GROWTH IN A PROTECTED ENVIRONMENT: PORTUGAL, 1870-1950*

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Abstract

From 1870 to 1913, the Portuguese economy expanded slowly and diverged from the European core. Contrarily, in the interwar period, Portugal achieved higher growth and partially caught-up to the levels of labour productivity of Western Europe. Higher growth in Portugal after World War I occurred in a framework of protection, increasing state intervention, and capital deepening. Agriculture responded more positively than industry, revealing important changes in its structure which favoured output with higher levels of factor productivity. Changes in agriculture were associated with higher levels of investment in the sector.

Keywords: Economic growth; State intervention; European periphery; Portugal.

I

A better understanding of the causes of European economic growth has much to gain from the knowledge of the experiences of falling behind and catching up of the Continent's poor periphery. Theories on the causes of rapid industrialization have to be validated by investigating why peripheral countries remained behind during most of the nineteenth century and why that changed during the twentieth century. In a few number of peripheral countries rapid growth and catching up was first achieved in the interwar period, as a prelude to the period of higher growth during the golden age.[1] That was the case of Portugal. In fact, from 1870 to 1913, Portugal failed to get closer to the levels of income per capita and labour productivity of the forerunners, despite the fact that it was increasingly involved in the international economy. Between 1913 and 1950, Portugal's growth experience changed in a remarkable way. Its rate of economic growth increased and, for the first time since industrialization began, the gap to the European core was partially abridged (though part of the recovery was due to the slowing down of economic growth in the European core after 1929). Thus, the Portuguese economy expanded slowly when more favourable external conditions developed, and expanded more rapidly when the international economic conditions were *less* favourable, after World War I. Portugal's growth experience in the century to 1950 was not unique.[2]

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[1] See Maddison (1995), Good and Ma (1999) and Lains (2003a). For Greece see Kostelenos (1995) and Christodoulaki (2001). Bulgaria and Turkey also caught-up in the period from the early 1920s to the beginning of World War II, whereas Latin America diverged. See Taylor (1998) and Pamuk (2001). See also Milanovic (2003).

[2] According to Clemens and Williamson (2004), tariffs were positively correlated with growth in the nineteenth century (1865-1908) and during the interwar period (1919-1934). For the analysis of the relationship between protection and growth see also Bairoch (1976), O'Rourke (2000),

Growth experiences in some European peripheral countries during the interwar period were more limited in time because of political instability and civil war. In Greece and Yugoslavia, the period of higher growth following World War I was interrupted by instability in Central Europe, following the 1931 bank crises in Germany and Austria. Spain had an acceleration of growth after World War I which was interrupted by the emergence of civil war in 1936.[3] The impact of the Great Depression in Italy was in the midway between industrialized and peripheral Europe.[4] The change in the pattern of economic growth in the poor European periphery in the period between the wars has deserved little attention in the literature and it has still not held enough recognition. But its understanding is most relevant for the discussion of explanatory models of European economic growth, as it contributes to the study of the effects of different levels of openness and state intervention on the growth of the less industrialized economies, as well as the effects in changes in capital flows.

This paper is structured as follows. Next section describes the main fundamentals of the Portuguese economy in the period under analysis, discusses the economic and financial impact of World War I, and provides an explanation for the stabilization of the monetary and financial indicators from mid-1920s onwards. We shall see that the government's stabilization policies were associated with the improvement of the balances in the external accounts. Section III discusses the main trends in economic growth and structural change in the period from 1870 to 1950. We show there that the share of the industrial sector expanded fastest during the period of slower economic growth to World War I. After the war, the shares of industry and agriculture remained virtually constant and the economy expanded more rapidly. These shifts were associated with changes in

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Rodríguez and Rodrik (2000), Madsen (2001b), Vamvakidis (2002), Williamson (2002), Estevadeordal *et al.* (2003) and Hadass and Williamson (2003).

[3] See Palafox (1991), Carreras (1995), Prados and Sanz (1996) and Prados (2003).

[4] See Rossi and Toniolo (1992), Mattesini and Quintieri (1997) and Perri and Quadrini (2002). See also Madsen (2001a).

tariff policy and state intervention that favoured agriculture. Section IV analyses the growth of factor productivity and shows that the contribution of agriculture to overall growth after 1914 was due to higher growth of investment in the sector. The paper ends with a concluding section.

II

By mid-nineteenth century, Portugal had the most backward economy in Western Europe, with a level of income per capita below that of Spain, Italy and the Scandinavian countries.[5] Such high level of backwardness was evident in many aspects. Firstly, there vast areas of the territory which were not put into productive use and large parts of land which were left under fallow, despite the fact that the labour force was to a large proportion still employed in the agricultural sector. Moreover, the share of animal output in total agrarian production was relatively small which implied a deficient use of natural manure and animal force, that were not substituted by chemical fertilizers until late in the nineteenth century and machinery well into the twentieth century. In the industrial sector there was the predominance of traditional activities and limited use of mechanization and coal or other sources of non-animal energy. The transport sector was also poorly developed, with bad roads, few ports and no relevant canals. Lisbon and Oporto were connected by railways only in 1877 and before that the best link between the country's two largest cities was by sea. The society at large also had many signs of serious underdevelopment. The state was relatively inefficient, constrained by political instability and scarcity of financial resources which implied low levels of investment in infrastructure and education. The military gained control over the southern

[5] For relative income levels in Europe, see also Maddison (1995), Reis (2000) and Lains (2002). Portugal could be classified by mid-nineteenth century as an 'extremely backward' country, in the sense introduced by Gerschenkron (1962), referring to a level of development below the threshold of the group of converging countries. See also Abramovitz (1986).

province of Algarve only in the 1860s as until then the region was ruled by militias.

Portugal's extreme backwardness was partially overcome in the years from 1850 to 1913. Firstly, the industrial sector expanded faster than agriculture, as we shall see in more detail in the next section. There were also productivity gains in the agricultural sector. Other facets of change in the Portuguese economy include changes in the structure within both the agricultural and the industrial sector. In agriculture, a major transformation concerned the increase in the area under acreage at the expense of the decline in the uncultivated area or the area left under fallow. This was a major source of the increase in labour productivity as more land was put into use. Contrarily, land productivity levels did not change in significant ways, as the introduction of new processes and techniques in agriculture was relatively slow. In the industrial sector, there were also some relevant productivity gains and changes in structure, which were associated with higher levels of protection. Yet due to highly protective tariffs, both in the domestic and the colonial markets, at the outbreak of the War, Portugal had a relatively large share of its industrial labour force occupied in the textile sector, which was relatively inefficient.[6]

Notwithstanding tariff protection, the degree of internationalization of the Portuguese economy increased from 1870 to 1914, as foreign trade, capital imports and emigration expanded faster than the rest of economy. These trends were not sustained though. Following a balance of payments crisis, Portugal left the gold standard in 1891 and the state partially defaulted in the following year. As a consequence, there was a sharp decline of foreign lending to the state, which had been up to then a major channel for capital imports. Export also expanded at slower pace in the last two decades before the war, as Portugal did not manage to keep her quotas in the markets for agricultural products, such as wine and live animals, due to the competition from Mediterranean

[6] For evidence on the Portuguese economy during the period, see, among other works, Justino (1988-89), Pedreira (1990), Reis (1993), Lains (1995) and Lains and Silva (forthcoming), vols. 2 and 3.

and South American exporters.[7]

The slow pace of economic growth in the decades up to 1914 went together with the slow development of institutions and infrastructures. But there were some positive signs in institutional development too. Firstly, the control of the State over the territory increased significantly and was universally achieved by the eve of the War. Secondly, literacy rates rose in significant ways and, at the same time, mortality fell and urbanization increased.[8] Thirdly, the financial system became more developed and widespread.[9] Finally, there was an important effort in building railways, roads and other infrastructures, mainly up to the 1890s. Such developments were made possible by increasing government deficits that were financed either domestically or in the international capital markets. Such positive economic and institutional developments were nevertheless insufficient and Portugal failed to catch-up to the levels of income per capita of the forerunners.[10] But half a century of slow but sustained growth led the Portuguese economy to a higher degree of maturity, in terms of its structure and overall productivity levels. Those changes proved to be fundamental for the response to the distresses provoked by World War I, as we shall see.

The war was greatly disruptive for the Portuguese economy, in spite of the fact that the country had only a minor participation and that its territory was not directly affected by warfare. In 1916, Portugal entered the war on the Allied side and the first immediate consequence was an increase in public expenditure and in the government deficit, which led to an increase in money supply and inflation.[11] The war also provoked the decline in exports from Portugal and, more importantly, reexports from the colonies. Portugal was unable to take advantage of some export

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[7] See Mata (1993), Esteves (2003) and Lains (2003c, chap. 2).

[8] See Reis (1993).

[9] See Reis (1995 and 2002).

[10] None of the European countries with levels of income per capita close to Portugal's in around 1870 caught up in the period to 1913. See Maddison (1995), Good and Ma (1999) and Lains (2002).

[11] On the interwar period see among others Carvalho (2001).

opportunities, as was the case with Spain, and the export of colonial produce declined following the trend in tropical products.[12] Contrarily, imports maintained its upward trend. Emigrant remittances declined too and the financing of the country's balance of payments was severely affected. The participation in the war was compensated by a loan from the British government which temporarily eased the external and the government financial disequilibria.[13] But that was not sufficient and, as state revenues did not keep up with expenses, the Banco de Portugal kept printing money and prices continued to rise sharply.[14]

After the War, several measures were taken in order for the government to gain more leverage over the economy, as was happening contemporarily in the rest of the European continent. That change occurred firstly as a response to the effects of the War in the supplies of energy, raw materials, and main food staples, in order to minor food shortages and to keep on working the industries which depended on the imports of energy and other industrial inputs. The interwar period was also marked by a high level of political instability which lasted to the very end of the Republican regime (1910-1926). Yet in the mist of political instability, the government managed to introduce fiscal and tariff reforms, respectively, in 1922 and 1923. Both reforms aimed to restore government import tariffs and income taxes which had been eroded by high inflation, as most tariffs were specific and not *ad valorem*. In 1924, a foreign reserve fund was created which retained 50 percent of the earnings in gold and foreign currencies from exporters and there was an important sale of silver coin reserves by Banco de Portugal.

Stabilization was first achieved in 1924, thanks to the better conditions in foreign markets, change in monetary policies, fiscal reform, and the rise of tariffs and other import controls. Such measures were also made possible by the recovery of emigrant remittances which were traditionally a major source of financing the current account balance. The new bank law of 1925 imposed stricter

[12] For Spain see Palafox (1991) and for Portugal Lains (2003c, chap. 7).

[13] Valério (1994).

[14] See Feinstein *et al.* (1997).

measures for the sector, in terms of capital requirements, and redefined the role of the central bank. Banco de Portugal ceased its activity as a commercial bank, and the government gained higher control on its administration. The new balances in the external and government accounts were also made possible by the negotiations of the war debt to Great Britain which was virtually cancelled in 1926. In that same year, a dictatorship was imposed by a military coup and a new surge of instability followed, which again had a negative impact on the main financial and monetary variables. In 1928, Salazar was designated Minister of finance and from there he started gaining control of the government which he led as a dictator from 1932 to 1968. Social unrest and strikes marked Portugal's political life until well into the 1930s and it only stopped thanks to the repression and the limitation of political rights imposed by the dictatorship.[15] The new Minister however enhanced the measures that had been taken before he came to power. The financial situation of the country had been steadily improving and the government could refuse a loan from the League of Nations, which had been negotiated by the finance minister before Salazar. One further major help in reaching the new equilibrium was the return of domestic capital that had flown the country during the War, which was estimated at 60 to 70 million pound sterling, accumulated in 1929, and should be compared to an estimate of British investment in Portugal of 21-25 million pounds and exports which totalled 10 million pounds, also in 1929.[16] Also in 1929, final steps were made to redress the state finances by increasing further tariff levels. Finally, in 1930 a new colonial statute led to severe cuts in the central government's expenditures with the colonies, which led to the elimination of the deficit on that account.

Table 1 provides the data on the evolution of Portugal's main fundamentals. It depicts the high rates of price inflation and exchange devaluation which started off during the War and were aggravated in the post-war period. At an annual rate of 58.8 percent, between 1914 and 1918, Portugal had the highest war inflation in Western Europe, surpassed only by Italy, Finland and the

[15] See Pinto (Ed.) (1998) and Gomes and Tavares (1999).

[16] Telo (1994, p. 797) and Valério (1994, p. 463).

hyperinflation in Germany and Austria. During the following period from 1918 to 1924 Portugal remained at the top of the inflation league in Europe. The depreciation of the exchange rate followed closely the inflation pattern, because the *escudo* was left to float. Table 1 also shows the growth of the money supply, total public debt and the ratio of the budget deficit to GDP. In all cases there was a considerable expansion, as compared to the pre-war levels and in all cases there was a sharp reduction in the years between 1924 and the outbreak of World War II. Table 2 shows the evolution of tariff protection. Average tariffs were computed in current and fixed prices, taking into account the evolution of the GDP deflator and import and export prices. Tariffs in volume are more trustworthy because imports were not valued at market prices but at official prices that remained fixed for several years. By deflating import values by the implicit price index, we eliminate that problem. The level of tariffs at current prices declined sharply after 1918 and we may assume that the same happened in constant prices. After 1929 protection increased substantially and the import/GDP ratio increased slightly in terms of volume (again, due to the undervaluation of imports, that ration in terms of value has little significance). After peaking at 30 percent of GDP, in 1924, the import share declined to 18 percent of GDP, in 1929, and that level that was kept roughly constant up to 1945. The share of exports in GDP also remained relatively constant throughout. After the war and particularly after 1929, the structure of Portuguese imports changed, as shown in Table 3. The main change was the decline in the share of imports of foodstuffs, beverages and tobacco, from 14.1 percent in 1918-28 to 10.8 percent in 1929-37. Contrarily, imports of other consumption goods, as well as transport equipment, machinery and energy increased slightly. Intermediate goods for industry also declined slightly. These changes reflect protection to the agricultural sector, particularly cereals.

TABLES 1, 2 AND 3 ABOUT HERE

III

The main phases of the growth of Portuguese income per capita during the century to about 1950 are given in Table 4 in the form of trends growth rates in periods defined between peak years (see also figure 1). The data shows that in the first phase from 1855 to 1870 there was a substantial decline in income per capita at the rate of – 0.74 percent per year. That decline could be overstated, as we cannot be sure whether 1855 is an absolute peak, for lack of data for the previous years. The sharp decline in agricultural output was due in particularly to the fall of wine production as a consequence of the spread of disease in the vines. Portugal was a highly agricultural economy, in which wine accounted for about 1/3 of the total agrarian output, and thus economic growth was much sensitive to changes in climate or other natural conditions.[17] Growth of income per capita resumed after 1870 but in a first phase income expanded only moderately. From the 1882 peak to the end of the nineteenth century, the trend rate of economic growth increased. According to the data on Table 4, most of the last quarter of the nineteenth century was spent in recovering the economic decline from the 1850s and the 1860s. During the first decade of the twentieth century, agriculture had again a negative phase, which partially offset the positive performance of the industrial sector (see Table 7 below). In sharp contrast with what happened in agriculture, industrial output expanded at relatively stable rates of growth throughout the decades from 1870 onwards and showed some tendency to rise at the end of the century. The peak year of 1922 marked an important turning point in Portugal's growth experience, as income per capita expanded since then at rates which had not been seen before. In the years after 1922, growth was common to the three sectors of the economy and in some periods there was a small increase in the share of agriculture in national output. There was a slight slowing down after 1934, but growth resumed at a faster pace after 1947.

TABLE 4 ABOUT HERE

Table 5 compares the growth of Portugal's GDP per capita with growth in three European peripheral and an average for nine European core countries, during what can be termed Maddison's phases of economic growth. The table shows that the comparative performance of the Portuguese

[17] See for agricultural growth Justino (1988-1989) and Lains (2003b).

economy was relatively poor during the first two phases down to 1913. During the period from 1913 to 1929, Portugal's income per capita growth rate increased, although it performed worst than Spain and Greece. Yet, Portugal kept on growing after 1929, contrarily to Spain, which was affected by the civil war (1936-1939). After 1938, Portugal's growth performance was also better than that of Greece and that can be explained by the fact that Greece was directly affected by World War II and the civil war that followed. As a result, Portugal performed better than the rest of the peripheral countries shown in the table when the whole 1913-1950 period is considered.

TABLES 5 AND 6 ABOUT HERE

Table 6 tells the same story, based on estimates for GDP per capita rates of catching-up towards the European core. As is shown, Portugal diverged in 1870-1890, at –0.41 percent per year, and even more in 1890-1913, at –0.92 percent per year. It is interesting to note that divergence after 1890 was more important in Portugal and that it also occurred in Spain and Ireland, contrarily to what have happened in these countries in the period before 1890. In the case of Portugal, there was a slight divergence during 1913-1929, but after the New York Stock Exchange crash, Portugal started catching-up for the first time, again in marked contrast to what was happening in the rest of the countries of the European periphery shown in the table. Catching-up was further helped by the reduction of growth in the European core after 1929. Figure 2 shows that the ratio of Portuguese GDP per capita to the average of the nine European core countries declined quite sharply, between 1870 and 1875, from 50 to 45 percent, stabilized in the years up to 1890, declined only slightly to 1900, and then sharply again to 1915. From then on, the ratio evolved in an irregular way but with a positive trend to at least 1947. However, in this year, Portugal's relative position was still below the one that existed in 1870.

FIGURE 2 ABOUT HERE

The observed pattern of growth of income per capita can be related to changes in the structure of the economy before we turn to the analysis of the evolution of factor productivity. Data on the evolution of the structure of the output of the Portuguese economy during the century from

1850 to 1950 is presented in Table 7. The data is based on direct evaluation of output at 1958 prices for the period from 1910 to 1950. For the previous period, we have indices for physical output growth (agriculture and industry) and a proxy index for the growth of services to compute backward extrapolations of the structure in 1910. As shown there, Portugal had in the beginning of the period a small level of industrialization, as the industrial sector accounted for only 13 percent of total output, whereas the agricultural sector accounted for about 45 percent. The share of the agricultural sector in GDP declined thereafter to 36.4 percent, in 1880, to increase in the following two decades. Such evolution of the weight of the agricultural sector is closely related to trends in the growth of output. In fact, the decline of the agricultural output share down to 1860 happened in a decade of severe contraction of output, whereas the recovery of the share between 1880 and 1910 was associated to the expansion of output.[18] Portuguese economic growth had to be somehow related to the performance of its largest sector, agriculture, but the fact that economic growth could be driven by an increasing participation of the agricultural sector has to be explained. By 1910, the share of agricultural output in total output had reached the level it had thirty years previously, and from 1920 to 1950 the agricultural share remained virtually constant. The largest increase in the share of the industrial sector occurred between 1850 and 1860, from 13 to 18 percent, and then it took five decades to reach a level of 27 percent. After 1910 the share of the industrial sector remained relatively stable, increasing only in the decade from 1940 to 1950.

[18] An ongoing research points to an expansion of the service sector output faster than population. Such revision however does not change our main results. In fact, in the extreme case that services expanded as fast as industry, the division of total output between agriculture, industry and services would be (percent): in 1850: 59.7, 17.3, 23.1; and in 1890: 45.0, 23.5, 31.4. This would imply a faster decline in agricultural share and a slower rate of industrialization of the economy, before 1910. This alternative outcome does not however change our main conclusions.

TABLE 7 ABOUT HERE

The evolution of labour force and of its structure can only be assessed indirectly due to lack of data. Table 8 sets down data the available data on total population, population in the 15-64 years bracket and active population. The data on active labour force provided by the three censuses from 1890 to 1911 imply that the male active population is larger than the number of males in the 15-64 years bracket. After 1911, male active population is marginally smaller than males in the same age bracket. In other words, population censuses up to 1911 include child labour and labour after 65 years of age, contrarily to what happens with the censuses thereafter. Consequently, the census data imply a substantial contraction in total labour participation rates, from 50.1 percent in 1890 to 37.9 percent in 1950, and a once and for all decline of 10 percentage points between 1910 and 1930. Thus, we opted to use as a proxy for the evolution of labour force the evolution of males in the 15-64 years bracket, which implies that we consistently do not include child labour and labour older than 65 years of age throughout the years. This option affects to a relevant extent only the evolution of labour force during 1910-1930 and that should be taken into account in the interpretation of the results. Our option depicts a growth of active population in line with estimates based on a model for interpolation of active population between census years.[19] According to that data, there was a gradual decline in the expansion of the total labour force all the way to 1920, although in this latter decade the reduction in the rate of growth was more important. After 1920, however, labour force expanded more rapidly, what was due to the contraction in emigration after that year. Table 9 shows the shares of total labour force in the three sectors based on the structure of active population given by two parish censuses for 1841, 1862, and the official population census for 1890, 1900, 1911, 1930, 1940 and 1950. The structure for the intermediate census years is estimated by linear interpolation.[20]

[19] See Valério (Ed.) (2001, chap. 4).

[20] See for the parish censuses, Reis (forthcoming).

TABLES 8 AND 9 ABOUT HERE

Table 10 shows aggregate and disaggregate growth rates for output, labour force and labour productivity. Labour productivity in the whole economy expanded faster during 1880-1900 and slowed down in the following two decades. After 1920, labour productivity gained momentum and despite the slowing down in the 1930s, labour productivity expanded more rapidly after the War than before. The productivity of labour employed in the agricultural sector in some occasions expanded at a similar pace or even more rapidly than that of the industrial sector, as it was the case in the decades from 1880-1890 and from 1920-1950. Thus the increasing importance of the agricultural sector was clearly associated with a better overall economic growth performance. This was so particularly during the 1920s and the 1940s. In order to explain the increasing contribution of agriculture to Portuguese economic growth after World War I we have to go beyond the analysis of labour productivity and evaluate the contribution of capital investment.

TABLE 10 ABOUT HERE

IV

In this section we carry out an analysis of the factors behind productivity increases in the agricultural sector and the aggregate economy within a growth accounting framework. Table 12 provides a summary of the available data on the growth of factors and factor productivity in the agricultural sector and the total economy, based on proxy estimates for the growth of capital in agriculture for the century ending in 1950 and for the growth of total capital in the interwar period. In what the agricultural sector is concerned, we may see that the growth of labour and capital productivity expanded at quite similar rates during 1865-1902. This period of higher growth was followed by one of slower growth of labour productivity and decline of capital productivity, to 1927. From then on, both productivity growth rates increased again, although the performance of labour was better than that of capital. Table 11 also shows that the ratio of capital to labour in agriculture increased throughout the period and that such capital deepening was associated with overall total factor productivity growth. Agrarian investment was materialized in more cattle, the expansion of tree cultures, such as olive oil and vines, and the increase in the use of fertilizers and the use of mechanization.[21] Total factor productivity in agriculture expanded at 1.6 percent per year after 1927 which compares relatively well with factor productivity growth elsewhere in Europe.[22]

TABLE 11 ABOUT HERE

For the aggregate economy we only have data starting in 1910 because we lack data on total capital investment before that year. The lower part of Table 11 shows that aggregate labour productivity expanded at a faster pace than aggregate capital productivity and considerably so after 1934, when there was a marked decline in the productivity of capital. Such patterns are reflected in the growth of total factor productivity which virtually stagnated in the period from 1934 to 1947. The ratio of capital to the labour force in the aggregate economy expanded rather fast after 1934 and that was due mainly to the increase in investment in the non-agricultural sector. By the account given here, this implies that capital productivity in the non-agricultural sector had a negative performance, particularly after 1934. Capital imports were relatively small in size when World War I broke out and thus Portugal's rate of domestic investment was not directly affected by the disintegration of the international capital markets in its aftermath. There is evidence for some capital flights during the War and also for its return from the early 1920s onwards. The evidence regarding capital flows and domestic investment is very scanty, though.

The pattern that emerges from the observation of factor productivity growth is that the performance of the agricultural sector was better than that of the non-agricultural sector. That outcome helps explaining why the Portuguese economy managed to obtain higher productivity gains by shifting to a higher participation of agriculture in economic growth, during the interwar period. In order to investigate the mechanisms that led to such an outcome, we need to look more in

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[21] See Gomes *et al*. (1944).

[22] See Federico (2000).

depth to the structure of the economy to find out how was it that the new capital invested in the agricultural sector had higher levels of productivity that capital invested in the rest of the economy. The data for this in-depth level of analysis is scant but it is sufficient to reach some further results that confirm our overall analysis.

By decomposing the growth of labour productivity in the growth of land per agricultural worker and the growth of output per land, we have reached elsewhere the conclusion that labour productivity growth in agriculture was a consequence of an increase in land productivity.[23] In fact, before 1930, the land-labour ratio increased slightly or remained stable and output per hectare increased only slightly. After 1930, the land-labour ratio *declined* and yet output per hectare increased at an unprecedented pace. Yet this happened without major changes in yields of the main agricultural staples. Agrarian productivity growth was achieved by structural shifts within the agricultural sector towards production with higher land values and higher labour productivity levels.[24] Animal output's share in total agrarian output increased from 23.6 percent in 1900-09 to 35.9 percent in 1954-58, whereas fruits and vegetables increased from 6.5 to 12.7 percent in the same time period.[25] Together, these two sectors accounted for almost half of total agrarian output in the 1950s, up from 30 percent in the beginning of the century. Structural transformations in Portuguese agriculture can be explained in terms of the evolution of aggregate domestic demand which was enhanced by agricultural protectionism and state subventions, particularly to wheat and other cereals. Such change was a consequence of higher levels of contraction of imports, due to higher levels of tariff protection and state intervention. But agrarian structural change was also related to the expansion of demand as a consequence of overall output growth and that was

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[23] See Lains (2003b).

[24] See Pereira and Estácio (1968).

[25] The increase in the cattle stock was made possible by the growing usage of stables in the western regions north of Lisbon, as opposed to the use of land intensive pasturage in the southern region of Alentejo.

particularly important for animal output. The role of demand in fostering agricultural output growth in Portugal is confirmed by showing that there was a positive correlation between long run output and price trends.[26] The observed changes in the agricultural sector compare favourably with what happened in the rest of the economy and in particular in the industrial sector. In fact, the structure of the Portuguese industry remained relatively stable in the period from 1930 to 1950 for which we have information shown in Table 12. There were of course some changes, as the share of chemicals, non-metallic products and basic metals expanded throughout the same period. Yet the fact that those sectors were relatively small, accounting for only 6.1 percent of total output in 1930 and 9.1 percent in 1950, implied that the overall impact was also small.

TABLE 12 ABOUT HERE

Table 12 also shows labour productivity levels across the Portuguese economy with the highest possible disaggregate level allowed by the available statistical data. Labour productivity in agriculture was clearly below that of manufacturing but it compared well to productivity in textiles and ‘other’ as well as in construction and services. We do not have disaggregated data on agrarian labour productivity, but the disparities across sectors were certainly large. In fact, data on land productivity by region for 1952-1956 show wide differences in the 270 departments (concelhos) ranging from 0.3 to 2.4 contos/hectare. The range of labour productivity at the 18 district level (distrito) is 1:2. This implies that labour in the agrarian sector of the top six districts, which account for 31 percent of total agrarian output, has productivity levels above the national average for manufacturing.[27] If we take into account the fact that labour productivity in agriculture varied widely, as shown by this regional data, we may conclude that in some agrarian sectors productivity was above that of textiles, construction and services. This conclusion is confirmed by the overall picture given by Caetano (1961), based on an interpretation of the first comprehensive industrial census for 1957-59 which states that Portugal’s industry was characterized by many units with what

[26] See Reis (1993, chaps. 2 and 3).

[27] Pereira and Estácio (1968, pp. 23-24 and 51).

he terms an 'anti-economical dimension' and a very small coverage of the country.[28] The character of industrialization would change markedly in the following decade, as Portugal adhered to EFTA in 1959 and the country opened up.[29]

According to Aguiar and Martins' (forthcoming) shift-share analysis, the agricultural sector contributed with 23.9 percent of total labour productivity growth during 1910-1950, whereas industry contributed with 35.5 percent and services with 40.6 percent. In no other period during the twentieth century analyzed by the authors did agriculture contribute to productivity growth in such a way. More importantly, 85 percent of overall labour productivity growth in 1910-1950 was a result of intra-sectorial productivity growth and just the remaining 15 percent can be attributed to shifts of labour towards sectors with higher productivity or with productivity growing above the average. About 1/3 of intra-sectorial growth is attributed again to changes within the agricultural sector. Labour productivity changes in the industrial sector occurred fundamentally in construction and energy (i.e. electricity), whereas the manufacturing proper sector lagged behind. Moreover, the observed productivity changes occurred mainly in the traditional sectors, namely, textiles and the food and wood industries. Building also increased its domestic output share. Contrarily the capital intensive sectors had negative labour productivity growth rates.

The short-run effects of tariff and other state protection in the interwar period were positive in the sense that the Portuguese economy responded and higher growth was achieved. That response implied an increase in the contribution of agriculture to domestic output. There was clearly a shift in the specialization of agriculture towards products with higher levels of factor productivity. In what the industrial sector was concerned, the changes favoured what we may term traditional sectors, including textiles, foodstuffs and wooden products. The fact that such low-key forms of structural change led to a positive impact on Portugal's total factor productivity growth

[28] See Caetano (1961, p. 931). See also Pintado (2002).

[29] After 1960, there was a clear change in the emphasis of economic policy favoring the industrial sector. See for example Moura (1973).

reflects the structure of the domestic economy. On the demand side the fact was that there was still much scope for growth of the consumption of comparatively more sophisticated agrarian products with higher levels of labour and capital productivity. On the supply side, it reflects the potential advantage point of investment in the agrarian sector, as factor productivity in agriculture could be higher than in some industrial branches. The mechanism which led to higher productivity levels in agriculture is peculiar to the Portuguese economy and presumably to the other peripheral European economies. It can be explained by the relative backwardness of these countries.

V

The countries of the European southern periphery took only limited advantages from the expansion of the international economy in the last quarter of the nineteenth century. The reasons for the lack of response in the periphery during this period are a matter of dispute. Some authors would stress the negative impact of protectionist policies followed by countries such as Portugal and Spain. Yet, the countries in the Balkan region also did not converge despite the fact that tariff protection there was introduced only latter on, during the last decade of the century, and even then in a mild form (Lains, 2002). Government may also have been responsible for diverting productive investment to excess expenditure and debt, but that would have been the case only in Portugal, Spain and Greece, as the other Balkan countries kept balanced accounts throughout the period between 1870 and 1914. Other structural factors, such as low literacy levels, were a common feature in these countries and that may have contributed to the poor performance of their economies.

However, such a list of negative factors did not disappear after the War and in many cases they were aggravated. Protectionism in the Periphery was enhanced, the level of state intervention was increased and there was a sharp contraction everywhere in the levels of exports and imports which were accompanied in many countries by declining terms of trade, particularly for agricultural exporters – as well as low levels of emigration. The fact that after World War I a country such as Portugal attained higher growth rates of GDP per capita and that, for the first time in many decades, managed to catch up, albeit only partially, to the European core implies that we need to investigate how growth was achieved in such presumably unfavourable circumstances.

There are several reasons for the little attention devoted to the good performance of the Portuguese economy in the interwar period that we have presented here. Firstly, although contemporaries were aware of improvements, it was only recently that yearly output indices for agriculture and industry have been computed for that period. Secondly, the years to the mid 1920s were marked by high inflation, as well as high internal and external deficits, which have been too hastily related to economic decline in the interwar period. Thirdly, the evaluation of the performance of the economy in those decades has been blurred by the debate over the consequences of the advent of the Salazar's regime as many authors assume that the policies imposed by the dictatorial regime were biased against growth. Fourthly, the good performance of the economy before 1950 has been less noticed because, despite such improvements as there were, Portugal's levels of labour productivity remained low by western European standards. Finally, economic performance in the interwar period fades away besides the performance in the golden years from 1950-73.

This paper shows that productivity gains were achieved by growth of the use of resources in the agrarian sector, where labour and total factor productivity gains could be achieved, as well as moving factors to construction, services and some of the more traditional branches in manufacturing, such as foodstuffs, textiles and wood products, as well as the service sector. The fact that the gains obtained were associated to what can be termed as traditional sectors implies that the Portuguese economy, overall, did not transform itself in an important way. We conclude that specialization towards the domestic market led to structural changes in the economy that promoted output growth. This was possible thanks to the existence of favourable conditions in the balance of payments that allowed higher levels of investment, which occurred despite the slowing down of the international economy. Our result shows that peripheral countries can achieve higher growth rates within an unfavourable context in the international economy.

The paper does not imply that protection is good for growth in any case. In fact, we did not address the question of knowing what would have happened in the counterfactual situation where externals markets would be buoyant and the Portuguese economy would be wide open to influences from abroad – the World of the interwar period was far too apart from such scenario. Our conclusion refers only to the situation in which the international economy stagnated and Portuguese producers benefited from exploring further the possibilities provided by the growth of domestic demand and by state protection. Such an outcome was made possible by higher levels of domestic savings and investment. There is the possibility that the higher intensity of growth that occurred in Portugal during the interwar period was necessary for the country to achieve the minimum social and economic capabilities in order to take full benefits of the international economic boom during the golden age (1950-1973), when the economy opened up and benefited from the exploration of external markets and capital imports.

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Table 1 - Monetary and fiscal indicators for Portugal, 1854-1945

	GDP Deflator % pa	Money Supply % pa	Exchange Rate % pa	Total Public Debt % pa	Budget Deficit % of GDP
1854-1891	0.39	3.23	0.00 (1)	5.12	1.5
1891-1914	0.92	0.68	0.69	0.46	0.3
1914-1918	58.81	21.37	8.68	11.29	6.8
1918-1924	30.84	37.68	60.28	41.70	8.7
1924-1929	-3.33	5.20	-4.17	3.48	3.3
1929-1939	-0.10	6.21	1.85	-2.84	-0.9
1939-1945	15.22	27.77	-1.58	5.54	0.9

(1) Portugal was on the Gold Standard from 1854 to 1891.
Sources: GDP deflator: Lains (2003c, appendix); Money supply (M1): Valério (Ed.) (2001, pp. 568-71) (for a discussion of different series for the period to 1912, see pp. 544-45); Exchange rate: Valério (Ed.) (2001, p. 737); Total public debt: Valério (Ed.) (2001, pp. 707-10); Budget deficit: Mata and Valério (1996, p. 205).

Table 2 – Trade ratios and average tariffs (percent)

	Average Tariffs		**X/ GDP**		**M/ GDP**		**(X+M)/ GDP**	
	Value	Volume	Value	Volume	Value	Volume	Value	Volume
1910-1913	22.9	--	9.0	11.4	19.4	7.5	28.4	18.9
1918-1928	8.0	19.6	8.4	11.3	24.9	9.8	33.3	21.1
1929-1937	27.9	47.4	6.6	8.7	14.7	12.3	21.3	21.0
1938-1950	16.3	19.1	11.5	9.6	16.3	15.0	27.8	24.6

Notes: Average tariffs are the ratio of total tariff revenues to total imports. Shares in volume were computed by deflating values respectively by the price indices for GDP, exports (X) and imports (M). Tariffs were deflated by the GDP price index.
Source: Computed from Batista *et al.* (1997).

Table 3 – Structure of imports (1958 prices, percent)

	Foods, Bev. & Tobacco	Other Consumption Goods	Transport Equipment	Other Mach. & Equipment	Intermediate Goods	Energy
1910-1913	0,158	0,100	0,019	0,043	0,606	0,074
1918-1928	0,141	0,076	0,025	0,042	0,628	0,088
1929-1937	0,108	0,113	0,046	0,069	0,571	0,094
1938-1950	0,061	0,084	0,052	0,066	0,612	0,125

Source: Computed from Batista *et al.* (1997).

Table 4 – Growth of real income per capita in Portugal, 1851-1958
(peak-to-peak annual growth rates; percent)

1855-1870	-0.74
1870-1882	0.44
1882-1902	0.90
1902-1922	0.69
1922-1934	1.56
1934-1947	1.13
1947-1958	2.14
Trend (1851-1958)	0.86

Note: Peak years (1855 and 1958 excepted) are derived from a log-linear time trend for 1851-1958.
Source: see Appendix Table.

Table 5 – Growth of real income per capita in the European periphery, 1870-1950
(Maddison's phases of development; annual growth rates between 3-years averages; percent)

	Portugal	**Spain**	**Greece**	**Ireland**	**Average 9**
1870-1890	0.66	1.48	-	1.21	1.07
1890-1913	0.40	0.76	-	0.84	1.32
1913-1929	1.35	1.65	2.45	0.33	1.39
1929-1938	1.28	-3.53	1.50	0.87	1.16
1938-1950	1.56	1.48	-2.72	0.94	1.00
1870-1913	0.52	1.09	0.54	1.01	1.21
1913-1950	1.40	0.31	0.51	0.66	1.21
1870-1950	0.93	0.73	0.53	0.85	1.21

Notes: 'Average 9' is based on an unweighted average index for the following European core countries, from Maddison: Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Sweden and UK. Three year averages, except for 1870/71 and for Spain (1870 and 1890), Ireland (1870, 1890 and 1913) and.
Sources: Maddison (1995 and 2001), Lains (2002), for Greece in 1870-1913 and Appendix Table for Portugal.

Table 6 – Convergence of real incomes per capita in the European periphery, 1870-1950
(Maddison's phases of development; annual growth rates between 3-years averages; percent)

	Portugal	Spain	Greece	Ireland
1870-1890	-0.41	0.41	-	0.14
1890-1913	-0.92	-0.56	-	-0.48
1913-1929	-0.04	0.26	1.04	-1.04
1929-1938	0.12	-4.64	0.33	-0.29
1938-1950	0.55	0.47	-3.69	-0.06
1870-1913	-0.68	-0.11	-0.66	-0.19
1913-1950	0.19	-0.89	-0.69	-0.54
1870-1950	-0.28	-0.47	-0.64	-0.35

Notes: convergence defined according to:

$$\phi = [(y_i / y9)_{(t+1)} / (y_i / y9)_{(t)}]^{[1/(t+1-t)]}$$

where y_i is income per capita for the 4 countries in the table and y9 is the average for the United Kingdom, France, Germany, Belgium, the Netherlands Italy, Sweden, Denmark and Norway.
Sources: see Table 5.

Table 7 – Evolution and composition of GDP, 1850-1950

	GDP	Agriculture	Industry	Services
	000 *contos* 1958 prices	Percent		
1850	9,340	45.4	13.1	[41.5]
1860	9,821	36.8	18.2	[45.0]
1870	10,958	37.6	17.1	[45.3]
1880	11,498	36.4	18.9	[44.7]
1890	13,727	41.5	21.7	[36.8]
1900	16,073	41.5	24.9	[33.6]
1910	18,267	36.6	27.1	36.2
1920	18,809	31.0	26.0	43.0
1930	27,387	33.1	27.4	39.6
1940	32,858	33.0	27.8	39.2
1950	44,800	32.0	30.7	37.3

Notes and sources: The years in table refer to the centre of three-year averages, except for 1910/11. 1 *conto* = 1,000$000 (1 million reis). For services to 1910 population growth was used as a proxy (see text). For 1910-50 shares are given by Batista *et al.* (1997). For the 1850-1910 period shares are given by extrapolating backwards output values for 1910 using output indices from the Appendix Table.

Table 8 – Population and labour participation rates

	Total population (000)		15-64 years as % of total population		Active as % of total population		Active as % of 15-64 years	
	Total	Males	Total	Males	Total	Males	Total	Males
1864	4,188	2,006	61.3	59.3	--	--	--	--
1878	4,551	2,176	61.4	59.7	--	--	--	--
1890	5,050	2,430	60.5	58.9	50.1	66.2	82.8	112.4
1900	5,423	2,592	60.3	58.7	45.3	66.6	75.1	113.4
1911	5,960	2,829	59.6	57.6	42.7	65.3	71.7	113.4
1920	6,033	2,856	61.0	59.2	40.2	--	65.9	--
1930	6,826	3,256	61.7	60.4	36.9	56.0	59.8	92.7
1940	7,722	3,712	61.3	60.4	35.9	57.7	58.7	95.6
1950	8,441	4,060	63.5	63.1	37.9	60.9	59.6	96.5

Sources: Valério (Ed.) (2001, pp. 51, 55-56, 164 and 178) and Mitchell (1996, table A2).

Table 9 – Evolution and sectorial distribution of male labour force, 1841-1950

	Total Male Labour Force	Agriculture	Industry	Services
	(000)	Percent		
1841	993	67.5	15.9	16.6
1862	1,161	65.9	15.5	18.5
1864	1,189	[66.0]	[15.7]	[18.2]
1878	1,298	[66.6]	[17.0]	[16.3]
1890	1,432	66.9	18.3	14.8
1900	1,522	66.4	18.8	14.8
1911	1,629	61.0	21.7	17.3
1920	1,691	[60.9]	[21.2]	[17.9]
1930	1,967	60.9	20.7	18.4
1940	2,241	57.8	21.0	21.1
1950	2,562	53.8	24.6	21.6

Notes and sources: Total males in the 15-64 bracket computed from table 7, except for 1841 and 1862 which are based on growth rates for labour force to 1890 from Reis (forthcoming). Shares from Reis (forthcoming) (for 1841 and 1862) and from Valério (Ed.) (2001, p. 164) (for 1890 to 1950, except for 1864, 1878 and 1920, which are linear interpolations from adjoining years).

Table 10 – Growth of output, labour force and labour productivity, 1860-1950

(annual growth rates, percent)

Output

	Agriculture	**Industry**	**Services**	**Total**
1860-1880	0.74	0.95	0.70	0.70
1880-1890	3.14	3.23	0.90	2.21
1890-1900	1.58	3.00	0.65	1.57
1900-1910	-0.40	1.97	1.00	0.74
1910-1920	-1.64	0.15	2.14	0.32
1920-1930	4.51	4.35	2.97	3.83
1930-1940	1.81	2.02	1.73	1.84
1940-1950	2.82	4.16	2.66	3.15

Labour force

	Agriculture	**Industry**	**Services**	**Total**
1860-1880	0.77	1.28	-0.09	0.70
1880-1890	0.86	1.44	0.01	0.82
1890-1900	0.54	0.88	0.61	0.61
1900-1910	-0.15	1.94	2.06	0.62
1910-1920	0.40	0.16	0.80	0.42
1920-1930	1.52	1.28	1.80	1.52
1930-1940	0.78	1.46	2.71	1.31
1940-1950	0.62	2.96	1.59	1.35

Labour productivity

	Agriculture	**Industry**	**Services**	**Total**
1860-1880	-0.03	-0.33	0.79	0.00
1880-1890	2.28	1.79	0.89	1.39
1890-1900	1.04	2.12	0.04	0.96
1900-1910	-0.25	0.03	-1.06	0.12
1910-1920	-2.04	-0.01	1.34	-0.10
1920-1930	2.99	3.07	1.17	2.31
1930-1940	1.03	0.56	-0.98	0.53
1940-1950	2.20	1.20	1.07	1.80

Sources: Output from the Appendix Table and labour force from Table 9, with linear interpolations.

Table 11 – Growth labour, capital and total factor productivities, 1910-1950

(Annual growth rates; percent)

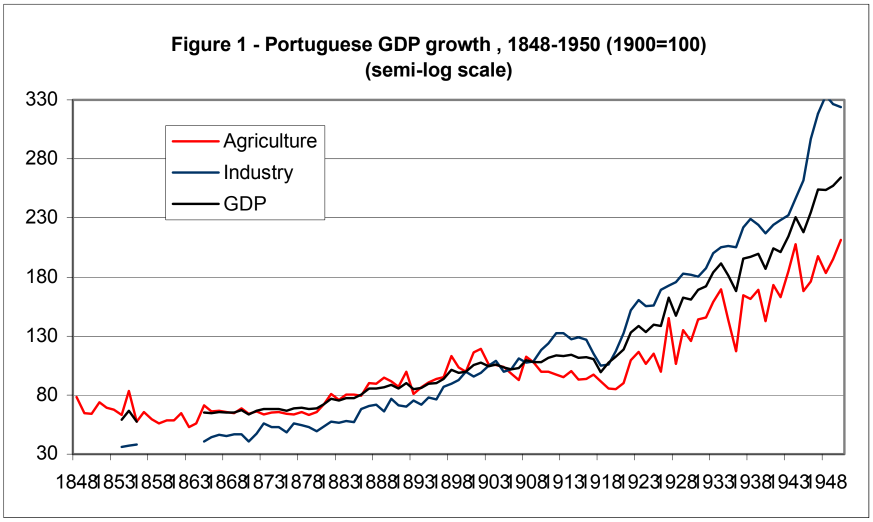
	1 Output	2 Labour	3 Capital	4 = 3-2 K/L ratio	5 = 1-2 Labour Productivity	6 = 1-3 Capital Productivity	7 TFP
Agriculture							
1865-1902	1.41	0.74	0.63	- 0.11	0.67	0.78	0.72
1902-1927	0.35	0.13	0.86	0.73	0.22	- 0.51	0.20
1927-1951	2.36	0.97	1.44	0.47	1.39	0.92	1.59 to 1.63
All Sectors							
1910-1934	2.17	1.00	1.25	0.25	1.17	0.92	0.72
1934-1947	2.09	1.31	3.89	2.97	0.78	- 1.80	- 0.02

Sources: Lains (2003a) and (2003b).

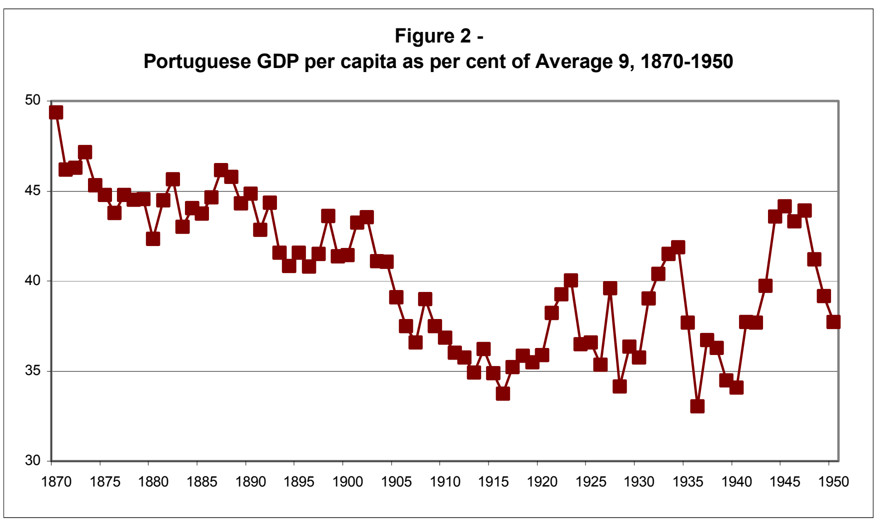
Table 12 – Structure of output and labour productivity in Portugal, 1930-1950

	Output shares Percent				**Labour productivity** *Contos* per head			
	1930	**1940**	**1950**	**1958**	**1930**	**1940**	**1950**	**1958**
Agricult., Forest, Fishing	33.1	33.0	32.0	26.8	7,1	7,4	9,1	10,6
Mining and Quarrying	0.4	0.7	0.6	0.6	9,3	11,1	11,2	12,3
Manufacturing	24.6	23.8	25.4	28.8	20,0	18,0	19,2	23,8
Food, bev, tobacco	*5.4*	*4.5*	*3.9*	*4.0*	*40,1*	*22,4*	*22,6*	*31,6*
Textiles, clothes, footwear	*6.8*	*6.2*	*6.7*	*7.0*	*11,4*	*10,3*	*12,5*	*15,8*
Wood, cork, furniture	*4.3*	*3.3*	*3.3*	*2.7*	*29,2*	*18,6*	*16,2*	*15,5*
Paper, publishing, printing	*0.9*	*1.0*	*1.0*	*1.6*	*25,1*	*25,8*	*24,6*	*33,3*
Chemicals, rubber, petrol.	*1.4*	*1.7*	*2.2*	*2.9*	*131,1*	*63,7*	*95,4*	*52,8*
Non-metallic miner prods	*0.8*	*1.1*	*1.5*	*2.0*	*26,5*	*23,4*	*26,7*	*29,5*
Basic metals, machinery	*3.9*	*4.7*	*5.4*	*7.1*	*20,2*	*27,2*	*29,0*	*28,2*
Other	*1.2*	*1.1*	*1.2*	*1.4*	*13,7*	*25,5*	*12,3*	*36,7*
Construction	1.8	2.6	3.6	4.7	4,0	6,8	10,3	11,8
Electricity, Gas, Water	0.6	0.8	1.1	2.3	27,3	45,1	51,3	90,5
Trade, Finance, Rents	16.3	17.0	17.0	17.5	30,7	29,4	29,8	32,3
Transport, Communications	3.8	3.9	4.3	5.3	14,6	15,3	18,1	24,9
Services	19.4	18.3	16.0	14.0	9,8	13,2	14,9	16,6
GDP at factor cost	100	100	100	100	10,9	11,8	14,0	17,2

Source: Computed from Batista *et al.* (1997).



Source: Appendix Table.



Source: see Table 5

Appendix Table: Indices of output and population, 1848-1958
(1953 = 100)

	Agriculture	Industry	Services	GDP	Population	GDP per capita
1848	32.3				44.6	
1849	26.8				44.5	
1850	26.6				45.0	
1851	30.6	7.7		20.6	45.1	45.7
1852	28.6				45.2	
1853	28.0				45.0	
1854	26.0	9.5		19.7	45.3	43.6
1855	34.6	9.6		22.5	45.1	49.9
1856	23.8	9.9		19.2	45.6	42.1
1857	27.2				45.9	
1858	24.7				46.2	
1859	23.1				46.7	
1860	24.2				47.2	
1861	24.3	11.2		20.2	48.0	42.1
1862	26.7				48.4	
1863	21.8				48.8	
1864	23.1				48.8	
1865	29.3	10.7		21.9	49.3	44.5
1866	27.3	11.6		21.6	49.7	43.5
1867	27.4	12.2		21.9	50.1	43.7
1868	27.1	11.8		21.8	50.3	43.2
1869	26.8	12.3		21.8	50.4	43.3
1870	28.4	12.3		22.4	50.9	44.0
1871	26.5	10.6		21.3	51.3	41.6
1872	27.3	12.3		22.2	51.6	43.0
1873	26.3	14.7		22.7	51.9	43.7
1874	27.5	13.9		22.8	52.0	43.9
1875	28.0	13.8		23.1	52.5	43.9
1876	28.1	12.6		22.8	52.9	43.1
1877	27.6	14.6		23.3	53.1	43.9
1878	26.3	14.2		22.8	53.2	42.8
1879	27.1	13.9		23.0	53.8	42.8
1880	29.8	12.9		23.7	54.6	43.5
1881	31.0	14.0		24.5	54.7	44.7
1882	28.9	15.0		24.2	55.3	43.8
1883	28.8	14.8		24.3	56.0	43.4
1884	38.0	15.1		27.4	56.5	48.5
1885	34.9	14.9		26.4	56.8	46.5
1886	35.3	17.8		27.6	57.5	48.0
1887	39.2	18.6		29.1	57.9	50.3
1888	38.0	18.7		28.9	58.4	49.5
1889	38.4	17.3		28.7	59.0	48.7
1890	37.3	20.1		29.3	59.5	49.3
1891	39.7	18.6		29.7	59.9	49.6
1892	41.2	18.4		30.2	60.4	50.0
1893	33.4	19.7		28.2	60.9	46.3
1894	35.7	18.7		28.7	61.1	46.9
1895	37.3	20.3		29.8	61.5	48.4
1896	38.7	20.0		30.1	61.6	48.9
1897	39.3	22.7		31.2	62.0	50.4
1898	46.7	23.4		33.9	62.5	54.3
1899	42.8	24.2		33.0	62.9	52.5
1900	41.3	26.1		33.2	63.2	52.5
1901	48.0	25.0		35.2	64.2	54.8
1902	49.2	25.8		35.9	64.7	55.5
1903	43.7	27.4		34.8	65.4	53.1
1904	43.5	28.5		35.2	66.1	53.2
1905	43.0	26.1		34.4	66.7	51.5
1906	40.7	26.6		33.9	67.0	50.5

1907	38.2	29.1		33.9	67.6	50.2
1908	46.6	28.1		36.4	67.9	53.5
1909	44.6	28.4		35.9	68.5	52.4
1910	41.1	30.8	35.0	35.6	68.9	51.7
1911	41.2	32.3	36.9	36.9	70.1	52.6
1912	40.1	34.6	37.7	37.5	69.9	53.6
1913	39.3	34.5	38.1	37.4	69.8	53.6
1914	41.4	33.3	38.0	37.6	70.7	53.3
1915	38.4	33.7	38.2	36.8	71.2	51.7
1916	38.7	33.2	39.0	37.1	71.5	51.9
1917	40.2	30.0	38.9	36.5	72.1	50.6
1918	37.8	27.4	32.9	32.7	70.7	46.3
1919	35.4	27.7	42.1	35.4	71.0	49.9
1920	35.0	30.6	44.6	37.1	70.7	52.5
1921	37.1	34.6	45.1	39.2	71.8	54.7
1922	45.2	39.6	46.6	43.9	72.3	60.8
1923	48.2	41.9	47.1	45.8	72.8	63.0
1924	43.9	40.5	47.6	44.2	73.8	59.9
1925	47.5	40.7	49.5	46.1	74.6	61.8
1926	41.2	44.2	51.3	45.8	76.0	60.3
1927	59.8	45.1	55.7	53.7	76.8	69.9
1928	43.9	46.0	55.0	48.6	77.5	62.7
1929	55.6	47.7	57.4	53.8	78.4	68.6
1930	52.0	47.5	59.0	53.1	79.3	67.0
1931	59.6	47.1	60.1	55.8	80.5	69.4
1932	60.0	49.0	61.0	56.9	81.5	69.9
1933	65.5	52.3	63.7	60.7	82.4	73.7
1934	69.9	53.6	65.8	63.3	83.6	75.7
1935	59.3	53.8	65.8	60.0	84.5	71.0
1936	48.4	53.6	63.5	55.5	86.0	64.6
1937	67.9	58.1	67.6	64.7	86.9	74.5
1938	66.6	59.9	68.4	65.2	88.0	74.0
1939	69.8	58.6	69.1	66.0	89.4	73.9
1940	58.8	56.7	68.8	61.8	90.4	68.3
1941	71.5	58.5	71.7	67.5	90.6	74.5
1942	67.2	59.5	72.1	66.6	91.4	72.8
1943	76.3	60.7	75.1	71.0	92.5	76.7
1944	85.7	64.4	78.0	76.2	93.2	81.8
1945	69.3	68.3	77.8	72.1	94.4	76.4
1946	72.7	77.5	82.2	77.7	95.1	81.7
1947	81.6	83.1	87.0	84.1	96.2	87.4
1948	75.6	87.1	88.3	83.8	97.2	86.3
1949	80.4	85.3	88.7	85.0	98.0	86.7
1950	87.2	84.6	89.9	87.4	99.0	88.3
1951	96.7	91.2	93.8	93.9	99.5	94.4
1952	81.3	99.0	95.2	91.9	99.6	92.3
1953	100.0	100.0	100.0	100.0	100.0	100.0
1954	97.5	103.0	102.3	101.0	100.2	100.8
1955	94.3	113.3	105.5	104.3	100.7	103.6
1956	95.0	120.5	108.5	107.9	101.1	106.7
1957	98.6	126.3	111.2	111.9	101.8	109.9
1958	94.0	131.1	114.0	112.9	102.2	110.6

Notes and sources: The indices for agricultural and industrial output for the 1848-1910 period are from Lains and Sousa (1998) and Lains (1995, pp. 211-212, column IPI), respectively, and based on prices for 1890-1900. For the growth of the service sector we used population growth as a proxy. This is probably an undervaluation of growth (see text). These indices are linked in 1910 with indices from Batista et al. (1997, pp. 5-8) and prices are for 1958. Population growth is from Neves (1994, pp. 221-223). Agriculture includes fisheries; industry includes mining, electricity, water and building.