Earning functions in Portugal 1982–1994: Evidence from quantile regressions*

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Abstract. This paper uses quantile regressions to describe the conditional wage distribution in Portugal and its evolution over the 1980s as well as the implications for increased wage inequality. We find that, although returns to schooling are positive at all quantiles, education is relatively more valued for highly paid jobs. Consequently, schooling has a positive impact on wage inequality. Moreover, this tendency has sharpened over the period. We also find that most of the estimated change in wage inequality was due to changes in the distribution of the worker’s attributes, rather than to increased inequality within a particular type of worker.

Key words: earning functions, wages, Portugal, quantile regressions

1. Introduction

The structure of wages and wage inequality have been under scrutiny in most developed countries for a long time. It is well established now that the 1970s and in particular the 1980s witnessed a reversal in the tendency towards a reduction in wage inequality that prevailed during the previous decade. An explanation that has been recurrently advanced for this change in the structure of pay is that there has been a shift in labor demand favoring high-skilled

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labor at the expense of low-skilled labor, primarily caused by changes in technology, notably by the use of computers (Juhn, Murphy and Pierce 1993, Bound and Johnson 1992). Another explanation relates the increase in the pay spread to the increase of foreign competition (Borjas and Ramey 1995). A third explanation suggests that demographic factors, such as reduction in the number of college graduates among the working population, may be responsible for the increase in the premium to education (Murphy and Welch 1989).

Each of these three factors were subject to important changes in Portugal in the last decade. Foreign competition increased, largely due to European Union membership in 1986. At the same time, and largely financed with European funds, very substantial resources were devoted to policies designed to modernize the industrial structure, both by subsidizing investment in modern technologies and by creating widespread training programs. These changes have certainly had an impact on the wage structure.

It comes therefore as no surprise that this topic has also attracted considerable attention in Portugal in recent years. As in the other developed economies, wage inequality increased during the last decade, in particular since the mid 1980s (Cardoso 1998). In addition, educational levels have been continuously increasing, largely as a result of successive increases in mandatory schooling from 6 to 9 years, which led to a shift in the supply of labor towards more skilled workers. At the same time, however, increasing returns to schooling are observed (Vieira, Hartog and Pereira 1997a).

In this paper, we do not go into the details of the changes that have occurred in the Portuguese labor market, nor do we offer explanations for the changes that have occurred. Our goal in the paper is rather to offer a detailed description of the conditional wage distribution and of its evolution over the 1980s.

Analysts of the determinants of wages have acknowledged that work places are highly heterogeneous. As a consequence, the returns to education (or, more generally, to human capital) may vary across individuals with the same observed human capital. To account for this heterogeneity, researchers control for region, industry and employer characteristics, which is typically done by including the explicitly observed characteristics of the employer or firm, industry and regional indicators in wage equations. Recent research, however, suggested that this may be insufficient to capture the real effect of employer heterogeneity and found that employee and employer characteristics interact in the process of the determination of salaries (see for example Cardoso 2000). A more primitive form of heterogeneity affecting the wage distribution is employee’s heterogeneity. This type of heterogeneity has been long recognized in labor economics, and panel data is commonly employed in the estimation of earning functions, in order to obtain unbiased estimates of the returns to human capital. However, conventional panel data techniques only deal with the effect of unobserved heterogeneity upon the mean wage. In this sense, the use of panel data is not helpful to study, for example, the effects of gender or formal education on wage inequality.

Rather than exploring the intricate set of relationships stemming from employers and employee’s heterogeneity, our analysis takes a different path. We use quantile regression techniques (Koenker and Bassett 1978), to document the heterogeneity in the way wages respond to variations in those variables which are normally expected to affect them — gender, human capital, firm attributes and industry indicators (Mincer 1974). Unlike mean (least squares) regression, these techniques allow the study of the effect of each of