The evolution of wage inequality in Spain and Portugal over the twentieth century

Jordi Guilera

University of Barcelona (UB)

Instituto de Ciencias Sociais (ICS)

Xarxa de Reecerca en Economia i Polítiques Públiques (XREEP)

jordiguilerarafecas@yahoo.es

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1.- Introduction

Wage inequality is today one of the main issues of debate both academically and politically. The interest on this issue comprises two different aspects: first, how large is wage inequality and how is it evolving, and second, which are the causes that may explain its evolution.

Regarding the first aspect, whereas the accuracy of statistical information for present economies allows having a relatively good knowledge of the situation based on solid and robust data, this is far from being true in historical terms. The first contribution of this paper is, therefore, the estimation of long term series on wage inequality from the First World War onwards for two peripheral European countries: Portugal and Spain. After reaching a good knowledge on what was going on, it will be possible to move to the other debate: which were the forces that had an influence on the evolution of wage inequality? A historical assessment of this kind will be highly valuable to understand not only what was happening in the past but also some current events. It will allow seeing if we are facing new problems or not, if the policies followed in the past worked properly and if they could also be implemented today. And it will highlight the importance of the context, since the effects of globalization may have been different in the twenties, the sixties and today, because the participants in the world economy have changed and also because the relative situation of each country in the world economy may also have changed throughout time. The same applies to technological change, investment in human capital, labour market regulations, etc.

More concretely, this paper focuses on the influence of labour demand and supply on wage inequality trends. In this regard, two channels may be defined through which those forces have an impact on wage inequality: the inter-sectoral and the intra-sectoral one. The former would affect wage inequality through the emergence and decadence of different economic sectors, whereas the latter would impact inequality

through changes in the relative wage of skilled labour. Although these two channels are highly related, because they may be affected by the same variables, the argumentation of this paper will follow this conceptualization that will provide key clues to better characterize the process.

This paper focuses on the cases of Spain and Portugal. It is not the first attempt to measure the evolution of wage inequality in those countries, but it is the most systematic and robust and covers the longest period so far. In the case of Portugal, Pereirinha (1988) measured wage inequality in the industrial sector between 1953 and 1980, and Lains, Gomes and Guilera (2008) studied the period from 1944 to 1974. Both studies found evidence of an inverted U-curve. Finally, Jimeno et al (2000) have studied the period 1985-95, finding an increase of wage inequality. In the case of Spain, Rosés and Sanchez-Alonso (2004), Vilar (2004), Vilar (2004b), Betrán and Pons (2004) and Prados de la Escosura (2008) are the most relevant studies. According to them, wage inequality decreased during and after the First World War, increased during the twenties and fell again in the thirties. After the Spanish Civil War, wage inequality fell rapidly to increase again from the mid-fifties or early sixties to the early seventies. From then to the mid nineties, it fell again, increasing thereafter until the end of the century.

The novelty of this paper is that it estimates wage inequality with a database containing wages for different skill levels and also different economic sectors. Most previous studies were built upon the between-sector inequality or the within inequality (skills differentials). This new approach will allow having a deeper understanding of the sources of wage inequality as well as which of them were pre-eminent in each historical context and also which of them were driving the evolution of global wage inequality.

The paper is structured as follows: the next section offers the theoretical framework on the topic. Section three briefly reviews the economic and political background of the Iberian countries throughout the twentieth century. Section four presents the new database constructed and the inequality indices estimated. Section five reports the main findings. Finally, the last section concludes.

2.-Theory

Wage inequality may be driven by a number of different factors acting through different channels. In order to clarify the exposition two different channels may be defined through which the different variables may affect wage inequality.

The first channel refers to the emergence and decline of the different sectors of activity throughout the process of economic growth. This approach is closely related with the Kuznets tale of the inverted-U curve,[2] throughout the transition from an agricultural economy to an industry and services oriented one. But, instead of being restrained to this particular historical process, the interpretation hold in this paper defends that this inter-sectoral forces may affect wage inequality in any historical context, if there are changes either in the average wages of each economic sector (due to different productivity variations) or in the labour force allocation. By contrast, the second channel deals with wage disparities due to skill differentials among the labour force.

The main forces behind the structural change (the inter-sectoral channel) are technology, changes in consumption patterns (Engel law), trade and public intervention. The role of technological change is ambiguous. On the one hand, it may be labour saving tending to remove labour force from the production process and to increase the capital labour ratio and labour productivity. On the other hand, it may allow the appearance, emergence and growth of new sectors. Therefore, technical change may provoke changes in the sectoral distribution of the labour force and also on its wages, thanks to productivity gains. The Engel law tends to diminish demand for "basic goods" as income rises, and that has a direct impact on the productive structure of the economy. Trade would increase the demand for goods of sectors with comparative advantage and, thus, would also have an incidence on the productive structure. Besides, public policies may also affect the sectoral composition of the economy if its goal consists in promoting certain strategic sectors, or in trying to dismantle the old fashioned ones.[3]

The other channel through which different factors may impact wage inequality lies in the wage gap due to skill differences, the skill premium. This source of inequality is attracting most of the scholars' attention in recent studies on this issue. According to this literature, the relative wage of skilled labour depends on the interaction between the relative supply and demand for skilled labour. The relative supply of skilled labour is a function of the investment in human capital, the natural growth of population and migrations (taking into account its skill composition). On the other hand, the relative demand for skilled labour would depend on consumption patterns, trade and technology.

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[2] Kuznets (1955)
[3] Galbraith and Kum (2005) have constructed a world-wide database on wage inequality based on the between-sector inequality approach from the sixties onwards.

Wage inequality, then, would increase if the relative demand for skilled labour increases faster than its relative supply and vice versa.

Whereas most of the factors mentioned above are measurable, the role of technology remains as a black box. If technology in most cases seems to be complementary to skilled labour, it is not always the case, nor today neither in the past.

Acemoglu (2002) defends that technological change is the main variable that drives the evolution of wage inequality,[4] and gives the other variables a secondary role. Technological change could be defined as an exogenous or an endogenous variable. As an exogenous variable, it is thought as a permanent process of skilled-biased technical innovations that implies a permanent increase in the relative demand for skilled labour.[5] According to this hypothesis, the evolution of the skill premium would be determined by changes in the relative supply of skilled labour.[6] On the other hand, technological change could also be defined as an endogenous variable. In this case, technological change would be sensitive to the evolution of the relative supply of skilled labour, in the sense that an increase in the relative supply of skilled labour would be an incentive to skilled-biased technological change, in order to use more intensively the most abundant and therefore, cheapest resource.

In spite of that, the empirical evidence of the last decade makes an alternative explanation necessary. Lemieux (2008) considers that, given that the skill-biased technological change is a global hypothesis, it should have similar effects on all developed countries. However, this is not the case, because whereas in some countries, such as the US or the UK, the relative wage of skilled workers has boomed over the last thirty years, it has remained more or less stable in continental Europe. Another inconsistence of this theory is that it is not capable to explain the enormous increases of top wage shares in some countries. The skilled-biased technological change story should impact wages of skilled workers and not only wages of the richest decile of the distribution.

Autor, Katz and Kearney (2006) have improved the traditional distinction between skilled and unskilled workers, by distinguishing among three different groups: skilled workers, skilled workers in routine tasks and unskilled workers in non-routine

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[4] See also Juhn, Murphy and Pierce (1993) and Levy and Murnane (1992)

[5] This increase is sometimes modelled as a steady-demand process and, some other times, under an accelerating hypothesis, if it is thought that technical change is increasingly more skilled-biased as times goes by.

[6] Card and Lemieux (2001) and Katz, Kevin and Murphy (1992)

tasks. According to this classification, skilled-biased technological change would have a positive impact on the wages of the first group but not on the second one. And this could help to explain why workers at the top have been doing well, whereas those in the middle of the distribution have been loosing ground and converging with unskilled workers, in a scenario of increasing polarization. However, this model is still unable to explain the differences between similar countries.

In order to explain these differences, it is also necessary to consider institutional explanations. Following Piketty and Saez (2006) top wage shares increases may be attributable basically to several non-economic factors: the invention of new remuneration tools such as pay per performance systems that generate more dispersion; the increasing power of the executives to fix their own wages; and changes in the prevailing social norms that have allowed sharp increases in the top wages previously unthinkable.

Finally, Lemieux (2008) highlights the relevance of labour market characteristics to understand the recent evolution of wage inequality due to skill differentials in the US. According to his study, the minimum wages have a clear impact on the lower tail of the wage distribution, as well as the decrease of the rate of unionization widened the P90/P50 gap and narrowed the P50/P10 gap.[7]

In summary, these are some of the variables that may drive wage inequality. Its final impact would depend on their interaction and the particular historical context. In this sense, the Iberian countries have gone through severe different conditions throughout the twentieth century. Economic growth, democracy, economic liberalization, trade policy, investment in human capital, migrations, etc. that may have affected wage inequality, have dramatically changed along this period. The main objective of this paper is trying to discern which of them have been really relevant and through which channel they have exerted their influence.

3.- Background

During the twentieth century, Spain and Portugal have suffered significant variations in different factors closely related with the evolution of wage inequality. In this section there will be reviewed the main events occurred in order to provide a

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[7] See also, Card (1992), Freeman (1993) and DiNardo, Fortin and Lemieux (1996). It has to be mention that Autor, Katz and Kearney (2005) limit the influence of the erosion of minimum wage to the eighties.

historical context to be able to analyse wage inequality trends that are presented in the next section.

Last century was characterized in both countries by being quite convulsive in political terms. The First World War was a destabilizing event. The years that followed this conflict in both countries were characterized by financial problems, social unrest and political instability. These disorders were "solved" with an authoritarian response. In Portugal the Republican period finished in 1926 after a military coup that instituted a dictatorship that would remain in power until 1974. In Spain, the twenties were ruled by a dictatorship that would give turn in the thirties to the first fully democratic period of the Spanish history, the Second Republic, which would only prevail for 5 years. After the Spanish Civil War (1936-39), a new dictatorship ruled by General Franco started, which would remain in power until 1975. In spite of that, the events that preceded the establishment of both dictatorships were hugely different. Whereas in Portugal the authoritarian period arrived "softly" and without great economic, productive or human losses, in Spain it was preceded by a bloody conflict that left thousand of casualties and a completely impoverished country. Something similar happened with the intensity of the repression of those regimes that was more intense in the Spanish case.

In 1974-75, democracy replaced dictatorship in Portugal and Spain, but the process followed by each country was completely different. Whereas in Spain, the Francoist political elites led a slow (although not peaceful) transition to democracy, in Portugal there was a revolutionary process after a military coup that meant a total discontinuity with the previous regime. In 1986, both countries joined the EEC, and from then on, they have converged in political and institutional terms with the rest of the EU countries.

The economic performance of both countries has followed a similar pattern. Table 1 shows the growth rates of Portugal and Spain compared with the core-european countries. Between 1913 and 1950, Portugal's income p.c. growth rates were around 1.4%, being higher during the forties. Spain's behaviour, excluding the Civil War period, was similar to its neighbour. However, the Civil War involved a severe economic contraction. In fact, economic growth during the forties was highly disappointing, because the low departing point should have allowed a faster economic growth. As a consequence, during the first half of the century, only Portugal converged with the core-european countries. By contrast, during the golden age of capitalism, both countries grew at a very high pace, rapidly converging with the European core. From

the transition to democracy to the entrance into the EEC, economic growth became sluggish. Finally, from 1986 to the end of the century, economic growth accelerated (especially in Portugal) and both countries converged again with the EU core.

This growth process provoked severe sectoral changes. As may be seen in Tables 2 and 3, the structure of the active population was completely altered, and both countries, which were agricultural economies at the beginning of the century, gradually became industry and services oriented ones at the end of the century. This process started in Spain after WWI but was interrupted and even reversed during the post-Civil War period and, as a consequence, it was only since the fifties that the process of structural change really advanced in Iberia.

Another phenomenon that should be mentioned, given its relation with the evolution of wage inequality is internal and external migration. Internal migrations accelerated in the periods of rapid economic growth and industrialization, i.e. the interwar period in Spain and the golden age of capitalism in both countries, granting an elastic supply of unskilled labour. On the other hand, emigration abroad was quite intensive during the sixties in both countries. Later on, in Portugal, the decolonization of the late sixties and early seventies had a high impact on immigration rates. Finally, Spain and Portugal at the end of the twentieth century, which had traditionally been emigration countries, became destination for migration inflows.

The intensity of the integration in international trade also varied widely. As it may be seen in Figure 1, trade openness decreased from the WWI to the thirties (in Portugal) or the forties (in Spain) to increase continuously afterwards. As should be expected from a smaller country, trade openness in Portugal was always higher than in Spain.

4.- Data and methodology

The sources and the methodology used to build up the wage database that provides this paper are described in Appendix 1. The final database has the following characteristics. All workers are classified into different economic sectors and, within each economic sector, most of them, in different skill categories. However, for the agricultural sector of both countries there is only one skill group. Average wages for the Portuguese' services sectors began in 1950, and from 1985 onwards they are also classified into different skill categories. In the case of Spain, wage data for services sectors for different skill groups is available from 1963 on. The database contains

information on quantities and prices, that is to say, wages and number of workers for each group.

With this information a Theil index has been calculated. This index has been chosen, instead of other better known indices (Gini) because it offers some advantages such as its potential to be decomposed. As has been said above, this paper will try to discern which has been the main channel (between or within sector) that has driven wage inequality. The Theil (0) index (mean logarithmic deviation) can be defined as:[8]

$$T_0 = \frac{1}{n} \cdot \sum_i \cdot \ln\left(\frac{\mu}{y_i}\right)$$

where n is the number of individuals of the sample, μ the average wage, and y_i the individual wage.

The Theil index can be decomposed as:

$$T_0 = \sum_k \frac{n_k}{n} \cdot T_0^{\ k} + \sum_k \frac{n_k}{n} \cdot \ln\left(\frac{\mu}{\mu_k}\right)$$

where n_k is the number of individuals in sector k and μ_k the average wage of sector k. The first term of the equation is a measure of inequality within each sector and the second term measures inequality between sectors.

Besides, the Theil index can be further decomposed, to see if the changes in the between and within coefficients are due to changes in prices or quantities, with the following expression:[9]

$$\Delta T_0 = \sum_k \left(\overline{\frac{n_k}{n}}\right) \cdot \Delta T_0^{\ k} + \sum_k \overline{T_0}^{\ k} \cdot \Delta \frac{n_k}{n} + \sum_k \left(\overline{\left(\frac{\mu_k}{\mu}\right) \cdot \left(\ln \frac{\mu_k}{\mu}\right)}\right) \cdot \Delta \frac{n_k}{n} + \sum_k \left(\overline{\left(\frac{n_k \cdot \mu_k}{n \cdot \mu}\right)} - \overline{\left(\frac{n_k}{n}\right)}\right) \cdot \Delta \ln\left(\frac{\mu_k}{\mu}\right)$$

where

$$\overline{T_0}^{\ k} = \frac{1}{2} \cdot \left(T_0^{\ k}(t) + T_0^{\ k}(t+1)\right)$$

The first term of the equation represents the impact of changes in the within subgroup inequality on total inequality change; the second and third terms indicate the effect of changes in the population shares on the within and between components, respectively;

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[8] Theil (1) index has also been calculated with similar results. More detailed information on those indices can be found in Mookherjee and Shorrocks (1988)

[9] The original decomposition proposed by Mookherjee and Shorrocks (1988) has been modified in order to improve its potential. More concretely, in the original decomposition, the fourth term contains the ln(μ) and not ln(μ_k/μ). The global result does not change, but using the relative wage of each sector instead of the absolute wage, allows knowing the exact contribution of each sector to the yearly change in inequality of the fourth component.

and the last term is the contribution to total inequality change of changes in the relative wage of each sector (i.e. sectoral wage/average wage).

The main shortcomings of the new series are related with the scarcity of data. Firstly, the low quality of the available figures for the last fifth of the century in Spain may have had the effect of an underestimation of the within inequality.[10] Secondly, the number of sectors and the skill groups reported varied across time, and this implies a number of discontinuities in the series that have been solved by linking them to minimize those distortions.[11]

The main contribution of this estimation is that information has been collected and aggregated with the objective of computing and discerning how much of the inequality came from inter-sectoral differences and how much was due to skills differentials. Actually, the new series are the first of these characteristics that cover the whole twentieth century in the Iberian countries.[12] In the case of Spain, Prados de la Escosura (2008) is the most consistent previous attempt to measure wage inequality during the twentieth century. However, he fails to capture within group inequality.[13] This may be seen in Figure 2, which compares the Prados de la Escosura's Gini index of wage inequality with our series. As it may be seen, his series and the between component of our Theil index follow exactly the same trend (except for 1981-83 and 1995-2000). It has to be mentioned that given that the within Theil component is flat during most of the period studied, the main discrepancies between the two indices arise from the early sixties to the early eighties, when the within coefficient has an important role explaining the evolution of the global Theil. This provides more robustness to both estimations[14] and reveals the added value of this estimation incorporating the within inequality component.

The second contribution of this estimation regards the period 1914-30 in Spain. Although the *Estadísticas de salarios y jornadas de trabajo* (ESJT), which are the main source of information for the period, have been extensively used by economic historians, they have always limited their analysis to the aggregate figures (average

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[10] Since 1995 the Encuesta de Estructura Salarial (EES) is published and within inequality computed from this source is substantially higher than the reported in our series: within inequality estimated from the EES is 0.182 whereas with our source is only 0.015

[11] More concretely, 1930-36, 1936-43, 1962-63, 1975-77 and 1982-83 for Spain and 1949-50, 1984-85 and   for Portugal. See Appendix 1 for details.

[12] Lains, Gomes and Guilera (2008) provided the same kind of estimation for the period (1944-74)

[13] This is due to the fact that he uses average wages for each sector without computing the differences between skill and unskilled workers' wages.

[14] That have been estimated with a similar methodology but with different sources in some periods

wages and numbers of workers) of each province.[15] However, this source also provides the number of workers of each qualification for different sectors in every province. When this amount of information is aggregated at the provincial level, it turns out that the provincial figures provided by the source are erroneous, and therefore the national figures provided by the source are also wrong. These mistakes have relevant implications for the analysis of the distributive patterns during this period. More concretely, the common view that indicates an increase in the skill premium among industrial workers during the twenties (especially in the second half of the decade) does no longer hold. On the contrary, the new series show that the skill premium declined.[16]

5.- Facts

Figures 3 and 4 show the evolution of wage inequality in Portugal and Spain through the twentieth century. At first sight, it seems that both countries followed a completely different pattern, but they share some important similarities that will be analysed below. In Portugal, wage inequality fell till 1927, and then increased in two steps until 1959: between the late twenties early thirties and during the fifties,[17] to decline severely until 1981. Finally, during the last 25 years, there has been a slow increase of wage inequality. Looking at the two components of the Theil index, two different patterns emerge. The between coefficient increased with the same timing than the global Theil from 1927 to 1959 and it declined continuously afterwards.[18] On the other hand, the within coefficient remained relatively stable between 1944 and 1959, and it followed thereafter a bell shape till the late seventies, with a peak of maximum inequality in 1968. The early eighties saw no variation, and from the late eighties onwards the within coefficient has increased steadily. Looking at the global picture, it could be said that, whereas the between coefficient was driving wage inequality till the eighties, it was the within component which drove it from the eighties onwards.

In Spain, wage inequality declined slightly after WWI, and it increased from the twenties to the Civil War. After the conflict, it declined during the forties to remain

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[15] See Betrán and Pons (2004), Rosés and Sánchez-Alonso (2004), Vilar (2004), Prados de la Escosura and Rosés (2007) and Prados de la Escosura (2008).

[16] This is the case when the wages are weighted according to census figures. When the number of workers from ESJT is used, the skill premium increases slightly, although much less than was assumed in previous research.

[17] It has to be mentioned that there is no data available between 1934 and 1944.

[18] It must be mentioned that until 1934 there is only information on average wages (without skill disaggregation), and therefore, inequality during this period may be interpreted as between inequality.

stable or decrease slightly in the fifties. Later on, it increased again during the sixties to remain relatively stable afterwards. The between coefficient followed the same pattern than global wage inequality till the early sixties and then it had two bell shapes cycles which peaked in the early seventies and the early eighties. On the other hand, the within coefficient remained relatively stable until the early sixties, and from then on, it increased steeply during a decade, to decline afterwards till the early eighties. Finally, from the mid eighties onwards it increased smoothly. It must be highlighted that the smooth decrease of the within coefficient during the twenties is at odds with the current state of the art that defends a sharp increase of the skill premium during this decade.[19]

Looking at the two countries, it can be seen that the evolution of the within coefficient is very similar: a long stability till the late fifties, an inverted-U curve of twenty years peaking at the top on the late sixties-early seventies, and a twenty-years increase from then onwards. All this tends to suggest common causes driving within wage inequality. The long stability of the first half of the century may be related with the tough economic control exerted by both dictatorships. For the pre-Civil War period in Spain, it could be due to a process of endogenous unskilled-biased technological change that could counterbalance the effects of an increasing supply of unskilled labour from the rural areas toward cities, given that the supply of skilled labour remained fairly stable[20] and globalization variables may have had a poor impact. Labour union activity could also help to explain the decline of within inequality during the early twenties and the thirties. The increase of the within component during the sixties may be related to the liberalisation reforms introduced by both regimes, in order to achieve higher rates of growth, whereas its subsequent decline could be related with the expansion of trade, migrations or even the political factors related to the transition to democracy in Spain. Finally, the increase of the relative wage of skilled labour of the last fifth of the twentieth century may be related with globalization forces (growing inflows of unskilled immigrants and the increasing competition of unskilled Iberian workers with low-wage workers' countries), and also with domestic institutional factors, such as the erosion of the minimum wage (in real prices) in Spain during the last two decades of the twentieth century. However, these are only preliminary impressions that will be thoroughly analysed in future research.

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[19] See particularly, Vilar (2004), Betrán and Pons (2004) and Rosés and Sánchez-Alonso (2004)
[20] See Nuñez (2005)

On the other hand, the between coefficient follow completely different trajectories in both countries. It seems that the Spanish Civil War shock affected severely the evolution of this coefficient in Spain. Besides, the steady decline of between sectors inequality in Portugal during the second half of the century coincides with several oscillations of this component in Spain. The second one, during the early eighties, may be related with the deep program of industrial restructuring that altered significantly the industrial structure.

Tables 4 and 5 provide an excellent guide to understand the nature of the evolution of the within and between coefficients. As has been said above, the yearly changes in the within and between coefficients can be decomposed into four components. The first calculates the impact of the changes of the within coefficient considering that the sectoral labour shares remains constant. The second, the impact of changes of labour shares considering that within inequality of each sector remained constant. The third, estimates the same effect but for the between coefficient. Finally, the fourth term estimates the change in inequality due to changes in the relative wage of each sector considering sectoral labour shares stable.

The first fact that should be highlighted is that the second component increased throughout the century. This would mean that economic growth in Iberia may have been characterised by the increasing size of the most unequal sectors against the most egalitarian ones. One of the factors that may have had a relevant impact on this component is the continuous transition of labour force from agriculture (totally egalitarian per construction) toward the other sectors. This was the case until the mid seventies (in Spain) or the mid eighties (in Portugal). For the following years the labour transition from industry towards the service sectors was the main cause behind the increase of the second component in Portugal. However, in Spain similar movements of labour provoked the opposite effect and from the mid eighties onwards, this component became negative (although of a low magnitude). It would be challenging to understand these divergent trajectories; however they could also be due to the bad quality of the Spanish data from the eighties onwards.

Although the second component had a larger impact than the first one in the long term, the magnitude of the first component was always greater and therefore it was the main factor behind the short term oscillations. Here it may be stated that whereas the second component may have been driven by structural change, the role of trade and consumption patterns, through the demand of goods or services, the first one may have

been sensitive to the relative demand/supply for skilled labour, technological change and labour market institutions, and these would be the variables capable to explain both the oscillation of the within component from the sixties to the eighties and also the last twenty years increase.

Moving forward, the evolution of the third component is quite similar in both countries, increasing till the early fifties (Spain) or mid seventies (Portugal) and declining afterwards. Here it should be stressed that the evolution of the second and the third components is perfectly consistent with the Kuznets hypothesis, according to which, during the transition from an agricultural economy toward an industrialized one (1) labour moves from egalitarian toward unequal sectors (long term increase of the second component) and (2) that this labour transition is likely to increase inequality during the first stages and reduce it later on, what is consistent with the evolution of the third component.

The evolution of the third component in Portugal until the mid eighties is totally due to the expulsion of labour from agriculture. When the vast majority of the labour force is in agriculture, the agricultural wage is the closest to the national average and its decreasing size imply an increase of inequality until a certain point, when the smaller sector size moves the agricultural wage far below the average, and the decreasing size of this sector imply a decrease of inequality. By contrast, from the mid eighties onwards, the decline of the third component is due to the increasing size of the sectors with average wages closer to the national average, namely construction, wholesale and retail trade and other services.

In Spain, the story is quite similar, since the agricultural sector size drives the third component until the nineties. It must also be mentioned that, during the eighties, the decreasing size of manufacturing (that had one of the lowest relative wages) and chemicals and non metallic minerals (with one of the highest relative wages) are also relevant factors behind the trend.

Finally, the evolution of the fourth component is totally different in both countries. Whereas in Portugal it increased until the late fifties to decline afterwards, in Spain it decreased till the late fifties to increase afterwards. In Portugal, this component declined at the beginning in 1921-27, due to the convergence to the mean of agricultural and transport and communication relative wages. During 1927-59 it increased because of the relative wage divergence of the sectors mentioned before and trade, although the main effect was associated to agriculture. Finally, from 1959 to 2005 the convergence

of the wages of Banks, insurance and real estate (overall), transports and communications and other services explains almost all the declining inequality.

In the Spanish case, the increase of the fourth component during the twenties was due to the divergence of agricultural wages. What is more striking is the great compression of wages of the post Civil War period (1936-61) when the wages of all sectors converged rapidly to the national mean. Finally, from the sixties onwards, the increase of the fourth component was mainly due to the divergence of agricultural wages, and from the eighties, also to the divergence of gas, transports and metallic products average wages.

6.- Concluding remarks

At this stage of research, this is mainly a descriptive paper on the evolution of wage inequality in Iberia. A new database on wages has been constructed and this has allowed the estimation of new measures of wage inequality. These measures are partially consistent with previous results, but they also provide new outcomes against the current established facts. What is, perhaps, more innovative is the consideration of both inter and intra-sectoral inequality in the indexes presented. This is a key aspect to better characterize the evolution and the typology of wage inequality, and it will also be important in the next future to discern which have been the main forces that have driven wage inequality throughout the twentieth century in Iberia.

Tables

Table 1 - Growth of real income per capita			
	Portugal	Spain	European core
1913-29	1,35	1,65	1,39
1929-38	1,28	-3,53	1,16
1938-50	1,56	1,48	1
1950-73	5,47	5,63	3,55
1973-86	1,52	1,31	2,01
1986-98	3,45	2,65	1,88
1913-98	2,79	2,2	2,06
Source: Lains (2003), p.373			

Table 2 - Labour shares by sectors in Spain			
	Agriculture (%)	Industry (%)	Services (%)
1900	66,3	16	17,7
1910	66	15,8	18,2
1920	57,2	22	20,8
1930	45,5	26,5	28
1940	50,5	22,2	27,3
1950	47,6	26,5	25,9
1960	38,4	31,7	29,8
1970	23,1	38,9	37,9
1981	14,1	37,8	48,0
1991	8	36,8	55,2
2001	4,7	30,7	64,6
Source: Nicolau (2005)			

Table 3 - Labour shares by sectors in Portugal			
	Agriculture (%)	Industry (%)	Services (%)
1900	62,2	18,7	19,1
1910	57,8	21,6	20,5
1920	56,0	20,5	23,4
1930	54,4	19,0	26,6
1940	52,6	21,1	26,3
1950	49,1	24,5	26,4
1960	43,5	28,9	27,5
1970	32,7	33,4	33,9
1981	19,2	38,9	41,9
1991	10,8	37,9	51,3
2001	5,0	35,1	59,9
Sources: Valério (ed.) (2001) for 1900-1991 and INE online statistics for 2001			

Table 4 - Sources of wage inequality change in Spain (x1000)					
	Within group inequality	Population shares within	Population shares between	Change mean incomes between	Total
1914-1920	-0,54	1,47	7,12	-9,51	-1,46
1920-1930	-2,63	1,34	4,04	6,26	9,02
1936-1949	-1,77	0,45	4,30	-51,11	-48,14
1949-1959	-2,02	2,02	-0,21	-2,51	-2,72
1959-1972	9,97	6,10	-6,27	25,82	35,62
1972-1978	-7,61	3,47	-4,16	4,29	-4,02
1978-1985	-4,56	-0,32	5,22	7,22	7,56
1985-2000	6,09	-0,37	-18,65	10,45	-2,48
1914-2000	-3,08	14,15	-8,60	-9,11	-6,64
Source: See Appendix 1					

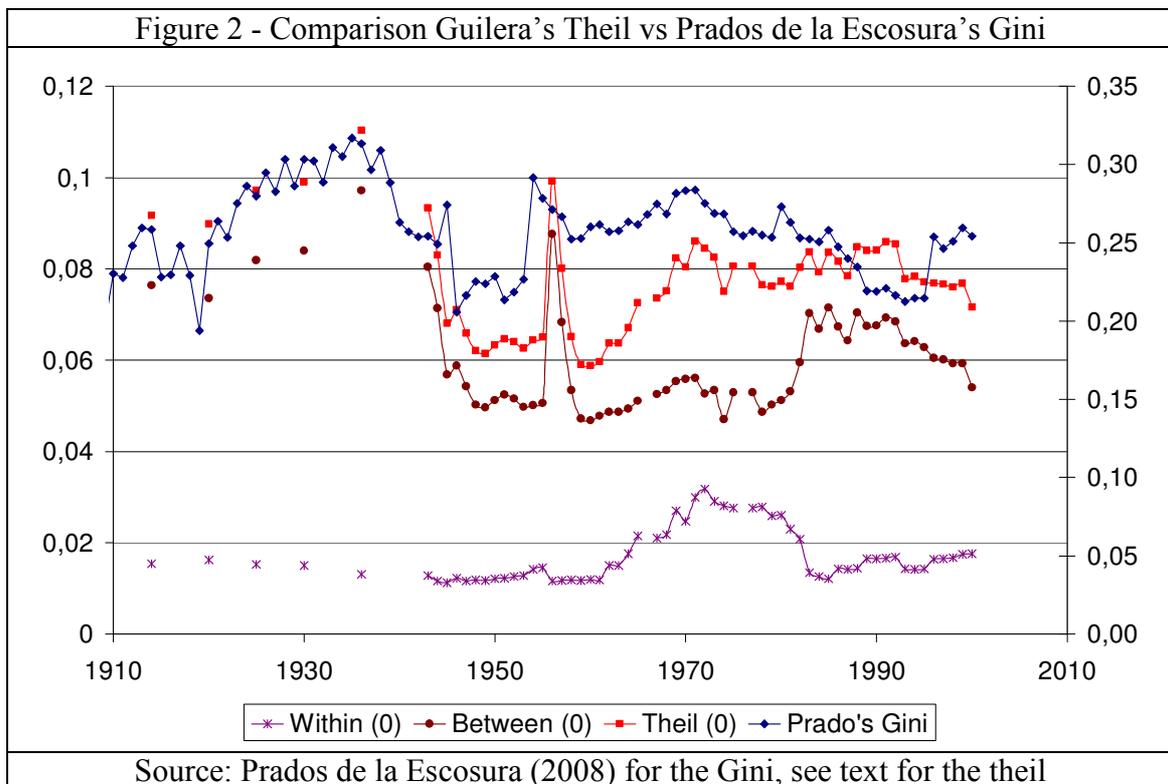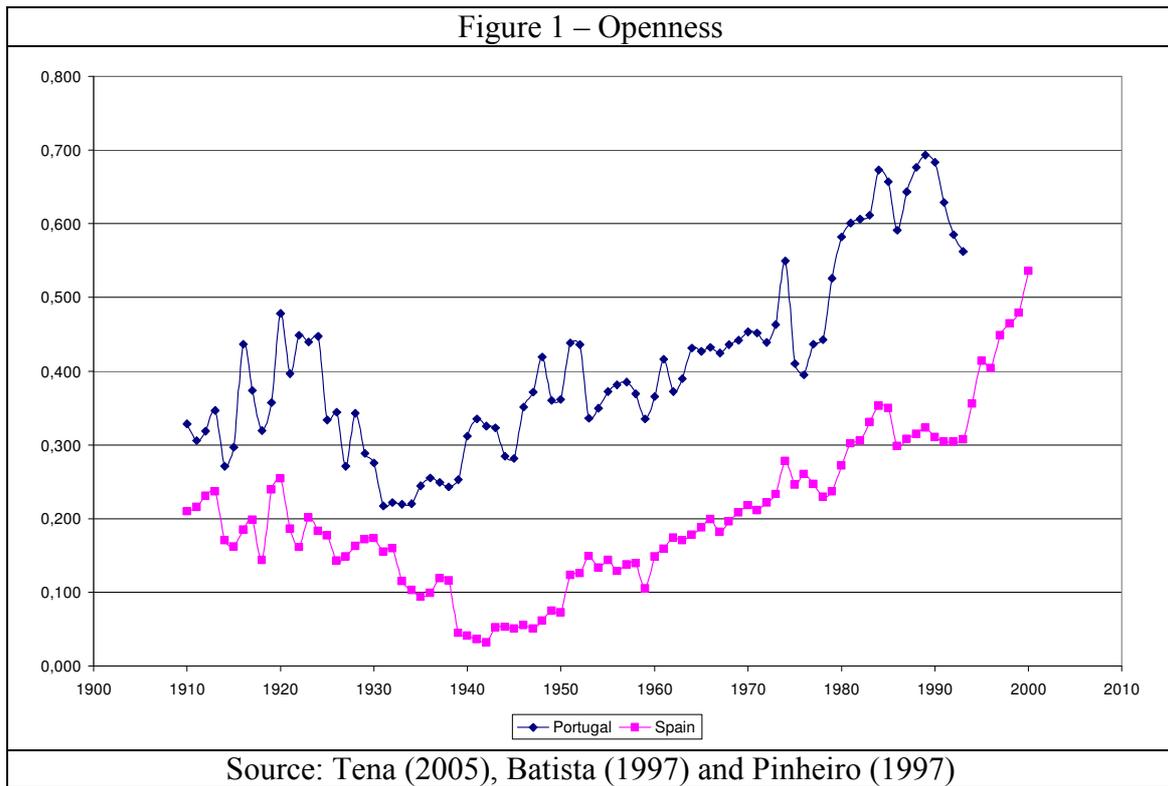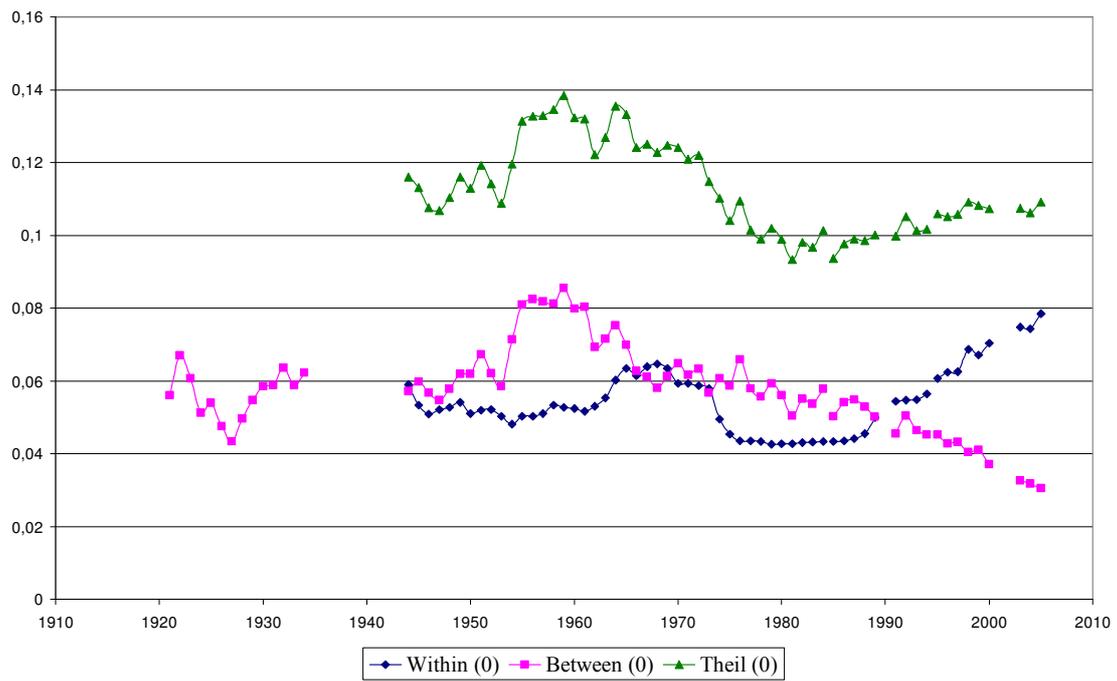| Table 5 - Sources of wage inequality change in Portugal (x1000)					
	Within group inequality	Population shares within	Population shares between	Change mean incomes between	Total
1921-1927			-0,24	-12,43	-12,67
1927-1934			0,85	18,12	18,97
1944-1959	-3,21	1,98	3,66	28,81	31,25
1959-1968	8,57	3,28	4,35	-31,63	-15,43
1968-1984	-21,39	0,15	-3,31	2,89	-21,66
1984-2005	23,87	6,91	-12,97	-6,74	11,07
1944-2005	7,84	12,33	-8,28	-6,67	5,22
Source: See Appendix 1					

Figures

Figure 1 – Openness

Source: Tena (2005), Batista (1997) and Pinheiro (1997)

Figure 2 - Comparison Guilera's Theil vs Prados de la Escosura's Gini

Source: Prados de la Escosura (2008) for the Gini, see text for the theil

Figure 3 – Theil Portugal

Within (0)   Between (0)   Theil (0)

Source: See Appendix 1

Figure 4 – Theil Spain

Within (0)   Between (0)   Theil (0)
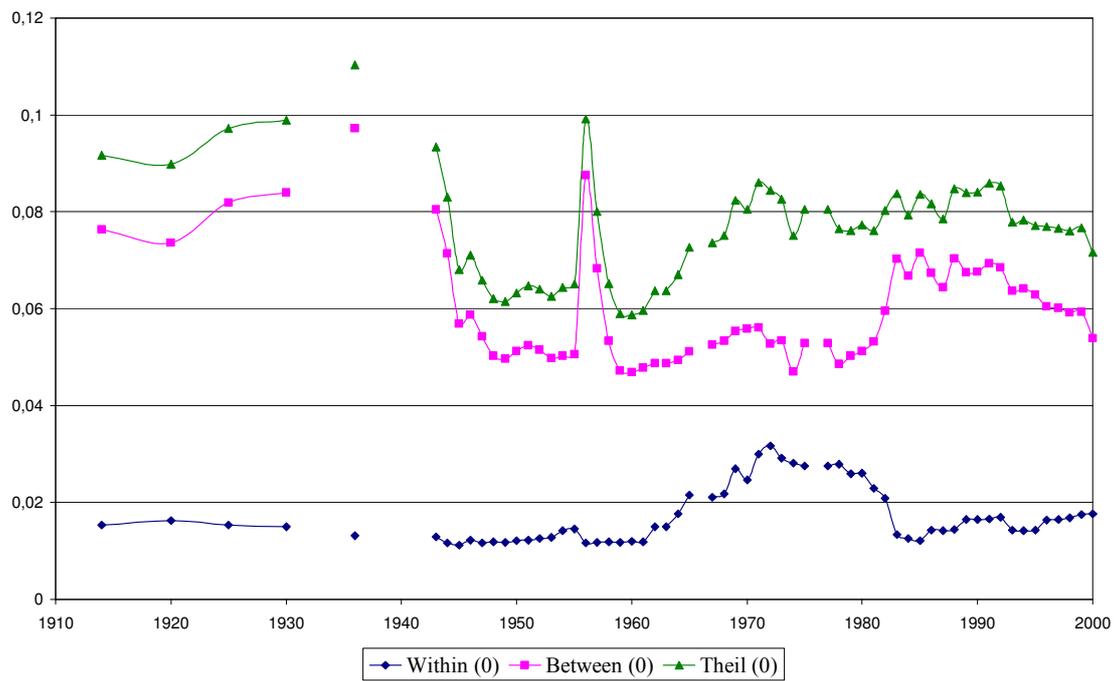
Source: See Appendix 1

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Appendix: sources and estimation of wage indices

Portugal

1921-84

Agricultural wages

Data on agricultural wages are from the *Anuário Estatístico de Portugal* conducted by the Portuguese Statistics Office (INE). From 1921 to 1928 it has been taken from the chapter *Indústria*. From 1929 to 1954 from the chapter *Produção e Consumo*, from 1955 to 1982 from the chapter *Preços e salários* and for 1983-84 from the chapter *Emprego é salários* The information is quite homogeneous throughout the period studied, consisting of male and female daily wages for different activities in each Portuguese district. The number of agricultural activities detailed in the source decreases over time, ranging from 28 to 1 for males and from 15 to 1 for females. Male and female daily wages in each Portuguese district have been estimated as an unweighted average of wages for different activities. For the whole country, male and female daily wages are calculated as the weighted average of the wages of all districts.

Industrial wages

Data on industrial wages also come from *Anuário Estatístico de Portugal*. From 1921 to 1934, data on wages come from the chapter *Indústria*. The source reports information on average daily wages for 30 sectors, by gender and for each Portuguese district. To estimate the national wage for each sector a weighted average has been calculated according to the active population of each district and sector. Female wages have been excluded because information was not systematically collected and could have disturbing effects on the estimation.

From 1944 onwards, data on industrial wages comes from a yearly survey conducted by the Portuguese Statistics Office (INE), which included information on firms with 10 or more employees, in the following chapters: "*Produção e Consumo*" (1944-1967), "*Indústrias extractivas*" and "*Indústrias transformadoras*" (1968-1970), "*Rendimentos, salários e preços*" and "*Mão-de-obra*" (1971-1981) and "*Emprego e salários*" (1982-84). The structure of the data is not constant over time because both the number of industrial sectors and the categories of workers considered changed during the period studied. For 1944-1955, the survey classified workers into three major

groups: employees (*empregados*), industrial workers (*assalariados industriais*) and other workers (*outros assalariados*). Employees were those with a longer term contract, whereas industrial and other workers earned daily wages. More precisely, employees were owners with management responsibilities and which earned a regular return (such as administrators, managers, economists, engineers, technical directors, secretaries, stenographers, typists, accountants, staff in charge of ordinary tasks in laboratories, personnel recruitment and staff of the social services of the company, i.e. clinics, schools, sports and other leisure activities). Workers comprised all personnel that participated directly in the production system, including masters and foremen. For employees (which we have classified here as "skilled workers"), the source gives information on their number at either December 31_{st} or the period of maximum activity of the year, and also on the total wages received by this group in the whole year. For other workers (which we have classified here as "unskilled workers"), the source gives information on their number at either December 31_{st} or the period of maximum activity, the number of working days per year and the total wages paid per year to this group. For 1956-1970, the source provides information on two occupational groups: employees (*empregados, administrativos, técnicos e de escritório*) and other workers (only one group). For employees ("skilled workers"), the source gives information on their number at either December 31_{st} or the monthly average, and also on the total wages received by this group in the whole year. For other workers, the source gives information on their number at either December 31_{st}, or the monthly average, on the number of working days per year and on the total wages paid per year to this group. For 1971-1981, the information on wages is again classified into three groups: *dirigentes*, *outro pessoal* (both of them employees) and other workers. For employees ("skilled workers"), the source gives information on the monthly wage and the monthly average number of workers in each group (*dirigentes* and *outro pessoal*). For other workers ("unskilled workers"), the source provides information on hourly wages and the monthly average number of workers. For 1982-84, there are only two groups of workers: employees (*Dirigentes, Administrativos, técnicos e outros empregados*) and workers (*operarios*). For employees ("skilled workers"), the source gives information on the monthly wage and the monthly average number of employees. For workers ("unskilled workers"), the source provides information on hourly wages and the monthly average number of workers.

For s*killed workers,* for 1944-1955, daily wages are estimated by dividing the total amount of wages paid each year by the number of employees at December 31st and then dividing the outcome by 304 working days. For 1956-1970, daily wages are estimated by dividing the total amount of wages paid each year by the monthly average number of employees and then dividing the outcome by 304 working days. For 1971-1984, daily wages are estimated by dividing monthly wages per 25,33 (i.e., 304 working days divided by 12 months). From 1971 to 1981, monthly wages are a weighted average of the wages for the two groups of employees that are distinguished in the source. For *unskilled workers,* for 1944-1970, daily wages are estimated by dividing the total amount of wages paid each year by the number of working days per year. For 1971-1984, daily wages are estimated by multiplying hourly wages per 8 (hours worked per day).

We use a working of 304 working days, assuming 6 working days per week and deducting the official and religious holidays. The 6-days working week was reaffirmed by law in 1934, *Decreto n. 24402* (Patriarca, 1995, pp. 372). The 5-days working week was established only after 1974 (Leite and Almeida, 2001, pp. 169; and Barreto, 1990, pp. 57-117). During the Estado Novo there were nine days of official and religious holidays per year (Araújo. *et al.*, 1969, p. 207), and this situation did not change until 1976, *Decreto* 874/76, See Leite and Almeida (2001), pp. 200-201.

The number of industrial sectors considered in the survey is very volatile: during these thirty years it varied from 21 to 187 sectors. To get homogenous data, the sectoral structure used by Pinheiro (1997) has been taken as reference, and all the information has been aggregated to fit that sectoral decomposition (CAErev1). In order to aggregate the different sub-sectors into those reference sectors, sectoral wages have been weighted according to the number of workers of each sub-sector.

Services

Data on services wages are from Instituto Nacional de Estatísitca, *Estatísticas das Sociedades.* This source starts in 1950. The information is quite homogeneous throughout the period under study. This source provides information on the number of workers and the total amount of wages paid per year in each sector. The source distinguishes among 15 sectors until 1952 and among 21 sectors from 1952 to 1984. Daily wages for services have been estimated by dividing the total wages paid per year by the number of workers of each sector, and by dividing the outcome per 304 working

days. The number of service sectors considered in the source has been aggregated to fit in CAErev1 (see Pinheiro, 1997). The process of aggregation took into account the relative importance of employment in each subsector.

1985-2005

Wage data comes from Quadros de pessoal. This source covers the workers of all sectors of activity. Workers are classified into 8 different skill-categories within each sector.

Regarding the sectoral decomposition, from 1985 to 1994, workers are classified into 17 sectors (only one sector for manufacturing), while from 1995 to 2005 there are 30 sectors (14 in manufacturing).

Employment

1921-34

Data on employment comes from Nunes (1989). This source provides active population classified in 16 economic sectors for each Portuguese district: Agriculture; Fishing; Mining; Manufacture of food, beverages and tobacco; Textiles and clothes; Manufacture of wood; Manufacture of paper; Manufacture of non-metallic minerals; Manufacture of chemical products; Manufacture of basic metals; Other manufacturing; Construction; Electricity and gas; Transport and communication; Trade; and Other services.

1944-84

Employment data for the period after 1953 is from Pinheiro (1997), *Parte V, Trabalhadores por conta de outrem,* which were extrapolated backwards on the basis of the growth rate of labour force by sectors given by Valério (2001, Tables 4.6 and 4.7), which are taken from Nunes (1989).

1985-2005

Employment is taken from *Quadros de pessoal*

Spain

Wages

All the sources used provide information on hourly wages.

1914-30

Data on wages is from *Estadística de Salarios y Jornadas de trabajo*. Statistics provide information for 1914, 1920, 1925 and 1930. This source classifies workers into 24 economic sectors at a provincial level and 5 groups: skilled-men, skilled-women, unskilled-men, apprentices-men and apprentices-women. In the case of apprentices the source only provides average wages for each province without a sectoral breakdown and they have been excluded from the database.

To calculate the national wages for each economic sector we have estimated weighted averages with the information on the number of workers provided by the source. For 1930, the source does not provide information on the number of workers and we have taken the values of 1925 as the reference.

The ESJT detail 19 economic sectors: Mining; Metallurgy; Iron and other metals; Chemicals; Tobacco; Textiles; Construction; Electricity; Food; Printing and publishing; Paper, pulp and rubber; Clothing; Leather, Wood; Transports; Furniture; Ornamentation; Pottery and Ceramics and Glass and Crystal.

1936-62

Data on wages is from Vilar (2004). The source provides wages for 6 economic sectors (minning, food and paper, wood and furniture, metallurgy, metallic products and construction) and two categories: skilled and unskilled workers.

Vilar (2004) do not provide any information on the number of workers per sector/skill.

Daily nominal wages for agriculture are from EHE, tables 15.19 and 15.20. EHE also provides the working time in agriculture (table 15.35) from which the hourly wage has been estimated. Between 1955 and 1971 there is no information on working time and it has been linearly interpolated.

1963-2000

Data on wages is from *Estadística de salarios* and *Estadística de Salarios en la Industria y los Servicios*. For 1963-75, the source classifies workers into 9 occupational categories and 19 sectors: Coal quarrying; Metallic mineral quarrying; Non-metallic

minerals quarrying; Food, drink and tobacco; Textiles; Clothing, leather and footwear; Wood, cork and furniture; Paper, pulp and paper products; Printing and publishing; Rubber; Chemicals; Oil, coal and non-metallic mineral products; Basic metals, metallic products, machinery, and electronic and transport equipment; Public works and construction; Electricity, gas and steam; Trade; Bancs and financial services and Insurance companies. For 1977-82 there are 11 categories and 23 sectors: Coal quarrying; Oil quarrying and refining; Energy and gas production and distribution; Metallic mineral quarrying; Basic metals; Non-metallic minerals quarrying and transformation; Chemicals; Metallic products, machinery, mechanical equipment and precision instruments; Office equipment, computers and electric and electronic material and machinery; Transport equipment; Food, drink and tobacco; Textiles; Leather, footwear, clothing and other textile products; Wood, cork and furniture; Paper, pulp and paper products; Printing and publishing; Rubber, plastic material, and other manufacturing activities; Construction; Bars, restaurants and hotels; Road transport; Bancs and financial services and Insurance companies. To construct the database in a homogeneous basis, information has been aggregated to 7 occupational categories (graduated technicians; other technicians; administratives; subalterns; masters, officials and skilled workers; unskilled workers and apprentices).

Until 1975 the source provides information on the number of workers for each category. On the other hand, for 1977-82, the source only provides the number of workers for two occupational groups (employees; and workers and apprentices). To assign a number of workers to each one of the seven categories the trend of the participation of each category of workers on labour force[21] during 1963-75 has been extrapolated onwards for 1977-82. For 1976 there is no information available and the values have been linearly interpolated.

For 1983-91 the information is more aggregated: 8 sectors (Energy and Water; Non-Metallic Mineral Products and Chemicals; Basic Metals; Manufacturing; Construction; Trade, Restaurants and Hotels; Transport and Communication; and Banks, Insurance and Other Services) and 2 occupational groups: employees and workers.

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[21] i.e. Number graduated technicians/number employees, Number other technicians/Number employees, Number unskilled workers/Number of workers and apprentices, etc.

For 1992-2000 the source classifies workers into two occupational groups: employees and workers and 44-46 sectors: Coal quarrying; Oil, gas, uranium and thorium; Metallic minerals quarrying; Non-metallic and non-energetic minerals quarrying; Food and drinks; Tobacco; Textiles; Clothing; Leather; Wood and cork; Paper and pulp; Printing and publishing; Coking, oil refining and nuclear fuels treatment; Chemicals; Rubber and plastic materials; Other non-metallic mineral products; Metallurgy; Metallic products; Machinery and mechanic equipment; Office equipment and computers; Electric machinery and equipment; Electronic equipment; Medical, surgery, precision and optical instruments and clocks; Engine vehicles and trailers; Other transport equipment; Furniture and other manufacturing; Recycling; Electricity, gas, steam and hot water; Water; Construction; Engine vehicles selling, maintaining and repairing; Wholesale trade; Retail trade; Hotels; Land and pipe transport; Sea transport; Air transport; Other transport activities, i.e. travel agencies; Mail and telecommunications; Financial intermediation; Insurances and pension plans (excluding compulsory social security); Auxiliary financial intermediation activities; Real estate; Machinery and other equipment renting; Computer activities; Research an development and Other business activities.

Agricultural wages come from EHE, table 15.20.

Employment

1914-63

For 1914-1950 data on employment for every economic sector comes from the Population census (1910, 1920, 1930 1940 and 1950). And for 1955-63, from *Renta Nacional BBV*.

The census figure of 1910 has been used for 1914, and the figure of 1940 census' for 1936. The remaining figures between census and between 1950 and 1955 have been estimated through linear interpolation.

Census provides data on the number of wage-earners for different sectors of activity only for 1920 and 1950. To obtain this figure for the remaining census it has been considered that the ratio wage-earners/total active population of 1920 remained constant for 1910 and 1930 and that the ratio for 1950 and 1940 were also equivalent.

For 1936-62 Vilar (2004) do not provide information on the skill composition of the labour force and it has been collected from various sources. For 1936, the figure has been taken from 1930 (ESJT), for 1950, from the population census, that classifies labour force into different skill categories for different economic sectors. During the forties it has been assumed that the labour force skill-composition remained constant at the value of 1950. Finally, from 1951 to 1962, the figures have been linearly interpolated.

1964-2000

Data on employment for this period comes from *Encuesta de Población Activa (EPA)*, This source provides yearly figures on the number of wage-earners classified in different economic sectors.