

EARNINGS INEQUALITY IN PORTUGAL: HIGH AND RISING?

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The level of earnings inequality and its change during the 1980s in Portugal are analyzed, relying on several inequality measures and on international comparisons to generate insight into their patterns. A high level of inequality at the beginning of the eighties is detected, together with a pronounced rise in wage dispersion, brought about by growing inequality at the top. Changes taking place *within* economic activities, possibly technical progress, are the main forces driving these changes in the wage pattern, while demographic forces, as well as international trade, which could have generated shifts in the demand for labor across economic activities, should be dismissed as explanations for the rise in labor market inequality in Portugal from 1983 to 1992.

1. INTRODUCTION

Labor market and inequality have been two lines of research to a great extent disassociated in the literature on Portugal. Indeed, most work on inequality has concentrated on income and not on labor returns, generating expectations about the evolution of wage dispersion that are worth testing.¹ Using micro data drawn from household surveys conducted in 1980/81 and 1989/90, Gouveia and Tavares (1995), Rodrigues (1994) and Rodrigues (1993) detect an unambiguous decline in income inequality during the decade. Gouveia and Tavares put forth the hypothesis that this trend may have resulted from the evolution of wages, as low-wage employment presumably increased its importance in the economy, under the pressure of international competition that would have contributed to reinforce the Portuguese specialization in low-skilled activities.

On the contrary, when progressing to the decomposition of the trend in inequality into income sources, Rodrigues (1994) finds that the evolution of wages and of the returns to capital would have generated rising inequality, which was nonetheless more than offset by the evolution of the earnings of the self-employed, direct taxes and other contributions, and pensions.

This view of rising earnings inequality is shared by the short references that can be found in the literature regarding labor market inequality in Portugal. The *Relatório de Conjuntura*, an annual report by the Ministry of Employment and Social Security (MESS), reported a 10 percent rise in the Gini index from 1982 to 1989, and an increase, from 37 to 40 percent, in the share of the total wage bill earned by the top quintile of the distribution (Portugal, MESS, DEP, 1992, p. 131). Similarly, the *Employment Outlook* by the OECD reports a rising trend in labor market inequality in Portugal from 1985 to 1989.

The first purpose of this study is to investigate the level and the trend of earnings inequality in Portugal, relying on several inequality measures and on

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¹See the point by Jenkins (1995: 30–32, 56) on income inequality trends vs. wage inequality trends.

international comparisons to generate insight into their patterns. Three major findings will be highlighted in Sections 2 and 3: (i) inequality in the Portuguese labor market achieves high levels, when compared to other countries; (ii) inequality increased during the 1980s and early 1990s, as in most other OECD economies; (iii) the upper part of the earnings distribution played a major role in shaping both the level and the trend of inequality in Portugal.

Progressing to an overview of the causes of the trend in inequality, the analysis concentrates in Section 4 on changes in the employment structure, relying on a simple supply-demand framework to evaluate alternative explanations for the rise in earnings dispersion, which are often presented in the literature. The fourth finding is thus: the rise in inequality was mainly generated by shifts in the employment structure that have taken place *within* economic activities, in favor of workers with higher qualifications; supply changes and the differential demand growth across industries should be dismissed as explanations for the trend in labor market inequality in Portugal.

Section 5 comments on the role of institutional forces—the minimum wage and collective bargaining—in compressing the bottom part of the wage distribution. Differences between the institutional framework in Portugal, other European countries and the U.S. are pointed out.

This study uses a dataset gathered annually by the Portuguese Ministry of Employment and Social Security, based on a questionnaire that every establishment with wage earners is, since 1982, legally obliged to fill in. The data source therefore provides invaluable information on the evolution of inequality in Portugal, highlighting developments in the labor market. The data concentrate on manufacturing and the services, and full-time wage-earners, male and female, with no age restrictions, are dealt with in the analysis throughout the paper. Where, for the purpose of international comparisons, other distributions are considered, it will be explicitly acknowledged. The appendix provides more detailed information on the data used.

2. THE LEVEL OF EARNINGS INEQUALITY AND ITS PATTERN: COMPRESSED BOTTOM AND STRETCHED TOP

The level of inequality existing in Portugal in 1983 is depicted in Table 1. Hourly earnings are considered (see Appendix for more details). The hourly concept, which is more often used, controls for the different durations of the workday, but it may nonetheless be influenced by the mismatch between the actual duration of work for certain types of workers and their *contractual* workday set by collective bargaining (which is reported by our data source). In fact, while manual workers usually stick to their pre-set duration of work, non-manual workers often extend their workday beyond the contractual level, having more fluid timetables.²

²See the analysis by Atkinson *et al.* (1988), who compare overlapping data reported by a household and by an employer survey—the Family Expenditure Survey and the New Earnings Survey, respectively. While for manual workers there is reasonable agreement on the number of hours worked, for non-manual workers, either male or female, employees report higher values than employers, suggesting that for staff not paid on an hourly basis, employers tend to report the contractual duration of work, while workers have a different perception of the hours effectively worked.

TABLE 1
HOURLY EARNINGS INEQUALITY IN PORTUGAL, 1983

Gini	Theil	Coef. Variation	Wage Ratio		
			Q90/Q10	Q90/Q50	Q50/Q10
0.324	0.2	0.782	3.755	2.354	1.596

Source: Computations based on Portugal, MESS, DE (1983).

Exploratory analysis, however, revealed that the pattern and the changes detected in the earnings distribution are robust to the choice of the concept of earnings (see Cardoso, 1996 for the comparison of hourly and monthly earnings).

International comparisons invariably have to face the fact that “complete cross-national comparability is not attainable. Comparability is a matter of degree, and all that one can hope for is to reach an acceptable level.” (Atkinson, 1996 p. 16.) Meaningful international comparisons of the level of inequality should be restricted to those studies that have measured a comparable variable, for a comparable population, during the eighties and, of course, relying on the same inequality measures, which must be independent of the size of the population and the scale of the variable. While our database only reports gross earnings—which therefore becomes a binding constraint—it allows great flexibility regarding other aspects of the comparison, given its very detailed and extensive nature. The availability of a harmonized international dataset, on which several studies of earnings inequality have been based (The Luxembourg Income Study—LIS) imposes the restriction of our sample, for the purpose of international comparisons, to full-time males aged 25 to 54 years.

The Gini index indicates that inequality in the Portuguese labor market reaches a level similar to that of the U.K., that is, slightly lower than the U.S., usually taken as the paradigm of an unequal labor market, but higher than Canada, and much higher than Australia, the ex-West Germany or Sweden. The

TABLE 2
GROSS EARNINGS^a INEQUALITY IN SEVERAL COUNTRIES, FULL-TIME MALES
AGED 25–54

	Gini1	Gini2	wage ratio: Percentile 90/Percentile 10
Portugal 86		0.295	3.17
U.S. 86	0.298	0.300	4.00
Sweden 87	0.190	0.205	2.08
Canada 87	0.253	0.256	3.03
Australia 85	0.212	0.202	2.42
W. Germany 84	0.204	0.205	2.38
U.K. 86	—	0.296	—

Sources: Portugal—own computations based on Portugal, MESS, DE (1986); Gini1—Green *et al.* (1992: 6, 9), using the LIS; Gini2—Bradbury (1993: Appendix A), using the LIS; Wage ratio—own computations based on data reported in Green *et al.* (1992, pp. 6, 9, 14–15).

Notes: “Data on Portugal refer to monthly earnings, those on the U.K. refer to weekly earnings, whereas for other countries they refer to annual earnings.

(—) Data not available.

ratio of the 90th to the 10th wage percentiles confirms this ranking of the countries.

More interestingly, the detection of the pattern of inequality would enable us to answer the question: *Why is inequality high in Portugal—is it mainly due to the situation at the top or at the bottom of the distribution?* Stated differently, *Is it because low wages are very low, because high wages are very high, or due to the situation at the middle of the distribution, that the value for overall inequality is high in Portugal?*

The international comparison of inequality at different points of the earnings distribution relies on studies that have specifically addressed the issue of inter-country comparisons. Since Portugal is not included in these studies, it will be *plugged into* the available rankings, by using a procedure that can be summarized as follows: the data on Portugal will never be mixed with more than *one* other data source at a time (understood as one article); the concepts used regarding the definition of the working population and the inequality measure are similar to those used by each of the studies, to ensure comparability of the distributions; alternative rankings of the countries are considered, and only results that are consistent across the different rankings will be stressed; furthermore, the *size* of the differences in inequality will not be referred to, but instead conclusions will be restricted to inequality *rankings*, to keep the comments on the safest grounds possible.

In Table 3, data on Portugal, highlighted in bold, have been plugged into different rankings obtained by previous comparative studies—referred to as 1, 2, 3 and 4. The values reported relate selected percentiles for each of the distributions to its median. Note that countries are always ranked in descending order of labor market inequality.

As we climb up the wage distribution, Portugal climbs up the inequality ranking. Such is the characteristic of the Portuguese earnings distribution that consistently emerges from all the comparisons in Table 3. Indeed, at the lowest part of the distribution, Portugal ranks among the least unequal countries, with a distance between the 1st and 50th wage deciles similar to that of Sweden. That situation gradually changes as we move towards higher wages. The relation between the 90th or 99th percentiles and the median in fact depicts Portugal as *the most* unequal country, with a wage distribution more stretched than the U.S. or the U.K. A relatively compressed bottom and a stretched top can thus be highlighted as the main characteristics of the Portuguese earnings distribution. The high degree of inequality prevailing in the country's labor market is essentially due to the fact that *high wages are very high*, relative to the rest of the distribution.

It is interesting to note that precisely the opposite pattern had been detected by Davis (1992, p. 250) and by Blau and Kahn (1996) for the U.S. A very stretched bottom of the wage distribution and a degree of inequality at the top similar to most other countries had been identified by these authors.

3. THE TREND IN LABOR MARKET INEQUALITY: RISING DISPERSION AT THE TOP

Following a trend by now widely reported for many other OECD countries [see for example OECD (1993)], rising inequality characterized the evolution of labor returns in Portugal during the 1980s and early 1990s.

TABLE 3
RANKING OF COUNTRIES ACCORDING TO INEQUALITY AT DIFFERENT POINTS OF THE
EARNINGS DISTRIBUTION—DESCENDING ORDER

Concept of Working Population Used (see notes)	Log Wage Differential Between the Percentiles							
	50-1		50-10		90-50		99-50	
1	U.S.	1.76	U.S.	0.77	Portugal	0.76	Portugal	1.60
	Canada	1.73	Canada	0.63	U.S.	0.62	U.S.	1.28
	Australia	1.55	Australia	0.43	W. Ger	0.52	Canada	1.10
	W. Ger	0.69	Portugal	0.39	Canada	0.48	Sweden	1.08
	Portugal	0.67	W. Ger	0.35	Sweden	0.46	W. Ger	0.93
	Sweden	0.67	Sweden	0.27	Australia	0.45	Australia	0.92
2			U.S.	0.70	Portugal	0.87		
			Portugal	0.49	France	0.73		
			France	0.45	U.S.	0.66		
			U.K.	0.43	U.K.	0.61		
3			U.S.	0.53	Portugal	0.77		
			France	0.41	U.S.	0.63		
			U.K.	0.41	U.K.	0.58		
			Portugal	0.36	France	0.52		
4			U.S.	1.04	Portugal	0.92		
			Australia	0.755	Switz.	0.777		
			U.K.	0.594	U.K.	0.683		
			Italy	0.478	Hungary	0.661		
			Switz.	0.464	U.S.	0.552		
			Hungary	0.462	W. Ger	0.539		
			W. Ger	0.456	Norway	0.525		
			Portugal	0.45	Austria	0.508		
			Austria	0.391	Italy	0.486		
			Sweden	0.382	Sweden	0.452		
		Norway	0.221	Australia	0.439			

Sources: Portugal: computations based on Portugal, MESS, DE (1983, 1986). Other countries: Panel 1—Own computations based on data reported in Green *et al.* (1992: 6). Panels 2 and 3—Katz *et al.* (1993, p. 37). Panel 4—Blau and Kahn (1996, p. 806).

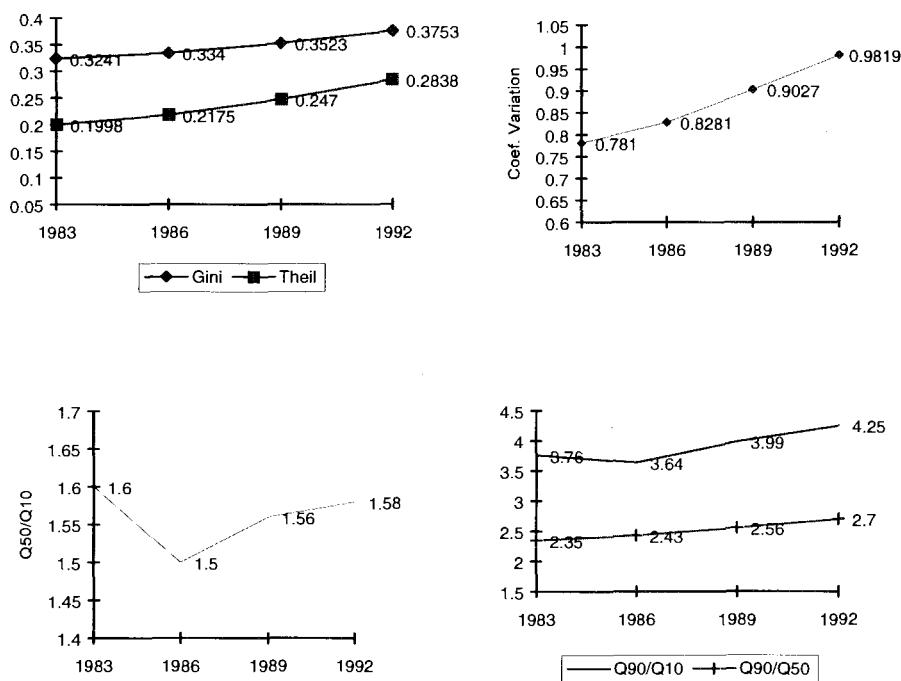
Notes: (1) *Working population:* full-time males, aged 25 to 54 years. *Concept of earnings:* gross monthly earnings for Portugal and gross annual earnings (full year workers) for the other countries. *Years covered:* 1986 for Portugal and the U.S. 1987 for Sweden and Canada, 1985 for Australia and 1984 for West Germany.

(2) *Working population:* full-time males, 18 to 64 years old in the U.S., older than 21 in the U.K., and with no age restrictions in France and Portugal. *Concept of earnings:* log hourly earnings (gross). *Years covered:* 1983 for Portugal and 1984 for all other countries.

(3) *Working population:* full-time females, 18 to 64 years old in the U.S., older than 18 in the U.K., and with no age restrictions in France and Portugal. *Concept of earnings:* log hourly earnings (gross). *Years covered:* 1983 for Portugal and 1984 for all other countries.

(4) *Working population:* full-time males for Portugal; males for the other countries (presumably, full-timers, but the data source does not provide detailed information on this aspect). *Concept of earnings:* log hourly earnings; net earnings are considered in Austria, West Germany and Switzerland, while gross earnings are used for Portugal and the U.S. (for the remaining countries, information is not provided by the data source—presumably, gross earnings are considered). *Years covered:* 1986 for Portugal and Australia; 1987 for Switzerland and Italy; 1980 for Sweden, 1989 for Norway; pooled data referring to 1985-89 for the U.S. and the U.K., 1985-88 for West Germany, 1986-88 for Hungary and 1985-87 and 1989 for Austria.

The Gini index, the Theil index and the coefficient of variation report a rise in wage dispersion, especially marked after 1986, when the economy began to recover and real wages were rising. Declining real wages were therefore associated with a slight increase in inequality, whereas the benefits of rising real wages were



Source: Computations based on Portugal, MESS, DE (1983, 1986, 1989, 1992).

Figure 1. Hourly earnings inequality in Portugal, 1983-92

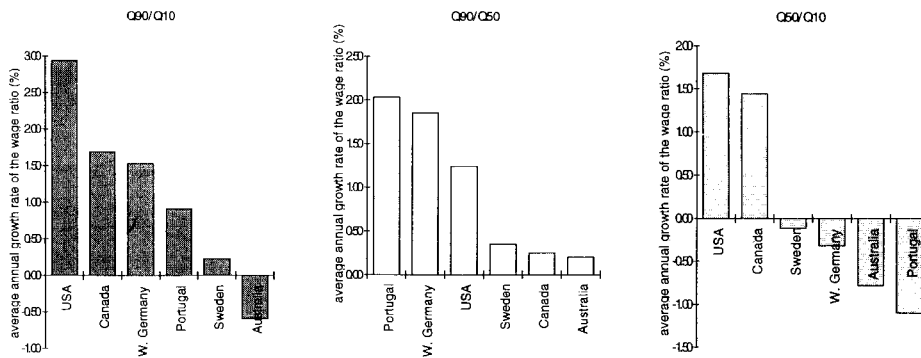
more unequally distributed. Over the decade, the Gini index for hourly earnings increased by 16 percent, from 0.32 to 0.38, while the coefficient of variation reported a more pronounced change of 26 percent. Such evidence sharply contrasts with the results found by Gouveia and Tavares (1995) and Rodrigues (1993) when analyzing *income* inequality, and thus no support is found for the hypothesis that the evolution of labor returns would have been responsible for the decline in income inequality.

A reconciliation of these findings is provided by the work by Rodrigues (1994), when progressing to the decomposition of the rise in inequality into income sources. The evolution of direct taxes, pensions and the returns to self-employment had an equalizing impact on the distribution. Concentrating on just gross wages, it is indeed found that, *ceteris paribus*, they would have generated a rise in inequality [see Rodrigues (1994), p. 424].

A look at point measures of inequality—the wage ratios Q50/Q10, Q90/Q10 and Q90/Q50—shows the pattern of change in inequality. From 1983 to 1986, the bottom of the wage distribution became more compressed, but its upper half, on the contrary, stretched during the whole decade. This preliminary evidence suggests that the rise in inequality during the decade was brought about by the reinforcement of the major characteristic of the distribution that had been highlighted for the beginning of the eighties—compressed bottom and stretched top.

Information on the shares of the wage bill earned by each decile in 1983 and 1992 confirms this idea. A humble *redistribution* has occurred during the decade in favor of the 10 percent lowest wage workers and, to a much higher extent, in favor of the 10 percent highest wage workers, at the expense of all the other deciles. Even though the 1992 distribution allocates a higher share of the wage bill to the 10 percent poorest, it does not exhibit a lower coefficient of variation, and therefore the result by Shorrocks and Foster (1987) on unanimous inequality rankings by any transfer-sensitive, scale-invariant and population-homogeneous measure, cannot be applied here. Instead, as already pointed out, inequality measures unanimously report a remarkable rise in labor market inequality.

These changes in the earnings distribution can be viewed in an international perspective.



Sources: Portugal—own computations based on Portugal, MESS, DE (1983, 1989); Other countries—computations based on data reported in Green *et al.* (1992, p6), who used LIS.

Notes: Data refer to monthly earnings for Portugal, while yearly earnings (for full-year workers) were used for the other countries. Average annual growth rates were computed using data for the following years: 1979 and 1986 for the U.S., 1981 and 1987 for Sweden and Canada, 1981 and 1985 for Australia, 1981 and 1984 for Germany and 1983 and 1989 for Portugal.

Figure 2. Changes in inequality at different points of the earnings distribution for several countries, full-time males aged 25–54 years

Data referring to male workers indicate an intermediate change in overall earnings inequality in Portugal. In fact, the ratio of the 90th to the 10th wage percentiles changed in Portugal at an average annual rate lower than that of the U.S., Canada or the ex-West Germany, but higher than Sweden or Australia. This intermediate position of the Portuguese labor market results from having had simultaneously *the sharpest increase in inequality at the top of the distribution* and *the sharpest reduction in inequality at the bottom of the distribution*, as reported by the changes in the 90/50 and 50/10 wage percentiles in Figure 2. International comparisons thus provide further evidence in favor of the idea that changes taking place in the Portuguese earnings distribution reinforced the pattern of inequality that had been detected for the beginning of the decade, as the lower part of the

distribution compressed even more, while its top stretched even more.³ The evolution in Europe can be contrasted to that in North America. *Compressing bottom* and *stretching top* was the trend followed by the European countries depicted and by Australia, whereas in the North American countries, the bottom of the distribution in particular became more unequal.

4. FORCES DRIVING THE RISE IN INEQUALITY

To obtain some insight into the forces that have driven rising inequality, let us now evaluate the changes in real relative wages controlling for the impact of shifts in the employment structure, by considering a fixed demographic distribution. The share of workers in each gender / broad occupation / schooling level is computed as the mean value of its initial and final periods (1983 and 1992). The average wage for each of these detailed groups in 1983 and 1992 is computed from the micro data on individuals, while the average wage for more aggregate groups is calculated as a weighted average of the gender/occupation/schooling wages, with their (fixed) employment shares as the weights. Under this procedure, changes in the average wage of broader groups are straightforward reflections of changes in the average wages of its sub-groups, not being blurred by shifts in the employment structure.⁴ Stated differently, the change in the economy's overall wage provides a benchmark against which we can measure the growth in earnings for selected groups of workers, enabling the evaluation of *relative* changes in wages [see Katz and Murphy (1992) for the original proposal of this procedure].

TABLE 4
WAGE GROWTH UNDER FIXED EMPLOYMENT STRUCTURE, 1983-92

Change in Log Hourly Earnings × 100 ^a									
Total	Gender		Broad Occupation		Schooling				
	Men	Women	White Col.	Blue Col.	←4 yrs.	6 yrs.	9 yrs.	11-12 yrs.	Univ.
27.27	27.78	26.31	29.86	26.16	26.13	27.39	24.21	30.38	44.68

Source: Computations based on Portugal, MESS, DE (1983, 1992).

Note: ^a Katz and Murphy (1992, p. 41) refer to 100 times log changes as percentage changes.

³Computations over a shorter time period for Portugal, but ending at a date closer to the final period for the other countries (1983-86), which capture precisely the sharp decline in inequality that occurred at the bottom of the distribution, yielded the following results: -3.76 percent, 0.67 percent and -3.12 percent, as the average annual growth rate for the 50/10, 90/50 and 90/10 wage deciles, respectively. According to these figures, the sharpest decrease in inequality at the bottom of the distribution took place in Portugal, associated with the third highest increase in inequality at the top of the distribution (among the countries represented in Figure 2).

⁴For clarification, consider an example of what could happen if such a procedure had not been used: assume that the average wage of each educational and occupational group remains unchanged both for men and women, while only the educational structure of female employment improves. In that case, women's average wage would rise and a reduction in the gender wage gap would have been brought about exclusively by shifts in the employment (educational) structure, not reflecting changes in the average wage by occupation or educational level. The procedure used ensures that the evolution of the average wage of broad groups of workers reflects the underlying evolution of wages for more detailed groups, not being blurred by changes in the composition of the workforce, which is held fixed.

If the employment structure by gender, schooling level and broad occupational group had remained fixed at its mean level of the decade, the overall wage of the economy for full-time workers would have increased by 27 points. This change was rather homogeneous across gender and white/blue collar groups. Indeed, the earnings of men increased by only 1 percent relative to that of women, meaning that the gender gap would have remained roughly unchanged over the decade, if the employment structure by schooling level and broad occupation had remained unchanged. The gap between white and blue collars' earnings increased by 4 percent.

On the contrary, the wage gap across schooling levels widened substantially, with the returns to University education sharply increasing relative to the other schooling levels. The earnings of holders of a University diploma increased by 17 to 19 percent relative to workers with 6 years of education or less, by 20 percent relative to those with 9 years of education, and by 14 percent relative to high school graduates. The wage growth for those with 9 years of education was surprisingly slow when compared to the other schooling levels, breaking the otherwise monotonic (increasing) relationship between growth of real wages and schooling level. This fact is worrying, if one considers that the length of compulsory education has been set at precisely 9 years, for children entering primary school in 1987. While such changes were taking place in the legislation, the mutations occurring in the labor market were not operating to motivate people to reach that level of education—the attractiveness of 9 years of school, relative to 6 or 4, as measured by their relative wages, decreased during the decade. This situation, together with the small difference between the growth of wages for those with 6 years of education and those holding a high school diploma suggests that the traditionally acknowledged mismatch between the educational and the productive systems in Portugal did not change much over the decade, as judged by the labor market valuation of such schooling levels. On the contrary, finishing University definitely *pays off*, having become a more more attractive option in the nineties than it was in the early eighties.

Relative changes in real wages therefore suggest that the source of the rise in inequality must be sought in the rising returns to education, in particular to University education. The rise in the wage premium for University graduates is common to many other countries, having been particularly studied for the U.S.A. Several explanations have been put forth to justify this trend, and a synthesis is by now possible, distinguishing among four different categories of explanations.

One first line of reasoning relies on demographic factors, stressing that the arrival into the labor market of the *baby boom generation* brought about an increase in the relative supply of workers holding a University diploma. Afterwards, however, a decline in the rate of growth of the working population with highest schooling levels took place, against a steadily growing demand for such workers. This mismatch between the rate of growth of the supply and the demand for more schooled workers would have led to a rise in the returns to education, generating higher labor market inequality. Also the increased participation of females could have contributed to rising inequality, given their traditional position in lower ranks of the earnings distribution. Either of these formulations highlights supply-driven changes in the wage distribution.

Explanations based on shifts in the pattern of international trade and on the increased openness of the economies, on the other hand, stress the importance of demand factors. Under increased international competition, more developed countries would have shifted their productive structures towards technologically more advanced activities, thus increasing the relative demand for a more schooled and skilled labor force, while the output of traditional activities, often intensive in low-skilled labor, would be increasingly supplied by less developed countries. Shifts in the employment structure across industries are thus the observable link to test this hypothesis. An alternative formulation of this view stresses the gradual switch, in the process of economic development, from high wage / low inequality activities (manufacturing) to low wage / high inequality activities (services).

Another formulation of demand-driven changes in the wage distribution highlights the mutations that have been taking place within economic activities. Technological progress is pointed out as the main force generating the need for a more qualified labor force. Though much effort has recently been put into measuring the impact of technological progress on the demand for labor and wages, the key proof is often left to the trend in the *residuals*, generating much suspicion of the interpretation of the results [see namely Klitgaard and Posen (1995, p. 33)].⁵

The weakening of institutional forces is stressed by other studies. In particular, the declining unionization rate and the weakening of the minimum wage legislation would have contributed to rising earnings dispersion.

In what follows, each of these explanations will be addressed.

4.1. *A Framework of Supply and Demand*

Reliance on the supply-demand framework developed by Katz and Murphy (1992), under the formulation applied by Juhn and Murphy (1995), encourages dismissal of some of these explanations of the trend in labor market inequality, for the Portuguese case, while lending support to others. The model considers the relative demand for different categories of labor (which depends on their relative prices and on demand shocks, being derived from an aggregate production function) and their relative supply (exogenously determined). A formal framework is provided for the idea that, in the absence of demand shocks, changes in labor supply and changes in wages must be negatively related; otherwise, supply shifts alone cannot account for the changes in real wages, and the operation of demand forces must be investigated [see Katz and Murphy (1992, p. 47)].

Following Juhn and Murphy (1995), consider ten different types of labor inputs, as evaluated by each of the deciles in the wage distribution in a particular year. Different labor inputs would thus be defined as the type of attributes implicitly required to be in a wage decile. The average wage for each category/decile in 1983 and in 1992 can be computed. Calculation of the real wage growth for each

⁵The work by Krueger (1993) on the impact of the adoption of computers on wages is a reference to this issue, relying on alternative tools of analysis, and direct measurement of the phenomenon. Also Machin (1995) based his analysis on direct measurement of the phenomenon. Explicitly taking account of worker (observable and unobservable) heterogeneity, Entorf and Kramarz (1997) present interesting evidence on the impact of new technologies on wages.

⁶Including some extra-variables, while eliminating others, to conform with our data and the aims of the analysis.

of these types of workers thus follows, which can be linked to a supply index and to a demand index.

Consider the supply index first. It evaluates the impact of demographic changes—reflected in the gender and school completion rate mix—on the composition of the working population. The relative growth in the supply of workers in a certain category/decile is calculated by multiplying that category's initial distribution across gender/schooling groups, by the aggregate change in the gender/schooling distribution:

$$(1) \quad \Delta S_d = \sum_i \frac{E_{di}}{E_d} \cdot \Delta \left(\frac{E_i}{E} \right)$$

where E_{di}/E_d represents the distribution of workers in decile d across gender/schooling group i , in 1983; E_i/E is the distribution of total employment across gender/schooling groups in the overall economy, and the Δ sign denotes the changes in that percentage, between 1983 and 1992. The reasoning behind that computation provides an answer to the following question: Given the schooling and gender requirements of each worker category/decile (represented by E_{di}/E_d , and assumed to remain constant over time), and given the growth in the supply of workers by schooling and gender groups in the economy ($\Delta(E_i/E)$), how would the supply of workers in each category have changed?

On the other hand, changes in the demand for particular types of workers will be proxied by shifts in the industrial composition of employment, under the assumption that the types of workers more intensively used in expanding industries will profit from increased relative demand. It should, however, be noted that a demand shift index built on this assumption of fixed-coefficient requirements captures particular types of demand changes—those that take place across industries. Forces operating within industries and biasing the demand in favor of particular types of workers are not reflected in the index. This measure can be extended to reflect shifts in the industry and occupational structure of the workforce (instead of just changes in the industrial mix). Changes in the demand for workers in each decile will also be computed using equation (1), but considering the industry/occupational distribution of employment (instead of its gender/schooling distribution).

TABLE 5
REAL WAGE GROWTH AND RELATIVE GROWTH IN THE SUPPLY AND DEMAND FOR
WORKERS, BY EARNINGS DECILE, 1983-92

Decile	1	2	3	4	5	6	7	8	9	10
Change in log average real hourly earnings $\times 100$	31.69	16.19	15.79	14.60	15.96	18.53	21.18	24.36	28.28	44.85
Relative growth in supply ^a	3.9	-0.07	-6.02	-9.63	-9.62	-8.18	-4.97	0.80	11.33	22.43
Relative growth in demand ^a	-4.13	3.62	3.07	0.79	0.88	0.53	0.05	-2.20	-0.07	-1.92

Source: Computations based on Portugal, MESS, DE (1983, 1992).

Notes: ^a For the computation and the interpretation of the indices, see the text and equation (1).

Consider first the evolution of average real wages by decile (second line in Table 5). The rise in the real wage of the last decile was remarkable, when compared to the rest of the distribution; among the categories with the sharpest wage increase, the first decile follows, with the remaining upper deciles—9th to 6th, in that order—coming next. Comparison of the last and the 4th deciles provides the most expressive picture of the rise in inequality, as the gap between these two categories of workers widened by 30 percent.

How far can demographic factors lead into the explanation of this pattern of change in real wages?

4.2. *The Dismissal of Demography and International Trade as Sources of Rising Wage Dispersion*

During the decade, an increased female labor force participation was noticeable, driving their employment share up, from 30 percent in 1983 to 40 percent in 1992; also, the schooling structure of the working population changed, under the influence of the entry into the labor market of younger cohorts. Changes in the relative supply of workers are quantified in Table 5. The *pure* supply shifts explanation of the rise in inequality would require changes in factor supplies to be negatively related to changes in wages. Surprisingly though, supply forces completely fail in predicting the direction of changes in real wages for the different categories of workers. Indeed, an upgrading of the quality of the labor force can be noticed, as the relative supply of workers initially in the 10th to 8th deciles increased. The first decile was the only other one to register a rise in relative supply. Note that groups of *workers whose supply increased* are precisely those that exhibited the *sharpest rise in real wages*. Note also that the group of workers who fared worst in terms of wage growth—the 4th decile—registered the *sharpest decline* in relative supply. In brief, supply shifts would, *ceteris paribus*, have led to the opposite result regarding changes in real wages by decile. The hypothesis of stable demand for labor must be rejected, as demographic factors, stressing supply-side explanations, fail to account for the rise in labor market inequality in Portugal.

The demand shifts that have taken place during the decade should therefore be analyzed. In particular, the index built captures changes in the demand that have occurred *across* economic activities (refer once again to Table 5). Demand shifts across industries and broad occupational groups (white/blue collar) also fail to predict the direction of changes in relative wages. As a matter of fact, while the relative demand for higher qualification was *declining* across industries, their relative wages were *increasing* the most; the same trend is registered by the first decile. It should, however, be stressed that these demand shifts (and thus their failure to account for the changes in wages) are humble, when compared to the *pure* supply changes. The irrelevance of changes in the employment structure across industries as an explanation for the mutations undergone by the wage distribution could have been foreseen by a comparison of the employment structures in 1983 and 1992. In fact, the 1992 employment structure mirrors that of 1983, with the main change being the slight increase in the already dominant position of traditional activities such as the textiles, clothing and footwear industry. The slight changes that occurred in the Portuguese employment structure

by industry did not bias the demand for labor in favor of workers with higher qualifications.

Another range of explanations for the rise in labor market inequality should thus also be dismissed—the one that stresses the different rates of growth across industries, be they brought about by the increasingly competitive international environment, by changes in the pattern of trade or by the development process itself. While categorically dismissing the possibility of stable relative labor demand, data on Portugal reveal that demand shifts under constant coefficients of labor requirements also fail to account for the changes that have taken place in the earnings distribution. Forces operating within economic activities, and generating an increase in the relative demand for higher qualifications, are therefore required to explain the pattern of wage growth.

4.3. *The Relevance of Forces Operating Within Economic Activities*

The impact of forces operating within industries can be explicitly addressed by decomposing the changes in the employment structure into its between and within-industry components, according to the formula (Machin, 1995, p. 5) (Berman *et al.* 1994, p. 377):

$$(2) \quad \Delta P_n = \sum_j \Delta S_j \cdot \bar{P}_{nj} + \sum_j \Delta P_{nj} \cdot \bar{S}_j$$

where j refers to an industry, and n stands for a category of workers, defined according to the gender/schooling/broad occupational group; $P_{nj} = E_{nj}/E_j$ is the share of category n in industry j ; $S_j = E_j/E$ is the share of industry j in total employment, and P_n represents the share of category n in total employment. The first term on the right-hand side quantifies the between-industry employment change, while the second term evaluates the within-industry component.

The share of workers with four years of education or less decreased in the Portuguese economy from 1983 to 1992, a trend that was felt throughout gender and broad occupational groups, being particularly pronounced for blue collar men (see columns 3 and 7 in Table 6). In every other case (except white collar men with 6 years of education), a general pattern applies—a rise in the employment share of the group was noticeable, mainly driven by changes occurring within industries. The relevance of the within-industry component of employment shifts is overwhelming, as illustrated by the very high absolute values in columns 6 and 10 of Table 6. In most cases, the contribution of changes taking place within industries to the total shift in employment is above 75 percent, and in some instances it more than offsets opposing forces operating across industries. Few exceptions can be pointed out. Only for the case of white collar women holding a University diploma does the contribution of the within-industry component drop below 75 percent (reaching 57 percent). In two other cases (white-collar males with a high school diploma and white-collar females with 6 years of education), the direction of change of the within-industry component contradicts the overall change, but it should be remarked that the employment shares of those two groups of workers in practice *did not change*, as reported by their very low values in columns 3 and 7.

TABLE 6
CHANGES IN THE STRUCTURE OF EMPLOYMENT, 1983-92

Schooling	Occup.	Men				Women			
		Total	Change in the Employment Share ^a			Total	Change in the Employment Share (1)		
			Between-industry component ^b	Within-industry component ^b			Between-industry component ^b	Within-industry component (2)	
(1)	(2)	(3)	Value	Value	%	(7)	Value	Value	%
			(4)	(5)	(6)		(8)	(9)	(10)
= 4 yrs.	White	-2.82	-0.08	-2.74	-97.2	-0.68	0.37	-1.05	-154.2
	Blue	-11.82	-2.67	-9.15	-77.4	-1.06	0.56	-1.62	-153.3
6 yrs.	White	-0.98	0.08	-1.06	-107.8	0.04	0.29	-0.25	-670.9
	Blue	3.09	-0.28	3.38	109.2	4.00	0.22	3.78	94.5
9 yrs.	White	1.07	0.11	0.96	89.4	1.39	0.34	1.05	75.4
	Blue	1.50	0.02	1.49	99.0	1.05	0.08	0.97	92.3
11-12 yrs.	White	0.02	0.12	-0.10	-459.5	1.65	0.38	1.28	77.2
	Blue	0.74	-0.01	0.75	100.9	0.74	0.08	0.66	89.0
Univ.	White	0.32	0.07	0.25	79.0	0.51	0.22	0.29	56.5
	Blue	0.69	0.02	0.67	97.0	0.54	0.09	0.45	83.8

Source: Computations based on Portugal, MESS, DE (1983, 1992).

Notes: ^a Difference between the employment share in 1992 and that in 1983 (either one evaluated in percentage points). Note that, since the values refer to absolute changes in the employment shares, they should not be used to evaluate relative changes (as an example, the rise of about 2 percentage points in the share of University graduates meant an extremely pronounced increase, from 2% to 4% of the workforce).

^b A two-digit disaggregation was considered, yielding 20 industries.

The between-industry component of shifts in the employment structure, though less important, also deserves a comment. While for males the evolution across industries contributed to raise the *schooling profile* of the workforce (accompanying the trend noted within the industries), for females the situation is characterized by some duality. Indeed, shifts in the industrial structure have created employment opportunities for women throughout the schooling rank. Job opportunities for women with very low schooling levels have been created, as opposed to the situation for men (see columns 4 and 8 for workers with 4 years of education or less). The increased role of the clothing, textile and footwear industry may have contributed to this outcome.

Support is therefore found for the hypothesis that changes taking place within industries are a major force driving the rise in inequality. Technological progress is one promising line of research into the causes of rising demand for skilled workers and rising labor market inequality.

5. BEYOND SUPPLY AND DEMAND: THE OPERATION OF INSTITUTIONAL FORCES

Against this background, institutions are expected to have an equalizing impact on the wage structure, in a country where minimum wage legislation is enforced, where trade unions explicitly claim to follow an inequality-reduction strategy, and where collective bargaining is extensively applied.

Minimum Wage

A *safety net* for low wage workers is provided by the minimum wage. Evidence in favor of its relevance in the Portuguese economy has been previously presented: "The relevance of the minimum wage in the Portuguese economy may be visually illustrated by the spikes detected in the [wage] distribution and, most relevant, by the fact that the spike moves as the minimum wage is updated." (Cardoso, 1997.) From 1983 to 1986 the minimum wage kept its purchasing power, having slightly increased from 55 percent to 56 percent of the economy's average earnings. The compression in the bottom part of the wage distribution in the early eighties could thus have resulted from this evolution of the minimum wage, following in particular the reasoning by Card and Krueger (1995, pp. 288–97) and by Machin and Manning (1994) on the impact of rises in the minimum wage on overall wage dispersion. Low wages may have been rescued by the relatively pronounced increase in the minimum wage. However, after 1986 these trends were reversed and dispersion at the bottom of the wage distribution increased, accompanying the trend at the top of the distribution.

Collective Bargaining

Characteristics of a centralized wage bargaining system can be found in the Portuguese industrial labor relations system. Indeed, massive wage bargaining contracts, often covering a whole industry, predominate in the economy and extension mechanisms are often found. Apart from the compulsive extensions that can be applied by the Government, voluntary extensions are also found, when

one economic partner—workers' representative or employer—decides to subscribe to an agreement which it had initially not signed. Also in contrast to the American practice is the fact that employers who sign an agreement with a trade union(s) usually extend its application to all of their workforce, irrespective of the worker's union membership status. As such, the impact of collective bargaining goes far beyond union membership and the distinction between unionized and non-unionized workers (or firms) becomes meaningless. Therefore, despite the decline in unionization rates in the economy, wage levels set by collective bargaining for the different categories of workers are expected to achieve major relevance in the economy.

On the other hand, certain aspects of decentralization can also be highlighted. Employers may choose to negotiate individually with trade union(s) and furthermore, the scattered nature of union organization and the multiplication of collective agreements provides the system with a certain degree of decentralization. Further contributing to some flexibility in the system is the fact that wages actually paid by the firms often drift from their contractual levels, especially in periods of unexpected high inflation or changing economic conditions. In fact, most agreements address specifically the base monthly wage, overtime pay and the normal duration of work, but wage increases above the collectively bargained levels are often found. Wage drift is a very selective mechanism, applied predominantly to white-collar and skilled workers, groups with high wages and high levels of internal inequality. What's more relevant, wage drift has gradually increased in the Portuguese economy during the 1980s—in an era of rising wage inequality, the use of wage drift as a mechanism of wage adjustment increased markedly (see Aperta *et al.*, 1994).

In synthesis, whereas collective bargaining and the minimum wage legislation were able to sustain the wages of low-wage workers, contributing in the early eighties to a compression of the bottom half of the earnings distribution, wage drift has been used by employers as a powerful tool to overcome the constraints imposed by collective bargaining with *equality-oriented* trade unions. Such may have been one of the main mechanisms through which trade union aims and action regarding wage compression have to some extent been neutralized.

6. CONCLUSION

Rising inequality characterized the evolution of labor returns in Portugal during the 1980s and early 1990s. The pattern of change in inequality in the labor market reinforced the main characteristic detected for the Portuguese earnings distribution at the beginning of the decade—a stretched top, where dispersion increased remarkably.

A simple supply-demand framework can generate interesting insights into the causes of rising labor market inequality. One explanation for this trend, often presented in the literature, relies on demographic factors, stressing the decline in the rate of growth of groups of workers with the highest qualifications. Supply-driven explanations, however, fail to account for the rise in inequality in the Portuguese labor market (and indeed would lead to predictions in sharp contradiction with the changes that have actually occurred in relative wages). Shifts in the

employment structure across industries are also dismissed as sources of rising wage dispersion, since no major changes in the industrial composition of the workforce can be detected. Moreover, the slight changes that have occurred were not biased towards sectors requiring workers with higher qualifications, having instead favored more traditional activities. As such, explanations for the rise in inequality that rely on shifts in the employment structure brought about for example by the increased openness of the economy also have to be dismissed.

Evidence on Portugal lends support to the idea that forces operating within industries have contributed to switch the relative demand in favor of very qualified workers. Technical progress is a major candidate under this set of explanations.

Going beyond a framework of supply and demand for labor, the minimum wage legislation and collective bargaining, setting minimum wage levels for different categories of workers, contributed to compress the bottom part of the wage distribution in the early eighties, whereas wage drift led to rising dispersion at the top of the distribution.

APPENDIX: METHODOLOGICAL ISSUES

Dataset

An extensive data set is gathered annually by the Ministry of Employment and Social Security (MESS), based on a questionnaire that every establishment with wage-earners has, since 1982, been legally obliged to fill in. Reported data cover in particular the firm (location, economic activity, employment, sales, legal setting), and each of the workers (gender, age, skill, occupation, schooling, tenure, earnings—split into base-wage, tenure-related earnings, other regularly paid subsidies, irregular subsidies and overtime pay—, duration of work—normal and overtime).

By design, public administration and domestic work are not covered by the database (though state-owned companies are) and in practice neither is agriculture. For the remaining sectors, *Quadros de Pessoal* (QP) is a very reliable source of information, being in fact a census of firms and their workers. For manufacturing, a thorough evaluation of the coverage of QP can be made, since a *Census* of manufacturing is available, gathered by a different source. Comparison of both sets reveals that QP covers more workers than the census itself, despite the fact that the census includes very small productive units that are not a part of the population covered by QP (firms with no wage earners).

The analysis is based on a random sample of the database. The years of 1983, 1986, 1989 and 1992 were selected for analysis, given that they span over a decade, allowing for the detection and explanation of inequality patterns, while the manageability of the database and the identification of stylized facts is enhanced by omitting the details of a year-to-year analysis. For the first year under analysis, a 20 percent random sample of firms, stratified according to industry (defined at the 2-digit level) was drawn. For subsequent years, firms previously sampled were followed, and new firms, that had meanwhile joined the database, were sampled according to the principle just explained. Sampling firms according to this procedure enables taking into account firm creation and destruction which, as

reported by Mata (1993), by Mata and Portugal (1994) and by Brandão Alves and Madruga (1993), achieves high levels in the Portuguese economy [see Cardoso (1996) for a discussion of alternative sampling procedures, which were judged as less appropriate].

Only full-time wage earners were retained for analysis. Full-timers are defined in the database according to the duration of work set by collective bargaining, which generally results in working at least 120 to 140 hours a month, depending on the industry. The resulting sample sizes are described in table A1.

TABLE A1
SAMPLE SIZES

	1983	1986	1989	1992
Number of Workers	253,157	247,536	291,379	295,050
Number of Firms	15,180	16,138	21,000	24,567

The sample reproduces accurately the average firm size of each industry in the economy, as well as its firm size structure (number of firms in each size bracket); ex-post checks on the distribution of the sample according to worker characteristics also confirmed its representativeness.

Concept of earnings

Average hourly earnings were computed as $hw = (bw + ts + rs + is)/nh$, all the right-hand side variables referring to monthly reported figures: bw stands for base-wage, ts is the payment indexed to tenure, rs are regularly paid subsidies, is are irregular subsidies and nh is the normal duration of work, as defined in the collective agreement or by firm regulations.

Gross earnings are considered before the deduction of any taxes or Social Security contributions, and no other labor costs are included. Cash benefits, as well as kind benefits regularly paid, are reported. Irregularly paid subsidies, such as Christmas or holiday pay, are likely not to be reported, since only the fraction actually *paid* in March is reported.

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