	LNURB	Endogenous	Towns over 5,000 inhabitants	Bairoch <i>et al.</i> (1988)
Natural log of agricultural TFP	LNAGTFP	Endogenous	As in Allen (2003)	PWR
Natural log of the proto-industrial labor share	LNPROTO	Endogenous	–	See Supplementary Material, Appendix A1
Natural log of the land–labor ratio	LNTL	Exogenous	As in Allen (2003)	See Supplementary Material, Appendix A1
Institutions dummy	PRINCE	Exogenous	By analogy with Spain	De Long and Shleifer (1993)
Enclosure	ENCL	IV	By analogy with Spain	Allen (2003)
Natural log of the lagged urbanization ratio	LNURBLAG	IV	–	–
Intercontinental trade per capita	TRADEPOP	IV	See Supplementary Material, Appendix A1	See Supplementary Material, Appendix A1
Spanish empire dummy	SPANEMP	IV	–	–
British empire dummy	BRIT 18	IV	–	–
Energy price	ENERGY	IV	–	Allen (2009); PWR
Manufacturing TFP	MANPROD	IV	Dual method	PWR

land–labor ratio, manufacturing productivity, the extent of enclosure, real energy prices, the volume of colonial trade, 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.

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.<sup>14</sup>

<sup>14</sup> In the Supplementary Material, Appendix A2, we offer a more detailed exposition and critical assessment of the model.

#### 4.1 Estimation

In columns (1) and (2) of tables 2 and 3, we present OLS estimates for the model. These have no causal interpretation, but show partial correlations which are of interest for comparative purposes. In columns (3) and (4), we replicate Allen's 2SLS estimates.<sup>15</sup>

A way of improving the estimation is to take advantage of the panel structure of the data. One possibility would be to use the fixed effects estimator. However, this would mean that we could not use lagged urbanization as an independent variable in a fixed effects estimation of the urbanization equation (Nickell 1981).

In keeping with the spirit of Allen's model, we want to include lagged urbanization as a covariate in the equation for urbanization, which means that we enter the context of dynamic panel-data models. We use the well-known Arellano–Bond estimator, which is a consistent generalized method of moments (GMM) estimator for “short” panels, and makes 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 (5) and (6) of the same tables display the results of the Arellano–Bond GMM estimation. Inspection of the results shows that the various estimated coefficients and standard errors do not change much, either when Portugal is included in the original sample or when alternative methods are used.<sup>16</sup> As discussed in the Supplementary Material, Appendix, in order to reach a lower bound, we use Allen's original coefficients.

To simulate real wage levels for Portugal, we employ these estimates and the historical data for the different explanatory variables. The next step is to repeat the exercise, with the same historical values, except that this time the volume of colonial trade is zero. The difference between the two outcomes measures counterfactually the impact on the home country's economy of having colonies, as opposed to not having them. This is carried out for every benchmark in the three centuries considered.<sup>17</sup>

### 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 specific issues pertaining to Portuguese long-term economic performance. We then broaden the perspective, placing them alongside the experience of other Early Modern colonizers, to obtain fresh comparative insights.

The estimated model enables us to construct a time line for the direct impact on the Portuguese economy of the country's imperial endeavor (figure 5). 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 and transoceanic trade comprises precious

<sup>15</sup> Subsequent minor data revision to Allen's original dataset means the estimates do not exactly match those in Allen (2003, 2009), but they are always very close.

<sup>16</sup> See Supplementary Material, Appendix A2 for additional discussion and robustness procedures. In particular, we reject the possibility of a weak IV problem. Additionally, we have checked that the difference between the simulated and real wage (the residual) for Portugal is not out of step with those for the other countries in the sample.

<sup>17</sup> This exercise can be performed additionally for the other endogenous variables—agricultural total factor productivity, urbanization, and proto-industrialization. In the Supplementary Material, Appendix, we show the simulation results for these variables.

Table 2. The wage equation

Dependent variable:	(1) Allen (2009) excluding Portugal	(2) Allen (2009) including Portugal	(3) Allen (2009)	(4) Allen (2003) including Portugal	(5) Allen (2009)	(6) Allen (2009) including Portugal
Estimator	OLS	OLS	2SLS	2SLS	Arellano-Bond dynamic panel GMM	Arellano-Bond dynamic panel GMM
LNTL	0.501*** (0.075)	0.477*** (0.066)	0.504*** (0.093)	0.444*** (0.099)	0.504*** (0.099)	0.444*** (0.098)
LNURB	0.187** (0.078)	0.170** (0.076)	0.211*** (0.065)	0.250*** (0.077)	0.211*** (0.074)	0.250*** (0.083)
LNAGTFP	0.906*** (0.173)	0.924*** (0.161)	0.865*** (0.241)	0.675** (0.324)	0.865*** (0.258)	0.675** (0.305)
PRINCE	0.143* (0.081)	0.119 (0.077)	0.136 (0.110)	0.059 (0.120)	0.136 (0.092)	0.0593 (0.099)
Intercept	1.792*** (0.184)	1.77*** (0.176)	1.848*** (0.204)	2.024*** (0.270)	1.848*** (0.239)	2.024*** (0.278)
IV first stage	-	-	LNAGTFP: 34.89	LNAGTFP: 23.73	-	-
F-statistic	-	-	LNURB: 97.78	LNURB: 68.77	-	-
R <sup>2</sup>	0.6454	0.6494	0.6440	0.6270	-	-
Observations	45	50	45	50	45	50

Standard errors in (1)–(4) are robust and small sample adjusted. Trade volume for Portugal is exclusive of gold. In specifications (3)–(6), the endogenous variables LNAGTFP and LNURB are instrumented by Allen’s seven instruments and two exogenous variables (Allen 2009). \*, \*\* and \*\*\* mean  $p < .10$ ,  $p < .05$ , and  $p < .01$ . Source: See text.

Table 3. *The urbanization equation*

Dependent variable: LNURB	(1) Allen (2009) including Portugal	(2) Allen (2009) including Portugal	(3) Allen (2009) 2SLS	(4) Allen (2009) including Portugal 2SLS	(5) Allen (2009) Arellano-Bond dynamic panel GMM	(6) Allen (2009) including Portugal Arellano-Bond dynamic panel GMM
Estimator	OLS	OLS	2SLS	2SLS	Arellano-Bond dynamic panel GMM	Arellano-Bond dynamic panel GMM
TRADEPOP	0.156** (0.072)	0.123** (0.060)	0.148** (0.071)	0.123** (0.059)	0.146** (0.072)	0.123* (0.070)
LNURBLAG	0.883*** (0.056)	0.8221105*** (0.067)	0.8461266*** (0.064)	0.7664851*** (0.079)	0.8365135*** (0.069)	0.7664851*** (0.080)
LNAGTFP	0.085 (0.135)	0.221 (0.144)	0.235 (0.196)	0.446* (0.259)	0.274 (0.204)	0.446* (0.241)
PRINCE	-0.015 (0.088)	0.022 (0.096)	0.014 (0.094)	0.071 (0.108)	0.021 (0.078)	0.071 (0.090)
Intercept	-0.242 (0.155)	-0.392 (0.181)	-0.355** (0.189)	-0.567** (0.239)	-0.385* (0.196)	-0.567** (0.231)
IV first stage <i>F</i> -statistic	-	-	LNURB: 34.89	LNURB: 23.73	-	-
<i>R</i> <sup>2</sup>	0.9122	0.8705	0.9101	0.8653	-	-
Observations	45	50	45	50	50	50

Standard errors in (1)-(4) are robust and small sample adjusted. Trade volume for Portugal is exclusive of gold. In specifications (3)-(6), the endogenous variable LNAGTFP is instrumented by Allen's seven instruments and two exogenous variables (Allen 2009). \*, \*\* and \*\*\* mean  $p < .10$ ,  $p < .05$ , and  $p < .01$ . Source: See text.

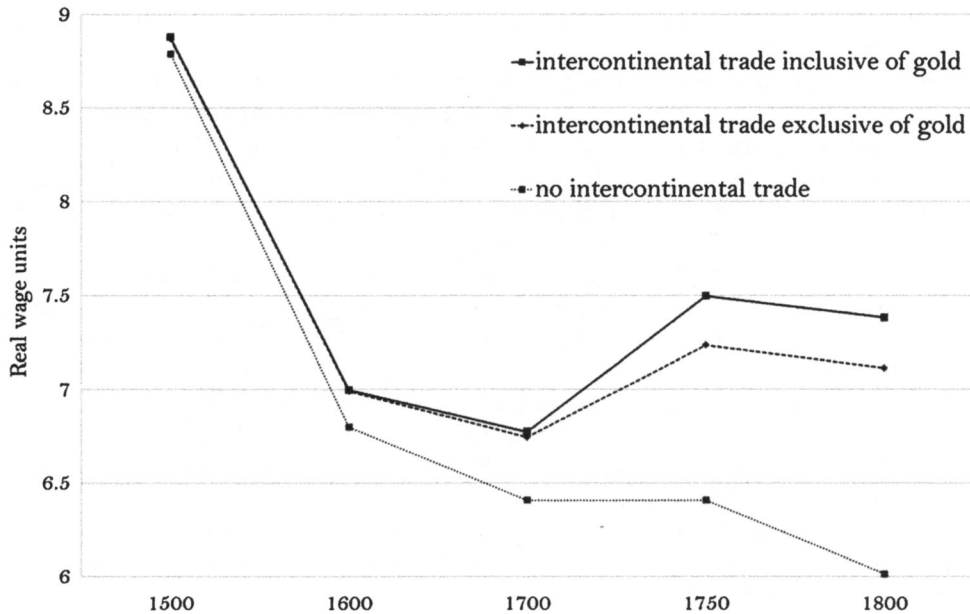


Figure 5. Simulated real wage rates for Portugal, 1500–1800. The simulated real wage is our prediction of the real wage taking as given different vectors for the exogenous variables.

Source: See text.

metals as well as commodity exports and imports.<sup>18</sup> The next line down (*intercontinental trade exclusive of gold*) 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 (*no intercontinental trade*) represents the real wage in the event of a complete shut-down of colonial trade. The colonial impact on the home economy is given, in two versions, by the difference between the two first lines and the last one standardized by the real wage.

Four major findings emerge, all of which challenge widely held views regarding the contribution to Portugal's economic growth of its empire before 1800. The first is that the colonies were consistently beneficial to the home economy: 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 (see table 4). At the dawn of the sixteenth century, when the empire concentrated on the Indian Ocean and the China Sea, the disparity between national income with and without colonies, respectively, was less than 1 percent, an indication that the legendary riches of Orient were much 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

<sup>18</sup> The historical real wage (the upper line shown in figure 1) is the real wage which we observe using our nominal wage and prices data collected from primary sources and calculated using the modified Strasbourg deflator. The simulated real wage corresponds to the model's prediction for the historical real wage—and the remaining endogenous variables within the system—taking as an input the observed historical value for the variables taken as exogenous.



seven-fold by 1700. By 1800, the “historical” real wage was around 20 percent higher than if the empire had not existed.

The third conclusion 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 substantially increased boost, they were just enough to neutralize the negative impact of Malthusian pressures on the home economy.

The fourth outcome is methodological in nature. It confirms the 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. This suggests that earlier cliometric efforts missed significant effects.

While our results reveal the empire’s considerable contribution to Portugal’s economic performance, they leave two critical issues unresolved. One is whether Portugal’s imperial effort would still look as impressive when compared with that of other colonial powers, using the same procedures as employed above for Portugal. The other is, in the event of Portugal passing this test, why were its colonies unable to promote the country’s convergence to the leading economies of this epoch?

To answer them we need to consider these problems in the framework of a comparative economic history of empires. The current and well-established consensus provided by the latter claims that before 1800 the impact of colonial systems on their metropolitan economies varied widely. Britain and the Netherlands are supposed to have gained “disproportionately” from overseas expansion; Spain and Portugal “ended up as losers”; and France was somewhere in between (Landes 1998; O’Brien 2005). Several reasons have been cited for this distribution, namely the “late comer” advantage of the Anglo-Dutch “free riders” in the eighteenth century (O’Brien 2005); their superiority in terms of institutions (Acemoglu *et al.* 2005) or of corporate governance (Rei 2011); and the heavy investment costs endured by the Iberian “early starters”, possibly beyond their means (O’Rourke *et al.* 2010).

We now turn to the verification of these assertions as a way to answer the first of our two questions. For this we repeat our earlier calculation of the economic impact of empire on the Portuguese economy, but applying it this time to all the other relevant countries as well. Table 4 displays the complete set of these estimates for the period 1500–1800. To our knowledge, it constitutes the first accurate, empirically well-founded and consistent description of how, over these three centuries, the five main imperial metropolises transformed the inputs accruing from their overseas possessions into national income increments.

The picture we obtain confirms the high degree of dispersion among nations recorded by the standard view. The latter, however, is almost entirely contradicted by this new evidence when it comes to ranking countries in terms of this indicator of colonial economic impact. England is an exception in that it still appears as the most effective colonial power in the late eighteenth century, though not at all for the earlier benchmarks. The same is true for the Netherlands but, in this case, its performance is more modest throughout the entire period. Despite its grand image of an expansionist past, France’s unusually weak imperial achievement also denies the conventional wisdom, whichever century is considered. Spain is the only instance in which reality matches the popular belief, in this instance, of an empire without significant benefits.

What is unexpected is Portugal’s persistent leadership in terms of this yardstick, ahead all the “Atlantic traders” even during the seventeen hundreds. Still more remarkable, however, is the

Table 4. Share (percent) of the real wage attributable to empire, 1500–1800

	Portugal		Spain		England	The Netherlands	France
	With gold	Without gold	With gold and silver	Without gold and silver			
1500	0.9	0.8	0.4	0	0	0	0
1600	4.3	4.2	1.2	0.3	0	0	0
1700	7.4	6.9	1.4	0.3	2.3	3.7	0.3
1750	17.0	13.0	1.7	0.8	2.9	6.5	0.1
1800	22.8	18.4	1.9	0.9	16.1	5.4	0

Source: See text and figure 4.

puzzle this poses. Why, in spite of this vigorous imperial success, Portugal's real per capita income gap with England, as shown in figure 2, proved impossible to narrow, and indeed even widened during the all-important eighteenth century?

The explanation is simple and relies on an additional yardstick for colonial performance, namely the “empire extraction rate”. This, as its name suggests, expresses the difference between the simulated historical and the counterfactual real wage in absolute terms at a given point in time. It is expressed in “real wage units” and is therefore directly comparable to the real wage gap between any two economies. It is displayed in table 5, in the higher level of each cell, for all five countries and all benchmarks under consideration.

During the entire Early Modern period, Portugal's “extraction rate” nearly always led those of its colonial rivals. Convergence with England driven by colonial expansion, however, would only occur if two conditions were satisfied. One was that Portugal's colonial extraction would have to be greater than that of the leading economy. This was normally the case, except for 1800. The other is that the difference between the respective extraction rates should come close to annulling the real wage discrepancy between the two countries. This did not happen at any moment in the period considered. In order to allow us to grasp to what extent these requirements were met, table 5 also exhibits, in parenthesis, the ratio of the “empire extraction rate” differential between Portugal and England to their respective real wage gap.<sup>19</sup>

The eighteenth century is the time when, for Portugal, a catch-up scenario based on colonial expansion is most plausible (Palma and Reis 2014). The values we obtain in table 5 show that a significant approximation to the British income standard would have, however, required a further Portuguese colonial expansion of an order of 200 percent or 300 percent given that growth would have to be mainly extensive (in a plantation economy, with high barriers to technological progress and a labor-intensive system of production, such a possibility is unavoidable). However, it would also have been historically unimaginable since it would have required an immense growth in the number of colonial inhabitants, both in slaves and Portuguese

<sup>19</sup> This is calculated, for each country  $i \neq$  England and each period  $t$ , as  $\text{empire extraction rate}_{\text{England},t} - \text{empire extraction rate}_{i,t} / \text{real wage}_{\text{England},t} - \text{real wage}_{i,t}$ .

For instance, the value for comparing England with France in 1700 is 18.5%. This is the percentage of the differential in real wages explainable by the differential effect of empires. For Portugal, the number is often negative because the empire is contributing toward convergence to England. The exceptions are 1600, when Portugal has a higher real wage than England, so Portugal's empire is contributing toward maintaining the divergence; and either 1750 or 1800, when England's empire extraction ratio for the first time surpasses that of Portugal (the exact benchmark depends on whether gold is accounted for; see table 5).

Table 5. *Empire extraction rate in “real wage units”, 1500–1800 in the upper line*

	Portugal		Spain		England	The Netherlands	France
	With gold	Without gold <sup>a</sup>	With gold and silver	Without gold and silver <sup>a</sup>			
1500	0.08 (-21.1)	0.07 (-18.4)	0.04 (-2.9)	0 (0)	0	0 (0)	0 (0)
1600	0.25 (67.6)	0.25 (65.8)	0.13 (-5.7)	0.02 (-0.9)	0	0 (0)	0 (0)
1700	0.38 (-8.94)	0.35 (-7.3)	0.11 (-5.2)	0.03 (-9.0)	0.22	0.33 (5.2)	0.22 (0)
1750	1.24 (-30.6)	0.30 (17.2)	0.14 (35.0)	0.025 (153.8)	0.64	0.72 (7.2)	0.01 (18.5)
1800	1.08 (10.0)	0.87 (17.1)	0.12 (10.0)	0.03 (112.5)	1.38	0.49 (74.1)	0.05 (73.9)

In parenthesis, the ratio of the empire extraction rate differential of England relative to a given country divided by the real wage gap between them (percent).

Source: Same as for figure 3 and table 4.

<sup>a</sup>Assuming parameter invariance to precious metal imports.

settlers. Assuming proportionality, this would have implied a drain of at least a third of the main-land population, an altogether improbable scale of events.<sup>20</sup> The conclusion is that convergence, if it were to happen, could only have come from concurrent developments internal to the home economy, since those from overseas would never suffice.

## 6. Conclusion

This paper takes Portugal as a case study for assessing the benefits of seaborne empires for the economic development of early modern nations. The starting point and the puzzle come from the revision of the economic statistics for this country, which portray it as one of Europe’s least successful macroeconomic performers of this period but also as one of the world’s most vigorous colonial traders in per capita terms.

We conclude that in the long run Portugal’s empire demonstrated a considerable degree of dynamism and contributed positively to the economic fortunes of the mother country. This goes against the common belief in a “long-term stagnation of the [Iberian] colonial economies” (Coatsworth 2005, p. 237). Our paper also diverges from the approach of the proponents of “modern world-systems” (Wallerstein 1980) in that we show semi-peripheral Portugal was able to gain as much or more from its empire in relative terms as the leaders of the Early Modern core. At the same time, Portugal’s imperial strength did not translate into economic convergence to its colonial arch-rivals, which were also among the richest economies of the day: England and the Netherlands.

There is an important sense in which it should not be surprising that Portugal’s empire did not lead to larger welfare effects. This is that in a Malthusian world, all returns from empires

<sup>20</sup> In 1800, a high point of colonial expansion, Brazil’s white population was about a million, while that of slaves was 1.6 million (Livi-Bacci 2002). To double output, we assume that both components would also have to double. The extra million Portuguese settlers required would thus represent a loss of one-third of the home country’s inhabitants and more, as a proportion of total adults.

should be irrelevant over the long run. Any “windfall” gains (or losses) from the empire should be followed by the combined effect of preventive and positive checks on the labor market until the real wage is back to the “subsistence” steady state level.

What is remarkable is that gains from intercontinental trade associated with empire, in the case of England and the Netherlands, should have led to long-run effects on urbanization, the real wage, and structural change (de Vries and van der Woude 1997; Allen 2003, 2009). For these nations, the empire apparently did help in achieving an early escape from Malthus. Hence one way to interpret our results is to emphasize that there was in fact something “special” about England and the Netherlands—but whatever the ultimate cause of it was, it could not have been just a high amount of trade per capita, since Portugal had just as high an amount, or even higher.

Indeed, despite considerable benefits from empire, Portugal’s economy diverged. This was because while the positive effect of intercontinental trade was undoubtedly significant, it was only one among several proximate 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. By 1700, the wage differential between them had become much larger, and thereafter never ceased to increase, to an extent that no realistic amount of additional colonial expansion could possibly erase.

## 7. Data

The data for Portugal used in this paper is available at: <https://sites.google.com/site/npgpalma/publications>.

## Supplementary material

Supplementary material is available at *EREH* online.

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