2.1. Is it still worth investing in education?

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1. Introduction

There is a wide strand of empirical literature shedding light on the magnitudes and explanatory factors of returns to schooling in both advanced and emerging economies. In the case of Portugal, returns to schooling rank high among European Union countries.[8] Vieira (1999) and Sousa *et al.* (2015) present estimates for an additional year of school ranging from 7 to 11 per cent at the mean of the wage distribution, while Machado and Mata (1998), Hartog *et al.* (2001) and Martins and Pereira (2004) show that returns are higher at upper quantiles. Moreover, existing evidence points that the returns are especially high in the case of individuals with university education (Alves *et al.* (2010) and Portugal (2004)), among which unemployment rates are also consistently lower, especially when compared with that of high school graduates (Figure 9).

The returns to schooling in Portugal may however have changed over the last couple of decades, given the remarkable increase in the average educational attainment of the labour force. Higher educational levels are still generally associated with higher wages. Importantly, the differential between wages of individuals holding university degrees and those with only secondary education is large and it widens across the life-cycle (Figure 10). However, the average differential has recently been shrinking and the percentage of university-educated workers with below-median wages increased. These pieces of evidence motivate the discussion on whether it *still* pays-off to invest in university education. Such discussion provides valuable insight for individuals, informing their decisions on how much to invest in formal education. It is also relevant for policy makers by providing guidance for the design of programs and incentive schemes to promote individual investment in education.

This Section, based on Campos and Reis (2018), complements the existing evidence on returns to schooling in the Portuguese economy,

8 Refer to, for instance, Psacharopoulos (1994), Martins and Pereira (2004), Psacharopoulos and Patrinos (2004) and Montenegro and Patrinos (2014).

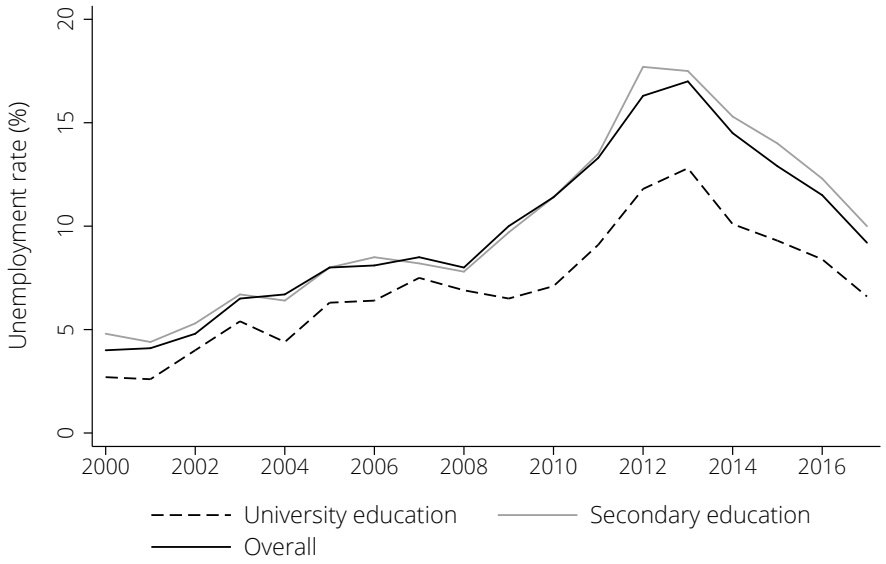

Figure 9: Unemployment rate by level of schooling

Note: The Figure depicts the average annual unemployment rate among individuals aged between 15 and 64.
Source: Labour Force Survey.

providing an overview of how they have changed since the late 1980s. We show that investing in tertiary education still yields significant individual returns.

2. Analytical framework

The analysis presented in this Section is based on data drawn from *Quadros de Pessoal* (QP) covering the 1986-2016 period (except 1990 and 2001 for which data are not available).[9]

A first grasp of the return to university education may be obtained by comparing the (present value of) costs and benefits of undertaking such investment accumulated over the lifecycle. In particular, assume that:

1. The costs of tertiary education correspond *only* to the average foregone earnings or the opportunity cost of spending four years in university instead of entering the labour market straight after finishing secondary education (the lighter shaded area in Figure 10); and

9 QP data cover every establishment paying wages in the Portuguese private sector: general government, military staff, self-employed and household employees are thus excluded.

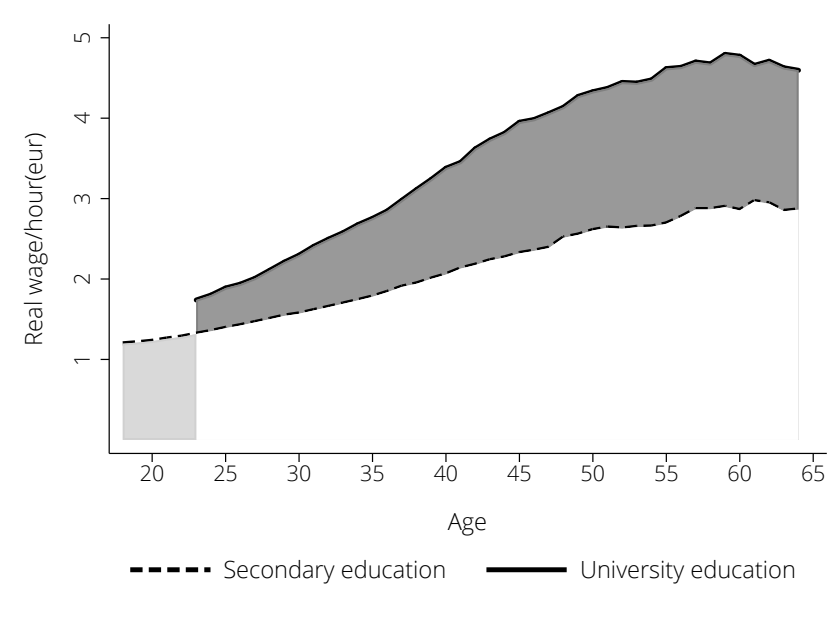

Figure 10: Average wage over the life-cycle

Notes: The darker shaded area represents the lifetime additional earnings associated with holding a tertiary degree instead of completing only secondary education. The lighter region represents the opportunity cost of spending four year in university instead of entering the labour market after completing secondary education. Earnings are expressed in 1986 prices.
Source: 2016 *Quadros de Pessoal*.

2. The benefits are *only* the average additional earnings of individuals holding tertiary, compared to those which only hold secondary education, accumulated over the whole career (the darker area in Figure 10).

On the basis of a (standard) discount rate of 2%, these simplified assumptions imply a rate of return for the investment in tertiary education of approximately 5% in 2016. This provides only an approximation as it does not take into account the whole range of costs and benefits incurred. Moreover, this figure is based on the rough comparison of wages of individuals that may differ as regards many observable and unobservable endowments. A better gauging of the returns to schooling can be achieved on the basis of the analytical framework proposed by Mincer (1974) which illustrates the empirical relationship between education and earnings as:

$$\ln y_i = \alpha + \beta S_i + \lambda_1 Exp_i + \lambda_2 Exp_i^2 + \epsilon_i \tag{8}$$

where $\ln y_i$ is the logarithm of earnings of individuals; S is a measure of educational attainment and Exp refers to individuals' experience in the labour market.

We run the regressions separately for each wave of QP, assuming a cross-sectional set-up and taking *age* (as a second order polynomial) as a proxy for labour market experience.[10] We control for educational attainment by including a set of binary variables for each of the following levels: 1) less than the 9th grade; 2) 9th grade; 3) secondary education; and 4) tertiary education. The coefficients referring to these variables yield the wage premia relative to individuals holding less than the 9th grade, which is the category omitted in the regressions. As we are interested in the wage gain relative to the schooling level immediately before, we take the *difference in the coefficients* as a measure for the return associated with each level.

2.1. *Results*

Figure 11 plots the returns for each schooling level (vis-à-vis the level immediately before), at the mean of the wage distributions referring to male and female workers. It shows that women tend to benefit from larger returns to education than men. The premium associated with completing the 9th grade sharply declined since the 1980s. According to our results the magnitude estimated on the basis of 2016 data corresponds to approximately half the figures obtained for 1986. Regarding secondary education, there is evidence that the gain relative to completing only the 9th grade increased along 1986-2016, but it is still considerably below the one referring to tertiary education. Finally, the premium associated to tertiary education markedly increased along the 1990s against a background of an expansion in the pool of workers holding university degrees, suggesting that such increase was demand-driven.

Since the beginning of the 2000s, the returns to university education have been declining steadily, particularly in the case of women. Results obtained by Campos and Reis (2018) on the basis of Quantile Regressions (which yield estimates at different points of the wage distributions) show that such decline is particularly relevant for low-earning individuals, whose wages place them at the bottom of the wage distribution.

An analysis by age (Figure 12) focusing on the post-2005 period suggests that this evidence is driven by developments referring to younger workers: these not only benefit from lower returns to university education than their older counterparts, but they have also experienced sharper drops in returns in the most recent period. In

10 The regressions include a set of other covariates: the individual's tenure in the current firm (also as a second order polynomial), and the logarithm of the current firm's size.

Figure 11: Returns to schooling at the mean of the wage distribution by educational attainment

Note: The Figures depict the per cent wage premium associated with each educational level relative to the level immediately before.

this regard, it should be noted that this analysis does not differentiate between holders of a Bachelor's degree (*Licenciatura*) from those holding a Master's or a Doctorate. Existing evidence suggests that the decline in the premia for tertiary education in the last decade was driven by developments referring to workers with a *Licenciatura* only, whereas for those with post-graduate studies there was actually an increase (Figueiredo *et al.* (2017)). This evolution occurred in parallel with the implementation of the Bologna reform which, on the one hand, implied a reduction in the number of years of study required to obtain a *Licenciatura* and may have contributed to decrease the value given by employers to this degree. On the other hand, the reform has also contributed to increase demand for Master's degrees and an expansion in post-graduate programmes offered by universities, not only in terms of quantity but also in terms of the range of covered specialization fields - something that employers are likely to value.

3. Discussion and concluding remarks

This Section sheds light on the recent evolution of private returns to schooling in the Portuguese economy. These are found to be higher in the case of women and to increase with educational attainment.

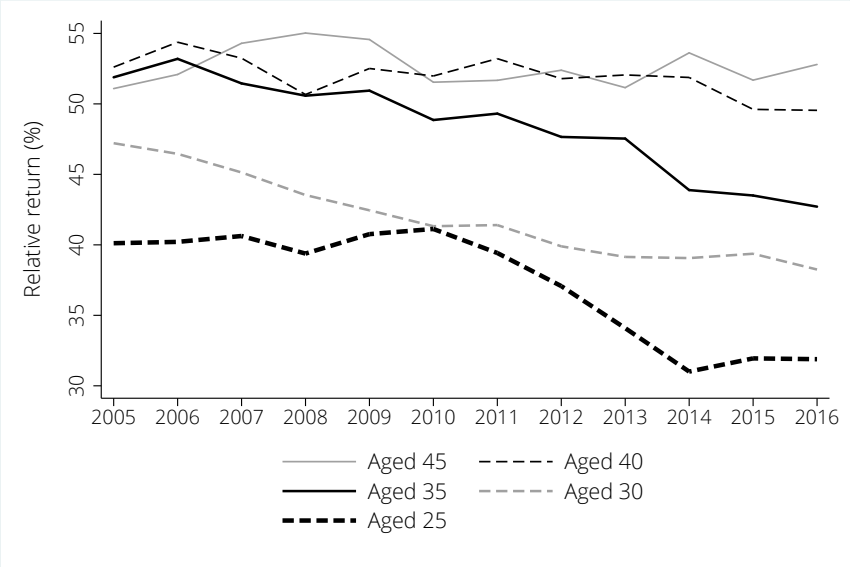

Figure 12: Returns to tertiary education by age

Note: The Figure depicts the relative wage increment from obtaining an university degree vis-à-vis completing only secondary education.

The returns to schooling increased in the late-1980s and the 1990s, especially as regards tertiary education. This occurred in parallel with an expansion of the pool of workers holding university degrees, suggesting it was surpassed by a rise in the demand for skilled labour. During the late-1990s and early-2000s, the wage premium for tertiary education remained relatively stable. In the most recent period the magnitude of the returns to tertiary education declined, an evolution that may have been driven by the drop in the number of years required to complete a *Licenciatura*, brought about by the Bologna reform. In any case, in Portugal, tertiary education remains a profitable investment for individual agents and policy makers must take this into account when designing policies and incentive schemes.

The current challenge for policy makers relies on ensuring the quality of the public school system while providing low-income households conditions to access university education, incluing at the post-graduate level. This cannot be done at the expense of low quality pre-school or elementary education, as investments in lower schooling levels increase the returns to subsequent ones. These tensions may require a reshuffling in terms of the funding sources, including an increase in the share of costs supported by the individuals in tertiary education. This may require not simply increasing tuition, but also the setting up of an effective loan scheme (such as the one recently implemented in the UK that is contingent

on graduates' future earnings). Ensuring access to the increasingly more valued post-graduate programmes - whose tuition prices are considerably higher than those of *Licenciaturas* - is paramount.

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