

# Establishment Turnover and the Evolution of Wage Inequality

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February, 2007

## Abstract

Using a large longitudinal matched employer-employee dataset we produce several measures of within and between groups inequality in Portugal for the 1986-1998 period. We focus our attention on changes in the returns to observable characteristics of workers and test the hypothesis that these changes reflect developments in the labour market. We depart from previous research by shifting focus from the supply side to the demand side of the labour market. Drawing on the results of the by-now large literature on plant turnover we investigate the link between plant entry and exit and changing returns to observable worker characteristics. We conclude that the turnover of establishments is a major determinant of changes in the wage distribution over time, new businesses increasing wage inequality and closings reducing it.

KEYWORDS: Wage Inequality, Regional Inequality, Plant Turnover.

JEL CODES: J31, J43.

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## 1 Introduction

Evidence on the evolution of earnings in the industrialized world unequivocally indicate a rise in inequality during the 1980s and 1990s, which was much more pronounced in the United States and the United Kingdom than in Continental Europe. Although market forces and institutional factors are jointly responsible for changing earnings inequality everywhere, the more limited rise in inequality in Europe is widely attributed to the fact that wage changes are bindingly constrained by wage setting institutions in place there (Blau and Kahn, 1996). More recently, Gottschalk and Joyce (1998) compared trends in inequality in eight OECD countries and found evidence that much of the cross-national differences observed can be explained by market forces. They find that even in countries where institutions are usually thought of as binding, large offsetting supply and demand shifts are sufficient to explain the relative stability of earnings inequality.

The focus on market forces unveiled the role played not only by changes in relative factor supplies, but also by shifts in labor demand. The importance of such demand factors as international trade (Borjas and Ramey, 1995), skill-biased technological change (Berman *et al.*, 1994; Juhn, 1999), or the changing nature of firm-level wage-policies (Cardoso, 1999) has been pointed out. Despite the difficulty of singling out one dominant reason for the observed shifts in labor demand (Baldwin and Cain, 2000), there is general agreement that changes in wage inequality reflect an increase in relative demand for skilled workers.

However, we know from a large literature on the turnover and mobility of firms that similar firms in narrowly defined industries, even when confronting similar market conditions, make different (and persistent) choices in terms of the (skill-)

composition of their workforce (Haltiwanger *et al.*,1999).<sup>1</sup> Whereas heterogeneity in productivity and earnings of incumbent firms at any point-in-time may be accounted for by vintage effects (Lambson, 1991), more heterogeneous outcomes for new businesses could be the result of complementary choices entrepreneurs make about technology, organization or managerial ability as part of the "experimentation" process of creating and running a business (Haltiwanger *et al.*, 2000). Allowing for the presence of costs of adjustment of the labor input further explains why incumbent firms - because they are more constrained to maintain their workers-mix - may respond slower (if at all) to changes in their business environment and, for this reason, become a source of the observed persistence of workforce composition and stability of the earnings distribution.<sup>2</sup>

This paper explores the extent to which differences in plant turnover are able to explain differences in changes in observable returns to skills. Using a rich longitudinal matched employer-employee dataset, we explore cross-regional variations to identify the causal effects of plant turnover on earnings inequality. To this purpose, Portugal's mainland territory was divided into twenty-eight regions, corresponding to the NUTIII-level division. The focus on regional variations has the advantage of guaranteeing a common institutional support which allows us to concentrate on the role of market forces alone. Besides, because we use data from a single source, full-comparability of results across regions is assured. The analysis spans a 12-year period, from 1986 to 1998, and covers the universe of Portuguese establishments with wage-earners.<sup>3</sup>

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<sup>1</sup>For a survey of this literature and of its main results, see Caves (1998).

<sup>2</sup>In extreme cases, labor adjustment costs may bias firms' response to exogenous shocks, towards the entry-exit margin.

<sup>3</sup>Only Public Administration bodies are excluded.

The paper is divided into six parts. The next section describes the dataset that we use to measure earnings inequality and the corresponding changes. Section 3 presents evidence on the changing inequality for twenty-eight regions in Portugal's mainland. In section 4 we deal with regional plant turnover and its impact on labor demand. Section 5 discusses the relationship between changes in labor demand due to business startups and changing returns to college education. The final section concludes.

## 2 Data Description

The data set of this study was constructed using the data from *Quadros de Pessoal* (*QP*). *QP* is an annual mandatory employment survey collected by the Portuguese Ministry of Employment, that covers virtually all establishments with wage earners.<sup>4</sup> Indeed, each year every establishment with wage earners is legally obliged to fill in a standardized questionnaire. Reported data cover the establishment itself (location, economic activity and employment), the firm (location, economic activity, employment, sales and legal framework) and each of its workers (gender, age, education, skill, occupation, tenure, earnings and duration of work). The information on earnings is very complete. It includes the base wage (gross pay for normal hours of work), seniority payments, regular benefits, irregular benefits and overtime pay, as well as the mechanism of wage bargaining. Information on normal and overtime hours of work is also available.

Twelve spells of *QP*, from 1986 to 1998, were available for this study.<sup>5</sup> From 1986 to 1993 the information was collected in March of each year, and since 1994,

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<sup>4</sup>Public administration and non-market services are excluded.

<sup>5</sup>No computer files are available for the year 1990.

in October.

The survey has three characteristics that make it particularly suitable for the analysis of the relationship between wage inequality and plant turnover. First, it covers all firms employing paid labor in Portugal.<sup>6</sup> Second, it has a longitudinal dimension which allows us to follow plants and individuals over time. Third, it contains information on firms, plants and their workers.

### 3 Trends in Wage Inequality

In Figure 1 we display the overall trend in wage inequality (as measured by the coefficient of variation of the log of hourly wages) for all wage-earners in the Portuguese labour market over the period between 1986 and 1998. Comparing the situation in the beginning and end of the period we see no significant change in wage inequality. However, if we consider intra-period variations we find that the stability of the wage distribution is only apparent. In fact, from 1987 to 1994 there was a sharp increase in the coefficient of variation of hourly earnings which was followed by an even sharper decline in the same indicator from 1994 to 1998. A similar picture is obtained if we look at other measures of wage inequality such as the ratio between the 10<sup>th</sup> and the 90<sup>th</sup> percentiles. Besides, a similar trend is noticeable both at the top and at the bottom of the distribution, although variations at the top were somewhat sharper.

In order to understand how these changes were generated one would like to see whether these changes mirror similar changes within and between groups of workers or if, on the contrary, they are the result of partially offsetting changes between

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<sup>6</sup>Thus, this source does not cover operated family businesses without wage-earning employees and self-employment. Public administration is also excluded.

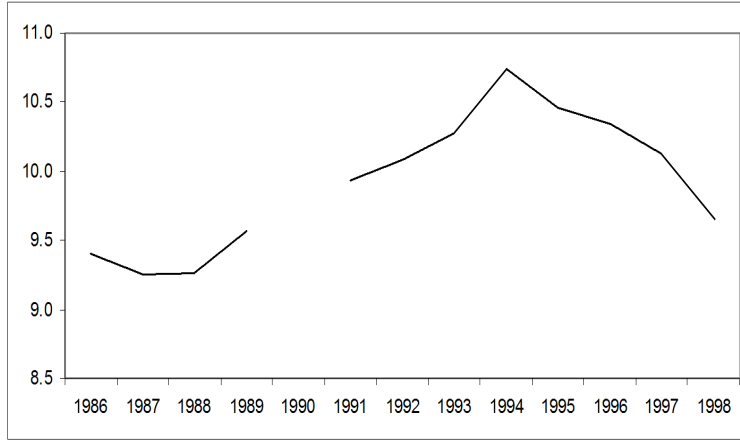


Figure 1: OVERALL INEQUALITY - COEFFICIENT OF VARIATION

and within those same groups. To do that we estimated twelve Mincerian-type wage equations, one per year between 1986 and 1998 (an exception being made for the year 1990). Employee data were used. The dependent variable in all equations is the log of hourly wages. The set of regressors include controls for the workers' age (linear and quadratic term), gender, tenure (linear and quadratic term), six skill-levels (the omitted category being apprentices) and four educational levels (omitted: less than mandatory schooling). Employer-characteristics are not controlled for to avoid endogeneity, a well-known problem in the economic geography literature. Worker attributes are assumed to be exogenous. This could be a problem if there is spatial selection bias in the unobservables, the most likely candidate being ability. However, given our focus on the dynamics of earnings inequality

the problem is relevant only if spatial biases undergo important changes over the period (Duranton and Monastiriotis, 2002). Besides, controlling for qualifications should capture, at least partially, the effects of ability.

In the analysis that follows we focus our attention in the evolution of wage inequality between groups defined along gender, age and education lines. To do that we display the evolution of the estimated coefficients of the corresponding variables obtained via the estimation of the wage equations mentioned above as well as the computed coefficient of variation of the log of hourly earnings and the ratio between percentiles 90, 50 and 1 = for each one of the groups considered.

Starting with the coefficient of the gender variable (females denoted 1) - Figure 2 - we see that much of the variation observed occurred between 1988 and 1992. During these years, while the overall measure of inequality started to rise, the wage differential between men and women with similar characteristics also rose from an estimated  $-0.125$  in 1988 to  $-0.158$  in 1992. This differential remained roughly at the same level in the years that followed and it was not affected by the reversal of the overall trend after 1994. On the contrary, within-gender groups inequality participates of the overall trend in both sub-periods and for both males and females. However, the trend towards greater inequality is due solely to changes at the top of the distribution. At the bottom, specially in the case of women, there was a reduction in wage inequality.

By age groups - Figure 3 - the evidence is mixed. For workers in the age interval between 25 and 34 the wage differential relatively to the reference category (workers below 25) remained stable specially after 1991. However, this was not the case for workers in the two older age intervals (between 25 and 54 and older

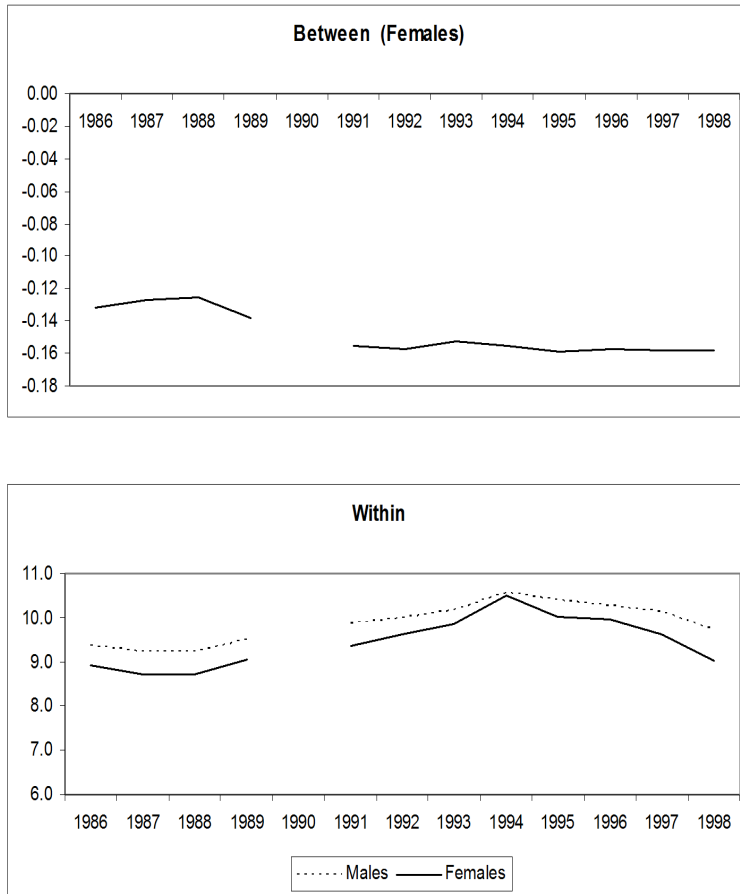


Figure 2: WITHIN-GENDER INEQUALITY

than 54). Wage differences between workers in these two groups and younger workers rose very fast after 1991 as indicated by the rising estimated returns to age (labour market experience). Rising between-inequality for these two groups was not accompanied by changes in inequality measures within the same groups. However, the opposite is true for younger workers for whom we observe a trend towards less variation in earnings after 1994.

Finally, we also considered the evolution of wage inequality - Figure 4 - between and within groups defined according to levels of schooling. Four different levels were considered: below 6, between 6 and 9, between 9 and 12 years of schooling and



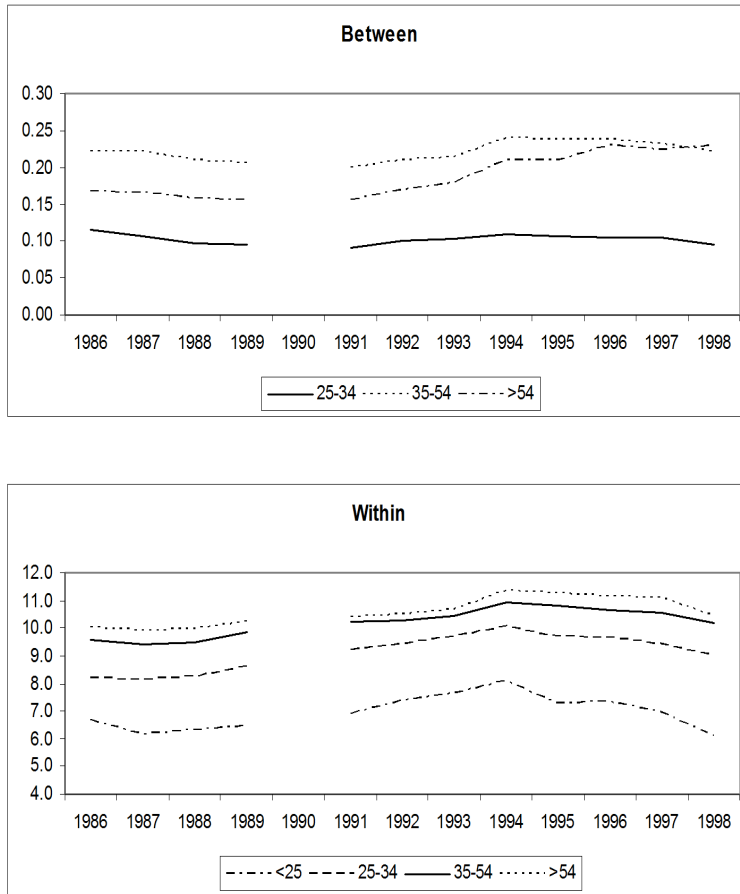


Figure 3: WITHIN-AGE GROUP INEQUALITY

college education. Results show that between groups all the activity is observed for the group of the most educated work (those with college education) for whom we observe rising returns to education until 1994 followed by a sharp reduction. Still for this group of highly educated workers, the reduction of the returns to education goes along with a significant increase in within-inequality specially at the top of the distribution. The opposite trend is observed for the lowest educated workers who suffer a sharp decline in within-group inequality.

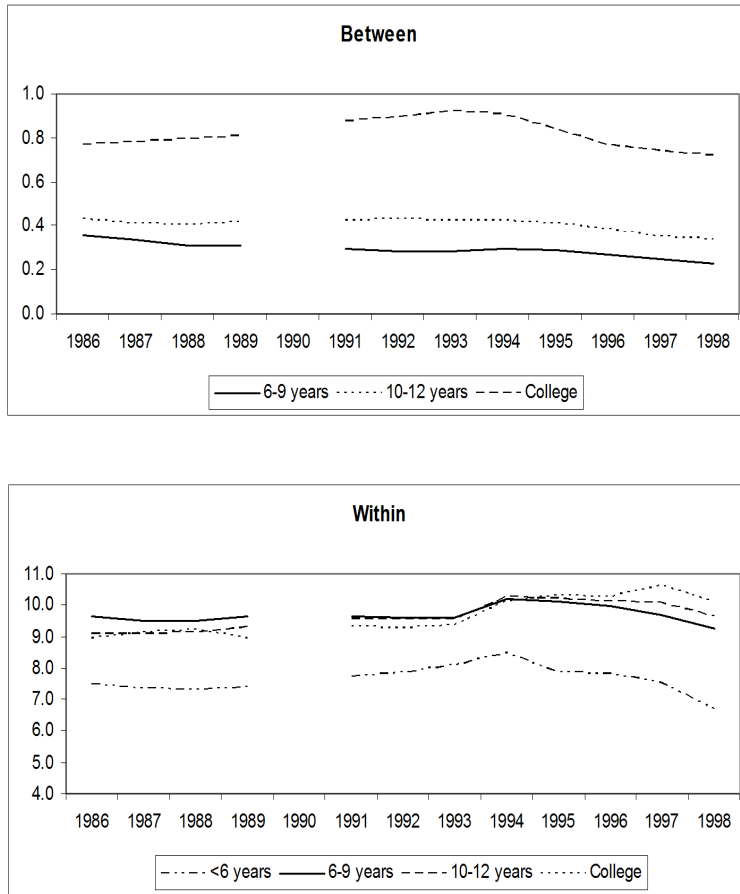


Figure 4: WITHIN-SCHOOLING LEVEL GROUP INEQUALITY

## 4 Establishment Turnover

In the aggregate, labor demand varies as a result of the continuing process of employers' adjustment to shocks both at the intensive (expansion and contraction) and the extensive (entry and exit) margins. The importance of both margin as sources of job turnover varies considerably across countries but it has been found that plant turnover accounts for an average of one third of all job turnover (Hamer-mesh, 1993). Previous studies of the Portuguese labour market have found that a larger share of job turnover (around 40 percent) is due to the process of entry and

exit of establishments because high costs of adjustment of the labour input bias employers' choices towards the intensive margin (Blanchard and Portugal, 2001).

To measure the impact of establishment turnover on the evolution of wage inequality we started by decomposing the variation of net employment into four components - employment growth due to plant births, employment growth due to expansion of continuing plants, employment decline due to contraction of continuing units and employment decline due to shutdowns. Start-ups and shutdowns were identified making use of the longitudinal nature of the dataset we use. An unit is classified as a start-up whenever it is the first time it shows up in the dataset and maximum tenure among its employees is less than two years. A shutdown is identified whenever an establishment exits the dataset and does not re-enter in subsequent waves of the survey.

As explained the dataset we use cover the period between 1985 and 2000 with one exception (the 1990 wave). In order to fully control for false entries and exits, employment flows were computed for the period between 1986 and 1998 (with the exceptions of 1990 and 1991), with the data corresponding to the first and two latter years in the sample being used to identify entries and exits in 1986 and 1998, respectively.

The results we obtained indicate that for an average yearly rate of job turnover of 25.4 percent, establishment turnover accounts for more than 40 percent of the total. Even if throughout this period adjustment is slightly biased towards the reduction of employment our results indicate that the exit of establishments account for a larger share of total employment losses (46 percent) than entries do for total employment creation (41 percent) - see Figure 5.

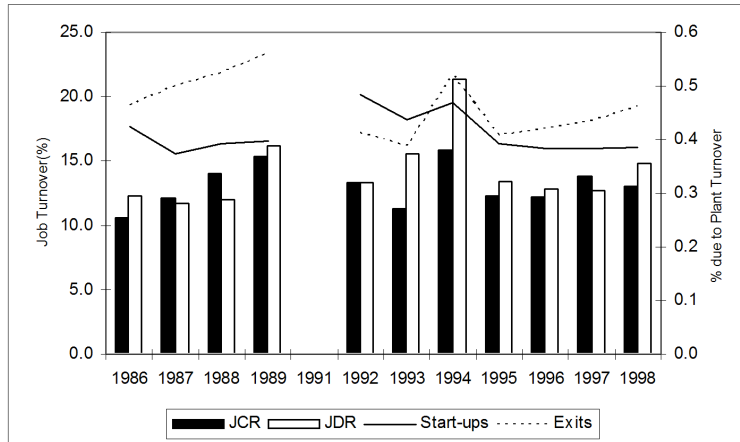


Figure 5: JOB TURNOVER AND ESTABLISHMENT TURNOVER

A first glimpse of the impact of the process of establishment turnover on the wage distribution may be obtained by looking at the unconditional average hourly wages paid by those establishments that are expanding each year and those that are entering the market in the same year. The results show that new establishments pay lower average wages than those already in the market - on average wages paid by the former group of employers is about 86 percent of those paid by the latter group. Although this result may indicate that there are significant returns to employer-specific human capital accumulated through tenure, it can also mean that the staffing choices made by new units are not significantly biased towards the use of a better qualified - more educated workforce.

## 5 Establishment Turnover and Wage Inequality

To identify the effect of establishment turnover on wage inequality we rely on the cross-regional variations. Hence, we have computed the above mentioned measures of the overall and within-group wage inequality (the coefficient of variation of the log of the hourly wage and the ratio between wages at the 10<sup>th</sup>, 50<sup>th</sup> and 90<sup>th</sup> percentiles of each region wage distribution) for each year between 1986 and 1998 and for each region (a total of 12 \* 28 set of results). Likewise, we have also estimated a set of twelve wage equations for each region obtaining thereby a full set of estimates of the between-group differences in wage rates. We also computed for each region the proportion of job creation and job destruction that is accounted for by the entry and exit of establishments. With the results thus obtained we constructed a longitudinal dataset with information on wage inequality, establishment turnover as well as other regional characteristics deemed relevant corresponding to a total of 252 observations usable in regression analysis.

These data were used to estimate by fixed-effects a regression equation of the form:

$$INEQ_{i,t} = \beta_0 + \beta_1 PBIIRTH_{i,t-1} + \beta_2 PEXIT_{i,t-1} + \beta_3 \mathbf{X}_i + v_{i,t}, i = 1, \dots, N; t = 1, \dots, T. \quad (1)$$

where, the error term writes as:

$$v_{i,t} = e_{i,t} + u_i. \quad (2)$$

$INEQ_{i,t}$  denotes one measure of wage inequality in region  $i$  and year  $t$ .  $PBIIRTH_{i,t-1}$

is the proportion of the job creation rate in region  $i$  at time  $t - 1$  that is accounted for by business start-ups,  $PEXIT_{i,t-1}$  is the proportion of the job destruction rate in region  $i$  at time  $t - 1$  that is accounted for by establishment exits and  $\mathbf{X}_i$  is a matrix of other regressors that include the regional rate of unemployment, the proportion of women, youngsters and workers with a college degree in the workforce of region which aim to control for the state of the regional labour market and the characteristics of labour supply. The error term  $v_{i,t}$  includes a regional time invariant component  $u_i$  and a region-specific time-variant component  $e_{i,t}$ . Results are in Table 1.

Table 1: Estimated Coefficients

		PBIRTH	PEXIT
Overall	Coef. Variation	1.696*	-1.42**
	P90/P10	0.041*	-0.030*
Between-group			
	Age		
	25-34	0.021	0.004
	35-54	0.015	0.002
	> 54	0.026	-0.136
	Gender		
	Female	0.007	-0.066
	Education		
	6-9 years	0.252*	-0.300*
	10-12 years	0.050***	0.048**
	College	0.022	0.005
Within-Age Group			
	< 25		
	Coef. Variation	1.466***	-3.249*
	P90/P10	0.015	-0.024
	25-34		
	Coef. Variation	1.588*	-1.962*
	P90/P10	0.050*	-0.034*
	35-54		
	Coef. Variation	0.885**	-1.094*
	P90/P10	0.040*	-0.023*
	> 54		
	Coef. Variation	-0.107	-0.499
	P90/P10	0.027***	-0.014
Within-Gender Group			
	Males		
	Coef. Variation	1.361*	-1.097*
	P90/P10	0.045	-0.035*
	Females		
	Coef. Variation	0.733	-2.333*
	P90/P10	0.01	0.025*

continue

Table 2: (continued)

Within- Education Group			
	< 6 year		
	Coef. Variation	1.044	-2.609*
	P90/P10	0.029	-0.041***
	6-9 years		
	Coef. Variation	1.665*	-0.63
	P90/P10	0.082*	-0.007
	9-12 years		
	Coef. Variation	1.622*	-0.415
	P90/P10	0.032*	-0.012
	College		
	Coef. Variation	0.02	0.109
	P90/P10	0.038	0.044

\*, \*\*, \*\*\* denote significant at 1, 5 and 10 percent.

Results indicate that establishment turnover has an impact on overall wage inequality. Job destruction originated by establishment shutdowns reduces wage inequality whereas job creation via business startups has the opposite effect on regional inequality. However, this result is mostly due to the impact of establishment turnover on within-group inequality. In fact, the larger is the share of job creation accounted for by new businesses, the more within group inequality we will find at the region level. This result is specially strong for all age groups and for mid-level education groups. On the contrary, job destruction via exits has the effect of reducing the variation of wages within age and gender groups, but not within educational groups (except at the bottom-end of the schooling scale).

What these results tell us is that the new businesses, although they are less constrained than older units in their staffing decisions (because they do not inherit an existing workforce that is costly to dismiss), they do not make significantly different choices both in terms of the age and gender profile of the workers they hire. Because of that, the process of creation of new units leaves wage inequality between age and gender groups very much unaffected. However, their pay policies



differ and that has an impact on within group inequality - they pay lower average wages and more diversified wages. The only exception to this result refers to workers with mid-low levels of education. Business start-ups have a positive impact on the returns to education of workers with lower levels of educations possibly because they pay even lower wages to the omitted category (less than six years of schooling).

On the exit margin, the results are even clearer. Job destruction reduces inequality at all levels both between and within groups. The only exceptions are that shutdowns do not impact significantly on returns to age (experience) and on inequality within groups of education. However, there is also a very clear indication that the effect of establishment closings on the distribution of earnings operates via the specific composition of the workforce of these units as compared with those of the establishment that survive. These are units that employ older and less educated workers and therefore the impact on exits is specially noticeable in terms of returns to age (a negative sign for inequality between older workers and the omitted category) and within inequality in the group of the lowest educated workers (negative and significant impact).

## **6 Conclusions**

In this paper we examine the process through which market forces contribute to shape earnings inequality. Using a large longitudinal dataset we found that small changes in labor market inequality in Portugal were the result of increasing inequality at the top of the earnings distribution.

Over the period analysed (1986-1998) there was a sharp increase in wage in-

equality until 1994, followed by an even sharper reduction. Over this period there was an increase in the wage penalty received by women as well as a reduction in within-group inequality in the case of women. Returns to experience (age) also increased considerably, but heterogeneity within the group of younger workers diminished. Following the increase in the share of the population with a college degree, inequality between college-educated workers and the others rose in a first moment, but it steadily declined afterwards. However, as the premium to college education declined, inequality within this group of workers increased.

Exploring regional variation of wage inequality we were able to identify a causal effect of establishment on inequality. By means of regression analysis we were able to establish a connection between the evolution of wage inequality and the turnover of establishments. We found that job creation through start-ups increases overall inequality as well as within group inequality (specially for groups defined according to the age of the worker), whereas shutdowns have an even wider but negative effect on inequality at all levels - overall, between and within groups.

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