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Abstract
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Keywords: Wage Inequality; Structural change; Portugal.
JEL Classification: D31, O15.

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ABSTRACT

This paper relates the changes in the structure of the Portuguese economy to changes in wage inequality, during 1944-1974, when Portugal had its golden age of growth under a dictatorial regime. We present a new wage data set based on surveys conducted by the Portuguese Statistics Office (INE). Our data set covers the whole economy, including 16 sectors, and data on skilled and unskilled labor for manufacturing, and on male and female labor force for agriculture. To measure the evolution of wage inequality we estimate a Theil index. The results reveal an inverted-U curve with a peak in 1959. We proceed by estimating econometrically the relationship between wage inequality and per capita income growth, controlling for the influence of additional variables that capture the effects of industrialization, investment in human and physical capital, emigration, foreign trade and the size of the government. We find a significant relationship between wage inequality, real GDP per capita, human capital and the share of government spending.

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1. Introduction

This paper is about what caused changes in income inequality trends in a country under a dictatorial regime, such as was the case of Portugal between 1926 and 1974. The suppression of political rights, a key element of dictatorships and crucial for securing the levers of power, is frequently pictured as being in favor of large scale industrial and agricultural capitalists, and thus anti-labor and against a more equal distribution of income[1]. On the other hand, institutional arrangements favored a more equal distribution of income in the western European democracies after World War II (Persson and Tabellini, 1994; Acemoglu 2003 and 2006). But income inequality can also be explained in terms of economic factors, such as industrialization (Kuznets, 1955; Lewis, 1954), and Hecksher-Ohlin effects arising from the increase in the size of international trade (Wood, 1997, 1998; Anderson, 2001).

According to the available evidence, the rise of the Latin American dictatorships during the 1970s and 1980s was associated with increasing levels of wage and income inequality and with a fall in living standards[2]. The Latin American experience in this period was not however replicated in Spain, at least during the later part of its dictatorial regime. As shown by Prados (2007, p. 3), inequality in Spain increased during the first decades of the Franco regime, but declined consistently after the early 1950s. Thus Spain, despite being a dictatorship, followed more closely the western European pattern. Was Portugal closer to the Latin American dictatorships in the 1980s or closer to Spain and Western Europe in the 1960s?

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[1] See for example Rosas (1994). See the discussion in Reis (2000) and Lains (2003b).

[2] See Frankema (2008), Wood (1997), Astorga et al. (2005), Prados de la Escosura (2005) and Fitzgerald (2007).

Portugal's *Estado Novo* had its origins in a military coup in 1926, being institutionalized after Salazar became Prime Minister in 1932, and a political constitution was approved by a rogue plebiscite in the following year. Political repression was strong in the initial years and the nature of the regime did not change significantly during the decades that followed. From at least 1945 Portugal had a period of rapid economic growth and, although the country remained the poorest and most backward in Western Europe, there was a noticeable increase in the shares of urbanized and educated population. This change led to the intensification of social and political opposition to the regime. Salazar, an ageing dictator, did not allow any kind of liberalization or softening of the regime. On the contrary, repression was stepped up in response to the increase in political opposition. From 1961 onwards, Portugal had to fight wars in the African colonies, and it became harder for the government to concede reforms. Salazar left power in 1968, due to a bad health condition and died in 1970. His successor introduced some changes, although the margin for change was still considerably small due to the continuation of the African colonial wars[3]. But some reforms were however implemented and the basis for a welfare state were laid. The regime came to an end finally in 1974 with another military coup. Portugal was then one of the most unequal countries in Western Europe and remains so in the present period[4].

The analysis of income inequality in Portugal during the dictatorship period has received little attention in the literature. Recently, Alvaredo (2008) and Guilera (2008) have estimated the evolution of top income shares during the twentieth century, which however

[3] A survey of Portugal's political history is provided by Pinto (Ed.) (2003).

[4] See in this respect Silva (1982), Pereirinha (1988), Gouveia and Tavares (1995) and Rodrigues (2008).

show different peaks in the 1950s and 1960s, respectively[5]. The present study provides further evidence for the evolution of inequality in Portugal. We estimate overall trends of wage inequality for 1944-1974 using data from the Portuguese Statistics Office (Instituo Nacional de Estatística), which have not been previously explored. Our data reveal an inverted U-shaped pattern of wage inequality, which peaks in 1959. Thus, *prima facie*, the evolution of inequality in Portugal is not related either with the nature of the political regime or the intensity of political oppression.

In order to explain inequality trends we also estimate econometrically the relationship between inequality and per capita income growth, controlling for the influence of additional variables that capture the effects of industrialization, investment in human and physical capital, emigration, foreign trade and the size of the government. We find a significant relationship between wage inequality trends, real GDP per capita, human capital and the share of government spending in GDP.

The paper is structured as follows. The following section sets down the theoretical framework of the analysis. Section 3 presents the macroeconomic background in terms of trends in growth rates, structural change and the evolution of the relevant macro variables. Section 4 presents the wage data set and the evolution of wage inequality. Section 5 estimates

[5] The two authors have contradicting results regarding the international comparison of top income shares. According to Alvaredo (2008) top income shares were higher in Portugal during 1950-1975, as compared to the other western countries for which such estimates exist, namely, the UK, France, USA and Spain. But according to Guilera (2008) Portugal's top income shares were generally lower than in other OECD countries since 1936. For an analysis of inequality trends during the Portuguese dictatorship period see also Carvalho and Moura (1964), Carvalho (1967, 1969), Castanheira and Ribeiro (1977), Silva (1982), and Pereirinha (1988). See also Pereirinha and Carolo (2007).

an econometric model to explain the observed inequality trends in terms of economic factors. Section 6 concludes.

2. Inequality and growth: theory and evidence

There is a long and prolific strand of research concerning the impact of economic growth on inequality trends. According to Kuznets (1955), during the early phases of development, countries may experience an increase in income inequality, as population shifts from low paid agricultural jobs to manufacturing and service sectors, which have higher productivity and wage levels. Lewis (1954) has argued that labor supply in developing countries tends to be elastic, whereas capital supply is less elastic. Thus, at early stages of development, profits will tend to increase faster than wages, which may even fall in absolute terms, leading to higher income inequality levels. Yet the Kuznets curve linking the early stages of industrialization with rising inequality has not been found everywhere, as a considerable amount of evidence documents[6]. The contradicting results suggest that there may be other forces at work, namely changes in the degree of openness, or in investment in human and physical capital, which may counterbalance the negative impact of industrialization on wage differentials (Aghion et all. 1999).

According to Heckscher–Ohlin and Stolper–Samuelson theorems, income inequality in developing economies may decline as they open up to trade. That is the case if the country specializes in exports that use more intensively unskilled labor, reducing the gap between

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[6] Williamson (1985), Scholiers (1991), Van Zanden (1995), Morrisson and Snyder (2000), Sodeberg (1991) and Morrisson (2000) have found evidence in agreement with the Kuznets' hypothesis for Great Britain, Belgium, France, Sweden, Finland and Germany, whereas Feinstein (1988), Thomas (1991), Rossi et al. (1999), and Bértola (2005) have rejected it for Great Britain, Australia, Italy and Uruguay.

unskilled and skilled labor incomes. The empirical evidence on the impact of trade on wage inequality has led, however, to mixed results. Wood (1997) shows that greater openness to trade led to a reduction in wage inequality in a number of East Asian economies in the 1960s and 1970s but that the opposite effect occurred in many Latin American during the 1980s. Such contrasting evidence is explained by the author as the result of a considerable change in the pattern of world trade from the 1960s to the 1980s. In fact, during the 1980s, the Latin American economies had to face increasing competition of low skill manufactures exports from countries such as China and India, which had a negative impact on the wages of their less skilled workers. Similarly, Anderson (2001) finds contradicting results regarding the relationship between globalization and wage inequality trends during the 1870-1970 period. According to the reported evidence, the intensification of globalization had a relevant impact in equality trends between 1870 and 1914, whereas it did not in the decades from 1950 to 1970[7]. Therefore, the impact of opening up to international trade on wage inequality seems to depend upon the specific circumstances regarding the structure of world trade in the period in which it takes place.

During the period under study, the Portuguese economy became increasingly open, with a rise in foreign trade shares, capital inflows and emigration[8]. The gradual removal of trade barriers was, however, mostly limited to trade with Portugal's more developed European partners. As such, the increase in the degree of openness has probably led to a reduction in wage inequality levels, as the country's comparative advantage was concentrated in unskilled manufactures. The growth of exports was, however, accompanied by a rapid increase in the

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[7] The author emphasizes the role of emigration, mainly of unskilled workers, from the Old to the New World in the 1870-1914 period, considering it to be the main factor behind the rise of inequality in the US, Canada and Australia and the decrease of inequality found in UK, France, Germany, Sweden and Denmark.

[8] See Lains (2003a).

size of the industrial sector and by significant shifts of labor from agriculture to manufacturing, which might have implied the opposite effect. Furthermore, wage inequality has also probably been affected by the rise in human capital and the size of government expenditure which took place during the period under study (Aghion et all. 1999). The effects of these factors in wage inequality are taken into account in the analysis pursued in Section 6.

3. The economic background

Portugal's golden age of growth went hand in hand with deep changes in the structure of its economy. Table 1 depicts a comparison of growth rates of Portugal with other peripheral countries and the European core. Rapid economic growth started in the 1930s, as a response to the increase in tariffs and wider state protection to the manufacturing and agricultural sectors. Then the economy benefited from the fact that Portugal did not participate in World War II. Growth stepped up after the war, as the country joined the efforts of the rest of Western Europe in the reduction of tariff and other trade barriers. During the period from 1950 to 1973, Portuguese GDP per capita increased at 5.5 percent per year and a substantial part of the gap in income levels with regard to the European core was then overcome. The rate of change in the structure of the economy at the level of the three main sectors of economic activity increased further after 1960, when industrialization and the growth of the service sector gained momentum and the agricultural output entered a phase of slower growth. There were however important changes in the composition of each sector which are not fully reflected at this broad-level of analysis. Within the agricultural sector, for example, there was an increase in the production of goods with higher income elasticities, namely meat, fruits and vegetables. Within manufacturing, there was also an increase in the relative importance of capital intensive industries, such as chemicals and cement[9].

[9] See Lains (2003a, 2007 and forthcoming).

[Table 1]

The evolution of the output of agriculture, manufacturing and services is shown in Figure 1. From its inspection, it can be seen that World War I affected negatively the three broad sectors of the economy and from the mid 1920s down to the mid 1950s they had similar trend growth rates. This pattern of growth is consistent with the relative constancy of the Portuguese economic structure during this period. From the mid-1950s onwards the manufacturing sector experienced rapid growth, and from the beginning of the 1960s onwards agriculture entered a period of virtually flat trend growth rate.

[Figure 1]

Tables 2 and 3 depict changes in the structure of labor force and output at the three sectors level. In 1930, 60.9 percent of total male labor force was in agriculture and contributed with 31.5 percent to total output. In 1950, those shares were still 53.8 and 32.1 percent, respectively. It was only afterwards that the share of agriculture in total employment declined systematically to 27.6 percent, in 1970, and 13.1 percent, in 1990. The share of agriculture in total GDP declined less than on total population after 1970, and it was only then that there was some convergence in terms of sectoral labor productivity levels. During the last decades of the twentieth century, the productivity gap declined for the first time and in 1990 labor productivity in the agricultural sector was 80 percent of labor productivity in the rest of the economy.

[Tables 2 and 3]

Table 4 provides the long-term view for decennial growth rates for output, labor and labor productivity. Industry expanded faster than the rest of the economy in all periods except 1960-1990, when it was surpassed by the service sector, albeit by a thin margin. Agricultural labor force increased until 1930 and remained stagnant in 1930-1960 to decline steeply in 1960-1990. Labor productivity in agriculture increased at rates which compare rather well

with those of the other sectors, except in 1900-1930. Figures 2 and 3 also depict the evolution of labor and output shares and Figure 4 shows the evolution of relative productivity levels. Convergence between services and industry is patent from 1920 to 1970, whereas agriculture converged only after 1970. These trends of relative productivity levels would imply only a partial reduction in wage inequality indicators.

[Table 4] [Figures 2 to 4]

The expansion of the foreign sector is pictured in Figure 5. The ratio of exports plus imports over GDP increased from close to 20 % in the 1930s to close to 50% in the early 1970s. Exports had a big spurt during World War II, as Portugal benefited from its status of non-belligerent country. Between 1955 and 1973 the export share increased to 20 percent in 1973. In the same period, the share of imports in GDP expanded faster, from about 20 percent of GDP in 1950 to about 30 percent in 1973. Such an increase in the external sector of the economy had a relevant impact on the composition of economic activity and employment, contributing to a large extent to the growth of the manufacturing sector and to the substantial decline of agriculture. Figure 5 also shows the evolution of the shares of government spending and gross fixed capital formation in GDP. Finally Figure 6 presents the evolution of a human capital index which shows again a steep increase in the period under study. That increase followed a more regular trend to the late 1960s which was followed by a rapid albeit short spurt in the early 1970s.

[Figures 5 and 6]

4. Trends in wage inequality

In order to analyze the evolution of wage inequality in Portugal during 1944-1974, we built a data set based on wage and employment surveys conducted by the Portuguese Statistics Office (INE). The wage data are presented in different aggregation levels along the

period under study and it was grouped in sixteen industries covering the whole economy: agriculture; mining and quarrying; food, drink and tobacco; textiles, clothing, leather and footwear; wood and products of wood; pulp, paper, paper products, printing and publishing; chemicals; non-metallic mineral products; basic metals and electrical and transport equipment; other manufacturing; electricity, gas and water supply; construction and public works; wholesale and retail trade; transport and communications; banks, insurance and real estate; and other services[10]. Wages are given in current prices and before taxes.

The coverage of the wage data base increased in the period under study. Between 1944 and 1949 eight sectors were considered, including agriculture, mining and quarrying and six manufacturing sectors. From 1950 to 1952 five new sectors were added – construction and public works; whole sale and retail trade; transports and communications; banks, insurance and real estate; and other services –, and from 1953 onwards, four additional sectors were included, three in manufacturing and one in services. Table 5 shows the coverage of the data base regarding manufacturing and services' wages[11]. It starts at 9.3 percent in 1944-49, and increases to 28.4 percent in 1950-54, and again to 44.2 percent in 1970-74. Manufacturing is better covered throughout the period under analysis but at the end of the period the differences between manufacturing, construction and services are lower. We test the effect of missing values in the inequality indices presented below. It is important to bear in mind that the coverage of the sample falls within a relatively constant range between 1950-1954 and 1965-1969 (between 28.4 and 35.5%, respectively), and that only in the two tails of the sample the coverage is considerably different.

[Table 5]

[10] In order to aggregate the different sub-sectors into the list of sectors considered wages were weighted according to the number of workers of each sub-sector. See Appendix.

[11] Unfortunately, similar information is not available for the agricultural sector.

The industrial survey concerns firms with 10 or more employees, and gives the number of workers per industry, the number of days worked per year, as well as the total amount of wages paid. It also provides information on male and female wages in agriculture and on skilled and unskilled wages in manufacturing[12]. Between 1944 and 1955, data on wages is provided for three types of labor: employees (*empregados*), industrial workers (*assalariados industriais*) and other workers (*outros assalariados*).[13] Employees are those with a longer term contract, whereas workers earn daily wages.[14] For the 1956-1970 period, the source provides data on only two groups: employees (*empregados, administrativos, técnicos e de escritório*) and wage-earners. After 1956, the number of workers is also given as a monthly average, which is the information considered in the construction of our dataset. After 1970 wage data is again given for three distinct groups: *dirigentes, outro pessoal* (both employees) and workers. These data comprise employees' monthly wages and workers' hourly salaries. For the agricultural sector our sources provide data on male and female wages and employment for Portugal's 18 districts. From that data we estimated aggregate figures for

[12] The data set and the sources are provided in Table A1.

[13] This information is given either for December 31st or for the period of maximum activity.

[14] More precisely, employees are owners with directive responsibilities and a regular remuneration, such as administrators, managers, services chiefs, highly skilled staff (e.g., 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 (clinics, schools, sports and other leisure activities). Workers comprise all the personnel that participate directly in the production system, including masters and foremen.

males and females based on averages weighted by employment[15]. For the service sector, the source gives the total number of workers employed and the total amount of wages paid, from which average annual wages were computed. For aggregation of wage rates into the 16 industries in our data set, we converted all wages into daily wages, considering 304 working days per year and 8 hours work per day[16].

The employment data is taken from different sources. For the period after 1953 we consider Pinheiro's (1997) database, whereas for the earlier period (1944-1952) we apply backwards the sectoral labor growth rates given by Valério (2001, Tables 4.6 and 4.7). The fact that the ratio of total wage-earning population and total labor force remained relatively constant, between 70 and 75 percent, as shown in Figure 8, provides the support for that option[17].

[Figure 8]

The main features of wage inequality trends during the period under study can be seen by the analysis of the data at a more disaggregated level. Figure 9 shows the evolution of the share of skilled and unskilled workers in the manufacturing sector. The proportion of skilled

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[15] The source does not provide data for 1955, which was linearly interpolated using data for 1954 and 1956.

[16] This assumption is based on 6 working days per week and the exclusion of official and religious holidays. The 6-days working week was established in 1934 (*Decreto n. 24402*; Patriarca, 1995, pp. 372). The 5-days working week was only established after 1974 [see in this respect, Leite and Almeida (2001, pp. 169) and Barreto (1990, pp. 57-117)]. During the Estado Novo period there were nine days of official and religious holidays per year (Araújo. *et all*, 1969, pp. 207) and this situation did not change until 1976 (*Decreto* 874/76; Leite and Almeida, 2001, pp. 200-201).

[17] See also Table A2.

workers remained relatively stable, around 8 percent, up to 1960, and then went up in two stages, between 1960 and 1965, and after 1970, reaching 14 percent in 1974. Figure 10 shows the distribution of labor force among sectors of different skill levels.[18] The figure also shows that the share of the manufacturing sectors that used more intensively unskilled labor declined from around 75 percent in 1950 to 53 percent in 1974. Moreover, the share of semi-skilled labor-intensive sectors increased faster than the share of skilled labor-intensive ones. Figure 11 shows the evolution of the skill premium in the manufacturing sector defined as the ratio between the daily wage of skilled and unskilled labor, which remained relatively stable, around 3, between 1950 and 1960, and which increased between 1961 and 1969, to decline again in the later part of the period.

[Figures 9 to 11]

For the agricultural sector, Figure 12 reports the results of the ratio between male and female wages along the 1944-1974 period. As can be seen from its inspection, the gender gap remained fairly stable until the early 1960s, declining slightly up to 1965 and fluctuating considerably thereafter, ending up at a level similar to the beginning of the period. Wage inequality in agriculture fluctuated around 1.7, with a blip in 1970.

[Figure 12]

In order to estimate the evolution of overall wage inequality, we calculate a Theil index (T_1), which is an inequality descriptive measure:

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[18] The degree of qualification of each manufacturing branch is defined according to the average participation of skilled labor in the sector's total employment during the 1970-1974 period. Skill intensive sectors are those in which skilled labor participation is above 25%, semi-skill sectors present a skilled labor participation rate between 15% and 25%, and finally, non-skill intensive sectors have a skilled labor participation rate below 15%.

$$T_1 = \frac{1}{n} \cdot \sum_i \left(\frac{y_i}{\mu} \right) \cdot \ln\left(\frac{y_i}{\mu} \right)$$

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:

$$T_1 = \sum_k \frac{n_k \cdot \mu_k}{n \cdot \mu} \cdot I_1^{\,k} + \sum_k \frac{n_k \cdot \mu_k}{n \cdot \mu} \cdot \ln\left(\frac{\mu_k}{\mu} \right)$$

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. Figure 13 reports the results. According to the overall index, wage inequality increased more rapidly after the end of the war and then more slowly till it reaches a peak in 1959. We recall that the strength of political repression was not eased in the years following 1959, since opposition became more active. This leads to the relevant conclusion that wage inequality in Portugal declined in the last years of a hardened dictatorship.

[Figure 13]

The analysis of the two components of the Theil index (also shown in Figure 13) provides additional information on the evolution of wage inequality. The "within" coefficient remained relatively stable along the 1944-74 period, although increasing smoothly to 1970 and declining afterwards. The evolution of the global coefficient and that of the "between" component is quite similar, indicating that the evolution of wage differences across sectors of activity was the main cause behind the evolution of global wage inequality[19].

[19] We assume equal shares of male and female labor force, because of underpresentation of female labor in the census. An alternative Theil index with the shares from the censuses has also been estimated. See Appendix and Table A.4.

Figure 14 below addresses the problem of incorporating new sectors in the sample. Three alternative inequality indexes have been calculated in order to discriminate the potential distortions in 1949-50 and 1952-53 due to the incorporation of new sectors previously omitted. T_{1-8} (8 sectors) and T_{1-13} (13 sectors) measure wage inequality among the sectors considered between 1944-49 and 1950-52 for the four following years after 1949 and 1952, whereas T_{full} (full sample) measures wage inequality among all the sectors with available information, which increases over time. The differences between the T_{full} (full sample) index and the two alternative indices are quite insignificant and always evolve in the same direction. This test suggests that the results are robust and are unaffected for the unbalanced coverage of the wage sample used to derive the Theil index.

[Figure 14]

5. Wage inequality and economic growth

The evidence presented so far shows that the evolution of wage inequality during the *Estado Novo* followed an inverted U shape characteristic of the Kuznets curve.[20] In order to achieve a greater understanding of the phenomenon and provide a tentative explanation for the observed pattern, in this section we assess econometrically the relationship between wage inequality and per capita income growth, controlling for the influence of additional variables that may as well influence inequality, such as industrialization, investment in human and physical capital, migrations and foreign trade. We thus estimate the following specification:

[20] The Kuznets' curve refers to the relationship between development levels and income inequality, not wage inequality (Kuznets, 1955). However, given that wages represent the most significant part of total income and no information is available regarding additional sources of income, we extrapolate Kuznets' results to the analysis of wage inequality trends.

$$THEIL_t = \beta_0 + \beta_1(LINC_t) + \beta_2(LINC_t)^2 + \beta_3 MANUF_t + \beta_4 GFCF_t + \beta_5 HK_t + \beta_6 OPEN_t + \beta_7 EMIG_t + \beta_8 GOV + \mu_t \quad (1)$$

The dependent variable, wage inequality, is represented by *THEIL*, which indicates the Theil coefficient computed in the previous section. The variable *LINC* stands for the natural logarithm of real income per capita. *MANUF* and *GFCF* represent manufacturing and GFCF shares in GDP, respectively. *HK* is an index of human capital and *OPEN* is a measure of openness, consisting in the ratio of exports plus imports to GDP. *EMIG* is the ratio of emigration to total population, and finally, *GOV* represents the government spending share in GDP.[21]

The empirical confirmation of an inverted-U curve requires β_1 and β_2 to have a positive and negative sign, respectively. The sign of β_3 is expected to be positive because, as indicated earlier, the process of Portuguese industrialization was characterized by the emergence and increasing relevance of skilled labour intensive sectors, which may have led to growing wage inequality during this period. GFCF captures a similar relationship, and therefore its coefficient is expected also to assume a positive value. At the same time, if investment in human capital is not equally distributed, we expect the sign of β_5 to be positive. β_6, β_7 and β_8 are all expected to be negative. In the first case, given the country's relative abundance of unskilled labour and assuming the validity of Heckscher–Ohlin and Stolper–Samuelson theorems, increasing openness to foreign trade has probably led to a decrease in

[21] For the sources concerning the data on population, real GDP, and on the shares of manufacturing, GFCF and government spending in GDP, and the human capital index, see Lains (2003a and 2003b). Export and import data regarding the 1944-1952 period is from Baptista et all. (1997), and for the subsequent period is from Pinheiro (ed.) (1997). Emigration data includes data of legal emigration and estimates for illegal emigration, from Leite (1987).

wage inequality. A similar effect is expected relatively to emigration.[22] Finally, β_8 is expected to be negative because the increasing state intervention in the economic sphere has probably been most beneficial to the lower income segments of the population.

Table 6 reports the results of the basic model estimated, along with different versions of Equation 1. The fit of the proposed relationship is rather good, as the adjusted R-squared values for all models estimated range from 0.69 to 0.83, meaning that the variables included in the regressions explain at least about 70% of the observed variation in wage inequality. Estimated coefficients show little variation in all regressions and have the expected signs.[23] Most importantly, β_1 and β_2 are always significant at the 1% level, thus demonstrating support for the existence of a Kuznets process of wage inequality transformation in Portugal between 1944 and 1974.

[Table 6]

In what concerns the control variables, only human capital and the share of government spending in GDP seem to significantly influence wage inequality. An increase in the index of human capital in 1 p.p., *ceteris paribus*, raises the Theil index in about 1.5 p.p., whereas an identical increase of the share in government spending originates the opposite effect, reducing the inequality index in about 0.7 p.p.. All the other coefficients remain statistically insignificant in all models estimated.[24] In particular, the two measures of

[22] However, the relationship can take the opposite direction if we consider that most of the emigrants came from the littoral regions and that the coastal population was most skilled than that of the interior regions.

[23] With the notable exception of β_6 which, although statistically insignificant, presents an (unexpected) positive sign.

[24] The only exception regards emigration, which presents a statistically significant coefficient at the 10% level in one of the estimated regressions.

industrialization, *MANUF* and *GFCF*, do not show any explanatory power for the evolution of the Theil coefficient. This can be due to the inclusion of the real income per capita variable, which may already capture the effects associated with these variables.

A problem with this estimation is that the series are not stationary. Wage inequality and human capital proxies, along with real GDP per capita and government spending series exhibit relevant trends (see Figures 5-7 and 12). In this case, the use of conventional estimation methods, such as least squares regression, may lead to spurious results (Granger and Newbold, 1974; Rao, 1994).[25] In order to confirm the influence of the selected variables on wage inequality we therefore resort to cointegration methods, which allow for the estimation of long-run parameters in a relationship that includes non-stationary variables.[26] Since the existence of a cointegration relationship requires that variables entering the regression have the same order of integration, we first analyse the stationarity of the individual series using the Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1979; 1981)

[25] The OLS estimation method is based on the classical hypotheses on perturbation terms. In the case of non-stationary variables these hypotheses are violated, since means and variances of variables change with time, meaning that all statistics that use such means and variances will also be dependent on time. Consequently, they do not converge to the true (population) values when sample size tends towards infinite.

[26] The logic underlying cointegration techniques relies on the possibility of the existence of a linear combination of non-stationary series which is stable around a fixed mean in the long-run. In this case there is a long-run relationship between variables, and the regression of all the variables has stationary perturbation terms, even though no variable, individually considered, is stationary.

and Phillips-Perron (PP) (Phillips and Perron, 1988) tests.[27] The test results are reported in Tables 7 and 8.

[Tables 7 and 8]

The results of both ADF and PP tests indicate that the (level) variables of the model are all non-stationary (the statistical evidence does not reject the non-stationarity hypothesis). The evidence also shows that when the selected variables are differenced once they all become stationary, that is, they do not have unit roots. Thus, we conclude that the series of the model are *I*(1).

Since all individual series have the same order of integration, there may be a stable long-run relationship between them (Dickey et al., 1991). We therefore estimate a cointegration regression which involves a relationship between wage inequality, real income per capita, human capital stock and government share in the economy, with all variables expressed in natural logarithms. We also estimate an additional regression which includes a step-dummy for 1959. The inclusion of this variable accounts for the break observed in wage inequality in the late 1950s, which from this period onwards presents a decreasing pattern that contrasts sharply with the earlier years.

The Johansen (1988) cointegration test requires the previous definition of the number of lags for an unrestricted VAR model. [28] For the econometric specification considered, we set one lag in differences (two lags in levels), following the Akaike information criteria. Moreover, we allow for a linear deterministic trend in the level data and consider that the

[27] Interest readers are referred to Hayashi (2000) for a detailed description of these tests.

[28] Although a number of cointegration tests have been developed to date (e.g., Engle and Granger, 1987; Stock and Watson, 1988; Johansen, 1988), we decided in favour of the Johansen procedure, which is frequently presented in the literature as a superior technique (see, for example, Gonzalo, 1994).

cointegrating equations only have intercepts because we believe all trends are stochastic. Table 9 summarizes the results of the λ_{trace} and λ_{max} tests performed to determine the number of cointegrating vectors.[29]

[Table 9]

The λ_{trace} and λ_{max} tests do not reject the hypothesis that there is one cointegrating vector at the 5% significance level. Choosing $r = 1$ and normalizing the cointegrating vectors by imposing that the parameter associated with the measure of wage inequality equals -1, we obtain the estimates presented in Table 10.

[Table 10]

Given that all variables are in natural logarithms, the estimated coefficients represent long-run elasticities of the wage inequality proxy with respect to the selected variables. According to the observed results, wage inequality is negatively (and significantly) related to per capita GDP and significantly related to the human capital stock and government share in the economy. The inclusion of the step dummy does not fundamentally change the results. With the exception of the parameter associated with government spending, these findings are in close agreement with previous results. The negative relationship between wage inequality and real per capita GDP reflects a virtuous relationship between development and inequality trends and gives support to the Kuznets' prediction according to which there is a decrease of inequality levels, after a critical point of development has been reached. Moreover, the long-run parameter associated with the human capital variable confirms the earlier finding according to which, during the period under study, the increase in scholar qualifications,

[29] The λ_{trace} statistics tests the null hypothesis according to which the number of cointegrating vectors is less or equal to r against the alternative hypothesis of the existence of n vectors. The λ_{max} statistic tests the null hypothesis according to which the number of cointegrating vectors is r, against the alternative hypothesis that there are r+1 vectors.

mostly directed to a minority of the population, was associated with a rise in wage inequality. Only the parameter associated with the government share in the economy contradicts our previous results, denoting a positive relationship between government spending and wage inequality. This finding suggests that the increase in government spending was not conducive to a compression of the wage distribution. The fact that government spending is positively related to increase in wage inequality is explained by the composition of public expenditure, which only later in the period switched to social programs.

6. Conclusion

The evolution of wage inequality in Portugal during the years from 1944 to 1974 followed a Kuznets inverted U curve, with a peak in 1959. The increase in wage inequality in the beginning of the period could thus be related to the nature of the Estado Novo dictatorial regime, which can be depicted as anti-labor and pro capitalists. That interpretation goes along our knowledge of the repressive nature of the regime. However, wage inequality declined after 1959, and that was by no means associated with the diminution of political repression. On the contrary, political repression increased in intensity in the last decades of the regime, due to the pressure from the colonial wars fought in Africa by the Portuguese government.

Our conclusion that inequality trends in Portugal are not associated with the evolution of the political regime and the intensity of its political repression over the citizens puts Portugal closer to the case of Spain, during the Franco regime, and distant from what happened in Latin American economies during the dictatorships they had to endure in 1980s.

In order to explain the evolution of wage inequality we estimate econometrically the relationship between our inequality index and a series of economic variables that capture changes in the structure of the Portuguese economy during this period. We found that inequality is positively related to per capita GDP, investment in human capital and the share

of government spending in GDP. These results help defining better how the Portuguese economy developed. Firstly, it followed the classical Kuznets' pattern where inequality increases at earlier stages of development and then declined. Secondly, inequality evolved positively with the growth of investment in human capital. Finally, it was also affected positively by the increase in the share of government expenditure in GDP. This last result derives from the fact that the structure of government expenditure in which social transfers had a relatively small share (Pereirinha and Carolo 2007).

Appendix: sources and estimation of wage indices

Agricultural wages

Data on agricultural wages are from the Portuguese Statistics Office (INE). From 1944 to 1954 it has been taken from the chapter *Produção e Consumo*, and from 1955 to 1974 from the chapter *Preços e 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 13 for males and from 15 to 3 for females. Male and female daily wages in each Portuguese district have been estimated as a weighted 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 comes from a yearly survey conducted by the Portuguese Statistics Office (INE) since 1944, which included information on firms with 10 or more employees, namely in the following chapters: "*Produção e Consumo*" (1944-1967), "*Indústrias extractivas*" and "*Indústrias transformadoras*" (1968-1970) and "*Rendimentos, salários e preços*", and "*Mão-de-obra*" (1971-1974). 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 31st 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 31st 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 31st 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 31st, or the monthly average, on the number of working days per year and on the total wages paid per year to this group. For 1971-1974, 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 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 1971-1974, daily wages are estimated by dividing monthly wages per 25,33 (i.e., 304 working days divided by 12 months). 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 1971-1974, 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 (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 onwards. 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.

Employment

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).

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Table 1

Growth of real income per capita in the European periphery and core, 1913-1986

(Maddison's phases of development; annual growth rates between 3-years averages; per cent)

	Portugal	Spain	Greece	Ireland	Core[(1)]
1913-1929	1.35	1.65	2.45	0.33	1.39
1929-1938	1.28	-3.53	1.50	0.87	1.16
1938-1950	1.56	1.48	-2.72	0.94	1.00
1950-1973	5.47	5.63	5.99	2.98	3.55
1973-1986	1.52	1.31	1.75	2.47	2.01

(1) 9 European forerunners

Source: Lains (2003a)

Table 2 – Male labour force (1911-1950) and total employment (1960-1990)

	Agriculture	Industry	Services	Total male labour force
		Percent		000
1911	61.0	21.7	17.3	1,629
1920	[60.9]	[21.2]	[17.9]	1,691
1930	60.9	20.7	18.4	1,967
1940	57.8	21.0	21.1	2,241
1950	53.8	24.6	21.6	2,562
1960	43.1	28.2	28.7	2,713
1970	27.6	33.9	38.6	2,263
1980	19.2	37.7	43.1	2,544
1990	13.1	37.3	49.6	2,476

Sources: Lains (2007) for 1911-1950, and Valério (ed.) (2001), p. 164 for 1960-1990.

Table 3 – Portugal: Composition of GDP, 1910-1990 (percent)

	Agriculture	**Industry**	**Services**
1910	37.1	27.1	35.8
1920	30.4	25.8	43.9
1930	31.5	28.0	40.5
1940	30.6	28.7	40.6
1950	32.1	30.3	37.6
1960	27.2	37.0	35.7
1970	15.3	48.8	35.9
1980	10.5	48.8	40.7
1990	10.4	44.6	45.0

1958 prices

Sources: Lains (2003a) and (2007).

Table 4 – Growth of output, labour force and labour productivity, 1860-1950

(annual growth rates, percent)

	Agriculture	Industry	Services	Total
Output [(1)]				
1910-1920	-1.64	0.15	2.14	0.31
1920-1930	4.51	4.35	2.97	3.83
1934-1940	1.81	2.02	1.73	1.84
1940-1950	2.82	4.16	2.66	3.15
1950-1960	2.63	5.89	3.83	4.23
1960-1970	-0.67	8.93	5.44	5.81
1970-1980	1.23	4.66	6.19	4.86
1980-1990	3.43	2.78	4.90	3.75
Labour force [(2)]				
1910-1920	0.40	0.16	0.80	0.42
1920-1930	1.52	1.28	1.80	1.52
1934-1940	0.78	1.46	2.71	1.31
1940-1950	0.62	2.96	1.59	1.35
1950-1960	-1.03	3.16	1.43	0.74
1960-1970	-3.46	2.82	3.98	0.95
1970-1980	-2.76	1.90	1.94	0.81
1980-1990	-2.99	0.72	2.25	0.82
Labour productivity				
1910-1920	-2.04	-0.01	1.34	-0.11
1920-1930	2.99	3.07	1.17	2.31
1934-1940	1.03	0.56	-0.98	0.53
1940-1950	2.20	1.20	1.07	1.80
1950-1960	3.66	2.73	2.40	3.50
1960-1970	2.79	6.11	1.46	4.86
1970-1980	3.99	2.76	4.25	4.05
1980-1990	6.42	2.06	2.65	2.93

Sources: Lains (2007) for 1910-1950; and Pinheiro (Ed.) (1997) for 1950-1990.

Table 5 - Number of workers in the wage survey / total employment (%)

	1944-49	1950-54	1955-59	1960-64	1965-69	1970-74
Manufacturing	26,2	41,5	46,7	43,0	41,9	58,6
Construction	0,0	11,2	13,3	17,1	24,2	33,9
Services	0,0	22,2	25,0	28,9	33,1	36,4
Total	**9,3**	**28,4**	**31,8**	**32,8**	**35,5**	**44,2**

Sources: Pinheiro et all (1997), Valério (2001), and INE (1944-1974).

Table 6: Regression results

Dependent variable: Theil Index														
Constant	-750.7	-739.0	-749.8	-691.6	-752.7	-761.8	-710.4	-712.0	-795.6	-781.8	-792.3	-714.5	-810.3	-707.2
	(-5.637)***	(-10.044)***	(-5.915)***	(-4,870)***	(-5.788)***	(-6.166)***	(-8.073)***	(-11.614)***	(-6.758)***	(-8.280)***	(-7.817)***	(-12.176)***	(-6.745)***	(-12.243)***
LINC	163.4	166.0	161.8	151.5	163.8	165.1	154.9	159.6	177.2	174.3	177.4	158.8	180.8	157.4
	(5.666)***	(9.937)***	(5.895)***	(5.055)***	(5.818)***	(6.163)***	(8.148)***	(11.599)***	(6.861)***	(8.191)***	(7.774)***	(12.785)***	(6.909)***	(13.094)***
(LINC)^2	-8.8	-9.4	-8.6	-8.2	-8.8	-8.8	-8.2	--8.9	-9.8	-9.6	-9.9	-8.7	-10.0	-8.7
	(-5.648)***	(-9.645)***	(-5.746)***	(-5.268)***	(-5.825)***	(-6.159)***	(-8.079)***	(-11.052)***	(-6.718)***	(-7.742)***	(-7.503)***	(-13.042)***	(-6.904)***	(-13.457)***
HK		1.6						1.4	1.7	1.7	1.8	1.3	1.8	1.3
		(4.730)***						(3.874)***	(2.442)**	(2.310)**	(2.628)**	(3.312)***	(2.723)***	(2.873)***
MANUF			-0.12						-0.04	-0.06		-0.1		-0.13
			(-0.992)						(-0.669)	(-0.714)		(-1.056)		(-1.220)
GFCF				0.1					-0.1	-0.1	-0.1		-0.15	
				(0.857)					(-1.062)	(-1.032)	(-1.117)		(-1.228)	
OPEN					0.01				0.04	0.04	0.04	0.03	0.04	0.03
					(0.250)				(1.236)	(1.203)	(1,121)	(0.767)	(1.229)	(0.832)
EMIG						-0.7			-0.2				-0.3	0.3
						(-1.824)*			(-0.359)				(-0.604)	(0.689)
GOV							-0.9	-0.6	-0.6	-0.7	-0.6	-0.7	-0,6	-0.8
							(-5,300)***	(-3.479)***	(-2.901)***	(-3.305)***	(-3.506)***	(-3.194)***	(-3.218)***	(-3.269)***
N	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Adjusted R^2	0.69	0.80	0.69	0.69	0.68	0.69	0.75	0.83	0.82	0.83	0.83	0.82	0.82	0.82
F statistic	34.18	40.41	23.08	23.53	22.02	23.38	30.82	36.38	17.79	21.20	25.44	23.94	21.17	20.05

Notes: Models estimated by OLS. *t*-statistics (in parentheses) are based on Newey-West autocorrelation robust covariance matrix. *, **, *** denote statistical significance at the 10, 5 and 1% level, respectively

Table 7: Unit root tests – variables in levels

Series	Mean	ADF test	(lags)	PP test
Trend and constant included in the regression				
LTHEIL	1.8264	-0.7112	(0)	-0.5094
LINC	9.1246	-2.005	(0)	-2.0236
LHK	1.8915	-2.0660	(1)	-1.7289
LGOV	2.2397	-2.6722	(0)	-2.3340
Constant but no trend included in the regression				
LTHEIL	1.8264	-1.5308	(0)	-1.6291
LINC	9.1246	2.252	(0)	6.7829
LHK	1.8915	0.4135	(1)	0.7685
LGOV	2.2397	-0.8184	(0)	-0.5193

Notes: All variables are expressed in natural logarithms. For the ADF test we used the AIC with an upper bound for the lag length as the integer part of $12(T/100)^{1/4}$ defined in Hayashi (2000, pp. 594), where T is the number of observations. For the PP test the bandwidth parameter for the kernel-based estimator of the residual spectrum at frequency zero was obtained by the Newey-West (1994) method using Bartlett kernel. MacKinnon (1991, 1996) critical values for rejection of hypothesis of a unit root (non-stationarity) at *1% and **5%.

Table 8: Unit root tests – variables in first differences

Series	Mean	ADF test	(lags)	PP test
Constant but no trend included in the regression				
LTHEIL	0.0112	-3.7004*	(0)	-3.5979**
LINC	0.0441	-5.953*	(0)	-5.9529*
LHK	0.0340	-3.7018*	(0)	-5.4301*
LGOV	0.0087	-4.9409*	(0)	-3.7018*

Notes: See Table 5.

Table 9: Results of Johansen's cointegration test

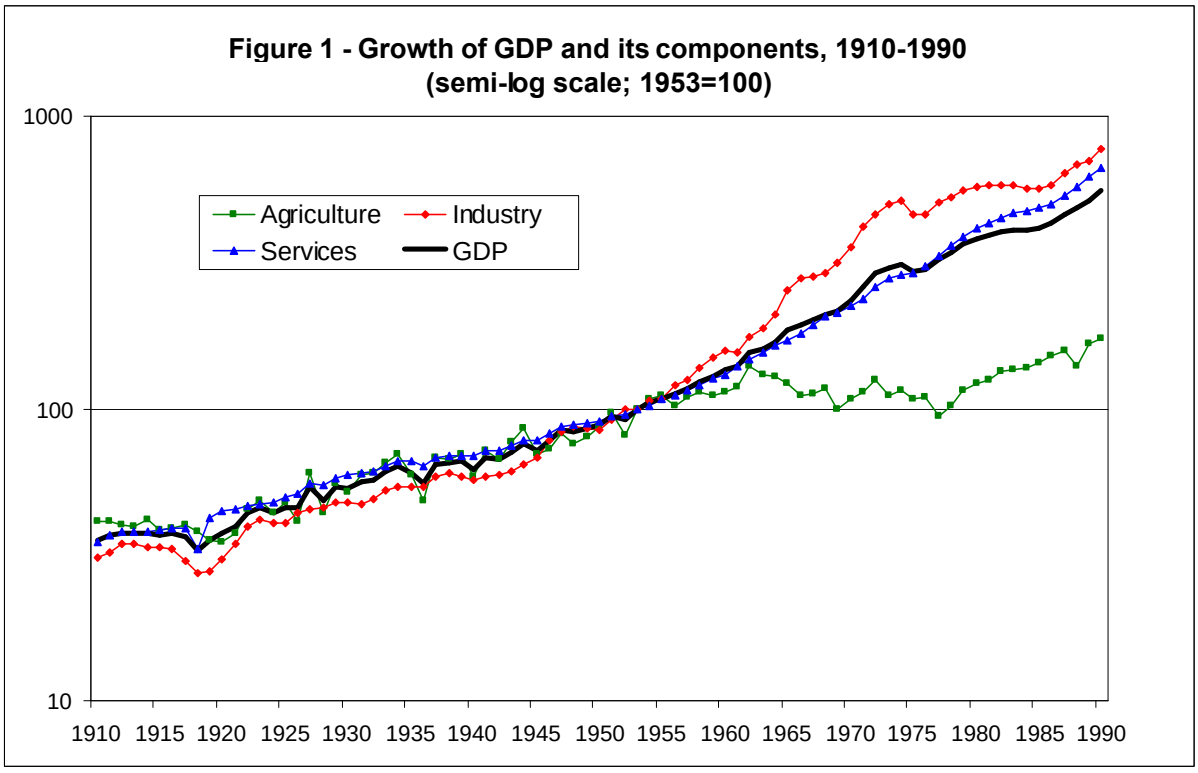
r	$\hat{\lambda}_i$	λ_{trace}	p-value	λ_{max}	p-value
None	0.6344	48.3446	0.0449	29.1833	0.0309
At most 1	0.4030	19.1614	0.4814	14.9606	0.2917
At most 2	0.1192	4.2007	0.8867	3.6808	0.8914
At most 3	0.0178	0.5199	0.4709	0.5199	0.4709

Notes: MacKinnon et al. (1999) p-values.

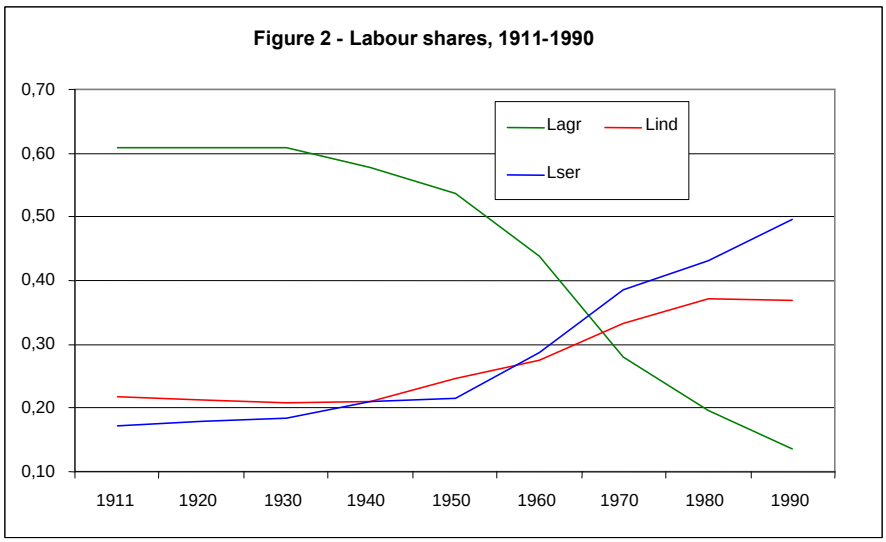
Table 10: Estimated long-run elasticities

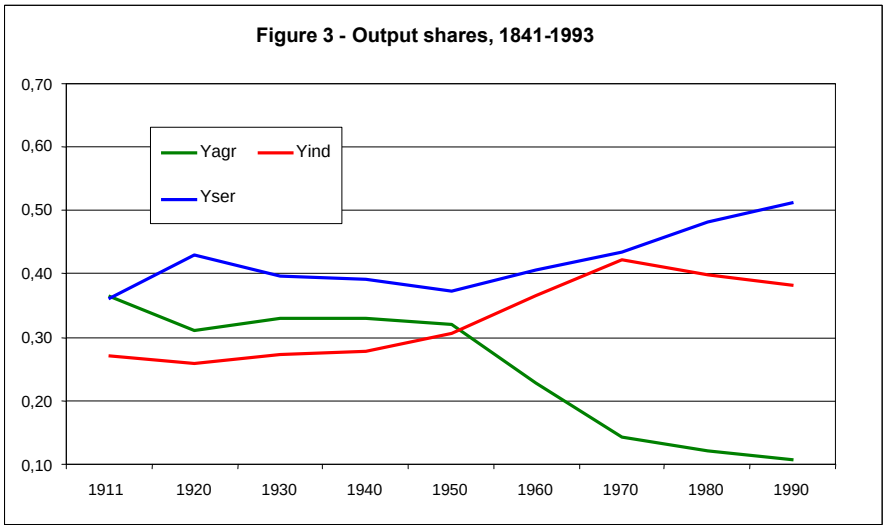
Variables	No time dummy	Step-dummy for 1959
LINC	-5.6882	-6.3795
	(1.0073)	(1.2021))
LHK	5.9197	5.9701
	(1.2174)	(1.4667))
LGOV	7.5298	10.8351
	(1.6450)	(1.9634)

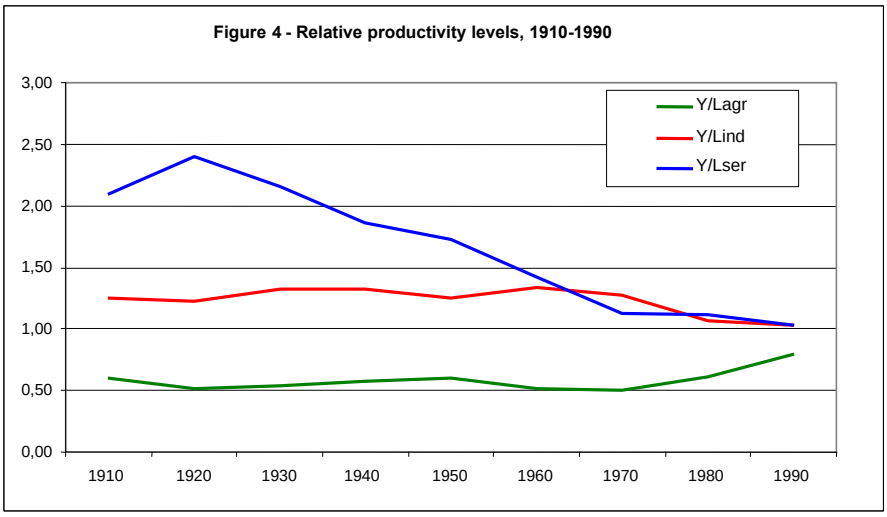
Note: Estimated standard errors in parenthesis.



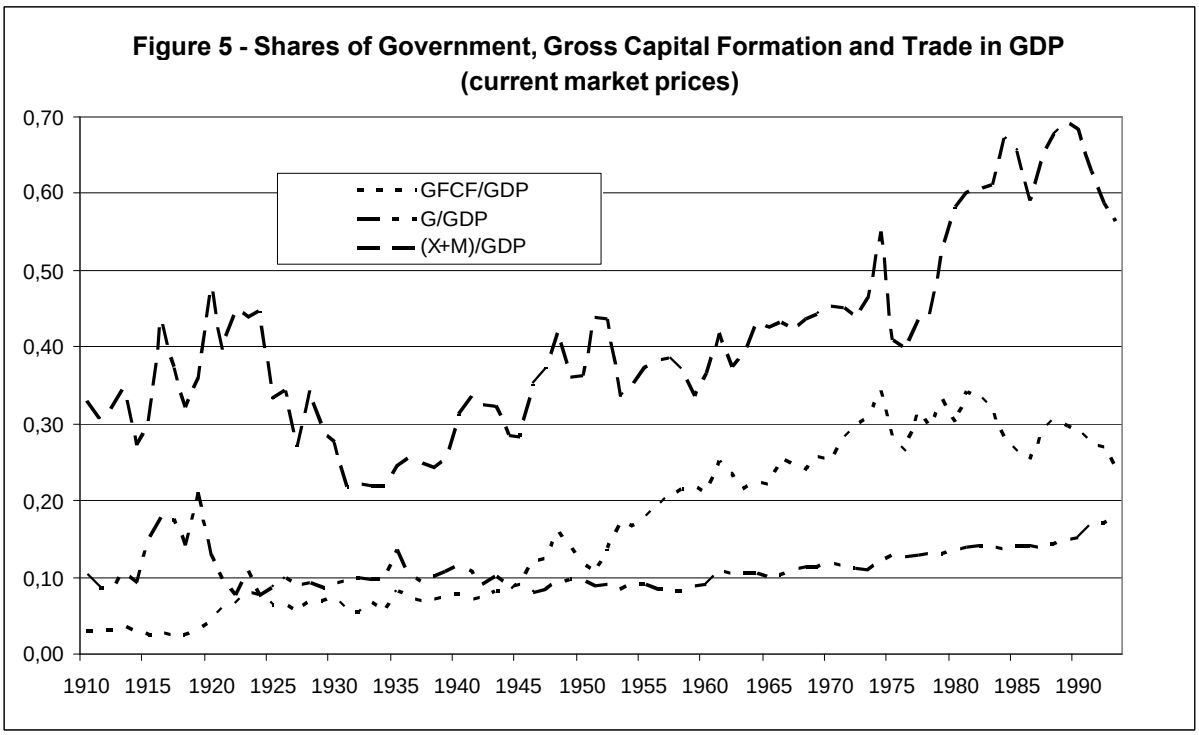
Source: Lains (2003b), Statistical appendix



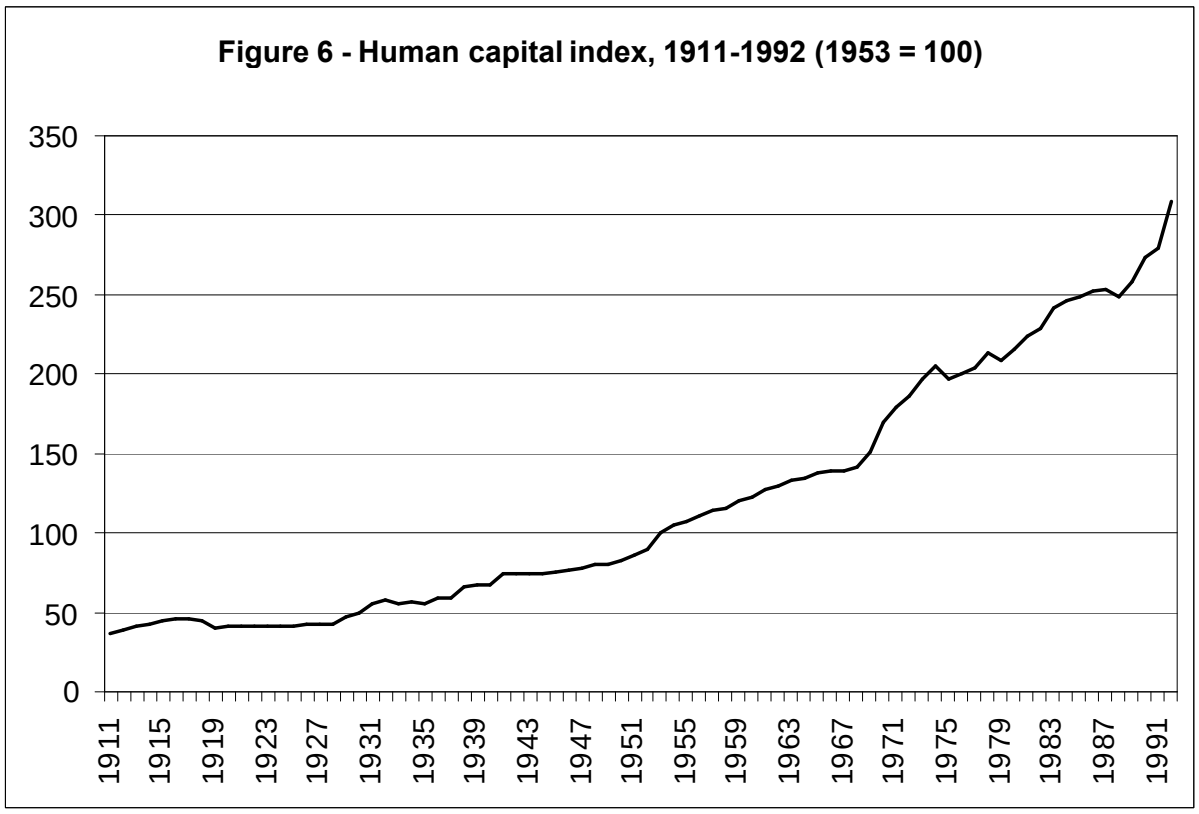




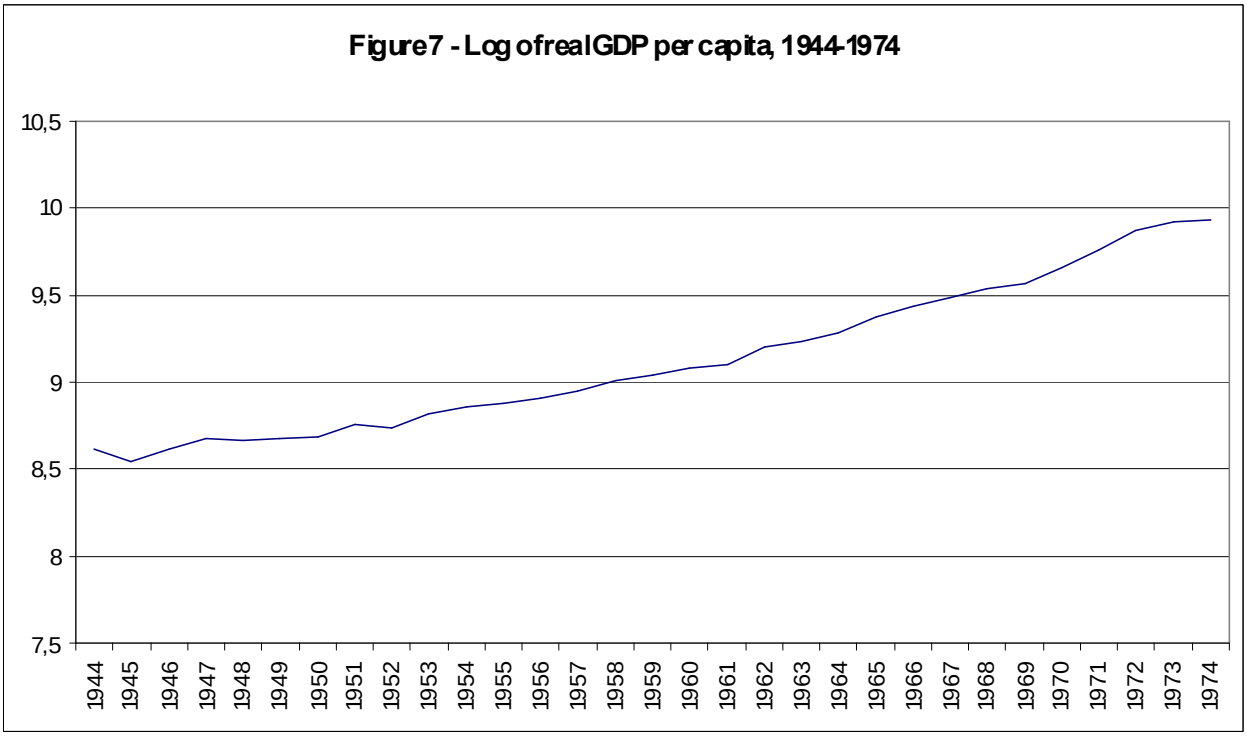
Sources: see Table 4



Sources: Lains (2003a and 2003b)



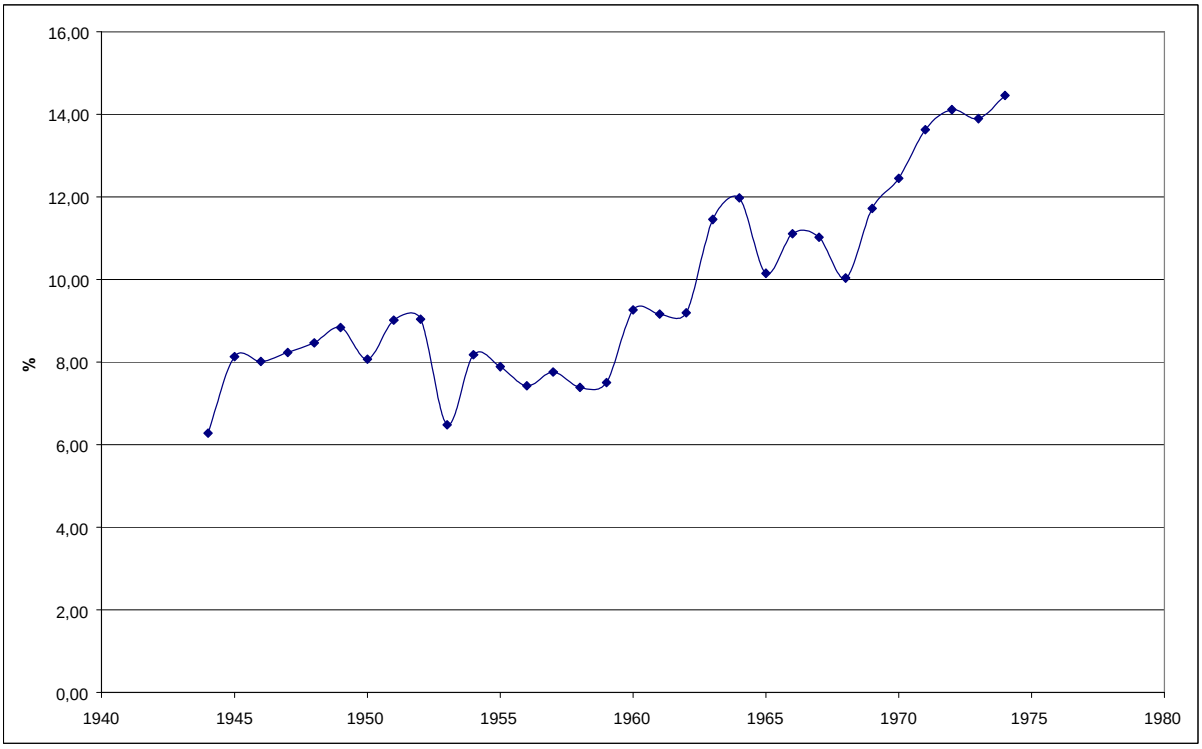
Source: Lains (2003a)



Sources: Lains (2003b)

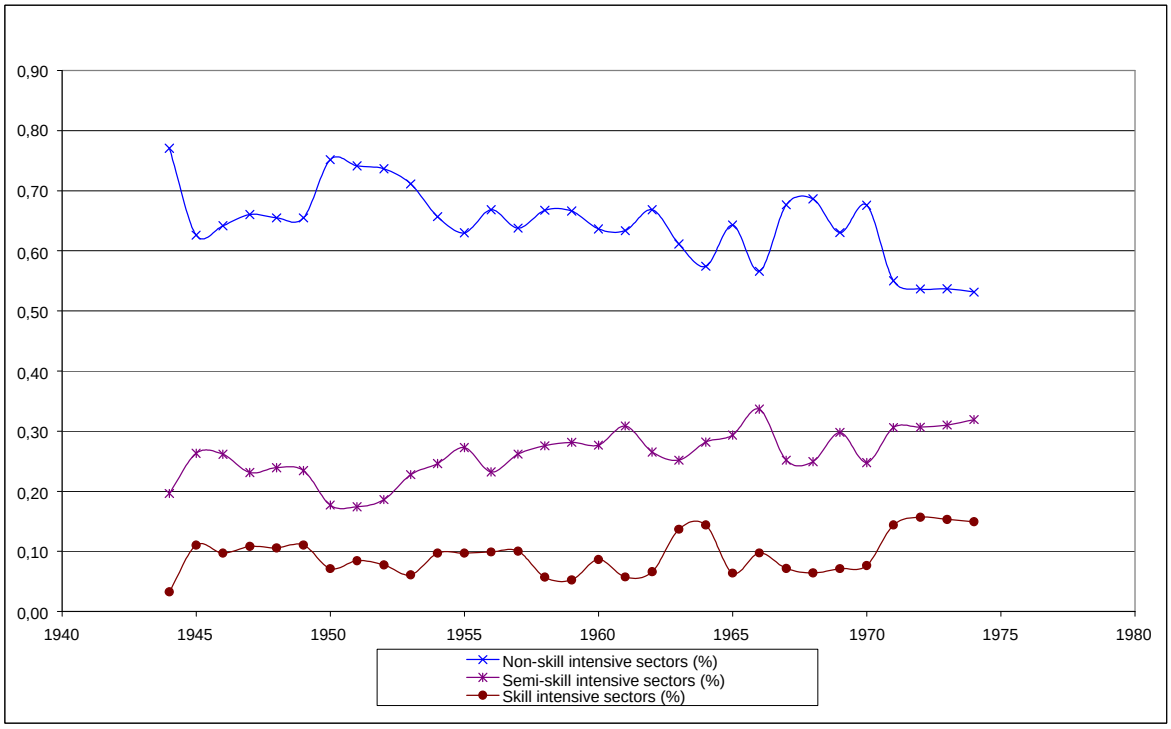
Source: Table A1.

Figure 9 - Participation of skilled workers in total employment in the industrial sector



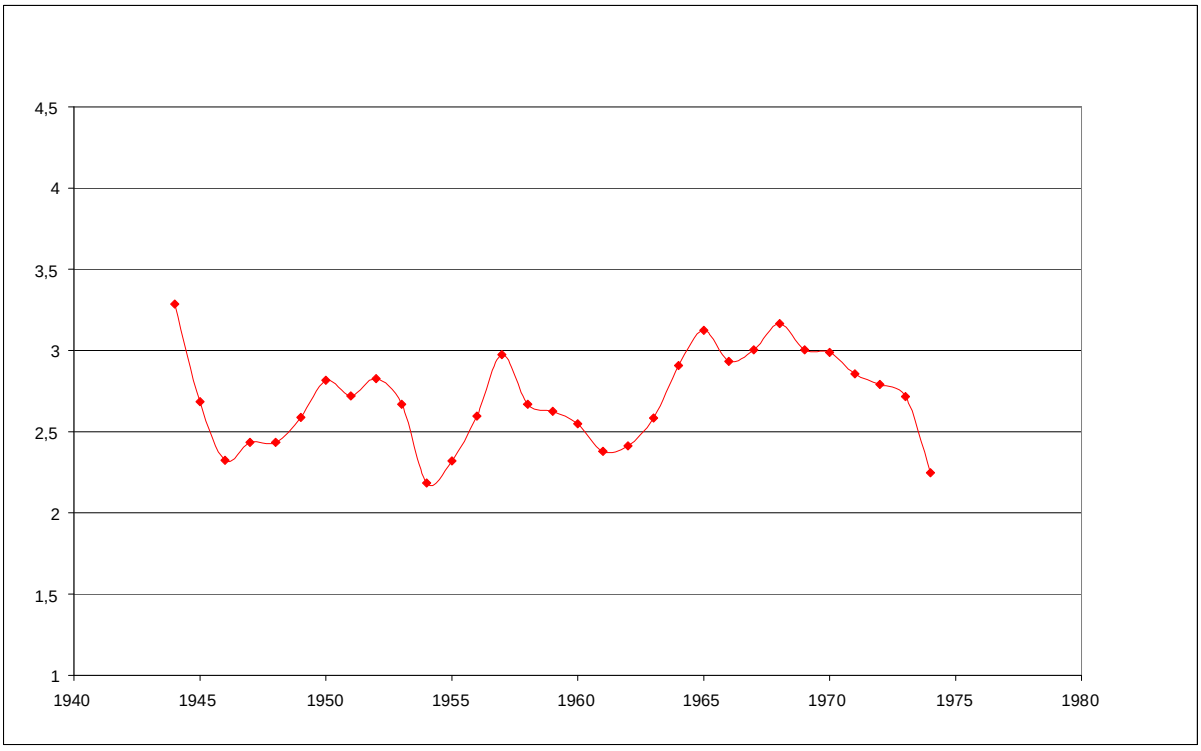
Source: Table A1

Figure 10 - Sectors participation in total labour force in the industrial sector



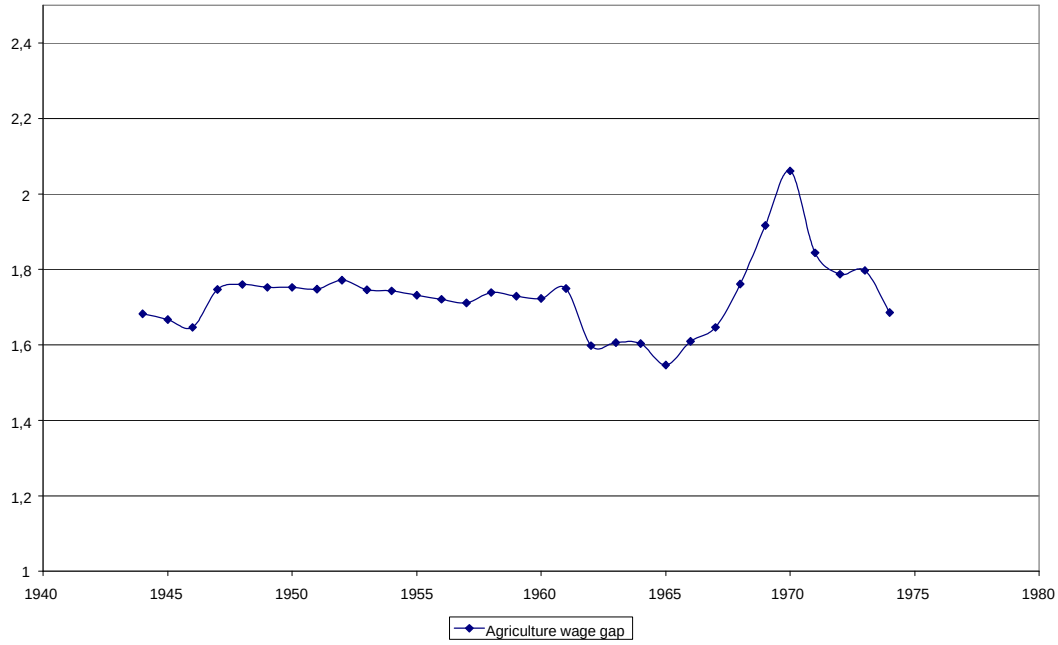
Source: Table A1

Figure 11 - Skill premium in the industrial sector (1944-74)

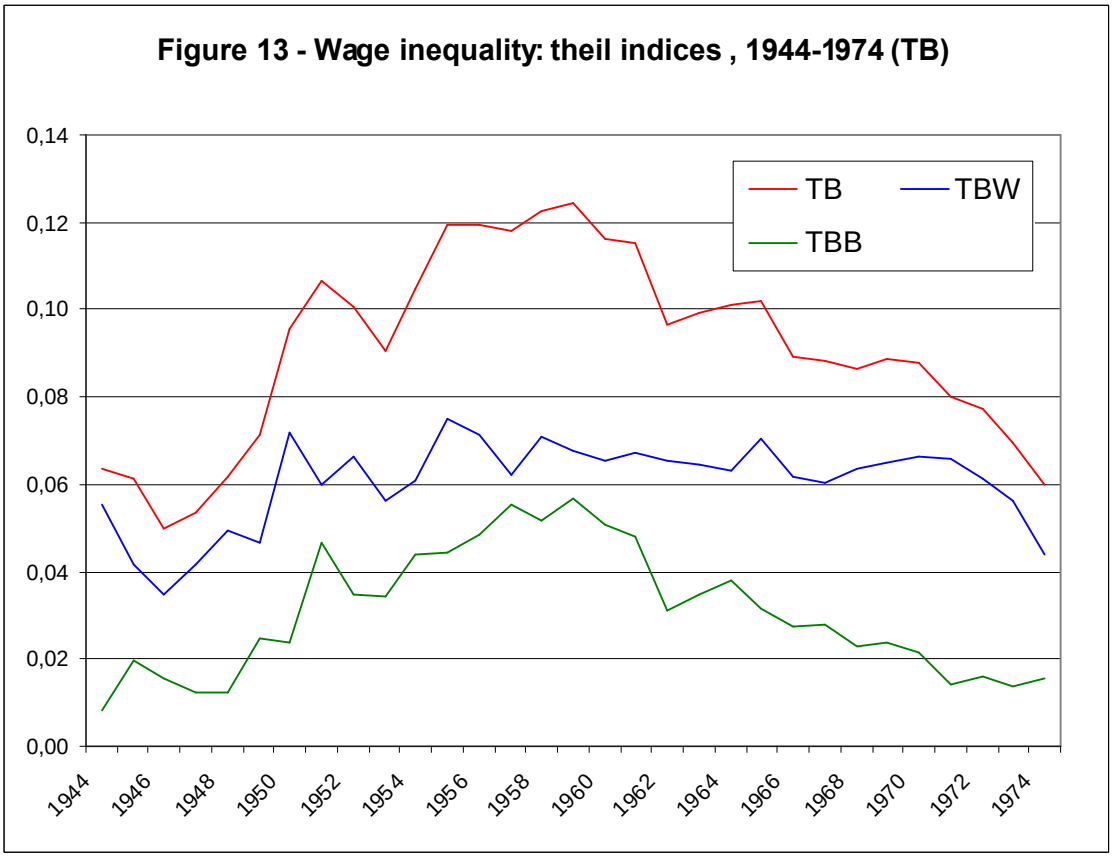


Source: Table A1

Figure 12 – Wage gender gap in the agricultural sector

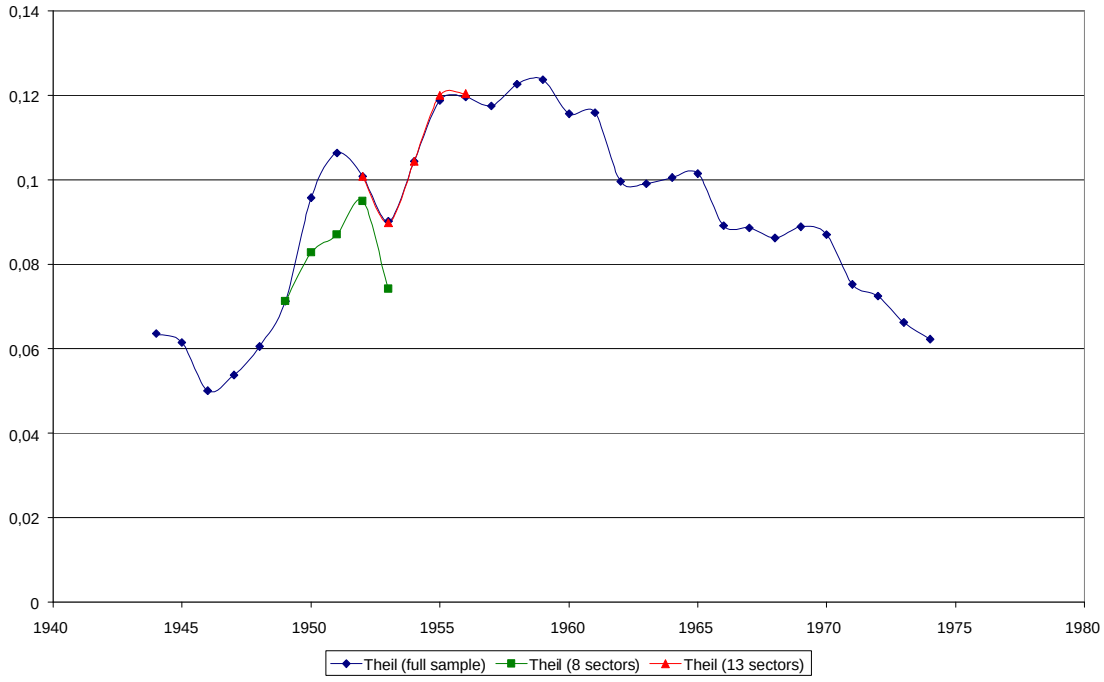


Source: Table A1



Source: Table A3.

Figure 14 – Robustness of the results



Source: see text.

Table A1 - Daily Wages (escudos, current prices)

	1		2		3		4		5		6		7		8		9		10		11	12	13	14	15	16
	male	female	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk						
1944	14,79	8,79	81,16	18,42	39,11	15,33	33,28	11,14	32,17	15,76	35,52	11,38	62,22	12,91	40,81	15,33										
1945	15,44	9,26	71,50	20,23	41,51	15,84	37,97	16,76	34,36	16,61	38,96	12,20	56,61	17,56	43,43	17,74										
1946	18,08	10,98	35,76	19,70	47,82	19,34	40,10	18,57	38,52	19,93	46,40	15,79	60,52	19,99	47,82	21,30										
1947	20,44	11,70	40,33	20,47	51,84	20,17	45,12	19,68	38,51	20,18	47,21	17,94	65,51	20,82	59,45	24,13										
1948	19,89	11,30	43,72	21,05	51,46	20,73	46,73	16,59	40,78	20,13	50,50	19,26	72,02	23,85	60,74	24,37										
1949	19,56	11,16	52,83	23,33	54,81	21,56	51,59	20,53	38,54	22,09	54,38	18,91	82,99	24,70	62,67	25,25										
1950	19,35	11,04	57,09	22,66	59,37	21,25	55,20	19,88	54,71	24,92	45,65	19,08	90,26	26,40	66,16	25,98						28,98	25,82	36,97	81,55	16,29
1951	19,61	11,22	50,10	22,88	59,61	21,87	58,24	20,06	54,50	24,00	60,55	19,20	97,89	27,38	70,85	24,35						31,49	33,71	43,16	103,62	24,52
1952	19,79	11,17	52,48	22,21	61,44	21,16	60,11	22,13	54,09	29,32	63,54	16,38	98,04	25,53	75,95	25,90						27,73	31,44	41,14	92,02	20,47
1953	19,94	11,42	72,13	19,15	50,36	20,42	56,63	22,32	58,43	24,73	67,00	21,50	74,20	25,57	73,55	25,98	52,42	28,02	17,65	19,09	51,67	28,89	31,29	39,82	91,34	21,65
1954	20,10	11,53	63,54	24,37	43,26	25,56	54,77	22,12	55,69	25,20	49,24	19,75	72,38	28,63	74,31	27,48	53,92	27,40	20,57	18,15	60,27	33,13	33,76	47,78	105,68	23,05
1955	20,31	11,73	69,38	24,95	59,05	22,21	63,38	24,02	61,58	33,06	73,35	19,67	66,97	27,25	78,02	26,01	53,10	27,34	16,50	18,41	60,42	33,91	33,58	55,63	108,26	21,55
1956	20,51	11,92	77,39	25,36	64,41	23,57	62,71	24,17	58,36	26,30	61,54	22,40	71,05	29,53	79,87	28,04	59,26	28,50	47,70	19,85	64,26	37,08	36,68	57,19	108,19	22,77
1957	20,86	12,19	85,70	27,20	66,46	24,45	69,88	24,33	60,27	31,32	63,08	22,57	77,02	30,23	85,59	28,75	59,95	29,44	26,54	19,45	62,67	40,20	37,06	56,73	117,33	26,72
1958	21,86	12,57	88,42	28,70	69,29	24,65	63,94	24,58	61,22	29,83	107,73	24,15	81,38	30,12	87,28	30,30	96,87	34,43	27,35	19,27	69,98	34,77	40,78	59,52	120,79	27,44
1959	22,96	13,28	91,34	29,60	71,77	25,47	67,44	24,98	61,66	30,49	78,46	25,18	84,86	31,59	99,17	32,98	100,06	43,76	29,00	19,79	75,85	39,99	44,58	61,14	129,64	30,67
1960	24,83	14,41	93,70	31,24	75,99	27,41	69,33	26,51	66,88	30,11	75,16	26,86	82,60	32,92	94,63	34,73	100,26	46,57	35,56	20,50	78,73	39,62	46,90	61,93	136,21	32,83
1961	27,20	15,55	91,98	33,76	72,22	27,89	69,31	29,89	86,69	36,75	78,22	31,04	88,83	35,11	91,72	35,74	100,16	50,04	39,84	23,08	81,75	42,57	50,40	68,09	153,43	34,55
1962	31,71	19,84	92,98	34,33	91,60	30,01	72,49	30,32	66,37	32,46	84,98	33,19	93,84	37,53	102,93	38,22	104,07	50,88	42,94	24,22	88,75	42,11	49,37	73,72	151,27	36,91
1963	33,60	20,92	96,60	36,63	96,54	31,11	86,52	31,18	75,01	34,14	96,81	36,77	101,93	38,33	109,74	40,11	116,91	55,50	60,04	25,61	95,29	43,95	59,40	78,11	156,18	42,16
1964	37,12	23,15	102,19	38,54	104,06	34,09	117,24	34,11	105,42	34,88	118,99	38,75	117,98	41,54	128,31	41,94	63,11	58,37	89,94	26,75	102,40	49,86	79,37	83,19	165,58	47,07
1965	40,95	26,48	108,96	43,34	111,43	36,79	138,41	39,43	126,18	36,68	133,93	43,78	129,70	44,90	137,52	42,62	144,78	59,07	79,52	29,63	115,88	53,26	77,22	89,74	190,89	51,96
1966	47,16	29,30	110,62	48,93	98,19	40,83	142,82	42,96	131,88	43,24	143,20	49,03	144,58	48,54	168,33	58,03	153,72	63,26	117,23	39,24	120,14	63,53	83,05	99,08	187,70	56,93
1967	52,13	31,66	110,16	53,91	138,02	45,66	160,47	44,75	146,61	52,55	155,37	54,17	163,92	55,95	165,61	57,21	176,00	70,18	108,39	36,73	128,77	71,59	91,80	106,69	198,48	66,02
1968	61,53	34,94	166,97	59,92	139,85	50,67	165,57	46,30	153,88	50,94	144,96	50,14	167,76	58,45	176,41	57,44	188,30	75,52	136,89	39,70	144,33	74,26	97,47	105,68	221,67	72,38
1969	66,66	34,78	188,15	68,91	149,06	55,96	171,94	47,31	168,87	56,82	152,88	53,07	172,93	70,09	178,72	67,01	202,44	83,62	131,50	49,45	167,10	81,47	105,71	118,44	230,66	77,77
1970	78,39	38,03	216,44	82,78	180,03	91,90	188,70	53,44	158,27	60,20	202,31	80,16	202,79	83,87	198,59	61,55	187,19	107,97	158,13	53,56	202,24	96,76	118,86	135,82	275,24	86,90
1971	91,42	49,57	214,51	89,60	172,57	77,65	210,56	62,31	165,68	71,21	212,38	101,00	245,34	106,07	240,58	91,92	264,75	122,75	171,92	63,89	220,92	96,57	134,66	148,72	286,58	96,32

1972	98,89	55,33	215,15	105,60	206,25	84,46	236,56	70,20	190,39	80,19	216,30	125,60	270,97	121,98	270,90	106,60	291,93	146,96	189,12	78,81	260,23	113,73	150,15	184,97	300,04	112,48
1973	114,81	63,88	243,10	119,20	216,00	104,62	273,13	86,09	211,84	94,97	250,69	140,33	322,08	142,95	298,69	120,15	347,15	160,91	226,50	93,01	313,52	137,97	174,22	174,47	333,18	127,26
1974	148,66	88,18	318,33	184,00	286,00	162,29	308,64	134,37	287,96	138,84	316,72	207,62	405,15	260,47	344,20	183,62	419,40	266,46	300,09	133,62	426,40	198,14	231,81	291,44	428,55	183,05

(1) Agriculture; (2) Mining & quarrying; (3) Food, drink & tobacco; (4) Textiles and clothing & leather and footwear; (5) Wood and products and cork & furniture; (6) Pulp, paper, paper products, printing & publishing; (7) Chemicals; (8) Non-metallic mineral products; (9) Basic metals & electrical and transport equipment; (10) Other manufacturing; (11) Electricity, gas & water supply; (12) Construction & public works; (13) Wholesale and retail trade; (14) Transport & communications; (15) Banks, insurances and real estate; (16) Other Services

(2) Sources: See Appendix

Table A2 - Number of workers

	1		2		3		4		5		6		7		8		9		10		11	12	13	14	15	16
	male	female	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk	skilled	unsk						
1944	754.653	125.429	1.424	23.413	5.930	47.933	12.034	147.592	2.581	58.325	987	13.988	2.826	21.159	1.258	16.168	na	na	na	na	na	na	na	na	na	na
1945	758.973	128.480	1.650	23.530	6.030	48.289	12.233	148.955	2.641	59.683	1.014	14.228	2.899	21.255	1.307	16.552	na	na	na	na	na	na	na	na	na	na
1946	762.233	131.322	1.913	23.954	6.138	49.070	12.079	152.284	2.763	62.427	1.086	14.688	3.019	21.556	1.396	17.359	na	na	na	na	na	na	na	na	na	na
1947	765.521	134.137	2.050	24.504	6.288	49.860	12.451	155.184	2.888	65.250	1.168	15.172	3.327	21.668	1.464	18.215	na	na	na	na	na	na	na	na	na	na
1948	770.988	137.310	1.990	25.289	6.718	50.370	13.329	157.628	3.015	68.126	1.192	15.714	3.525	21.975	1.548	19.056	na	na	na	na	na	na	na	na	na	na
1949	774.168	140.052	1.911	26.093	7.226	50.801	12.720	161.584	3.143	71.029	1.370	16.135	3.784	22.222	1.724	19.805	na	na	na	na	na	na	na	na	na	na
1950	777.321	142.759	1.805	26.733	7.649	50.860	12.226	164.538	3.248	73.149	1.600	16.571	4.248	23.693	1.919	20.593	na	na	na	na	na	114.116	109.245	97.699	19.140	478.620
1951	770.796	141.732	1.717	27.127	7.677	50.858	11.274	167.114	3.686	74.101	1.868	17.068	4.985	26.322	2.134	21.417	na	na	na	na	na	116.529	110.246	98.302	19.258	477.924
1952	762.744	140.419	1.411	27.508	7.328	50.826	11.024	168.176	3.403	74.969	1.785	17.983	5.784	30.320	2.099	22.551	na	na	na	na	na	121.402	112.277	99.507	19.494	476.706
1953	755.411	139.232	1.347	27.095	7.151	51.977	10.851	166.420	2.902	74.940	1.850	18.787	6.293	32.759	2.108	23.947	5.815	65.469	171	4.377	9.820	124.734	114.080	101.123	19.953	474.279
1954	747.297	137.897	1.250	26.587	6.866	53.914	10.072	166.175	2.169	76.344	1.788	19.975	6.709	33.892	2.130	26.160	5.997	66.912	194	4.435	10.325	129.662	118.829	101.671	20.556	471.336
1955	739.713	136.653	1.403	26.750	6.991	56.212	9.974	164.227	2.218	78.749	1.950	21.008	6.934	34.079	2.372	29.113	6.368	71.294	288	4.439	11.335	140.499	124.999	102.126	21.363	469.004
1956	732.012	135.383	1.437	27.845	6.982	57.982	8.832	165.342	2.609	82.100	1.953	21.760	7.794	34.511	2.605	32.338	7.234	77.171	327	4.441	11.958	155.189	132.643	102.973	22.085	468.869
1957	723.556	133.968	1.500	28.133	7.244	59.552	8.432	164.608	2.823	83.051	1.982	21.852	8.634	35.561	2.892	35.485	8.165	82.514	370	4.476	12.921	172.319	139.023	105.181	22.860	471.875
1958	715.637	132.647	1.475	26.710	7.502	60.543	8.575	163.783	2.994	82.058	1.978	21.823	9.864	37.122	3.266	38.940	9.162	86.015	363	4.608	13.918	184.856	144.788	107.892	23.770	475.354
1959	707.498	131.280	1.584	24.586	7.991	60.500	9.217	164.245	3.065	81.468	2.114	21.963	11.098	38.253	3.887	42.975	10.173	89.046	470	4.784	14.340	195.041	151.313	110.271	24.777	478.220
1960	687.436	127.693	1.532	22.501	8.599	60.205	9.852	166.286	3.499	84.380	2.403	22.353	12.042	38.297	4.443	46.250	11.231	92.678	628	5.376	15.074	202.189	158.129	113.603	25.831	478.554
1961	654.370	114.709	1.499	20.211	8.835	60.379	10.484	169.463	4.342	91.396	2.704	22.856	12.760	37.337	4.897	48.149	12.540	97.774	799	6.033	15.725	204.501	168.048	116.337	26.757	479.858
1962	626.944	103.353	1.257	18.433	8.993	61.411	11.027	174.373	5.309	99.398	2.950	24.294	13.070	36.839	5.130	48.637	14.155	101.642	857	6.475	16.140	201.957	179.371	117.929	27.769	485.139
1963	604.136	93.292	1.227	17.337	9.192	63.262	11.727	184.500	6.019	105.704	3.228	25.891	13.656	37.378	5.360	48.752	15.801	105.492	839	6.523	16.430	199.275	191.375	118.653	29.114	493.856
1964	580 .464	83.589	1.210	16.989	10.037	66.116	12.757	200.946	6.170	107.666	3.541	27.765	13.999	39.144	5.686	49.559	17.483	110.969	876	6.557	16.749	206.892	203.979	119.620	30.909	504.707
1965	555.168	74.170	1.220	16.726	11.707	69.144	14.268	218.280	6.410	107.383	3.871	29.469	14.281	41.088	6.074	51.256	19.288	121.731	1.050	6.772	16.714	221.254	218.660	121.877	33.151	519.584
1966	528.916	65.167	1.210	16.581	12.566	72.468	15.436	230.708	6.753	106.492	4.291	30.744	14.450	42.233	6.462	52.726	21.404	133.055	1.178	7.005	17.158	232.172	235.202	124.401	35.797	537.985
1967	504.187	56.887	1.369	16.356	13.374	75.162	15.612	237.905	7.547	104.736	4.662	32.003	14.673	42.381	6.694	52.896	23.102	139.643	1.215	7.209	17.985	234.257	250.776	128.618	39.110	559.790
1968	481.656	49.353	1.558	16.039	13.720	77.642	16.344	241.632	7.976	102.383	4.957	33.098	15.107	42.221	6.918	51.834	24.868	142.621	1.258	7.325	18.282	234.854	263.729	134.952	43.523	584.247
1969	458.579	42.241	1.732	15.514	14.732	78.284	17.072	243.139	7.871	98.932	5.335	34.361	15.803	42.809	7.077	50.689	26.696	147.191	1.395	7.350	18.258	240.728	274.435	141.619	48.638	614.602

1970	434.412	35.523	1.487	15.306	15.538	77.478	18.901	243.945	8.155	95.646	5.950	35.172	16.931	43.645	7.382	49.710	27.371	157.526	1.504	7.501	17.782	257.435	285.037	147.395	53.694	639.045
1971	404.551	36.766	1.238	15.064	15.502	76.277	19.695	247.712	8.687	94.301	7.583	34.731	18.189	44.200	7.545	49.488	27.065	167.909	1.555	7.810	17.604	280.753	297.649	151.032	58.306	655.939
1972	378.475	38.135	1.075	15.399	15.537	75.094	21.049	256.143	9.453	94.168	9.082	34.542	19.139	44.611	7.757	50.064	26.368	178.276	1.589	8.240	17.779	303.343	313.288	153.517	63.310	661.261
1973	354.874	39.573	1.181	15.745	15.702	74.417	22.418	261.252	9.369	93.827	10.491	34.153	19.817	44.427	7.894	50.324	27.322	185.098	1.667	8.511	17.500	309.152	324.865	154.967	68.398	676.345
1974	334.923	41.282	1.267	16.083	16.032	73.865	23.348	264.215	9.192	93.356	10.702	34.475	19.908	44.711	7.965	50.431	27.826	188.807	1.692	8.675	17.924	309.516	330.834	155.293	71.265	682.683

(1) Agriculture; (2) Mining & quarrying; (3) Food, drink & tobacco; (4) Textiles and clothing & leather and footwear; (5) Wood and products and cork & furniture; (6) Pulp, paper, paper products, printing & publishing; (7) Chemicals; (8) Non-metallic mineral products; (9) Basic metals & electrical and transport equipment; (10) Other manufacturing; (11) Electricity, gas & water supply; (12) Construction & public works; (13) Wholesale and retail trade; (14) Transport & communications; (15) Banks, insurances and real estate; (16) Other Services

(2) Sources: see Appendix

Table A3 – Total wages and GDP (millions escudos), labour force (thousands) and shares

	WA	WB	GDP	WLA	WLB	L	WA/GDP	WB/GDP	WLA/L	WLB/L
1944	4.827		35.040	1.236			0,138			
1945	5.385		36.514	1.248			0,147			
1946	6.312		45.485	1.263			0,139			
1947	6.974		50.558	1.279			0,138			
1948	6.872		47.403	1.298			0,145			
1949	7.222		49.737	1.314			0,145			
1950	13.172		50.938	2.148			0,259			
1951	15.198		54.842	2.152			0,277			
1952	14.590		53.773	2.158			0,271			
1953	15.519	27.017	58.993	2.243	2.283	3.243	0,263	0,458	0,692	0,704
1954	16.585	29.123	62.564	2.249	2.273	3.248	0,265	0,465	0,692	0,700
1955	17.265	30.112	65.447	2.270	2.298	3.266	0,264	0,460	0,695	0,704
1956	18.219	31.681	69.943	2.304	2.343	3.295	0,260	0,453	0,699	0,711
1957	19.807	32.633	74.250	2.339	2.375	3.329	0,267	0,440	0,703	0,714
1958	20.803	32.927	79.191	2.366	2.405	3.358	0,263	0,416	0,704	0,716
1959	22.962	35.608	84.042	2.390	2.426	3.379	0,273	0,424	0,707	0,718
1960	24.480	38.026	88.994	2.401	2.439	3.390	0,275	0,427	0,708	0,719
1961	26.762	41.245	92.648	2.393	2.433	3.398	0,289	0,445	0,704	0,716
1962	28.695	43.693	103.987	2.393	2.432	3.408	0,276	0,420	0,702	0,714
1963	31.715	47.671	107.438	2.408	2.440	3.432	0,295	0,444	0,702	0,711
1964	36.270	52.171	116.626	2.444	2.472	3.477	0,311	0,447	0,703	0,711
1965	41.013	58.697	135.681	2.501	2.540	3.531	0,302	0,433	0,708	0,719
1966	46.818	65.292	144.812	2.553	2.610	3.582	0,323	0,451	0,713	0,729
1967	53.432	75.189	162.217	2.588	2.627	3.626	0,329	0,464	0,714	0,725
1968	58.520	81.464	175.432	2.618	2.642	3.660	0,334	0,464	0,715	0,722
1969	64.910	90.414	188.229	2.655	2.692	3.693	0,345	0,480	0,719	0,729
1970	77.109	104.106	212.358	2.699	2.734	3.736	0,363	0,490	0,723	0,732
1971	88.668	118.278	245.768	2.747	2.777	3.772	0,361	0,481	0,728	0,736
1972	104.270	137.751	289.955	2.797	2.834	3.815	0,360	0,475	0,733	0,743
1973	120.910	162.368	342.817	2.829	2.878	3.851	0,353	0,474	0,735	0,747
1974	174.841	213.138	405.744	2.836	2.874	3.862	0,431	0,525	0,734	0,744

Sources: WA = Total wages from the data set (tables A1 and A2), current prices; WB = Total wages (ordenados e salários) from Pinheiro et al. (1997) current prices; GDP = Pinheiro et al. (1997) and Batista et al. (1997), current prices; WLA = wage labour from the data set (table A2); WLB = wage labour from Pinheiro et al. (1997) (trabalhadores por conta de outrém);
L = Labour from Pinheiro et al. (1997) (população activa, sentido lato)

Table A4 – Theil inequality indices

	TA	TAW	TAB	TB	TBW	TBB	TC	TCW	TCB
1944	0,041	0,039	0,001	0,064	0,056	0,008	0,014	0,006	0,008
1945	0,035	0,028	0,007	0,061	0,042	0,020	0,022	0,002	0,020
1946	0,027	0,022	0,005	0,050	0,035	0,016	0,017	0,001	0,016
1947	0,029	0,026	0,003	0,054	0,041	0,012	0,014	0,001	0,012
1948	0,036	0,033	0,003	0,062	0,050	0,012	0,017	0,004	0,012
1949	0,041	0,032	0,009	0,071	0,047	0,025	0,027	0,003	0,025
1950	0,072	0,062	0,010	0,096	0,072	0,024	0,068	0,045	0,024
1951	0,079	0,052	0,027	0,107	0,060	0,047	0,081	0,034	0,047
1952	0,074	0,057	0,017	0,101	0,066	0,035	0,073	0,038	0,035
1953	0,066	0,049	0,017	0,090	0,056	0,034	0,067	0,033	0,034
1954	0,079	0,054	0,025	0,105	0,061	0,044	0,086	0,042	0,044
1955	0,093	0,067	0,026	0,119	0,075	0,044	0,098	0,054	0,044
1956	0,094	0,064	0,030	0,120	0,071	0,049	0,099	0,051	0,049
1957	0,093	0,056	0,036	0,118	0,062	0,056	0,097	0,042	0,056
1958	0,097	0,064	0,033	0,123	0,071	0,052	0,098	0,046	0,052
1959	0,099	0,062	0,037	0,124	0,068	0,057	0,102	0,045	0,057
1960	0,092	0,060	0,033	0,116	0,065	0,051	0,095	0,044	0,051
1961	0,092	0,062	0,030	0,115	0,067	0,048	0,095	0,047	0,048
1962	0,079	0,061	0,019	0,097	0,066	0,031	0,077	0,046	0,031
1963	0,082	0,060	0,022	0,099	0,065	0,035	0,077	0,043	0,035
1964	0,084	0,059	0,025	0,101	0,063	0,038	0,077	0,039	0,038
1965	0,087	0,067	0,020	0,102	0,071	0,031	0,072	0,040	0,031
1966	0,074	0,058	0,017	0,089	0,062	0,027	0,061	0,034	0,027
1967	0,073	0,056	0,017	0,088	0,061	0,028	0,058	0,030	0,028
1968	0,071	0,058	0,013	0,087	0,064	0,023	0,055	0,032	0,023
1969	0,071	0,059	0,012	0,089	0,065	0,024	0,058	0,035	0,024
1970	0,069	0,060	0,010	0,088	0,066	0,021	0,062	0,041	0,021
1971	0,067	0,061	0,006	0,080	0,066	0,014	0,055	0,041	0,014
1972	0,065	0,058	0,008	0,077	0,061	0,016	0,055	0,039	0,016
1973	0,059	0,053	0,006	0,070	0,056	0,014	0,047	0,034	0,014
1974	0,050	0,042	0,009	0,060	0,044	0,016	0,049	0,033	0,016

TA = 16 sectors, including skilled and unskilled workers (male and female shares in agricultural labour force taken from the original source) ; TB = 16 sectors, including skilled and unskilled workers (male and female shares in agricultural labour force set at 50 percent each); TC = 16 sectors, average wages.

T = Theil index of total inequality; TW = inequality within sectors; TB = inequality between

Sources: tables A1 and A2