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## CRECIMIENTO ECONÓMICO Y CAMBIO ESTRUCTURAL EN LAS ECONOMÍAS IBÉRICAS, 1800-2000

Luciano Amaral<sup>†</sup>, Concha Betrán<sup>§</sup> y Vicente Pinilla<sup>\*\*</sup>

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**RESUMEN**

En este trabajo se analizan las etapas de cambio estructural en los tres principales sectores de las economías ibéricas. También medimos la contribución del cambio estructural al crecimiento económico a largo plazo y estudiamos los tres sectores para determinar las industrias líderes en cada etapa. Finalmente, también medimos la contribución de estos sectores al crecimiento económico. Nuestro trabajo muestra que ambos países ibéricos fueron rezagados en la industrialización y también en el desarrollo agrario. Con un comienzo tardío a mediados del siglo XIX en relación con los principales países europeos, avanzaron en términos de cambio estructural durante el período de entreguerras y experimentaron crecimientos muy rápidos después de 1950. Los principales cambios tuvieron lugar cuando el cambio tecnológico y los mercados exteriores se adaptaron a sus dotaciones de factores. Las principales diferencias entre ambos países fueron la lenta trayectoria de Portugal en relación con España y el cambio estructural portugués menos intenso, en el que la agricultura tuvo una menor participación y los servicios una mayor en el PIB y el empleo durante el siglo XIX, mientras que en el siglo XX ocurrió lo contrario. Dentro del sector industrial, las industrias ligeras y las industrias menos intensivas en mano de obra cualificada y capital tuvieron una mayor importancia en Portugal que en España.

**Palabras clave:** Historia económica de la Península Ibérica, Cambio estructural, Historia económica de Europa, Crecimiento económico.

**ABSTRACT**

This paper analyses the stages of structural change between the three main sectors of the Iberian economies. We also measure the contribution of structural change to economic growth in the long term and we disaggregate within the three sectors to determine the leading industries at each stage of economic transformation. Finally, we also study the contribution of these sectors to economic growth. Our work shows that both Iberian countries were latecomers in industrialisation and also in agricultural success. With a late start in the mid-nineteenth century in relation to the core European countries, they advanced in terms of structural change during the interwar period and experienced post-1950 growth miracles. Major changes took place when technological change and foreign markets were adapted to their factor endowments. The main differences between both countries were the slow path of Portugal in relation to Spain, and the less intense Portuguese structural change, with agriculture having a lower and services a higher share of GDP and employment during the nineteenth century with the opposite being the case in the twentieth century. Within the industrial sector, light industries and industries less intensive in skilled labour and capital had a higher importance in Portugal than in Spain.

**Keywords:** Iberian economic history, Structural change, European economic history, Economic growth.

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# **ECONOMIC GROWTH AND STRUCTURAL CHANGE IN THE IBERIAN ECONOMIES, 1800-2000**

## **1.- Introduction**

The Iberian countries followed the typical path of structural change of contemporary economies, with most resources (including labour) being transferred from agriculture to industry and services. These changes in the composition of employment and production are important parts of the development process. However, they took place in the Iberian countries at a later stage than in the more core European economies. The latter started their industrialisation processes in the late eighteenth century while peripheral countries did so in the mid-nineteenth century, especially in Southern Europe. This work examines the main stages of economic growth and structural change in the two Iberian economies and explains the main differences between them and the core European countries. Industrialisation and the modern economic growth process began in the two countries in the middle of the nineteenth century (1850-1860); the interwar period was a period of significant transformations (especially, 1913-1929), and industrialisation concluded in the twentieth century during the golden age of capitalism (1960-1973). Both countries experienced post-1950 growth miracles as a consequence of being rapid industrialisers, similar to other European latecomers (such as Greece, Ireland, and Italy).

The Iberian countries had common characteristics which made it difficult for them to catch up with the European core, such as being on the periphery of Western Europe, with difficult access by land to the core European countries, not being very well endowed with land for cereal agriculture, and having a poor supply of fuel resources, although Spain was well endowed with metallic-mineral resources (but not Portugal). The educational level of the labour force was relatively low, and neither of the countries was very densely populated. These factors explain the late start and the slow pattern of development during the late eighteenth century and the nineteenth century. However, technological change, especially from the late nineteenth century onwards, was more adapted to the factor endowments and conditions of the Iberian countries, such as in the case of electricity (Betrán, 2005; Henriques and Sharp, 2020). Industries using these new technologies transferred their productivity gains by means of lower relative prices which in turn produced a positive market pecuniary externality which promoted demand spillovers that were sufficient to increase the market size of the whole industry and economy, and established a path for economic transformation and growth. In addition, foreign demand for agricultural products such as olive oil, wine, cork, fruits and vegetables, and those related to Iberian comparative advantages, improved agriculture

productivity and trade specialisation. However, the most significant changes in the demand side were biased in favour of industrial and services sectors due to the higher increase in these sectors' demand as a result of income rises (Engle's law), and their greater contribution to economic growth.

Besides presenting the stages of structural change between the three main sectors of the two economies, we will also measure the contribution of structural change to economic growth in the long term. Then, we will disaggregate further within the three sectors to determine the leading industries at each stage of economic transformation. Finally, we will study the contribution of these sectors to economic growth. Relative productivity in traditional industries fell. These were industries that used land and natural resources intensively, and relied on unskilled labour. Structural change can make an important contribution to economic growth, since it corresponds to a change from low productivity sectors to high productivity ones. Maintaining a long-run growth trajectory of the economy requires more, however, namely a change in the fundamentals of the economy: institutional quality and education to establish the incentives and factors to invest in newer and higher productivity sectors. The structural change from agriculture to the manufacturing and services sectors will improve growth at the first stage but more changes will be required simultaneously and in the near future.

In this process, a convergence in the labour productivity of manufacturing industries across countries was to be expected. Moreover, manufacturing shifted towards higher capital and human capital-intensive industries. However, industrialisation has its limits; this limit was reached when a share of employment in industry of around 30% occurred in the 1970s in the Iberian economies. The next growth stage or the new driver of growth was based on broad capabilities, most of them related to the services sector, with a de-industrialisation process taking place. Finally, we will analyse how the evolution of a services sector economy took place and how the new IT-based communications technologies and human capital-intensive industries emerged from the 1980s onwards. Both education and institutions, especially with respect to the removal of barriers and regulations in the services sector, are the main investments that Iberian countries need to make in order to face the challenges of information technologies and globalisation during the twenty first century.

## **2.- Stages of economic growth and the contribution of structural change to productivity and economic growth**

The main stages of economic growth in Spain have been estimated by Prados de la Escosura (2003) for the 150 years from 1850 to 2000 (see Table 1). These stages are related to three periods of greater economic growth<sup>1</sup>: 1) 1850-1883, 2) the 1920s, and 3) 1950-1974. We will consider the contribution of the main sectors during the long period between 1850 and 2000 and these stages of economic growth. Modernisation and

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<sup>1</sup> This is the average growth for periods delimited by two peak years.

industrialisation began in the mid-nineteenth century at a later stage than in the Western European economies. Per capita growth surged in the interwar period in Spain in relation to the core European countries. This period is important for understanding the subsequent period of rapid and outstanding economic growth. Furthermore, this latter period of rapid industrialisation and the growth miracle in Europe also explain the great deceleration that took place from 1973 onwards. However, economic growth was higher than in other European countries in the following period of 1986-2000.

Portugal also entered into the process of modern economic growth in the second half of the nineteenth century. The pace was, however, generally disappointing in comparison with the rest of Western Europe, and even with Spain (Table 2). This was, indeed, a very negative period: between the 1850s and the early twentieth century, the Portuguese economy diverged strongly in relation to the European first-comers. Only in the 1920s did it show any signs of change in behaviour, something that was only completely inverted in the post-World War II period until 1973, when it caught up rapidly (Lains, 2003; Amaral, 2002). The period between 1973 and 2000 was one of relative slowdown and milder convergence. (Table 2).

The growth process involves a specific structural transformation: the shift of labour from traditional or lower productivity industries, such as agriculture, towards new higher-productivity industries. In Spain, the stages of economic growth were accompanied by a shift in resource allocation towards more productive industries, and for this reason structural change generated an important contribution to labour productivity and economic growth. Using a shift-share analysis, Prados de la Escosura (2007) calculated the part of the increase in aggregate productivity due to the increase in output per worker in each industry (internal productivity) and the part due to the shift of labour from less productive to more productive industries (structural change)<sup>2</sup>. As we can see in Table 1, the contribution of structural change to economic productivity growth is around 6 % for the whole period 1850-2000<sup>3</sup>. We can distinguish a higher contribution in the years 1920-29, with 17%, which is related to an important structural change as a consequence of an inter-industry transformation. This structural change is due to the reduction of the share of agriculture in the total economy, and also to the increasing share of leading industries with higher productivity due to their relationship with new industrial technologies (electricity, chemicals and equipment goods). In the golden age period, 1958-1974, corresponding to the highest growth of labour productivity, the contribution of structural change was 10 %.

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<sup>2</sup> The intra-sectoral effect or internal productivity shows the growth of labour productivity that would have occurred if there had not been any structural change and it corresponds to the productivity gains due to the increase in productivity in each sector. The difference between total productivity and internal productivity is the contribution of structural change which is due to the re-allocation of labour between sectors.

<sup>3</sup> Together with this traditional form of calculation, Prados de la Escosura (2007) provides a different one which calculates internal productivity by means of the weight of the contribution of each sector at the initial level of employment. Using this metric, the results are more realistic and similar to those obtained in other countries, assigning greater importance to structural change, being a half during the whole 150 year period, also a half for the 1920-29 period, and one third for the 1958-1974 period. Unfortunately, no similar exercise exists for Portugal.

The contribution of structural change to the growth of the Portuguese economy for the whole period (1910-1995) was 7%, according to the shift-share analysis presented in Table 2. The contribution coming from the transferring of resources from sectors with relatively low productivity levels to sectors with relatively higher ones was almost always residual and was even negative between 1862 and 1910 (this could explain the exceptionally low growth rate of the Portuguese economy in this period). These results seem to show that, throughout the modern age, the Portuguese economy has not been able to significantly shift its structure towards sectors with higher productivity levels. Structural change was much lower in the 1950-73 period with a contribution of 7%. The combination between structural change and intra-sectoral productivity growth (column 3 in Table 2) was not very significant either, except in the 1910-1950 period with 11.8 %. On the other hand, productivity improvements within sectors have been significant.

Tables 3 and 4 provide each sector's share of GDP and total employment respectively. Portugal and Spain were among the least industrialised countries of Europe in the second half of the nineteenth century and the beginning of the twentieth century. Moreover, they were also among those where structural change was less important. The change in pattern occurred mainly in the twentieth century.

Agriculture's share of GDP in Spain reached its highest point at around 40% in the nineteenth century (1873-83). In the 1920-29 period, manufacturing overtook agriculture, reaching 28%. The highest share that manufacturing had of GDP occurred in the 1958-74 period with 30.8%. Services represented 56.9% in 1974-86 and 62.9% in 1986-2000 while construction accounted for 8% in the 1986-2000 period (Prados de la Escosura, 2003).

However, agriculture's share of total employment was over 50% until 1920-29, decreasing from around 64% in the middle of the nineteenth century. Manufacturing's share of employment reached its highest percentage in 1976 with around 26%, surpassing agriculture. This share is approximately the percentage considered by Rodrik (2013b) as the highest during the industrialisation process (30%). Services accounted for 50% in 1982. In addition, at the end of the twentieth century agriculture accounted for 7% of employment, manufacturing 20%, and services 63% (Prados de la Escosura, 2003). This is a particularity of Spain: the late exodus of the agricultural labour force to other sectors and the decline in industrial employment in the 1980s perhaps constituted one of the main origins of the high structural unemployment of the Spanish economy during the late twentieth century. As a consequence of the observed trends in production and employment, and given that agriculture had a lower labour productivity than manufacturing and services, structural change made a higher contribution to labour productivity and growth during these different stages of growth, as we have explained before.

With respect to Portugal, we should note that the services sector contributed most to GDP throughout the entire period (Table 3). In the second half of the nineteenth century agriculture was the largest sector in Spain but not in Portugal. Agriculture even lost

weight then, when the industrialisation process began and, consequently, industry increased its weight in the economy. The years of the highest contribution of industry to GDP were those between the 1960s and the 1980s. Then, de-industrialisation began, although later than in Spain: the loss of weight of industry started in the 1970s in Spain, one decade before Portugal. Services increased in proportion, but, by the late twentieth century, the structure of the Portuguese economy had changed less than that of the Spanish one. The importance of agriculture is still one third higher than in Spain, and that of services is still lower. This might help to explain why the contribution of the inter-sectoral relocation of resources was less important in Portugal than in Spain.

As for employment, a similar picture seems to apply. In the second half of the nineteenth century, the Spanish and Portuguese economies seemed to have a similar structure. However, from then on, the process of relocation of labour from agriculture to industry and, later, services, was quicker in Spain than in Portugal (Table 4). Rather interesting is the still quite high proportion of employment in agriculture in Portugal in the late twentieth century (13%).

### **3.- Sectoral developments and the contribution of different sectors to growth**

One of the reasons why we need to study the sources of economic growth and the nature of structural change at the sectoral level is because the innovations leading to long run economic growth are concentrated in a relatively small number of sectors. Manufacturing before 1976 and services after 1976 had the highest growth rates and made the largest contributions in the subsequent stages of economic growth and development. However, agriculture was the main sector during a great part of the period and its dynamics explain a significant part of the GDP trend.

#### **3.1.- Agriculture**

The majority of the Iberian Peninsula has a Mediterranean climate. This represents a severe obstacle to the development of agriculture due to the irregularity and scarcity of rain, conditioning the crops that can be cultivated. Vineyards and olive groves adapt excellently to these agro-ecological conditions while cereal crops, although well adapted, generate very low yields per hectare. However, the high amount of sunshine received due to the latitude of the peninsula means that with the addition of water to counteract the natural aridity, the conditions are ideal for growing horticultural products (Table 5). Only the west and northern coasts of the peninsula are more humid and are therefore better suited to other crops that require larger volumes of water. These conditions also limited the development of livestock farming due to the poor pastureland. Nomadic sheep farming was the adaptive response that sought to exploit the pastureland of the lower southern areas in the winter and of the northern mountains in the summer.

In the nineteenth century, agricultural production grew in the Iberian Peninsula, which was driven mostly by the increasing population and also by a growing insertion into the international markets of agricultural production that were taking shape in the first globalisation. Before this expansion in production could take place, an important institutional change had to be implemented in both countries in order to enable the formation of a market economy. Furthermore, the restrictions imposed by the institutions of the Ancien Regime had to be eliminated. Both in Portugal and Spain, the liberal reforms were met with a high level of resistance from the absolutists which delayed their definitive implementation (Amaral, 2012; Pinilla, 2017). The privatisation of land belonging to the church and local governments and communal land and its sale by public auction in the successive disentailment processes was particularly relevant, although the property structure did not change substantially in either of the two countries.

The population of the Iberian Peninsula grew by approximately five million people during the second half of the nineteenth century and feeding it without barely depending on imports required a tremendous increase in production. The most important structural change of Iberian agriculture in the second half of the nineteenth century was, precisely, the rapid conversion of unused land into cultivated land. The cultivated area grew in Portugal between 1867 and 1902 by approximately 1.2 million hectares and in Spain between 1800 and 1900 by almost 6 million hectares. This turned out to be a period of very strong growth of agricultural output, as shown by Lains (2003a and 2001). In Portugal, output increased during the second half of the nineteenth century at an average annual rate of 1.4% and in Spain throughout the whole of the nineteenth century at an annual rate of 0.7%. In both countries, wheat, grapes and olives were the principal crops, together with Mediterranean horticultural products.

In the second half of the nineteenth century, there was a growing presence of Iberian agricultural exports in international markets, particularly from Spain. The star product was wine. The shaping of an international market, arising from the growth in demand in industrialised countries in the American continent and in France due to the phylloxera plague, gave rise to interesting opportunities for the traditional producers. Between 1850 and 1890, Portugal tripled the volume of wine exported and Spain multiplied its exports fifteen-fold. The exports of other agricultural products also expanded significantly, such as cork or olive oil in Portugal and olive oil or fresh fruits and vegetables in Spain (Branco and Silva, 2017; Gallego and Pinilla, 1996).

The large expansion of production was accompanied by a moderate increase in productivity. Even so, there was a notable intensification process which moved resources into higher productivity sectors (from unused land or pastures to crops). Total factor productivity (TFP) in the agricultural sector grew very slowly during the first half of the nineteenth century (the annual growth rate for Spain was 0.16 between 1800 and 1857), but faster in the second half (the annual growth rate for Portugal was 0.63 between 1865 and 1902, and 0.95 for Spain between 1857 and 1905) (Lains, 2009; Bringas, 2000). A severe obstacle limiting the growth of productivity was the inability of the agricultural sector to adapt to technological change ('the first green revolution'), given the



environmental conditions prevailing in much of the Iberian Peninsula. Starting from relatively low levels of agricultural productivity, the gap between Iberian productivity and the already high levels found in other European countries could only widen.

The beginning of the agricultural depression at the end of the nineteenth century marked the start of a certain divergence between the Iberian agricultures. In Portugal, the early twentieth century was a period of slower growth, mostly marked by a traditionalist turn of agricultural policy, as protection and stimulus were given to wheat cultivation (Reis, 1979). Although it was during this period when the use of fertilisers and machinery was gaining importance, Portugal did not incorporate the innovations to modernise its agriculture at a sufficiently fast pace. However, its orientation towards the foreign market weakened as a result of the difficulties in the wine market and the decline in British purchases of other products, which was not compensated by a reorientation towards products with a higher income elasticity (Lains, 1995). TFP in the sector grew at a much slower rate than during the second half of the nineteenth century (Lains, 2009).

In contrast, although it was facing serious difficulties as a result of the depression and its problems in foreign markets, Spanish agriculture experienced significant changes in the first third of the twentieth century. Agricultural productivity improved, initially in terms of the yield from the land itself and, after World War I, in labour productivity. TFP also grew faster than in the previous century (Bringas, 2000). The consumption of fertilizers grew sharply, and their use quadrupled between 1907 and 1935 (Gallego, 2001). Agricultural mechanisation finally took off, particularly when, after World War I, real wages began to increase appreciably, which constituted an incentive to substitute capital investment for labour (Clar and Pinilla, 2009). The strong wheat protectionism gave farmers a margin to allow them to modernise their production. Meanwhile, in foreign markets, the most important Spanish export products faced serious difficulties. Wine, which had represented the fundamental part of exports in the second half of the nineteenth century, had many difficulties in accessing its traditional markets either due to the protectionist policies of countries such as France, the United States or Argentina or because it had not become a mass consumption product in industrialised countries (Pinilla and Ayuda, 2002).

However, a subsequent reorientation in the development of Spanish agriculture consisted of increasing the production and export of fresh fruit and vegetables. Nevertheless, the development of these crops required the extension of irrigated land to counteract the effects of aridity. This was remarkably successful, since increased production and exports were an unquestionable source of improvement and growth for Spanish agriculture (Pinilla and Ayuda, 2010).

The Spanish Civil War and the Second World War marked a further divergence in the trajectory of the two countries. While in Portugal structural changes continued, with cereals and wine declining and animal products, fruits, and vegetables, especially the latter, increasing their weight in agricultural output, in Spain, the process of agricultural modernisation was interrupted between 1936 and 1951, within a context of

erroneous interventionist policies and foreign isolation due to the Franco dictatorship. This resulted in a severe fall in productivity and a notable incapacity to adequately feed the Spanish population, while agriculture exports decreased significantly.

After 1951, both countries began a period of strong economic and industrial growth, with a significant increase in income per capita and urbanisation, which had an appreciable impact on consumption. Initially, the traditional agriculture of the Iberian Peninsula found it difficult to adapt to the new diet, giving rise to surpluses in some products (wheat) and deficits in others (meat).

The industrialisation process generated push and pull effects that were strong enough to cause a mass rural exodus. The demand for labour in the more developed European countries also contributed to this exodus, particularly in Portugal. The increase in wages in rural areas promoted mechanisation, although in Portugal the public policies sought to maintain the volume of the active population in agriculture higher than necessary (Amaral and Freire, 2017). This process was completed with the adoption of Green Revolution technologies, in particular the introduction of hybrid seeds, although more profoundly in Spain than in Portugal. The expansion of irrigation was also crucial, and irrigated land increased in Spain by over one million hectares between 1950 and 1978, although it hardly grew in Portugal.

The restructuring of Iberian farm production began around 1965 and was mainly concentrated in meat. Livestock farming became the paradigm for the transformation of agriculture. International connections favoured the introduction of technologically mature foreign species (particularly chickens and pigs, although also cattle). Intensive livestock farming was developed using industrial production systems and was increasingly vertically integrated, becoming one of the leading sectors in farm production in the second half of the 1960s.

In 1986, Portugal and Spain joined the EEC and after a period of transition, they adopted the Common Agricultural Policy (CAP). However, the results of this integration were very different in each case. The type of policy implemented in Portugal was similar to that existing in the EEC: protection at the border, guaranteed prices, and some (but little) structural reform. In this respect, there was, therefore, no major conceptual adaptation. Nevertheless, there were two main problems: the differences in guaranteed prices (lower in the CAP) and the structural development of agriculture (lower in Portugal). The Portuguese approach to negotiations was to make few demands on price levels but, at the same time, to ask for strong support for structural reform (Amaral and Freire, 2017).

The result of this transition process together with various changes in the mechanisms of the CAP over the years had a strong impact on Portuguese agriculture. The support mechanisms of the CAP had a natural impact on land use and the product mix. The use made of land changed significantly. In 1970-73, arable land occupied about 63% of used land and pasture 21%, but by 2000-3 the proportions between the two were almost the same, with about 40% each – the area dedicated to permanent crops remained

practically unaltered. Portuguese agriculture became much more extensive than it used to be, with a large percentage of the soil no longer dedicated to temporary or permanent crops. Under these circumstances, the product mix of Portuguese agriculture changed significantly. Cereals and wine followed by olive oil and fruits, which had been the traditional and most important Portuguese crops, lost weight. Milk and dairy products have become the clear front-runners, with a relevant increase in beef and other meats. The CAP changed the profile of Portuguese agriculture in a pronounced way, although it was not enough to make it converge, in terms of productivity, with the agricultural sectors of Northern countries (Amaral and Freire, 2017).

The entrance of Spain into the EU represented a significant increase in the support given to Spanish farmers, which implied a significant stimulus for expanding production (Clar, Martín-Retortillo and Pinilla, 2018). Furthermore, gaining access to the European market initially represented excellent trade opportunities for those products, particularly Mediterranean horticultural ones, in which Spanish agriculture was competitive. Internal European agricultural trade increased substantially after the abolition of internal tariffs, and even more so with the creation of the single market and the monetary union (Serrano and Pinilla, 2011). Spain, therefore, initially benefited from accessing a market with enormous potential under more favourable conditions. However, more interesting than these benefits, which we could classify as being static and derived exclusively from trade liberalisation, is that the Spanish agri-food sector became highly dynamic after Spain's accession, with the introduction of technological improvements and its adaption to the new conditions of demand and consumer tastes. Spanish agri-food companies learnt how to raise and improve their productivity (Serrano et al., 2015). Consequently, agricultural production, integrated in the complex agri-food sector, has grown, and Spain has become one of the world's leading food exporters. Agricultural exports grew at a very fast rate after 1985, and their volume multiplied almost five-fold in only twenty years.

The results of the Iberian agricultures in the second half of the twentieth century are clearly divergent. Spanish agriculture shows quite outstanding results, with an average annual growth rate of 2.2%, between 1950 and 2005, compared to a European average of 1.3%, the highest of the continent (Table 6). In contrast, the agricultural production of Portugal grew at a modest rate of 0.9%. The main difference in the pace of Spanish growth had to do with the fact that although until 1985 its production increased at a high rate, similar to that of many other European countries, after this year it continued to grow vigorously. On the other hand, countries in Western Europe saw their production stagnate and those in Eastern Europe fall as a result of the collapse of the communist model and the transition to a market economy. Portuguese agriculture however maintained a very similar growth rate in both periods; much lower than the European average in the first period but clearly higher in the second (Martín-Retortillo and Pinilla, 2015).

### 3.2.- Industry

The manufacturing sector followed the typical pattern of economies that started late their industrialisation process, as there was a specific scarcity of raw materials, such as water and coal in both countries and iron in Portugal, a low educational level of the population, and protected domestic markets. The upswing of Spanish industrialisation took off when the textile and, later the iron and steel industries developed due to the use of steam in the mechanisation of their production processes. The origin of this industrial advance took place in the late eighteenth century in Catalonia. This region sold spirits and calico manufacturing (linen textile printing) to American colonial markets. Printing textiles was a growing industry mostly concentrated in Barcelona producing linen calicos for the colonies and cotton calicos for the domestic market. Thanks to the Atlantic trade, wine growing experienced a commercial and industrial expansion essential for the start of the industrial revolution. At the same time, the colonial trade of calicos allowed the import of cheaper raw cotton and the surge of cotton textile shops scattered across the countryside which were replacing wool manufactures. Subsequently, cotton yarns were produced using the new spinning jenny and an improved adaptation of it, the so-called “bergadana”.

After the Napoleonic Wars, colonial markets were lost and industry had to adapt. The loss of population due to the war, together with the capital accumulation during the export boom and also the Royal decree forbidding cotton yarn imports from abroad in 1802, favoured the manufacturing mechanisation of cotton spinning by means of water-frames and mule-jennies, and later on with the first use of the Watt steam machine in 1833 in the Bonaplata factory. Mechanical spinning accounted for nearly 30 per cent in total in 1835 and reached almost 100 per cent in 1861 (Sanchez, 2000). However, the mechanisation of weaving was slow. Cotton textiles adopted the new technologies and gained importance and competitiveness in relation to old textile industries, such as linen and wool. Moreover, as a consequence of steam energy, the location of the factors changed from places near water resources to the coast. The advantages of being located close to Barcelona port included the import of raw cotton and coal and the agglomeration economies or Marshall externalities that are shared by industries located together: a skilled labour pool, specialised inputs and technological spillovers.

The iron and steel industry had different locations according to factor endowments. The first industry was established in Malaga in 1826 which produced 72 per cent of Spanish cast iron. However, the change from charcoal to coal increased the competitiveness of the Asturias factories located near the coal mines and Britain during the 1864-79 period. After 1879, the industry developed in Biscay (Basque Country) due to cheaper coal shipping from Great Britain owing to the lower transport costs thanks to the abundance of high quality iron in Biscay and its exports mainly to the British market when Bessemer technology demanded non-phosphoric iron ore. In short, manufacturing was concentrated in these two provinces of Asturias and Biscay primarily due to the important role of access to natural resource endowments such as coal and other raw materials and mining inputs in production and also external and internal economies of

scale. In addition, iron and steel industries were protected in 1869 and especially after 1891.

As mentioned, Spain was well endowed with metallic-mineral resources and the mining sector experienced a boom thanks that the 1868 law for the exploitation of natural resources was passed and foreign demand increased as a consequence of European industrialisation. The period from 1861 to 1913 coincided with the golden age of mining, being its highest level in 1900, representing 7.3% and 1.8% on industrial value added and GDP respectively. From 1876 to 1900, Spain was at the forefront of the lead and copper industries (Harley and Taylor, 1987), producing more than 86 per cent of iron ore and 90 per cent of the sulphur sold abroad by European countries, and 40 per cent of world's mercury (Escudero, 1996). Lead, copper and mercury were mainly located in Andalusia and iron in the Basque Country. During the interwar period, the deposits were used up and the foregoing regions became less important.

However, around 1910, the textile, food, beverage and tobacco industries were predominant. For Spain, manufacturing transformation at a lower level of disaggregation over the long run (1850-2000) can be followed with data drawn from corporate income taxes and estimations from national accounts<sup>4</sup>. Consumer goods industries constituted the most important manufacturing sector until 1913. Food, drinks and tobacco represented the highest share in manufacturing in 1856, with 56%, although with a decreasing share in favour of textiles and clothing, and leather and shoes, which had its maximum share of 30% in the 1920s. With respect to Portugal, the biggest difference was the larger concentration of Portuguese industry in textiles rather than in food and beverages, despite some change throughout the period. As a matter of fact, textiles had an overwhelming weight in the Portuguese industrial structure, although with a declining trend: from about 60% in 1845 to 45% in 1896 (Table 7), with a more or less equi-proportional distribution between cotton and wool. The most important changes in structure came about thanks to the growth of the cork and tinned fish industries, the former increasing from almost 2% to 9.5% in 1896, and the latter from virtual non-existence to 10% (Table 7). As could be expected for these two new sectors, most of the industry depended on the internal market and most of it was technologically traditional. Domestic industry continued to represent the largest part of the sector, with just a few islands of more modern units.

The Portuguese industrial sector was practically unable to profit from the environment of the “first age of globalisation” of the second half of the nineteenth century (expression coined by Williamson and O'Rourke, 1999), which had a lot to do with the adoption of a deliberate protectionist policy (Lains, 2006). According to Lains (1995), the specialisation in textiles went against the country's comparative advantages, which existed in some agricultural goods but also in the new industrial sectors of tinned fish and cork products. This prevented Portugal from following the pattern followed in Spain but also in Italy or even France: specialising in food and beverages allowed these countries

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<sup>4</sup> See sources for the different years in Table 7.

to compensate for the disadvantage of not being well endowed with the raw materials and fuel typical of industrialisation in Northern Europe. However, according to Reis (1984), even that sort of specialisation would not have been enough to put the Portuguese economy on a different path. The country simply did not possess the natural resources or a viable specialisation pattern that could have broken the cycle of backwardness: no coal or iron existed in sufficient amounts and all potential specialisations based on the economy's comparative advantages (wine, tin sardines or cork) were not viable due to various supply limits. As noted by Reis (1993), one of the resource endowments seriously limiting not only the overall productivity of the economy but also the ability to move resources from less to more sophisticated industrial sectors was human capital. Portugal had one of the highest illiteracy rates in Europe in the second half of the nineteenth century. Not only was the initial level high but it decreased very slowly in comparison with other similar low literacy countries such as Spain or Italy: 88% in 1864, compared to 76% in Spain and 73% in Italy, and 78% in 1900, compared to 60% in Spain and 56% in Italy.

From the interwar period, 1913-1929, there was a decline in traditional industries in favour of a more diversified industrial structure. For Spain, during the 1920s, the share of traditional lighter industries lost ground to chemicals, building materials, and metal transformation. In the golden age and the miracle stage of the Spanish economy, metallurgic and transformed metal, including transport equipment, represented the greatest share of total manufacturing at around 40% (see table 7). These changes came together with important transformations and innovations within a common protectionist and regulatory context. The important innovations at the end of the nineteenth century were electricity and other technological changes and goods associated with this General Purpose Technology (GPT). The industries related to these technological changes contributed to growth through transferring their productivity gains, by means of lower relative prices and producing a positive market pecuniary externality which promoted demand spillovers that were enough to increase the market size of the whole industry and economy (Betrán, 1997). These industries included: electricity, industries related to the first processing of metal and non-metal minerals (aluminium, lead, copper, cement), equipment goods (electric materials, engines, machinery, and transport equipment), and chemicals (fertilizers, artificial silk). By contrast, some industries delayed the process due to their high relative prices, being coal, iron and steel industry, wheat flour and sugar, among the most important ones (Betrán, 1997). These industries were the most highly protected after 1891 with the trade tariffs of 1891, 1906 and also 1922.

As a consequence of the opposite contributions of coal and electricity, coal was replaced rapidly with electricity, especially in the industries that were intensive in the use of electric processes within chemicals and equipment goods. Electrical energy played a determinant role, especially in countries that lacked coal, as electricity could be created from different primary energies, as water or coal. In general, electricity-coal relative prices were lowest in countries such as Spain with poor coal endowments, leading to more opportunities from using the new energy as was the case in Italy and Scandinavian

countries. Spain, where electricity was cheap compared to coal, had the opportunity for greater economic growth during this period. Moreover, the degree of electrification advanced substantially from the end of the nineteenth century until WWII. The height of the process was in 1925, after WWI, when real electricity prices fell considerably, generating important consequences for economic growth (Betrán, 2005). The height of manufacturing concentration took place in the interwar period due to the importance of factor endowments in industry location and the concentration of industries in a few regions. However, increasing returns were also fundamental in certain industries, especially, such as cotton textiles, due to Marshall's externalities during this period (Betrán, 2011). In addition, there was a process of formation of large corporations, initiated at the end of the nineteenth century through mergers to invest in capital and technology and access a growing market and take advantage of economies of scale; such as in the iron and steel (Altos Hornos de Vizcaya), paper (Papelera Española), and sugar beet (Sociedad Azucarera de España) industries. Other large firms were created in the electricity sector, such as Chade and Barcelona Traction, and in communications (Telefonica), and also in the chemical industry, with Cross and Unión Española de Explosivos, and in the equipment goods sector, with Sociedad Española de Construcción Naval. There was substantial participation of foreign enterprises in technology-intensive industries through the establishment of affiliated companies jointly owned with the national producers, for example AEG, Siemens, General Electric and Westinghouse, among others, due to the economic advantages to be gained by the national industrial producers (industrial protection laws of 1907, 1917 and 1924).

In the case of Portugal, the industrial structure changed considerably. During World War I, the 1930s crisis and World War II there was a return to protectionism on a global level – in Portugal it was not a return but an increase. Governments used protectionism to foster new sectors that they identified with industrial and technical progress. Besides protectionism, governments used a series of other stimuli, especially between the 1930s and 1970s, such as reserved markets and fiscal incentives. This is how textiles declined from a proportion of 44% of industrial value added in 1910 to 36% in 1929 and 20% in 1960, and the same happened with wood and cork products, from 18% in 1910 to 11% in 1929 and 10% in 1960. The biggest increases took place in the chemical industry, from 11% in 1910 to 14% in 1929 and 20% in 1960 (thus reaching the size of textiles and food and beverages), and the metalworking industries, rising from a residual level of 2% in 1910 to 5% in 1929 and 12% in 1960. The biggest boost for the chemical industry came from the development of the oil refining industry, especially after the opening of a large refining infrastructure in Lisbon in 1939. As for metalworking, the impulse came from a series of projects on industrial machinery and light vehicles (Aguar and Martins, 2005). Governments, especially from the 1930s to the 1970s, were very active in providing a series of incentives for these sectors. Industry was concentrated in coastal cities, mainly Lisbon and Porto, with the exception of Covilhã, a traditional centre for woollens since the eighteenth century. Advantages of international market access and agglomeration economies were behind this industrial location pattern.

The advance in the industrialisation process accelerated during the 1960s; the so-called economic miracle. For Spain, the leading industries were electricity, machinery and equipment, transport materials and the chemical industry thanks to the diffusion of US technologies across Europe. Sanchís (2006) estimated a disaggregated growth accounting of the industrial sector, separating the part explained by the growth of TFP and by intermediate, capital and labour inputs. TFP represented around half of overall production growth. This result is similar to the findings for the whole Spanish economy and other countries. As previously explained, these leading industries with a higher contribution in terms of TFP generated demand spillovers in the industry and the economy. At the same time, manufacturing spread to more regions as a consequence of industrialisation and the convergence of factor endowments between regions, particularly skilled labour, and the growing importance of mobile factors in relation to immobile ones (coal, minerals and land) in production. For example, internal and external migrations were extraordinarily high during the 1960s. In addition, there was an increase in the significance of market access, as a location factor, due to the importance of economies of scale in 1960-1973. Later on, its importance decreased in line with the reduction in transport costs (Betrán, 2011). This process was enhanced by using industrial promotion policies and public intervention, through the application of development plans and the creation of public companies in selected industries (for example, Ensidesa in iron and steel). These public companies were also the origins of some large companies in the leading industries, such as Seat in automobiles, Repsol in oil refining (a merger of Campsa, Encaso and others), and others that are among the most internationalised firms today. In addition, multinational companies, especially in the automobile and petrochemical sectors, also entered the Spanish market.

For Portugal, this advance also occurred after 1960, when the economy opened up and became increasingly connected with the rest of Europe. Portugal participated in the process of European integration from the start, joining the European Free Trade Association (EFTA) in 1960 and the European Economic Community (EEC) in 1986. This time, contrary to what had happened in the nineteenth century, the country was a full participant in the second wave of globalisation. The sectors where Portuguese industry had the most success in international markets were the previously protected textiles and metalworking sectors (Amaral, 2002; Lains, 2003b, Aguiar and Martins, 2005). The industrial structure experienced many changes in this period: textiles kept their share at around 20% to 25%, from 1960 to the end of the century, as did food and beverages, from 17% to 20% (Table 7), but the chemical industry declined, halving its weight from 20% to 10% between 1960 and 1980 and staying at that level until 2000; as for the metal industries, their weight doubled, from 12% in 1960 to 20% in 1980 and 17% in 2000. Most changes took place between 1960 and 1980, being much fewer in the last twenty-five years of the twentieth century. Economic activity was still concentrated in coastal regions around Lisbon and the North East until the 1970s, but after that the concentration decreased (Badía, Guilera and Lains, 2012) although later than in other countries, including Spain, where this happened before the Second World War.



This seems to indicate that Portugal found its specialisation pattern under the conditions of European openness during the 1980s. In these conditions, many of the policies that had been followed before with the purpose of protecting and fostering certain sectors had to be interrupted: this explains how the chemical and basic metal industries lost weight within the Portuguese industrial structure. This indicates an apparent confinement of the Portuguese economy to a relatively low-tech path, which raises questions over its ability to integrate into the wider European market. Again, human capital played an important role in this transformation, as illiteracy declined to 60% in 1930, 26% in 1970 and 13% in 1990. So, changes in this respect allowed for labour to move to more sophisticated industrial sectors. Still, human capital remained low by international standards until the end of the twentieth century. This may explain why sectors with lower technological content still predominate in Portugal's industrial structure.

For Spain, the main international integration process came later on when it became a member of the EEC in 1986, which accelerated the changes in the industrial structure. In Table 7, from 1980 to 2000 we can observe the relative importance of food, drink and tobacco, metalurgy, metal transformation, transport material, and chemicals and the loss of weight of textiles and footwear. Food and drink and transport material were the leading exporters to the EU. The previous interventionist policies had to be eliminated and it was necessary to take measures to adapt the Spanish economy to its entry into an open European market with a customs union. Spanish comparative advantages were located in the leading industries of the previous years of the entry into the EEC (especially in automobile and food and beverage).

This seems to indicate that Spain and Portugal found their specialisation pattern under the conditions of European openness. When comparing the two countries, although in both cases food and beverages were important, there still seemed to be an excessive importance of textiles in the case of Portugal. The same goes for food and beverages although to a lesser degree. The increasing importance of metal industries in Spain is significant as it contrasts with stabilisation in Portugal. The chemical industry also increased in Spain and stabilised in Portugal and basic metals had a relevance in Spain that Portugal never matched. The scarcity of factors used intensively in the metal and chemical industries, natural resources and human capital, and the different size of the markets of two countries could explain the different patterns.

### **3.3.- Services**

Although it has been a long neglected element in the explanation of modern economic growth, the services sector has acquired increasing relevance in some recent literature. Broadberry (2007) and Broadberry and Ghosal (2005) have noted how the productivity differential between the UK, the US and Germany during the twentieth century was more due to the evolution of the services sector than to manufacturing and agriculture. The relevance of the sector is linked to the so-called process of

“industrialisation’ of services”, which involves “the transition from a world of customised, low-volume, high-margin business organised on the basis of networks to a world of standardised, high-volume, low-margin business with hierarchical management” (Broadberry, 2007, p. 5). The process of industrialisation of services started in the second half of the nineteenth century in the early developing countries and continued with increased intensity throughout the twentieth century, spreading progressively to late-comers.

Spain and Portugal were not left entirely outside of this process but they followed it with a considerable delay on account of their limitations at both the supply and demand levels. On the supply side, the process of industrialisation of services is highly intensive in physical capital, human capital and technology. On the demand side, it requires a relatively high degree of urbanisation and complex patterns of consumption. The beginnings of the industrialisation of services can be found in railways in the US, very closely followed by retail and wholesale trade, both being at the origin of the modern, large business firm (Chandler, 1977). They also correspond to the beginnings of modern finance, with the expansion of commercial and savings banks, as well as insurance companies. All of these subsectors required strong physical capital expansion (rails, locomotives, carriages, buildings...) and a high human capital stock (to deal with the new technologies and increasingly more complex management and accounting systems). They also required a high level of technological intensity, especially to process information: the telegraph, the telephone, typewriters, calculating machines and other similar instruments were crucial for them.

Spain and Portugal could only follow this process in a moderate way in the late nineteenth century and early twentieth century. Table 8 shows how, in that period, wholesale and retail trade had the highest weight in both countries, at around one third of the sector’s value added. Although this was one of the subsectors where many innovations appeared in the US or the UK, the Iberian countries did not adopt them with high intensity. Despite some examples of modern retail methods in the largest cities, on the whole the sector remained essentially traditional, based on small shops selling basic consumption goods (Martins, 1997; Cuñado, 2018). The same is true for transports and communication. Railways, the telegraph or the telephone expanded in the Iberian Peninsula in the second half of the nineteenth century, but to a lesser extent than in core countries (Herranz, 2006, Calvo, 2001; Mata, 1988; Alegria, 1990). This subsector was the second most important service branch in Spain in the early twentieth century, although not in Portugal. Railways were initially based on steam power, but when electricity became widespread, not only railways reconverted in order to profit from the new technology but also new urban means of transportation appeared, such as tramways, subways and the metro. Despite its relatively low importance in comparison with other countries (Caruana-Galizia and Martí-Henneberg, 2013), the contribution of railways to economic growth was substantial in the case of Spain: the social saving for the economy, as a percentage of GDP, calculated by Herranz (2006) is 3.9-6.4 in 1878 and increased, as a consequence of technological progress, to 18.9 in 1912. No similar calculations exist

for Portugal, but most probably the contribution of railways to economic growth was much less pronounced. On the one hand, its weight was substantially lower, and on the other the few existing indications point to significant inefficiency in the installation of the railway network: under the influence of highly corrupt practices, the chosen routes do not seem to have favoured the best integration of the national market (Vieira, 1983). Modern banking institutions and methods were introduced in both countries in this period, following the path of core countries, but, as in the case of many other services, they remained less developed, in this instance reflecting their much lower financial intermediation (Molina and Martín-Aceña, 2012; Valério et al., 2006). The relatively low endogenous capacity of both Iberian countries to contribute to the industrialisation of services is revealed by the fact that most modern activities depended on foreign direct investment, as demonstrated by the cases of railways, public transportation, the telegraph or telephone (Silva, 2016; Puig and Álvaro, 2016).

The third most important subsector in Spain, and fourth in Portugal, in the late nineteenth century and early twentieth century was that of public administration, representing a similar weight in value added in both countries. Spain and Portugal experienced similar processes of institutional development, as both installed a modern State in the period, with its associated bureaucratic and administrative structure. This process was common to the rest of Europe, as the liberal revolutions of the period did not only mean the liberation of markets from old restrictions but also the creation of public authorities in the sense we understand them today (Cardoso and Lains, 2010).

The process of industrialisation of services was somehow interrupted, even in core countries, between 1914 and the 1940s, as a consequence of the world wars and the 1930s crisis, but resumed after the 1950s, this time affecting especially Europe, which adopted many management methods that had been in use for some time in the US – a phenomenon sometimes defined as the “Americanisation” of European economies (Zeitin and Herrigel, 2004). The Iberian countries followed this process quite closely, as many of the supply and demand aspects that had hampered the industrialisation of services in the nineteenth century and early twentieth century were now being overcome, continuing their quick catch-up processes to core countries. Physical and human capital intensity grew at fast rates in the period, as did technological progress. At the same time, urbanisation and more sophisticated consumption habits also developed. Many of the new management methods were introduced by large business groups, which had a visible expansion from the 1950s until the 1970s in both countries (Curevo-Cazurra, 2018; Silva et al., 2016). A subsector where this was especially visible was in retail trade, with the appearance of the first supermarkets and department stores (Cuñado, 2018). Loss of weight in the sector’s value added (Table 8) did not mean lack of substantial modernisation. The same is true for transport and communication, a subsector that acquired similar relevance in both countries from the 1980s onwards. Another subsector that had considerable expansion was banking and finance. This depended again a lot on the catch-up processes of both economies, which led to substantially increased financial intermediation. As a consequence, the banking system grew and modernised from the 1950s onwards (Molina

and Martín-Aceña, 2012; Valério et al. 2010). In the last couple of decades of the twentieth century Spain was even able to develop some important multinational banks, with influence in Europe and outside of Europe (Santander and BBVA are cases in point). All of these activities were very much affected by the ICT revolution that started in the 1980s. According to some estimates, ICT technologies in Spain, as applied to communications, retail and banking represented a share of valued added of 2.8% in 1980, increasing to 5% in 2003 (see Gordo, Jareño and Urtasun, 2006).

A subsector that became crucial for both economies, especially after the 1960s was that of tourism. This is reflected in Table 8 in the growth of the hotel and restaurant item. The reason for this was the transformation of Spain and Portugal into popular beach destinations for many northern Europeans (mostly from the UK but also France, the Netherlands, Germany or Scandinavia). Foreign exchange originating in tourism reached a first peak of 5% of GDP in Portugal in 1966 and remained at about that level until the end of the century (Amaral, 2019). The weight was higher in Spain, reaching close to 8% of GDP in 1965 and increasing afterwards until 11% in the late twentieth century (Vallejo, 2002).

Public administration, including public provided social systems (such as Health and Education), grew slowly until the 1970s in both countries, mostly on account of the little attention devoted to social programmes by their respective authoritarian regimes (lasting between 1939 and 1975 in Spain, and between 1933 and 1974 in Portugal) (Espuelas, 2012). This changed considerably from the 1970s onwards, when both countries acquired democratic regimes that relied heavily on this sort of policy. Between the 1970s and the end of the century, each of the Iberian countries installed their own version of the Welfare State, with the corresponding increase of social expenditures (Tanzi and Schuknecht, 2000). It is not possible to disaggregate the figures for Portugal in Table 8, but the figures for Spain reveal a process that was similar on the other side of the border: by the end of the twentieth century, public administration, together with education and health services, was the largest services subsector in both countries.

A final note about the importance of real estate in Spain and Portugal, which can be observed in Table 8, should be made. The figures reflect the fast pace of construction in both countries from the 1960s onwards (see also Tables 3 and 4 for Spain), sometimes leading to episodes of excessive growth culminating in speculative spells, particularly in Spain (Lourenço and Rodrigues, 2014).

#### **4.- Conclusions**

Both Iberian countries were latecomers in industrialisation and also in agricultural success. With a late start in the mid-nineteenth century in relation to the core European countries, due to both poor factor endowments and institutions, they advanced in terms of structural change during the interwar period and experienced post-1950 growth

miracles. Major changes took place when technological change and foreign markets were adapted to their factor endowments.

The main differences between both countries were the slow path of Portugal in relation to Spain, and the less intense Portuguese structural change, with agriculture having a lower and services a higher share of GDP and employment during the nineteenth century with the opposite being the case in the twentieth century. Within the industrial sector, light industries and industries less intensive in skilled labour and capital had a higher importance in Portugal than in Spain. Moreover late 20<sup>th</sup> century de-industrialisation also took place a decade later in Portugal than in Spain. Agriculture displayed a different trend, shifting from a specialisation in olive oil, wine and cork towards a higher importance of cattle and dairy products in Portugal and towards an integrated agri-food sector with a higher growth in Spain. The successful exporters in both countries were heavy industry, especially automobile, and food and beverages, and clothing and footwear also in Portugal; while banking and finance and tourism were the predominant services.

The main challenges for both countries, although more pressing in Portugal, are increasing human capital, research and development investments, and changes in regulations and institutions to upgrade to higher value-added in all sectors, but particularly in services where the role of the new IT-based communications technologies and human capital are decisive.

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**Table 1: Economic Growth, Structural Change and Labour productivity (%), Spain**

	<b>GDP</b>	<b>GDP/L</b>	<b>Internal productivity</b>	<b>Structural Change</b>
1850-2000	2.5	1.7	1.6	0.1
1850-1883	1.8	1.3	1.1	0.2
1920-1929	3.8	2.4	2.1	0.4
1958-1974	6.9	6	5.4	0.6
1974-1986	2.5	4	3.9	0.1
1986-2000	3.5	1.4	1.7	-0.3

**Note:** growth rate in percentages

**Source:** Prados de la Escosura (2007)

**Table 2: Structural Change and Labour productivity (%), Portugal**

	<b>GDP/L</b>	<b>Internal productivity</b>	<b>Structural change</b>	<b>Interaction Internal-Structural</b>
1862-1910	-0.2	0.2	-0.5	0.1
1910-1950	1.7	1.4	0.2	0.1
1950-1973	5.4	3.9	0.4	1.1
1973-1985	1.0	0.7	0.6	-0.3
1986-2002	2.2	2.0	0.5	-0.3
1910-1995	2.8	2.4	0.2	0.2

**Note:** growth rate in percentages

**Source:** 1862-1910: authors' calculations using data from Lains (1995), Nunes (2001) and Reis (2005); 1910-1995, 1910-1950, 1950-1973 and 1973-1985: Aguiar and Martins (2005); 1986-2002: Amaral (2010)

**Table 3: Share of each sector in GDP (%)**

	SPAIN					PORTUGAL		
	Agric.	Ind.	Cons.	Serv.		Agric.	Ind.	Serv.
1850-1880	41.9	18.1	3.0	39.3	1850-1880	39.6	15.8	42.3
1920-1929	26.8	28.0	3.7	41.5	1920-1930	31.0	26.9	42.2
1958-1974	16.7	30.8	5.3	47.2	1960-1973	17.0	39.1	43.8
1974-1986	7.7	28.2	7.2	56.9	1974-1986	11.9	39.6	48.5
1986-2000	4.9	24.2	8.0	62.9	1986-2000	7.5	35.5	57.0

Source: Spain: Prados de la Escosura (2003)

Portugal. 1850-1930: Lains (2006); 1960-1995: Pinheiro et al. (1997) spliced with AMECO for 1995-2000

**Table 4: Share of each sector in employment (%)**

	SPAIN					PORTUGAL		
	Agric.	Ind.	Cons.	Serv.		Agric.	Ind.	Serv.
1850-1883	63.6	13.2	3.7	19.5	1841-1878	66.5	16	17.4
1920-1929	50	20.3	4.6	25	1920-1930	60.9	21	18.2
1958-1974	32	23.1	8.1	36.8	1960-1973	33.7	32	34.3
1974-1986	18	24.7	8.5	48.8	1974-1986	20.2	36.1	43.6
1986-2000	9.3	20.8	9.5	60.4	1986-2000	13.2	34.5	52.3

Source: Spain: Prados de la Escosura (2003)

Portugal. 1850-1930: Lains (2006); 1960-1995: Pinheiro et al. (1997) spliced with AMECO for 1995-2000

**Table 5: Structure of agricultural output (%)**

<b>SPAIN</b>	<b>1891-5</b>	<b>1900-10</b>	<b>1931</b>	<b>1950-5</b>	<b>1971-5</b>	<b>1981-5</b>	<b>1991-5</b>
Cereals & pulses	45.2	44.25	34.2	24	20.5	16.1	13
Wine	12.2	8.85	6	14.5	5.3	4.3	5.8
Olive oil	5.5	5	5.7	10.1	3.4	6.3	6
Fruits and vegetables	7.6	9.1	13.9	11.4	23.4	22.3	29.9
Roots and Potatoes	6	7.05	11	17	5	5.5	3
<b>Crops</b>	<b>79.7</b>	<b>79</b>	<b>76.2</b>	<b>80.5</b>	<b>65.6</b>	<b>63.5</b>	<b>64.6</b>
Meat	9.8	9.65	11.4	5.8	17.7	22.9	22.7
Dairy	5.1	5.4	6.9	8.3	12.2	9.2	9.4
Wool	0.9	0.8	0.6	1.2	0.2	0.1	0
<b>Animal products</b>	<b>20.3</b>	<b>21</b>	<b>23.8</b>	<b>19.4</b>	<b>34.4</b>	<b>36.5</b>	<b>35.4</b>
<b>Total Agriculture</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

<b>PORTUGAL</b>	<b>1861-70</b>	<b>1900-9</b>	<b>1935-9</b>	<b>1954-8</b>	<b>1970-3</b>
Cereals & pulses	34.7	32.1	32.6	29.8	19.5
Wine	22.0	24.2	14.0	13.9	12.7
Olive oil	5.9	8.4	8.2	7.2	4.6
Fruits and vegetables	7.9	6.7	6.7	13.9	16.5
Roots and Potatoes	4.5	4.7	9.4	8.8	9.0
<b>Crops</b>	<b>75.0</b>	<b>76.0</b>	<b>71.0</b>	<b>73.6</b>	<b>62.3</b>
Meat	15.4	16.8	19.4	25.5	22.2
Dairy	7.6	5.8	8.1	11.1	8.9
Wool	2.2	0.8	1.6	2.5	6.6
<b>Animal products</b>	<b>25.0</b>	<b>24.0</b>	<b>29.0</b>	<b>26.4</b>	<b>37.7</b>
<b>Total Agriculture</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Lains (2009), Clar and Pinilla (2009)

**Table 6: Agricultural annual growth rates of outputs, inputs and TFP between 1950 and 2005**

<b>1950-2005</b>	Output	Labour	Land	Capital	TFP
Portugal	0.9	-1.73	-1.09	2.24	1.34
Spain	2.34	-2.52	-0.2	3.64	2.37
<b>Europe</b>	<b>1.26</b>	<b>-2.76</b>	<b>-0.31</b>	<b>2.18</b>	<b>1.8</b>
<b>1950-1985</b>	Output	Labour	Land	Capital	TFP
Portugal	0.87	-1.2	-0.33	3.38	0.54
Spain	2.92	-2.2	0.09	5	2.36
<b>Europe</b>	<b>2.07</b>	<b>-2.41</b>	<b>-0.2</b>	<b>3.92</b>	<b>1.98</b>
<b>1985-2005</b>	Output	Labour	Land	Capital	TFP
Portugal	0.96	-2.64	-2.41	0.3	2.73
Spain	1.33	-3.08	-0.69	1.33	2.36
<b>Europe</b>	<b>-0.15</b>	<b>-3.37</b>	<b>-0.5</b>	<b>-0.77</b>	<b>1.48</b>

Source: Martín-Retortillo and Pinilla (2015).

**Table 7: Share of Manufacturing Valued Added (%)**

	<b>Spain</b>	<b>1856</b>	<b>1900</b>	<b>1913</b>	<b>1929</b>	<b>1958</b>	<b>1980</b>	<b>2000</b>
1	Food, beverages and tobacco	55.8	40.3	38.4	29.6	17.0	14.9	14.0
2	Textiles, clothing and footwear	27.4	29.6	28.9	21.4	21.2	12.0	7.2
3	Wood, cork and furniture	1.2	3.2	7.6	11.3	7.1	6.6	5.5
4	Paper printing and graphic arts	2.3	5.0	2.2	1.7	4.4	6.5	8.8
5	Chemical industry	3.5	5.6	2.5	4.3	10.2	10.6	14.5
6	Stone, clay, glass and cement	5.3	4.0	0.7	4.4	4.4	9.4	8.6
7	Basic Metallurgic			6	6.6	6.2	15.1	14.4
8	Metal transformation	3.2*	8.1*	6.3	12.7	17.3	16.3	15.3
9	Transport equipment			5	6.6	7.6	7.7	10.6
10	Diverse industry	1.1	4.1	2.4	1.4	4.6	0.9	1.1
	<u>Total Manufacturing</u>	100	100	100	100	100	100	100

	<b>Portugal</b>	<b>1845</b>	<b>1896</b>	<b>1910</b>	<b>1929</b>	<b>1960</b>	<b>1980</b>	<b>2000</b>
1	Food, beverages and tobacco	10	24	21	25	17	16	20
2	Textiles, clothing and footwear	58	45	44	36	20	22	25
3	Wood, cork and furniture	1	10	18	10	11	10	5
4	Paper printing and graphic arts	10	3	3	4	5	7	8
5	Chemical industry	-	-	11	14	20	10	10
6	Stone, clay, glass and cement	-	-	1	2	7	9	10
7	Basic Metallurgic	-	-	1	1	1	3	2
8	Metal transformation and Transport equipment	7*	6*	2	5	12	20	17
9	Diverse industry	-	-	1	1	1	1	1

\*Basic Metals, Metal Transformation and Transport Equipment together

**Source:** Spain. Nadal, J. Benaül, J.M. and Sudrià, C. (2003) for 1856 and 1900 from corporate income taxes (Basque country and Navarra are not included); Prados de la Escosura (2003) and own calculation from Nadal et al. (2003) for 1913, 1929 and 1958; for 1980 and 2000 from *INE, Encuesta industrial*. Portugal. 1845 and 1896: Pedreira (2013): based on employment shares; 1910-2000: Aguiar and Martins (2005)

**Table 8: Share of Service sector Value Added (%)**

<b>Spain</b>	<b>1913</b>	<b>1929</b>	<b>1958</b>	<b>1980</b>	<b>2003</b>
Transports and Communications	18.2	23.3	16	11.9	13.7
Wholesale and Retail Trade	31.7	29.6	27.9	22.3	16.9
Banking and Assurances	2.3	4.6	8.6	9.9	7.5
Real states	7.7	6.9	7.6	12.2	11.1
Public Administration	13.8	12.1	12.6	7.8	9.4
Education	2.6	2.4	2.9	6.2	7.1
Health	0.5	0.8	2.4	6.9	8.3
Hotel and restaurant	10.6	7	5.6	11.4	10.1
Housekeeping	3	3	4.2	5.9	6.3
Other services (liberal professions)	9.5	10.2	12.2	5.5	9.5
	100	100	100	100	100

<b>Portugal</b>	<b>1910</b>	<b>1929</b>	<b>1958</b>	<b>1980</b>	<b>1995</b>
Transports and Communications	7.5	9.1	9.6	10.9	10.8
Wholesale and Retail Trade	29.2	26.0	34.6	33.6	22.7
Banking and Insurance	1.4	1.7	5.4	9.4	9.3
Real Estate	20.2	14.4	21.8	9.6	12.3
Public Administration*	12.0	20.7	13.5	22.5	24.8
Hotel and restaurant	-	-	1.8	4.1	6.7
Other services	30.6	28.6	13.3	9.9	13.4
	100	100	100	100	100

\*Includes Education and Health

**Source:** Spain. Prados de la Escosura (2003) for 1913, 1929, 1958 and Gordo, E., Jareño, J. and Urtasún, A. (2006) for 1980 and 2003. Portugal. Batista *et al.* (1997) for 1910, 1929 and 1958 and Pinheiro *et al.* (1997) for 1980 and 1995.