What Accounts For the Rise in Wage Inequality in Italy?

Evidence from Administrative Matched Employer-Employee Data, 1985-1996[*]

by

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Abstract

This paper provides new empirical evidence on the changes in the Italian wage distribution using administrative data from 1985 to 1996. Various statistical indicators are used to document a slight, but not negligible, increase in wage inequality. Standard decompositions of inequality indices by population subgroups shed light on the underlying causes of the observed distributional changes. Following Junh *et al*. (1993), econometric-type decompositions are also employed to disentangle the effects of observable quantities, prices and unobservable factors on inequality trends. The changing prices of observable characteristics are found to play a major role in accounting for the observed inequality increase.

JEL Classification: J31, D63

Key Words: wage inequality, inequality decomposition, observable/unobservable inequality components.

1. Introduction

Recent studies on earnings inequality remark that only a relatively few OECD countries experienced a significant increase in earnings inequality over the first half of the 1990s. Contrary to the fears emerging from the trends documented at the end of the 1980s, only the United Kingdom and the United States continued to feature persistent and strong widening earnings differentials throughout the 1990s (OECD, 1996). As about Italy, the prevalent indications coming from existing research point to a modest or negligible increase in earnings inequality, mainly documented on the basis of the Bank of Italy's survey on Household Savings (see, for example, Brandolini et *al.*, 2000; Erikson and Ichino, 1995; D'Ambrosio, 1999; Manacorda, 2002; Rosati, 2001).

The economic theory has pointed out how a variety of changes in the economy – e.g., changes in the industrial structure, increased foreign trade, stronger immigration, skill-based technical change and the decline in the labor market institutions that limit the market (e.g., labor market legislation and unions) – are consistent with the observation that wage differentials have enlarged (see the Symposium on Wage Inequality in the Journal of Economic Perspectives, Vol. 11, No.2, Spring 1997). In Italy the role played by the institutional framework and its reforms has been particularly emphasized by the existing research. Lucifora (1999) stresses the inequality increasing effect of the decline in the unionization density (from 49,3% in 1980 to 38% in 1995) and coverage[1] that occurred in Italy since the 1980's. Erickson and Ichino (1995) also point the finger to the ending of synchronized wage bargaining across different sectors. Manacorda (2002) argues that the gradual dismantling of the automatic cost-of-living indexation, the *Scala Mobile*, from the second half of the 1980's until 1992 (when it was ultimately abolished) may have been the main cause of the widening earnings distribution. He goes on by showing that, had the Scala

Mobile been inoperative, earnings inequality in Italy would have increased at a rate similar to the one observed in the US.

This paper contributes to the existing empirical literature on wage inequality in Italy by its different data, focus and methods used. The paper takes advantage of the recent availability of data from the Italian Institute for Social Security, covering a relatively long time-period, from 1985 to 1996. Their administrative nature, type of information contained and large sample size make them an ideal candidate for supplementing wage inequality analyses based on the Bank of Italy's survey.

Drawing on these employee microdata, our main focus will be in assessing how much of the increase in earnings inequality can be attributed to changes in three main factors underlying each employee's received wage, namely the characteristics of the individual or of the job, the price attached to them by the market, and the effect of unobservable attributes.

We first compute various statistical indicators and document a slight, but not negligible, increase in wage inequality throughout the observation period. Standard decompositions of inequality indices by population subgroups are used to identify the key univariate factors underlying the observed distributional changes. Following Junh et *al*. (1993), we then employ multivariate econometric-type decompositions to disentangle the effects on inequality trends of (i) sample composition, (ii) the returns to observable attributes and (iii) unobservable factors. Finally, a simple statistical method is used to show that the increase in inequality is mainly due to a widening in the permanent – rather than transitory – components of earnings.

The first two approaches tell a consistent story and complement the picture on wage inequality emerging from existing research in Italy. In particular, it is found that most of the increase in inequality is due to a rise in the return of observable characteristics, while the role of unobserved prices and quantities - at the heart of suggested explanations for countries such the US and the UK – appears to count less. This conclusion is shown to be consistent with the role that the permanent component of the variance has in driving earnings inequality.

The paper is organised as follows. Section 2 describes the data and section 3 offers a preliminary analysis of the changes occurred in the Italian wage distribution. Inequality trends for the population as a whole are documented using standard indices. Univariate decompositions of these indices by subgroups are performed in section 4, while the decomposition approach of Juhn et *al*. (1993) is presented in section 5. Section 6 examines the contributions of permanent and transitory factors in the observed inequality trends, while sensitivity analyses to the choice of the wage definition and sample selection are carried out in section 7. Section 8 gathers the main conclusions of the paper.

2. Data and Definitions

The INPS data contain information on a sample of Italian employees over a period of twelve years – from 1985 up to 1996.[2] For each calendar year, the Social Security forms of employees born on the 10th of March, June, September and December were selected to form a sequence of random samples of the population of employees (sampling ratio 1:91). Each yearly sample includes approximately 100,000 workers of Italian private firms, with the exclusion of agriculture and the central state administration.[3] The firm's longitudinal records are then accessed for each worker in the sample and the employer's attributes are linked to the employee, obtaining a matched employer-employee database. Available information include individuals' wages, career histories and a number of worker's characteristics (gender, age, job qualification and geographical region of work) and of the firm where the job is held (size and sector of activity).

As we do not observe the number of hours worked by an employee, we cannot compute hourly wages. We do however know the number of paid days[4] for each job spell and the corresponding remuneration, which allows us to compute the employee's monthly wage after a suitable normalization. The monthly wage is obtained by dividing the employee's gross annual earnings by the number of days s/he got paid for during the year. This normalization takes us as close as possible to a measure of hourly wages, an ideal variable for evaluating the economic conditions of each employment position. The result is then multiplied by an average working month of 26 days, and deflated by the 1996 consumer prices index for white and blue collar worker households (source: ISTAT).

The sample has been restricted to all employees with age between 15 and 64. The wage distribution has been trimmed at the 1^{st} and 99^{th} percentiles so as to minimize measurement and reporting errors. Our sample includes part-time workers, whose wages have been converted in terms of full-time equivalent.[5] Section 7 explores the consequences of excluding individuals employed in part-time jobs.

3. Changes in the Italian wage distribution, 1985-1996.

By way of first acquaintance with our data, let us consider in Figure 1 the Kernel density functions of earnings for three reference years only, 1985, 1991 and 1996, i.e. the start, an intermediate and the final year in our sample.

<Figure 1 around here>

First, note how at both ends of each density function, the curve is rather low: there are relatively few people with very low wages, and also relatively few with very high wages. The vast majority of the population has monthly wages between about 2 and 4 millions of Italian liras (€1=ITL1936.27), the mode being at about 2.4. Second, all three curves are asymmetrical towards the right hand side, pointing to the existence of a relatively small number of very well paid individuals, a fact confirmed below by a mean wage exceeding the median. Note how the right tail has become even thicker towards the end of the period, a circumstance that hints to an increase in overall wage dispersion. Third, though the density curve appears to be relatively smooth and unimodal, some wage clumping can be observed – particularly so in 1985 – in the left tail. In subsequent years, this "bump" of wage concentration gets flatter but does not disappear completely.[6] The existence of nationally-agreed "wage floors", differentiated by sector and job institutional rankings (*livelli di inquadramento*) - in effect acting as (a set of) minimum wages - can be partly held responsible for the manifestation of this bump. The decline in the degree of wage bargaining synchronization may have contributed to its subsequent smoothing out. Finally, observe how the 1991 density function resembles a shift to the right of the 1985 density, while the 1996 density appears to be located in between. As we show below, this pattern is consistent with the business cycle that the Italian economy went through during the period.

Figure 2 displays the time series of the mean, median (also referred to as p50), and the tenth and ninetieth percentile of the wage distribution – denoted by p10 and p90, respectively.

<Figure 2 around here>

The temporal path of real mean earnings reflects the growth the Italian economy experienced until 1992, when it reaches its maximum value, and its substantial slowdown thereafter. The mean's decline is such that it reaches in 1996 almost the same value it had in 1990; despite that, over the twelve years in our data average earnings grew by about 11%. A similar path can be observed for the median and for the bottom and top percentiles. Note, though, that p90 and p50 started to decline at least one year earlier than p10, this latter reaching its maximum in 1993. The economic slowdown seems, then, to have hurt medium/high earnings prompter than earnings at the bottom of the distribution. Notwithstanding this, the earnings of the richest 10% have grown by a stunning 20% over the 1985-1996 period, compared to a more modest 15% of the poorest 10% of the population. Workers in the median position saw, on the other hand, an earnings growth of 4% only.

Earnings inequality

When focusing on the behavior of the three earnings percentiles chosen, earnings differences in the Italian distribution seem to have enlarged over the 1980s and 1990s, though the increase may appear a modest one if compared to the changes experienced by other developed countries, the US in particular.[7]

<Table 1 around here>

The first half of Table 1 shows the temporal series of various percentile ratios. In 1985 the monthly wage of the person at the richest tenth of the population was 2.3 times the wage of the person at the poorest tenth; by 1996, the ratio had enlarged at 2.4 (a 4% rise). Even more did the distance increase between the richest tenth and the median, as their ratio was 1.5 in 1985 and 1.7 in 1996 (a 15% rise). On the other hand, the poorest tenth gained ground with respect to the median, with a ratio that exhibited a 10% drop from 1985 to 1996. Overall, the evidence presented points to a reduction in earnings differentials in the poorest half of the distribution, to be set against an increase in the richest half.

This conclusion is only partly confirmed by a look at the behavior of the earnings shares of decile groups of the population. The second half of Table 1 depicts in more detail the changing fortunes in different parts of the distribution. Small drops in the earnings share of deciles 2-8 are in contrast to the more substantial gains recorded by the bottom and top deciles. These findings suggest that a limited amount of polarization towards the extremes of the Italian earnings distribution might have taken place over the time period studied, with the best well-paid jobs – but also the least well-paid ones – improving their situation at the expenses of those in the median position.

OECD (1996, chart 3.3) reports that real wages of low paid workers (first decile) have risen for most countries during the second half of the 1980s and the first half of the 1990s (the United States and, to a lesser extent, New Zealand and Australia are exceptions). However only in a small group of OECD countries (Germany, Finland and Canada) among the 13 studied is the growth of p10 higher than that of the median and p90. Interestingly, the results therein shown for Italy (deriving from the Bank of Italy survey for the period 1983-93) are at variance with our own, as p10 is shown to grow by less than both p50 and p90.[8]

The improvement of the economic situation of the least advantaged prevents us to predicate that inequality has unambiguously increased in the Italian earnings distribution. Economic inequality is often quantitatively assessed by resorting to summary measures that aggregate information on the individuals' incomes, putting different weights on different parts of the distribution. In the case of the Italian earnings distribution, then, it might well be possible that any measure that puts enough weight to the improved economic situation of the bottom tenth ends up declaring that earnings inequality indeed lowered over the time period 1985-1996.

For a battery of commonly used measures of inequality, though, inequality is found to have increased. Three of them are reported in Table 2 (see Borgarello and Devicienti, 2002, for full results). The rise slows down after 1991, but the inequality level in 1996 is still about 13% higher than in 1985 according to the Gini coefficient and almost 31% higher if the index of Theil is used instead. Standard errors appear to be rather small and that increases our confidence in the statistical validity of our conclusions about the inequality trends.

<*Table 2 around here*>

In the introduction we have recalled a number of institutional factors and reforms that have been suggested as potential explanations for the observed rise in wage inequality in Italy. While it is not the aim of the present paper to further explore those arguments, a few considerations can be made on the basis of the preliminary evidence reported above.

In particular, the period characterized by the absence of the automatic cost-of-living indexation does not coincide in Table 2 with any acceleration of the rise in wage inequality.

On the contrary, the steepest change is observed during the period 1985-1992, when the scala mobile was undergoing a process of gradual dismantling. This is consistent with the view that the egalitarian bias of this institutional constraint had been previously binding (i.e. effective in keeping inequality below its constraint-free level) and that its elimination allowed earnings to open up in accordance with market forces. In this sense, the steep rise of the 1985-1992 period would emerge as a rapid adjustment of inequality to its «equilibrium level»; the subsequent slowdown would then simply signal that the «equilibrium path» has been reached.

Another possible explanation for the rather flat trend in the mid nineties may be found in the impact of the economic slowdown of 1993 and 1994. In principle the effect of the business cycle on earnings inequality is unclear, crucially depending on the pattern of growth in different subgroups of the distribution. If earnings everywhere increase by the same proportion, relative inequality measures (like the ones we have used) do not change. On the other hand, overall growth is inequality enhancing when it implies disproportional gains (losses) for those at the top (bottom) of the earnings scale.[9] OECD (1996) reports that "no uniform picture emerges either across countries or over time of a cyclical pattern in the dispersion of wages", (p.63). In the case of Italy, we find only weak evidence that inequality is higher when average income grows and tends to lower during the recession years.[10]

The "stability pact" signed between the unions and the government in 1992 with the aim of inaugurating a new season of wage moderation - in the face of the increasing demand for financial stability coming from the EU - might also be invoked as a potential cause for the leveling off of wage inequality in the first half of the nineties.

Finally, one cannot rule out the possibility that the market forces pushing towards increased earnings dispersion might have weakened (e.g., as a result of the gradual absorption of the tensions coming from the wave of technological innovations started in the late seventies). We will come back to this issue in Section 5.

While we cannot fully discriminate between these conjectures, the next section will start providing further explanations of the observed trends in inequality by studying how earnings changed within and between different subgroups of the population. It should be emphasized that the business of disentangling the disparate causes of the rise in wage inequality is inherently complex, mostly because they can act simultaneously, which would require a hardly tractable general equilibrium analysis. In this respect, the simple decomposition techniques used below – notwithstanding their obvious limitations – can help the researcher to identify some key factors underlying the recorded distributional changes.

4. Changes in the earnings distribution: Univariate decomposition analyses

Underlying these decompositions is the basic intuition that some causal factors affect the earnings distribution by changing, in various combinations, three basic ingredients: (1) the number of persons in each subgroup, (2) the mean earnings in these subgroups, and finally (3) the dispersion within each subgroup. Three inequality measures are *exactly* decomposable (e.g. Cowell, 1995; Jenkins, 1995), in that total inequality is the sum of a within-group component (an average of the subgroup inequalities, weighted by the subgroup share), plus a between-group component (the amount of inequality that would remain if there was no inequality within any sub-group. They are members of the single parameter Generalized Entropy class: the mean logarithmic deviation, denoted *GE*(0), the Theil index, *GE*(1), and half the square of the coefficient of variation, *GE*(2). Table 3 contains the results of this decomposition exercise and presents an illustrative example too. For each partition of the population, the table reports the subgroup's mean earnings, share, and inequality levels; it also shows the within and between levels of inequality. Needless to say, the number of break-downs considered has only been constrained by the information available in the INPS data.

<Table 3 around here>

Table 4 reports instead the 1985-1996 percentage change for the mean and the percentiles in each subgroup. In the interest of brevity, both tables will refer to a direct comparison only of the first and the last years in our sample (see Borgarello and Devicienti, 2002, for complete time series of mean earnings, percentiles and percentile ratios for each subgroup). The decomposition analysis of Section 5 will be also carried out over shorter time intervals.

<Table 4 around here>

Gender

It is well known that the participation of women to the Italian labor market has been increasing over time, and in fact female employees had a share of 30% in 1985 and of 33% in 1996. Though women's mean earnings in 1996 were still about 20% lower than men's, the growth rates reported in the Table 4 demonstrates that female employees have been catching up with men over the time period studied, a finding common to all OECD countries (OECD, 1996). Female's average earnings grew by almost 15% from 1985 to 1996, while men's growth was only 11%. At all percentile points, too, female employees saw their earnings expand more than men. Particularly impressive was the pay raise of the poorest female tenth, which increased by 30% compared to a much smaller 6% for men. In Italy, more than in other OECD countries, the gender gap is narrowed not only because of the substantial earnings rise of more qualified women, but also – and above all – because women's growth at the bottom of the distribution has been larger than for men. For the three summary measures considered, inequality is higher for men than for women at the start and at the end of the sample period, and is also increasing faster. The lion's share of observed inequality is held by the within-group component, but inequality between men and women explains between four and eight percent of total inequality. Moreover, the within-group component has been expanding over time, highlighting an increasing return to observable and unobservable characteristics other than gender. That the differences between men and women have reduced over time is also demonstrated by a falling between-group contribution. Taken together these findings suggest that women have contributed to a decrease in overall wage inequality.

Age group

The youngest employees (aged 15-24) had a share of about 26 per cent in 1985, which dropped at only 17% in 1996, in part a reflection of the increase in schooling for this group. The oldest age group (aged 50-64) shrunk too, though to a much lesser extent (from 14% in 1985 to 13% in 1996), also because of various incentives for early retirement introduced in the mid nineties (Sestito, 2002).[11] On the other hand, those with age 25-34 expanded their share, from 28 to 35 per cent, as did those with age 35-49, from 32 to 35 per cent.

Table 4 demonstrates that the gap between the very young (new entrants to the labor market) and the oldest workers (the almost-leavers) has visibly magnified over the 1980s and the 1990s. In fact, while the new-entrants' mean grew by only 2.6%, the mean for the almost-leavers jumped up of about 21% over the entire time window. Mainly this is the result of the stunning growth experienced by those aged 50-64 and receiving very high wages, as shown by a 35% raise of p90.[12] The same percentile for those aged 15-24 was virtually unchanged in 1996 from its value in 1985. To a lesser extent a similar discrepancy is also found for the medians of the two groups. Relatively to the population mean, the mean of the youngest cohort decreased from 0.79 to 0.73, while the reduction of the next younger group fell from about unity to 0.93. On the contrary, the two most senior groups saw their mean wages increase relative to the overall mean. However, at very low wages the new-entrants score a higher growth than the almost-leavers, with p10 increasing respectively of 14% and 8%. Whether this is the effect of institutional constraints (e.g., labor market legislation for young employees) or of more general market forces is hard to say with the available information.

Wage inequality widened in all but the youngest age group (due to the improved situation of very low wages in that group). Once again the bulk of observed inequality is within-group, and this is increasing too. However, differences between age groups are important (being able to account for between 13 and 19 percent of aggregate inequality) and have exacerbated during the 1990s. These findings suggest that the structural changes in the Italian labor market might have pushed the return to seniority and experience upwards.

Sector of activity

We next partition the totality of jobs in three activity sectors - constructions, manufacturing and services. Table 3 reports a decline in the share of manufacturing from 57% in 1985 to 52% in 1996. Constructions too shrunk, from a share of 13% in 1985 to a tinier 10% at the end of the period. On the other hand, workers employed in the service sector witnessed an expansion from a share of 30% to 38%. Mean earnings growth was fairly low for construction (a 2% change during the period) and much higher in manufacturing (10%) and services (15%). In 1985, mean earnings were highest in constructions, followed by services and manufacturing. In the following years services emerge as the sector that pays better on average, 6% more than manufacturing and 10% more than constructions in 1996. Construction is the sector that guarantees better pay for employees at the bottom (p10) and at the median of the distribution[13], followed by manufacturing, but the ranking is completely reversed when we look at p90. Services is the sector with highest inequality levels in both 1985 and 1996, followed by manufacturing and constructions. However, in terms of inequality growth, earnings differentials opened faster in manufacturing, followed by constructions and services. Virtually all observed inequality is accounted for by the within-group component. The between-group component increased in 1996, though of an almost negligible amount. Overall, these results suggest that the modification that occurred to the Italian industrial structure over the 1980s and 1990s cannot be held responsible for an important part of the observed increase in earnings inequality.

Occupations

The data allows us to distinguish only four broad occupations. Blue collar workers had a share equal to 66 percent in 1985, white collars were at 26 percent, managers at 0.4 and apprentices at 7 percent of the population. These shares went through important structural changes during our sample period, with both white collars and managers absorbing a larger proportion of the Italian employees at the expenses of the other two groups. Blue collars' average wages were below the overall average in 1985 and lost additional ground during the next 11 years, their relative mean dropping from 0.95 to 0.88. White collars kept their relative mean wages above the aggregate mean in both years and no appreciable trend can be spotted. A bit surprising is the circumstance that both managers and apprentices saw their relative mean earnings decline over the sample period (see footnote 17). Table 3 suggests that white collars have the most unequal earnings distribution, according to whichever of the three indices is used and in both 1985 and 1996. This is a reflection of the higher growth of p90 for white collars compared to blue collars. The within-group component certainly explains most of the observed inequality but note that for this population partition the between-group component is now able to explain as large as 36% of observed inequality. Moreover, this component has exhibited an impressive growth during the period 1985-1996, more than doubling its level. This implies that the skills related to the above occupational partition have increasingly attracted differential rate of returns in the labor market.

Firm size

Panel G of Table 3 shows that the share of those working in small firms (up to 20 employees) has been shrinking over the sample period, with a corresponding increase in the proportion of those in larger firms. The three inequality indices seem to indicate that earnings differences were more acute for small firms than large ones in 1985, but during the subsequent twelve years this pattern is inverted. There does not seem to be an obvious explanation for the more pronounced raise in inequality levels that characterized employees in large firms. Note also that relative mean earnings have increased only for employees in the two largest firm categories. Some composition effects seem to be at play: young workers are disproportionately concentrated in small firms, while the most mature labor force is more abundant in large firms.[14] The general weakening of the labor market institutions (e.g., the unions), which in Italy have traditionally been disproportionately concentrated on defending workers in large firms, might also be invoked as a potential rationalization worth further investigation. During the period 1985-96, the lowest percentile grew much more for employees in small sized firms than for those in large firms, while the opposite can be observed with respect to the highest percentile, providing hints that earnings become more dispersed as firms expand their size. The within component is predominant, and further enlarges over time, but the between component is able to account for a fairly high proportion of observed inequality (up to 21%) and is growing faster than the within component.

Part-time

The share of part-time workers passed from 1% in 1985 to 8% in 1996. Mean earnings in full time jobs are higher than in part-time jobs (though note that part-time jobs paid slightly better, on average, in 1985). Inequality was higher for part-time workers in 1985, but by 1996 the situation had reversed. The between-component, though slightly increasing, does not account for a significant proportion of the observed inequality.

Geographical areas

The wage distributions of three macro-regions (North, South and Center[15]) do not seem to differ much, particularly so in 1996 when it becomes hard to distinguish the three curves (see Figure 3). In 1985 the South stands out for its more pronounced bump in the left-hand tail and its tri-modality (its highest mode is larger than the modes in the remaining macro-areas). Note also that in 1985 the proportion of employees with low monthly earnings was higher in the South, followed by the Center. However, these features do not seem to persist in 1996. This substantial uniformity in the wage distribution across regional areas – which is to a large extent the result of the lack of decentralized wage setting mechanisms - has been indicated by many commentators as one of the reasons for the failing convergence processes between the developed North of the country and the more economically backward and high-unemployment South.[16] To our aims it is here important to stress that regional differences, and their changes, do not seem to have contributed to the rise in earnings inequality. This is pointed out by the completely flat path of the between-group component in Table 3, panel D.

<Figure 3 around here>

5. Components of change in wage inequality

In the previous section inequality indices have been decomposed in their between and within components when the population is partitioned according to one characteristic at a time. It has been shown that, in general, observed inequality can only marginally be explained by our sex, age, occupation or sector partitions. In fact, the within-group component - i.e. the inequality explained by factors other than the partitioning characteristic – is by far the most important source of the observed earnings differentials. However, it has also been remarked how the returns to experience and skill – as proxied by age and occupation - have shown an increasing pattern during the period, as documented by a relatively large and increasing between-group component. If inequality between characteristics such as occupation, sex and age group has increased that might be because the composition of the sample with respect to those characteristics have changed over time (sample composition effect), or because the return (or price) attached to those characteristics has increased during the time period. Moreover, total inequality can increase because of changes in unobserved quantities and prices, which manifest their impact through modifications in the within-group component.

In order to disentangle and quantify the contribution of changing observable quantities, observable prices and unobservables (prices and quantities) to the overall increase in inequality, we take on board what can be considered multivariate (econometric-type) decomposition techniques, as proposed by Juhn *et al*. (1993) and by them applied to US data. Suppose that the evolution of (log) wages, Y_{it}, is given by:

$$Y_{it} = X_{it}\beta_t + u_{it} \qquad (1)$$

where X_{it} is a vector of characteristics (e.g., experience) and β_t a vector of parameters representing the prices attached by the market to those characteristics (e.g., return to experience). Residuals u_{it} capture unobserved factors and have distribution function F_t. If θ_{it} denotes the rank of individual *i* in the cumulative residual distribution F_t, then we can write:

$$u_{it} = F_t^{-1}(\theta_{it}). \qquad (2)$$

Expression (1) can be re-written as:

$$Y_{it} = X_{it}*\overline{\beta} + X_{it}*(\beta_t - \overline{\beta}) + \overline{F}^{-1}(\theta_{it}) + [F_t^{-1}(\theta_{it}) - \overline{F}^{-1}(\theta_{it})] \qquad (3)$$

which shows how the earnings distribution (and its inequality) may vary over time because of changes in the sample composition with respect to X_{it}, at fixed prices $\overline{\beta}$ (first term in the right hand side in (3)), because of changes in prices at given quantities (second term), or finally because of changes in the distribution of the unobservables. Accordingly, we will compute the following distributions, for each year *t*, using the estimated coefficients and residuals of (1).[17]

$$Y_{it}^1 = X_{it}*\overline{\beta} + \overline{F}^{-1}(\theta_{it}) \qquad (4)$$

$$Y_{it}^2 = X_{it}*\beta_t + \overline{F}^{-1}(\theta_{it}) \qquad (5)$$

$$Y_{it}^3 = X_{it}*\beta_t + F_t^{-1}(\theta_{it}) \qquad (6)$$

As specified in (4), Y_{it}^1 is obtained from the characteristics that individuals have in *t*, multiplied by the average vector of coefficients $\overline{\beta}$ and drawing the residual of each individual from the average distribution $\overline{F}^{-1}$, according to his/her rank in the distribution at time *t*. $\overline{\beta}$

and $\overline{F}^{-1}$ are obtained from a pooled (over the whole sample period) version of (1). We then compute inequality $I(Y_{it}^{1})$ for each year and attribute any inequality change over time to the effect of changing quantities: $I_t^Q = I(Y_{it}^1)$. Next, we compute $I(Y_{it}^2)$ and attribute to a price effect any further inequality increase: $I_t^P = I(Y_{it}^2) - I(Y_{it}^1)$. Finally, we compute $I(Y_{it}^3)$ and attribute any further change of inequality to the effect of changing unobservables: $I_t^U = I(Y_{it}^3) - I_t^Q - I_t^P$.

The results of our analysis are shown in Figure 4 and Table 5. Unlike previous sections, we have now confined our treatment to men only, as it is generally more difficult to model women's earnings due to the complications arising from participation decisions. For simplicity we have used as our inequality indices *I* the log wage differentials between the ninth and the tenth percentile, the ninth and the median, and the median and the tenth, though it should be noted that the procedure can be applied to any inequality measure.

With reference to the first of these indicators, Figure 4, panel A, first shows the inequality trend observed in the men's distribution, to be decomposed in the three components as explained above. Panel B documents that the changing sample composition in terms of observable characteristics (the changing group shares documented in Table 3) has only had a slight positive impact on the trend of the ninth-tenth differential. The effect of prices, depicted in panel C, is instead quite surprising: it seems as if most of the observed inequality increase is due to rising returns to skills, as proxied by our age and occupation controls in (1). In panel D, the effect of changes in unobservables is shown to be relatively unimportant, though slightly increasing over the sample period. It is interesting to note that the results of Juhn *et al*. for the US (and also those for the UK reported by Prasad, 2002) points to a different pattern as to which components exert the biggest impact in driving the observed inequality trends. In fact, in the US it is the massive increase in the component due to the unobservables that is often invoked as an explanation for the well-documented increase in wage inequality, and indeed this is confirmed by the analysis presented by Juhn *et al*. (1993) too. In Italy, on the other hand, it seems that earnings have become more dispersed precisely because more senior, more experienced and, ultimately, more skilled workers have been able to attract a greater and greater reward in the new labour market environment.

Table 5 computes the change from the beginning and the end of the overall time period, as well as for three sub periods, of the three percentile ratios, along with the contributions of the three components to those changes. In panel A the decomposition refer to the period 1995-1985, i.e. after excluding the final year in our sample. This was done because, while total inequality slightly decreased in that year, the quantity and the price components show sizeable opposite movements. We have reasons to believe that these 1996 components might have been overestimated due to some data re-labelling occurred in that year, and we have therefore decided to concentrate on the first 11 years in our sample.[18]

With reference to the 1995-1985 period (panel A), the change in the ninth and the tenth percentile is 0.13, of which almost 80% is due to the price component. The impact of the unobservables is positive but very small (accounting for only 13% of the total inequality rise), while the changing sample composition had an even smaller positive impact (contributing to about 8% of the total change). The decompression in the upper part of the distribution was higher still, as shown by a change in the p90-p50 ratio equal to about 0.15. Once again the price component exert the greatest impact on the overall change, but changes in the sample composition over time have also a substantial positive impact (almost twice as much the impact of unobservable attributes). Note also that between 1985 and 1995 the first half of the distribution underwent a certain amount of wage compression, as revealed by the negative (albeit small) change in the p50-p10 ratio. The price effect is positive in this case too, but more than counterbalanced by the combined negative impact of the composition and unobservable components. This may entail that, as a result of the de-industrialization and greater employment flexibility (part-time opportunities), the pool of workers employed at low wages has become more homogeneous, thereby with a negative effect on total inequality in that part of the distribution.

The remaining panels of Figure 4 confirm that the bulk of inequality increase occurred during the first sub-period (1985-1988), with the pattern of components contributions broadly reflecting that discussed with reference to the entire period. Between 1989 and 1992 inequality continued to increase but at a slower pace, once again with the price components being the major driving force. In the subsequent four years the wage distribution showed little trend, which mainly seems to be attributable to a composition effect.

In summary, our analysis points to the crucial role of changing prices of such observed attributes as age and skills in shaping the changes in the earnings distribution over the mid eighties and mid nineties. This evidence is consistent with skill-biased technological change theories as well as with those studies that highlight general labour-market liberalization. Italy's wage setting process has been and still is dominated by industry-wide national unions' wage contracts, which in effect cover the almost totality of regular jobs. These contracts specify wage floors and wage increases differentiated by skill levels and seniority. While these worker's attributes have continued to shape the earnings differentials implicit in the wage contracts, the liberalization processes intervening in the labour market in those years has over time required that their price/return – traditionally constrained by the egalitarian policies of the unions of the sixties and seventies - become more in line with the new labour market environment (in turn hit by the IT revolution and the rise in the relative demand for skills). Whether the recent slowdown in the inequality rise is the result of a gradual absorption of the excess demand for skills is an issue that future research may enlighten.

<Figure 4 around here>

<*Table 5 around here*>

6. Permanent versus transitory inequality

The previous analysis has highlighted that the price of certain observable characteristics has had a dominant role in explaining the cross-sectional trends in earnings inequality. To the extent that characteristics such as experience and occupation – which in turn are highly correlated with education that we do not observe – can be regarded as permanent (or slowly changing) characteristics of the individuals, we should observe that an increasing portion of the cross-sectional income variability is accounted by the permanent differences between the individuals. To investigate the validity of this conjecture, we now take advantage of the panel dimension of our data. We estimate the transitory and the permanent components of the earnings variance following the simple method suggested by Moffit and Gottschalk (2002). The basic idea is that the permanent component can be approximated by the covariance of pairs of earnings of the same individual, chosen to be sufficiently far that any transitory errors can be assumed to be uncorrelated. In particular, the permanent-transitory model is

$$y_{ia} = \mu_i + \nu_{ia} \quad (7)$$

where y_{ia} is the log earnings for individual i at age a, μ_i is a time-invariant individual component with variance σ_μ^2 and ν_{ia} is a transitory component with variance σ_ν^2. If we assume that $Cov(\mu_i , \nu_{ia}) = 0$, then $Var(y_{ia}) = \sigma_\mu^2 + \sigma_\nu^2$. Moreover, for ν_{ia} and $\nu_{ia'}$ sufficiently distant in time, we can assume that $Cov(\nu_{ia} , \nu_{ia'}) = 0$, so that $Cov(y_{ia}, y_{ia'}) = \sigma_\mu^2$. This means that, after estimating the permanent component by the covariance of observed earnings, we can easily compute the transitory component by subtracting the first from the variance. The results are shown in Figure 5 for the sample of men, using a 5-year distance between y_{ia} and $y_{ia'}$. We experimented with various earnings lags and always got the same conclusions.

Figure 5 shows that the slightly increasing trend in total inequality of log earnings (measured by their variance) during the period 1990-96 is the result of two opposing forces, an increasing path for the permanent component and a decreasing path for the transitory component. This evidence is indeed consistent with the view expressed above: the main reason for the inequality trends observed in the Italian earnings distribution has to do with widening earnings differential of a permanent nature. As shown in section 5, these in turn are due to the rise in the prices of the observable and permanent characteristics of the employees. Cappellari (2000), using covariance-structure models also concluded that the overall earnings inequality increase experienced in Italy since the 80s was prevalently driven by the permanent component.

<Figure 5 around here>

7. Job precariousness, part-time and wages

So far we have considered employees who work any number of days during the year and made their remuneration comparable by dividing annual earnings by the number of days. We noted how disadvantaged subgroups of the population, for example women at the lower extreme of the distribution, have seen their relative position improve over time. Changes in the labour market may then have become more favourable to those subgroups by, for instance, making more remunerative the (increased) opportunities for part-time work. General employment flexibility is also generally thought of as a valuable asset in the labour market, which firms may be ready to pay at an increasing rate. In order to shed some light on these considerations, we restrict our sample to employees with uninterrupted job spells, by requiring that they report a number of annual paid days equal to 312 (equivalent to 52 worked weeks). With this requisite we intend to select individuals with stable jobs and careers and assess how far the results found in the previous section still apply. Given the observed tendency – in Europe as elsewhere – of a substitution of jobs-for-life with short-spell jobs, a comparison of the trends in the wage distribution for the selected subgroup with that of the whole population may provide elements for an assessment of the changing risks of segmentation in the labour market. Selected statistics calculated over the sub-sample (employees with 312 days only) are reported in the second half of Table 4, while the first half refers to the same statistics obtained with reference to the unrestricted sample and discussed in the previous sections.

The most striking difference between the two parts of the table is the divergence that emerges in the 1985-1996 change for the poorest percentile calculated on the two samples. If we consider employees with 312 worked days, then for almost all the worker categories that may be deemed as "weak segments" (female, young) there has been a much smaller rise in p10 than what has been reported in the previous sections. For example, female worker's p10 grew by only 12%, instead of the 30% gain predicated in section 3. Similar conclusions can be reached if we look at age classes or at the firm-size split: both young and small firms show a much reduced increase (respectively 4.9% and 24.5%) in the poorest percentile which contrasts with the figures reported in the first half of Table 4. As for occupation, we note that white collars see the 7.3% gain in p10 recorded from 1985 to 1996 reduce to a 5.8% change if only full-time year-round workers are considered. The same conclusion holds for blue collars, whose 2.3% gain in p10 becomes a 1.7% when restricting the attention to full-time year-round workers. Surprises can also be seen when examining firm sectors, the most striking behaviour been that p10 in services now grows by 14%, whilst it was reported to increase by 25% with reference to the unrestricted sample.

Though far from conclusive, this evidence highlights the potential role of temporary/part-time jobs in shaping the wage distribution at low wages, and, even more so, its trends. By construction the stable workers in the restricted sample do not carry out any part-time jobs and, it would seem, this circumstance may be particularly "unfavourable" for those at the bottom of the distribution. Indeed prospects of improving one's relative position in the wage distribution over time appear rosier for those at the bottom if they are able to take advantage of such opportunities as part-time and temporary work. At the extreme, one may also argue that what might be sometimes regarded as "job precariousness" might instead be a proxy for a number of job characteristics that have attracted, over time, a sort of monetary premium compared to the characteristics associated with more stable jobs.[19]

8. Conclusions

This paper has studied the changes in the Italian earnings distribution from 1985 to 1996, using INPS administrative data, a complementary source to the survey data most often used for analyzing earnings inequality in Italy. We have documented a slight, but not negligible, increase in wage inequality, according to a battery of commonly used distributional indicators. The gap between the richest and the poorest tenth broadened, but by less than what happened to the distance between the richest tenth of the distribution and the median. This is due to the poorest tenth, which managed to reduce its relative distance from that of the person in the median position. The bulk of the increase occurred during the second half of the eighties, while the trend becomes flatter after 1992.

While the increase in the overall wage inequality can be established with little doubts, the reasons for its occurrence should continue to occupy future research. Our paper has contributed to the existing literature by providing univariate and multivariate decompositions that shed light on the underlying mechanisms. For all the population partitions used, inequality is mainly explained by its within-group component. In all cases, this is increasing too. The between-group component is, however, particularly important for the decompositions by occupation and age group. Moreover for these categories the between component is increasing, almost doubling its value over the sample period.

Both the univariate and the multivariate decompositions have suggested a consistent story, that the increase in inequality cannot be explained by a change in the sample composition with respect to observable worker attribute; nor is it due to changes in the distribution of unobservables, as it has been documented to be the case for the US. In Italy it is instead the effect of changing prices of the observable characteristics that plays a major role in accounting for the observed inequality increase. If earnings have become more dispersed, that seems to be because more senior, more experienced and, ultimately, more skilled workers have been able to attract a greater and greater reward in the new labor market environment. Such conclusion finds additional support from the decomposition of the cross-sectional earnings variances in their permanent and transitory component.

The paper also compared the wage distribution of the whole sample with that of the subsample of employees in stable jobs and careers. Some evidence is found consistent with the idea that increased employment flexibility (in terms of part-time/temporary jobs availability) is an asset firms have been willing to pay for at an increasing rate, as indicated by the positive discrepancy in the pay growth of the least well-paid jobs in the two samples.

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[1] The union coverage was still at 82% of the employed in 1995.

[2] See Contini (2002) for a detailed description of the INPS data.

[3] Using available identifiers (fiscal and social security codes), individual longitudinal data can be generated for each worker. For the purposes of the present paper, however, the data will be mainly treated as a set of repeated cross-sections. The panel element – notwithstanding its limitations due to the sample “attrition” over time (see Contini, 2002) - is instead necessary for the permanent and transitory inequality decomposition of section 6.

[4] Some of the paid days may not be worked days, since, included under this heading, are periods of paid time during which no work is done, e.g. maternity leave, sick leave, holiday.

[5] To do this the number of days worked in a part-time job spell is multiplied by a factor (less than 1) that converts them in terms of full-time equivalent. The converting factor is computed as the ratio between the “equivalent weeks in the spell” (these in turn are obtained by dividing the total number of hours worked in a part-time spell by the number of hours scheduled per week in the collective national contract for the same full-time job, for example 40 hours per week) and the “number of paid weeks in the spell”. The converting factor – but not the number of hours – is available in our data (See Contini, 2002, for further details).

[6] The “bump” concerns workers with a wage included in a range from ITL 1.217 to 1.546 million. They are prevalently female (54%), 15-24 years old (52%), blue collars (54%) and equally distributed among regional areas. They mainly work in small firms (80% in firms with less than 19 employees) and in the manufacturing sector (52%).

[7] The p90/p50 and p50/p10 ratios for the US in 1995 were both equal to 2.1, compared to the value of 1.7 and 1.4 we obtain for Italy for the same year. During the period 1985-95 in the US, p90/p50 changed by about 17% and p50/p10 had a *positive* growth of about 7-8% (our calculations from Table 3.1 in OECD, 1996).

[8] Comparing the percentile ratios with our figures in Table 1, one notes that our p90/p50 is systematically higher while our p50/p10 is always lower, pointing to a greater polarization of the INPS earnings distribution than in the Bank of Italy's. The differences in the nature of the two datasets (administrative data rather than survey data), as well as the income variable used (gross monthly earnings rather than net monthly earnings) are likely to be responsible for the observed differences.

[9] A compression of the wage differentials may for example occur if, in the face of an economic downturn, labor market institutions concentrate their efforts in the employment and wage protection of those at the bottom of the distribution. Lower inequality may also be the outcome of an economic slowdown where most lay-offs are concentrated amongst low-paid low-skill jobs (for example, very young workers), so that the distribution gets 'censored from below'.

[10] A 12-observation regression of each of the inequality indices shown in Table 3 on a deterministic time trend, average earnings and its growth rate displayed positive but not statistically significant coefficients.

[11] The peak in the baby-boom of the Sixties manifest itself in the labour market at the beginning of the Eighties; the drop in the size of young cohorts has been impressive since. Other factors, such the reduced incentives to work and training contracts (CFL) starting in 1991, contribute to explain the drop in youth employment (Contini, 2002).

[12] Composition effects might have partly contributed to this change. The "Amato" pension reform in 1992 may have induced the 50-64 employee with medium/high wages to early retirement, while the same incentives were less appealing for those with very high wages.

[13] These results consider only regular jobs, while in the construction sector irregular jobs are easily diffused and, usually, they are low-paid jobs.

[14] Contini (2002) associates the relation between the worker's age and firm's size to the higher market entry/exit rates (and therefore shorter life) displayed by small firms. The higher turnover risk may be then more acceptable by young employees (Contini, 2002, p. 29).

[15] The North includes Piemonte, Valle d'Aosta, Lombardia, Trentino, Veneto, Friuli, Liguria and Emilia Romagna; the Centre includes Toscana, Umbria, Marche, Lazio and Abruzzo; the South includes Campania, Molise, Basilicata, Puglia, Calabria, Sardegna and Sicilia.

[16] Contini *et al*. (2000) note that this result might be spurious, arising from the wage normalization used, in the alleged presence of strategic mis-practices of southern firms to under-report the number of days worked by their employees. They show that the number of paid days reported for the South is less than for the North. For this reason, we have computed the regional wage distributions for the subsample of year-round employees (working 312 days per year), in order to isolate regional earnings differences due to wage variation only. The difference between the North and the South somewhat re-emerge in the expected direction (with the North's distribution lying everywhere to the right of the South's). While mean earnings in 1996 were only 8% higher in the North than in the South if monthly earnings for all employees are used, while the figures doubles for year-round workers.

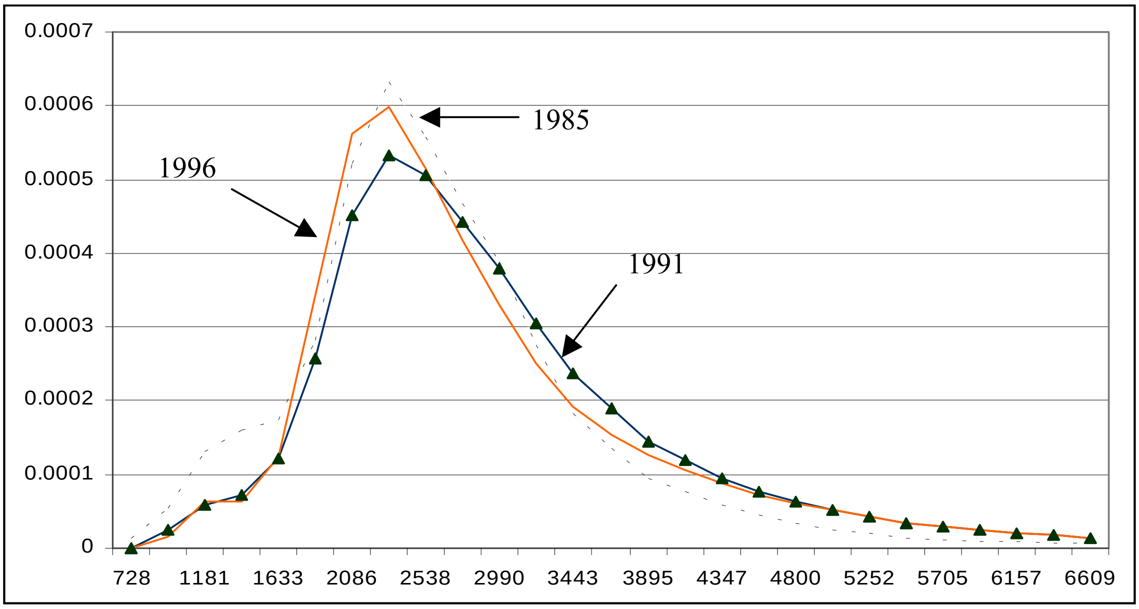
[17] A flexible specification is employeed, where log wages are regressed on a quartic in age and dummy indicators for part-time, firm's size and occupation, regional area, sector of activity, fully interacted with a polynomial in age.

[18] A large number (about 1,000) of 1995 white-collars have been relabelled managers in 1996 by the data collector without a corresponding change in the employee's job position. Re-estimation of the whole decomposition of section 5 after excluding 1996 (which otherwise would enter in the estimation of the average β) leads to indistinguishable results and are not reported.

[19] Needless to say, that unit wages for low-paid "flexible" workers have increased more than for corresponding "stable" workers does not imply any assessment in terms of individual welfare, as the latter depends, among other things, on the actual amount of work.

Figures

Figure 1
Kernel Density Estimates: 1985, 1991 and 1996.



Notes: wages greater than 6.7 million of Italian liras are not shown (but have been used to compute the kernel density) so as to improve the picture's readability. Epanechnikov kernels.

Figure 2
Mean, 10th Percentile, Median and 90th Percentile of the Wage Distribution

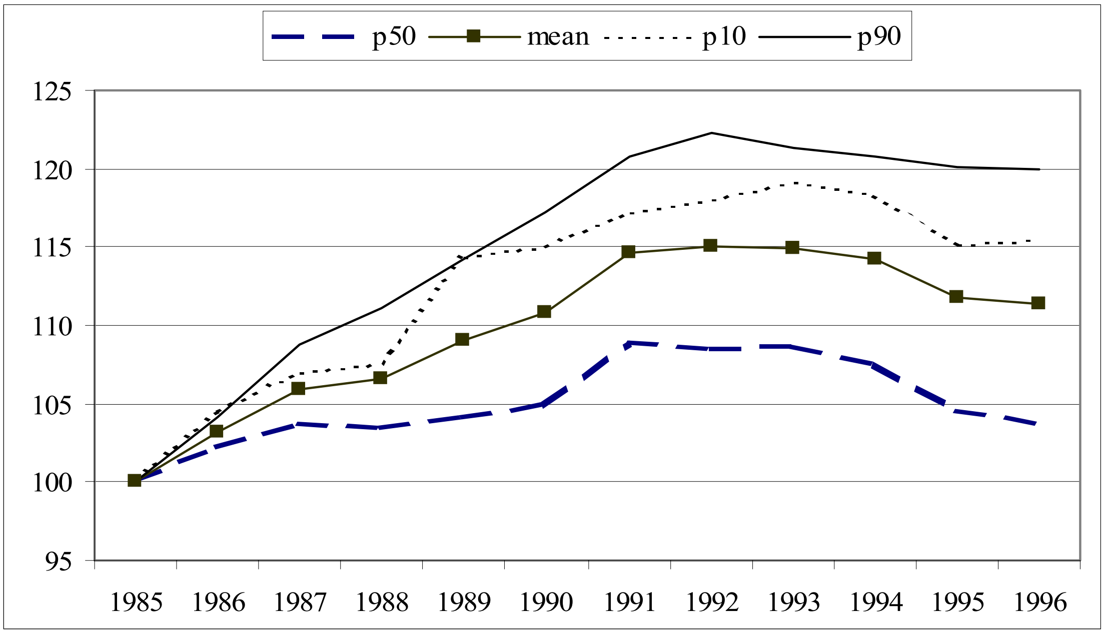


Figure 3
Kernel Density Estimates by Regional Area in 1985 and 1996.

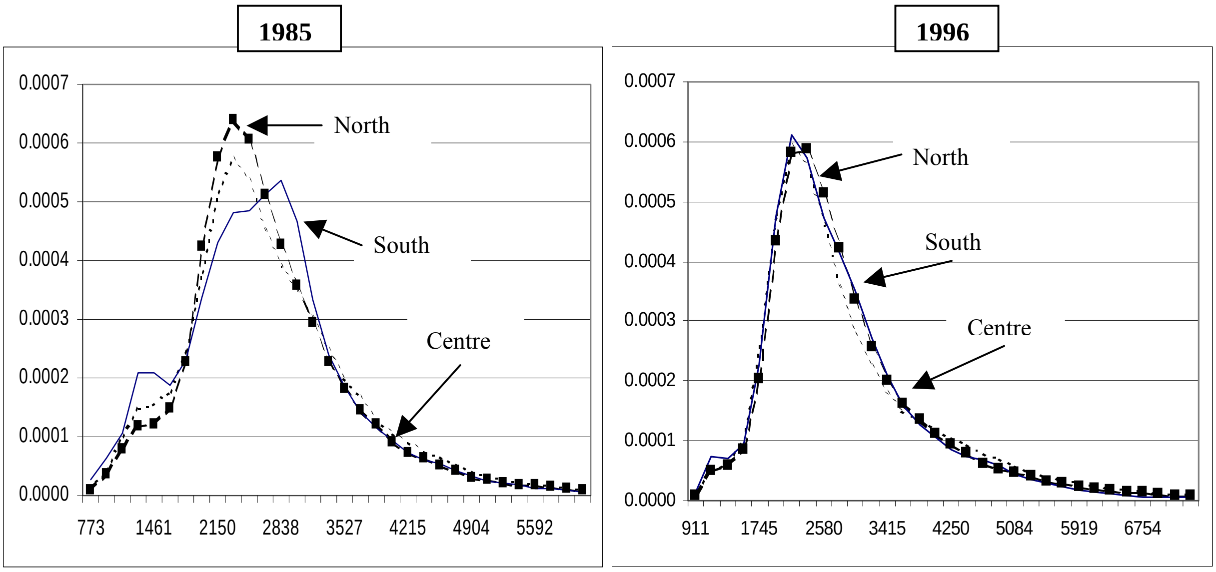
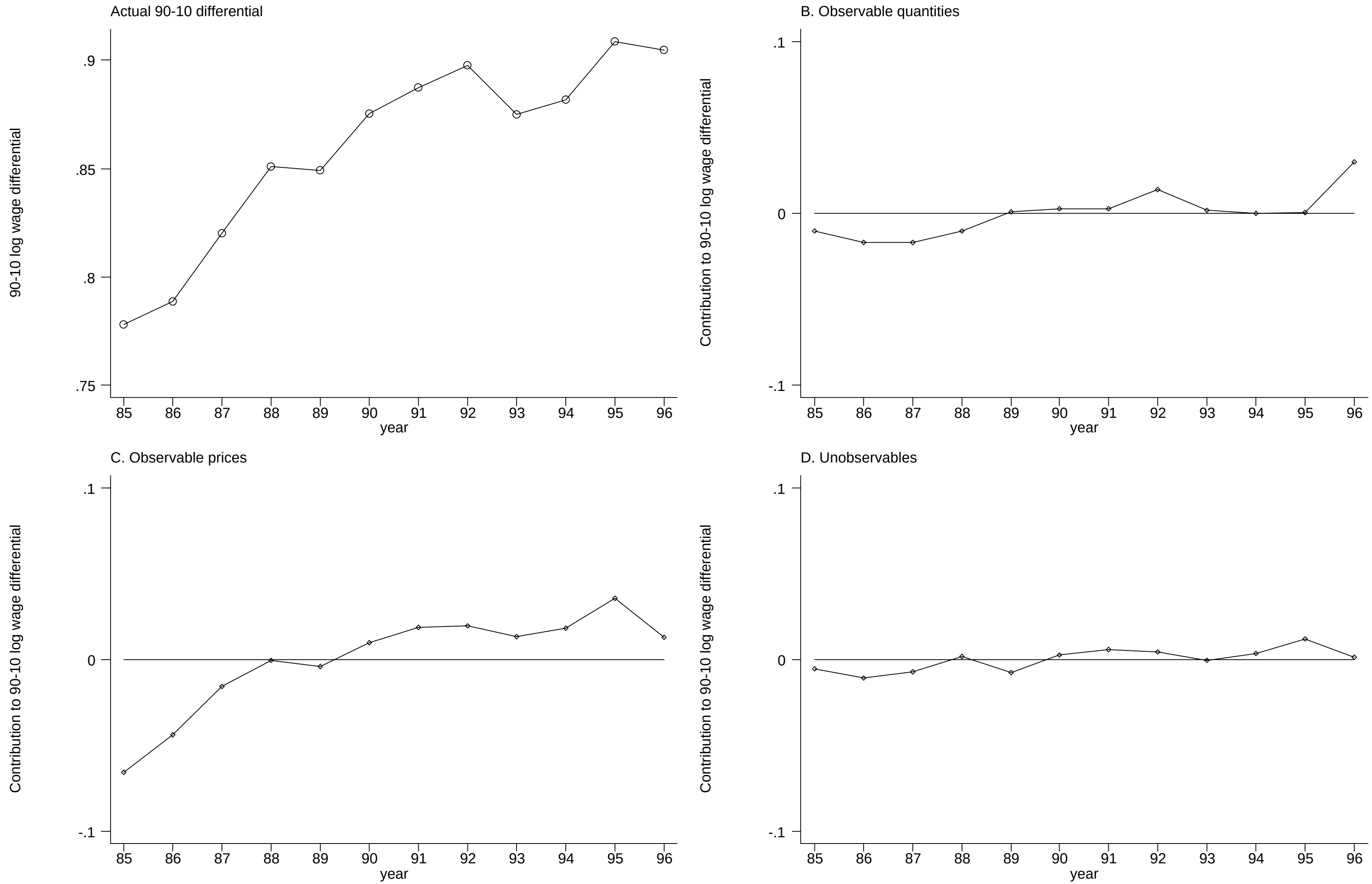
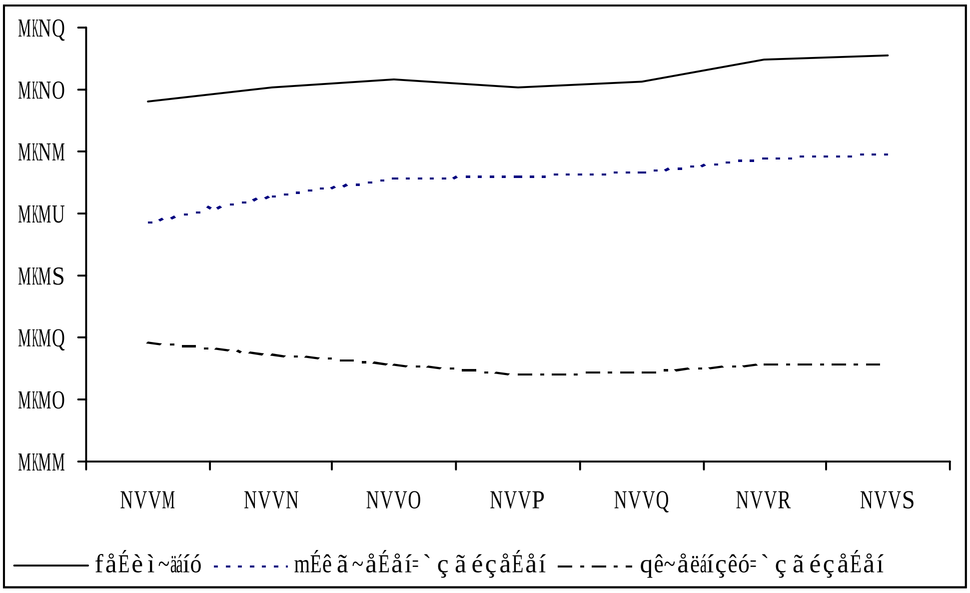


Figure 4
Ninetieth-tenth percentile log wage differential and inequality components, 1985-96



Notes: men only

Figure 5
Inequality Decomposition between Permanent and Transitory Component



Notes: men only. Inequality is measured by the variance of log wages.

Tables

Table 1
Percentiles Ratios and Earnings Shares for Decile Groups: 1985-1996

	Percentile ratios			*Decile earnings groups shares*									
year	*p90/p10*	*p90/p50*	*p50/p10*	*(poorest) 1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*(richest) 10*
1985	2.32	1.50	1.54	0.049	0.069	0.079	0.085	0.091	0.098	0.105	0.115	0.130	0.180
1986	2.31	1.53	1.50	0.049	0.069	0.078	0.084	0.090	0.097	0.105	0.115	0.131	0.183
1987	2.36	1.58	1.49	0.049	0.069	0.076	0.083	0.089	0.096	0.104	0.114	0.131	0.190
1988	2.39	1.62	1.48	0.049	0.068	0.075	0.081	0.088	0.095	0.104	0.114	0.133	0.193
1989	2.31	1.65	1.40	0.053	0.068	0.074	0.080	0.086	0.094	0.102	0.114	0.133	0.196
1990	2.36	1.68	1.41	0.053	0.067	0.073	0.079	0.086	0.093	0.102	0.114	0.134	0.198
1991	2.39	1.67	1.43	0.052	0.067	0.073	0.079	0.086	0.093	0.102	0.114	0.134	0.200
1992	2.40	1.70	1.42	0.053	0.067	0.073	0.079	0.085	0.093	0.101	0.113	0.134	0.202
1993	2.36	1.68	1.40	0.054	0.067	0.074	0.079	0.086	0.093	0.101	0.113	0.133	0.201
1994	2.37	1.69	1.40	0.054	0.067	0.074	0.079	0.085	0.093	0.101	0.113	0.134	0.201
1995	2.41	1.73	1.40	0.054	0.067	0.073	0.079	0.085	0.092	0.101	0.113	0.135	0.203
1996	2.41	1.74	1.38	0.054	0.067	0.073	0.079	0.084	0.092	0.100	0.113	0.136	0.203
% change 1985-96	3.9	15.6	-10.4	10.2	-2.9	-7.5	-7.0	-7.6	-6.1	-4.7	-1.7	4.6	12.7

Table 2
Trends in earnings inequality, 1985-1996

Year	***Inequality measure***		
	Gini (s.e.)	**Theil (s.e.)**	**Var-logs (s.e.)**
1985	189 (0.6)	62 (0.4)	122 (0.8)
1986	192 (0.6)	64 (0.4)	123 (0.7)
1987	200 (0.6)	70 (0.5)	130 (0.7)
1988	206 (0.6)	74 (0.5)	135 (0.7)
1989	206 (0.6)	75 (0.5)	129 (0.7)
1990	210 (0.7)	77 (0.5)	134 (0.8)
1991	213 (0.7)	80 (0.5)	138 (0.8)
1992	213 (0.7)	81 (0.6)	136 (0.8)
1993	209 (0.6)	79 (0.5)	131 (0.7)
1994	210 (0.6)	79 (0.5)	132 (0.7)
1995	213 (0.6)	81 (0.5)	136 (0.7)
1996	214 (0.7)	81 (0.5)	137 (0.8)
% change 1985-96	12.7	30.45	11.48

Notes: Bootstrap standard errors in brackets (1000 replications). The values of the indices and of the s.e. have been multiplied by 1000.

Table 3
Inequality decompositions by population subgroups, 1985 and 1996

	(1) Sub-group partition	(2) 1000*GE(0)		(3) 1000*GE(1)		(4) 1000*GE(2)		(5) Share (%)		(6) Mean		(7) Relative mean	
		1985	**1996**	**1985**	**1996**	**1985**	**1996**	**1985**	**1996**	**1985**	**1996**	**1985**	**1996**
A	**All persons**	61	74	62	81	68	97	100	100	2674	2977	100	100
B	**Male**	58	77	59	84	65	99	70	67	2839	3151	1.06	1.06
	Female	51	58	52	64	57	77	30	33	2289	2623	0.86	0.88
	***within*-group inequality**	56	71	57	78	64	94						
	***between*-group inequality**	5	4	5	4	4	3						
C	**Blue collars**	39	38	38	40	40	45	66	61	2552	2635	0.95	0.88
	White collars	68	70	68	74	73	83	26	32	3176	3553	1.19	1.19
	Managers	50	33	37	32	31	32	0.4	2	6668	6983	2.49	2.35
	Apprenticeship	44	32	45	35	49	40	7	5	1649	1691	0.62	0.57
	***within*-group inequality**	47	48	48	52	53	64						
	***between*-group inequality**	14	26	14	29	15	34						
D	**North**	58	75	59	82	67	99	62	63	2703	2997	1.01	1.01
	Centre	63	82	64	89	71	106	18	18	2678	3022	1.00	1.02
	South	68	66	66	71	70	83	20	19	2584	2871	0.97	0.96
	***within*-group inequality**	61	74	62	81	68	97						
	***between*-group inequality**	0	0	0	0	0	0						
E	**Age 15-24**	46	38	45	39	47	44	26	17	2115	2169	0.79	0.73
	Age 25-34	43	46	43	50	45	58	28	35	2663	2759	1.00	0.93
	Age 35-49	59	75	60	81	67	93	32	35	3001	3372	1.12	1.13
	Age 50-64	61	90	62	96	69	112	14	13	2981	3613	1.11	1.21
	***within*-group inequality**	51	60	52	68	59	84						
	***between*-group inequality**	10	14	9	14	9	13						
F	**Manufacturing**	57	72	58	78	64	94	57	52	2653	2925	0.99	0.98
	Constructions	43	46	41	49	43	58	13	10	2722	2778	1.02	0.93
	Services	77	84	79	91	88	108	30	38	2694	3099	1.01	1.04
	***within*-group inequality**	61	74	62	81	68	97						
	***between*-group inequality**	0	1	0	1	0	1						
G	**Firm employees <5**	52	42	52	46	57	56	22	19	2185	2399	0.82	0.80
	Firm employees >6 & <19	51	48	51	53	56	64	25	23	2431	2552	0.91	0.86
	Firm employees >20 & <99	52	66	53	73	60	89	22	23	2712	2882	1.00	0.97
	Firm employees >100 & <499	50	74	52	80	58	93	14	15	2964	3252	1.00	1.09
	Firm employees >500	42	67	44	69	48	77	16	20	3399	3881	1.27	1.32
	***within*-group inequality**	50	59	50	65	57	80						
	***between*-group inequality**	11	16	11	16	12	17						
H	**Full-time**	61	76	62	82	68	98	99	92	2674	3006	1.00	1.01
	Part-time	61	53	66	61	77	76	1	8	2710	2652	1.01	0.89
	***within*-group inequality**	61	74	62	81	68	97						
	***between*-group inequality**	0	1	0	1	0	1						

Notes: Due to rounding, the sum of within-group and between-group inequality may not exactly add up to total inequality. Illustrative example, consider year 1985 and the gender decomposition (panel B). Column 2 shows that inequality over all persons (section A) is 61 according to the index *GE*(0). When we disaggregate according to gender, we calculate that inequality, in the same year and for the same index, is 58 for men and 51 for women. The share of men and women in 1985 is 70 per cent and 30 per cent, respectively (column 5). Averaging inequality for men and for women, using these shares as weights, we obtain the within-group inequality value of 56. To compute the between-group inequality, we first eliminate inequality within men (i.e. assign to each man the men's mean earnings of reported in column 6) and inequality within women (i.e. assign to each woman the women's mean earnings reported in column 6). The between-group value of 5 obtained in 1985 is the inequality that still remains between men and women. Column 7 reports the ratio of the group's mean earnings to the population mean.

Table 4
1985-1996 % change in mean earnings and percentiles, by subgroups

Feature	Group	All workers mean	All workers p10	All workers p50	All workers p90	Full-time year-round workers mean	Full-time year-round workers p10	Full-time year-round workers p50	Full-time year-round workers p90
All		11.3	15.4	3.7	19.9	13.3	3.8	8.6	20.5
Gender	Female	14.6	30.1	5.7	22.5	14.5	11.6	8.4	22.0
	Male	11.0	6.3	3.4	20.6	13.3	2.4	8.2	21.5
Occupation	Blue Collars	1.5	2.3	-1.4	4.1	6.4	1.7	4.1	9.9
	White Collars	8.1	7.3	4.4	10.2	11.5	5.8	9.6	13.1
Firm sector	Manufacturing	10.3	10.3	3.8	18.9	12.2	0.6	7.6	21.2
	Construction	2.0	8.2	-4.0	5.3	1.8	4.4	-2.1	1.0
	Service	15.0	25.2	7.7	19.5	15.4	14.1	11.3	20.7
Age	Young	2.6	13.9	-0.1	-0.4	1.9	4.9	0.6	0.9
	Old	21.2	8.0	10.5	34.8	26.3	6.3	24.1	38.8
Firm size	≤5 empl.	9.8	31.4	5.2	5.2	9.4	24.5	5.6	7.5
	≥6 & ≤19 empl.	5.0	19.3	1.2	5.7	7.3	5.3	5.5	7.7
	≥20 & ≤99 empl.	6.3	1.0	0.5	0.5	10.5	2.5	6.8	15.8
	≥100 & ≤499 empl.	9.8	-1.1	5.2	18.3	15.0	2.8	10.8	23.5
	≥500 empl.	15.3	1.6	12.9	24.8	18.4	6.6	16.6	28.3
Regional Area	North	10.9	8.4	4.3	19.2	13.3	3.4	9.0	21.0
	Center	12.8	15.7	3.3	25.1	14.4	5.0	7.7	22.9
	South	11.1	34.3	1.9	17.0	10.9	10.1	4.1	14.0
Part-time	Part-time	-2.1	3.6	-4.6	-4.5				

Notes: Full-time year round workers include employees working 312 days per year (equivalent to 52 paid weeks).

Table 5
Observable and unobservable components of changes in inequalities

percentile change	quantities (I^Q)	prices (I^P)	unobservable (I^U)	total ($I^Q + I^P + I^U$)
			A. 1985-95	
90-10	0.011	0.101	0.017	0.130
90-50	0.052	0.069	0.026	0.148
50-10	-0.042	0.032	-0.008	-0.018
			B. 1985-88	
90-10	0.000	0.065	0.008	0.073
90-50	0.022	0.030	0.015	0.068
50-10	-0.022	0.035	-0.008	0.005
			C. 1989-92	
90-10	0.013	0.024	0.012	0.049
90-50	0.010	0.016	0.005	0.031
50-10	0.002	0.008	0.007	0.017
			D. 1993-96	
90-10	0.027	-0.000	0.002	0.029
90-50	0.038	-0.004	0.002	0.035
50-10	-0.010	0.004	0.000	-0.006

Notes men only.