2.3. What is the relative advantage of vocational education in the Portuguese labour market?

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1. Introduction

Debates on the relative value of vocational versus general education have a long history among educators, politicians, lobbying employers, labour leaders and opinion leaders. It's a very broad issue, considering arguments such as intellectual and cultural preparation for adult life, citizenship and lifetime labour market prospects, too broad for analysis in a single sweep.

School systems usually differentiate among vocational and general (or academic) tracks. Vocational education will prepare rather directly for specific occupations and train the students in the skills needed in these occupations. General education teaches more broader, more basic abstract skills not directly related to tasks in particular occupations.

The relative benefits of vocational versus general education are often perceived to differ by career stage: (i) relative short-term benefits enhanced by vocational skills and (ii) relative long-term benefits enhanced by general skills. In other words, potential gains in youth by the vocational system facilitating the transition from school to work may be offset by less adaptability in the future. Empirical evidence is relatively limited. The main exceptions are the recent papers by Golsteyn and Stenberg (2017), Brunello and Rocco (2017), and Hanushek *et al.* (2017). In terms of earnings, Golsteyn and Stenberg (2017), show some evidence for Sweden supporting the trade-off result. For the UK, Brunello and Rocco (2017) find also evidence of a trade-off, but only for the group with secondary vocational education. In terms of employment, Hanushek *et al.* (2017) find evidence of the mentioned trade-off in countries with strong emphasis on apprenticeship programs. In a different context but also related, Malamud and Pop-Eleches (2010) examines the relative benefits of general education and vocational training during Romania's transition to a market economy. For Portugal, Pereira and Martins (2001) find that with a Mincer earnings function over the period 1982-1995, a

lower secondary technical degree pays always more than its academic counterpart and, over the years 1994 and 1995, that upper secondary vocational education paid better than general education. Oliveira (2014) finds that between 1993 and 2009, workers with vocational education initially have a wage advantage, but wages are higher for workers with general education after eight years of experience.

This Section follows up and complements the analysis on Hartog *et al.* (2018), providing evidence for the period 2011-2016 and for different levels of education in Portugal. More specifically, we compare the wage trajectories over the life course associated with high school vocational, high school general, higher education and less than secondary education, for a country where the vocational system is not so well developed and most likely still in a transition period. We also compare these groups in terms of risk measures defined as the coefficient of variation of wages, and unemployment rate. As expected, in terms of wages, high school vocational students are always worse off than higher education and always better off than less than secondary. Nevertheless, when comparing with the high school education we find evidence supporting the short-term advantage of the high school vocational and its long-term disadvantage. We find similar conclusions in terms of the risk measures.

2. Data and institutional setting

For the wage analysis, we use data from the Portuguese Quadros de Pessoal (QP), a longitudinal dataset that covers all workers in firms with at least one employee, irrespective of age. Our sample includes full-time wage earners in the private non-farm sector. Moreover, civil servants are not covered by QP and we dropped the self-employed as the data on this category is too noisy. We use data from 2011-2016, restricted to birth year cohorts 1968-1996 including only individuals that started school in the "modern system", i.e after the Law 46/86 that established the current system with 3 cycles of 9 years of basic school, and 3 of secondary school. At the same time, only the cohorts that were born in 1968 onwards are affected by the Law 194-A/93, which established the dual certification. For more details on the Portuguese education system please see Hartog *et al.* (2018). The selection analysis is performed using data from the Observatory of Student Pathways in Secondary Schools (OTES), in particular from the survey among students at the beginning of the secondary education. It is a representative survey, provided by the Ministry of Education, among students in tenth grade, i.e. the first year of our upper secondary level. Finally, the unemployment data is from the Portuguese Labour Force Survey, provided by Statistics Portugal(INE).

Since 1986, the Portuguese system has 3 years of differentiated secondary education, which is characterised by subject specialisation and is organised in different paths. More specifically, vocational education provision is concentrated mainly at the secondary level, while the vocational component at the basic and higher education levels represents a small share of the system. The vocational path follows the structure set in the legislation, comprising a general component and a training component. In Portugal the main vocational qualification is the "Professional Programmes" which accounts for around 70% of the enrollment in the vocational path.[11] This path lasts for three years with approximately 3200 hours. On the job learning is mandatory and lasts 600-840 hours, corresponding to 19-24% of the overall programme, and are offered by public and private schools.

3. Selection issues

We cannot take for granted that students choosing a vocational education or a general education are identical. For three recent school cohorts, we use data on students' performance in the period before entering upper secondary education. The data are from the Observatory of Student Pathways in Secondary Schools (OTES), in particular from the survey among students at the beginning of the secondary education. It is a representative survey, provided by the Ministry of Education, among students in tenth grade, i.e., the first year of our upper secondary level.

With this data, we can check the effect of ability and family background on actual track choice. Table 4 shows that mothers' education, whether measured in years or levels, has a significant effect on track choice: children from higher educated mothers choose the general track more often. This effect is much smaller for those who do not intend to continue education after secondary level than for those who do. In the latter case, reading score has a positive effect on the likelihood of choosing the general track, while math score has no significant effect. Since math scores are generally considered a good indicator of general intellectual ability (or IQ) and reading scores are taken as an indication of taste and talent for more scholastic engagement, this would indicate that students who choose the secondary education are not necessarily of lower ability, but have an interest in more practical, directly applicable education. However, this is a rather speculative interpretation which would require more evidence to substantiate. Therefore, we can document that in recent

11 Other components: Apprenticeship programmes, Education and training programmes for young people, specialised art programmes, and other specific vocational programmes.

Variables	All General and All Vocational	General - with no intention to continue education after high school and All Vocational
	(1)	(2)
Mothers' years of schooling	0.0160***	0.00978***
	(0.00105)	(0.00218)
Reading Score (9th grade)	0.0703***	0.0265**
	(0.00469)	(0.0119)
Math score ((9th grade)	0.0498***	-0.00897
	(0.00433)	(0.00929)
At least one retention	-0.277***	-0.137***
	(0.0105)	(0.0142)
Age finishing 9th grade	-0.0579***	-0.0407***
	(0.00384)	(0.00661)
Gender	0.0650***	-0.00640
	(0.00828)	(0.0147)
Family structure (ommited: mother and father)		
Monoparental	-0.0153*	0.0269
	(0.00871)	(0.0183)
Couple but not father or mother	-0.0204	0.0288
	(0.0129)	(0.0246)
Other	0.0213	-0.0257
	(0.0175)	(0.0341)
Mother labour market status (ommited: employed)		
Unemployed	-0.0301**	-0.0108
	(0.0118)	(0.0193)
Domestic occupation	0.00680	0.0205
	(0.00979)	(0.0168)
Student	0.000722	0.0678
	(0.0353)	(0.0940)
Retired	-0.00816	0.0453
	(0.0175)	(0.0347)
Constant	1.041***	0.837***
	(0.0668)	(0.118)
Observations	35,023	6,840
R-squared	0.255	0.057

Table 4: Selection at secondary level

Note: Linear Probability Model estimates of the Likelihood of choosing the General track, for students at the 10th grade in the academic years of 2007/08, 2010/11, and 2013/14. The data are from the Ministry of Education, Observatory of Student Pathways in Secondary Schools (OTES). In Column (1) we use data from all students both in general and secondary education. In Column (2) the sample includes all vocational students but for the general track only students who have stated that they do not intend to continue education after graduating from upper secondary school. Both specifications include also year fixed effects. Robust standard errors in parentheses. * Significant at 10%; ** significant at 5%; *** significant at 1%.

years there is a large gap in school performance (*ability)* between vocational students and general students that go on to advanced education but only a modest negative gap with general students that refer no intention to continue.

4. Wage analysis

Next we turn to a simple analysis of the wage premium of the vocational graduate students on the basis of the well-known Mincerian wage equation that captures the empirical relationship between education and wages.

Table 5 shows vocational graduates wage premium (unconditional and conditional on age, gender, tenure, and firm size) relative to other education levels: Less than secondary, general secondary, and higher education. There is a positive premium compared to completing less than the secondary education, reaching on average almost 20% (almost 30% in the conditional specification). When compared to the higher education workers, the wage premium is clearly negative, reaching on average more than 50% in both specifications. Figure 17 shows that in both cases, the gaps increase with age. In particular, for individuals aged 45-49, the higher education premium is almost 70% and above 30% when compared to individuals with less than secondary education.

Graduates from vocational secondary education have about 8% lower wage than graduates with general education as their highest degree. Once we control for individual and firm characteristics, the gap shrinks to only 2%, on average (Table 5). By age, Figure 17 shows that there is a positive gap until age of 30 (around 2.5% for workers between 25 and 29), followed by a negative premium for older workers (almost 10% for individuals aged 45-49).

	Unconditional	Conditional
Less than Secondary Education	0,17	0,28
High School General Education	-0,08	-0,02
Higher Education	-0,55	-0,51

Table 5: High School Vocational graduate wage premium

Note: Conditional regression includes gender, age, age squared, tenure, tenure squared, log of firm size and year specific effects.

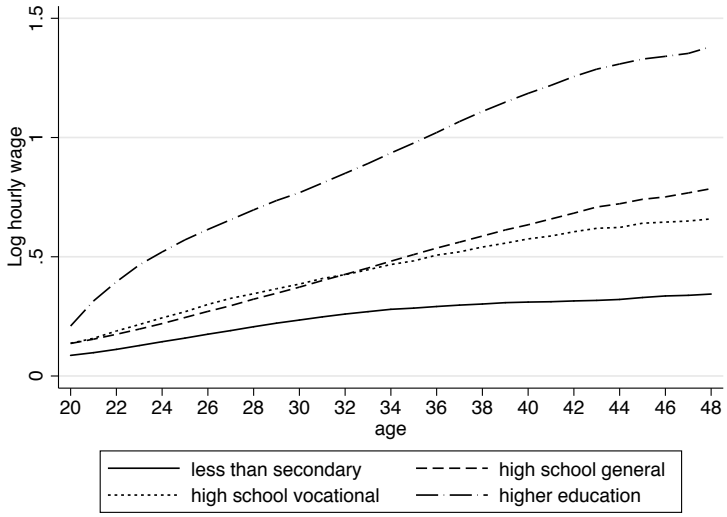

Figure 17: Log hourly wage - Life cycle profile by education level

5. Some "risk" measures

A trend to expand the curriculum of lower and extended vocational educations to include more general skills like math and languages has been observed in many countries, often to the dismay of students and employers. In Portugal, policy makers always motivated such expansion with the claim that vocational graduates will have a stronger position in a dynamic labour market, face less risk and have higher lifetime returns. In this setup, next we turn to the analysis of risk indicators by type of education: earnings variance, earnings coefficient of variation and unemployment rate.

Figure 18 shows that in terms of financial risk, higher education presents clearly a less riskier profile, while individuals with less than secondary education face a higher risk when compared to the vocational graduate individuals. As in the wage profile, we observe a short-term advantage of the vocational graduates but a long-term advantage of the general high school graduates.

In terms of unemployment, using data from the Portuguese Labour Force Survey, we observe a lower unemployment rate for the individuals with higher education levels (Figure 19). Nevertheless, in contrast to the other indicators, when compared to workers with less than secondary and with general high school graduates, we observe a higher unemployment rate for the vocational high school graduates between 2011-2014 but a lower one in the most recent period. These developments are likely to be related with the economic cycle, and potentially a result of the higher flexibility of the vocational type of

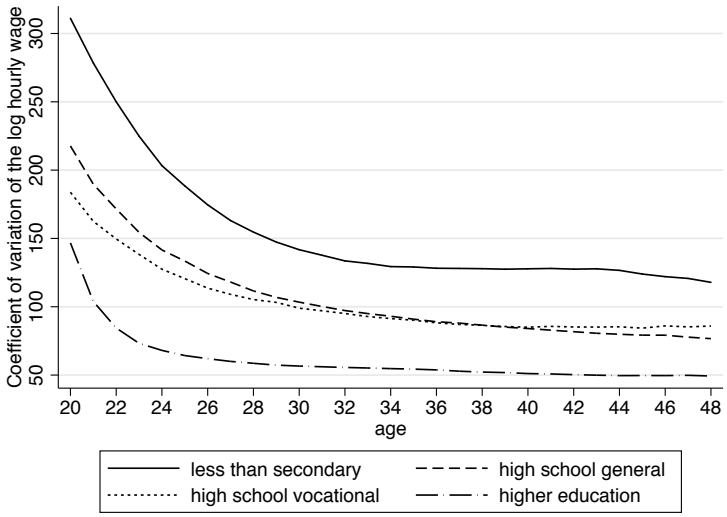

Figure 18: Earnings coefficient of variation, by education level

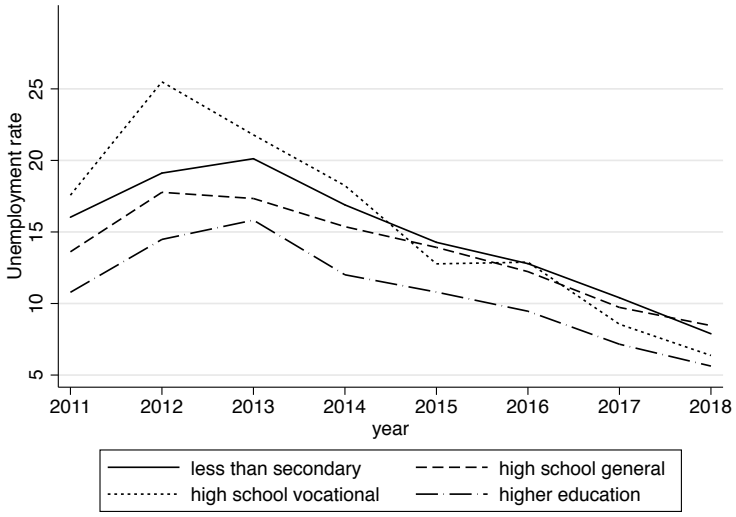

Figure 19: Unemployment rate, by education level

workers. By age, we do not observe a clear pattern by education groups.

6. Concluding remarks

Portuguese students tend to favor general education over vocational alternatives. However, it can be argued that vocational education is both under-developed and under-valued in Portugal and most likely

still in a transition period. Indeed, a non-trivial share of those entering higher education drop-out without obtaining any diploma and some public universities/courses tend to be over-crowded. Therefore, tracking those students ill-prepared for general education toward more applied education curricula may be an efficient way to reduce youth-unemployment. Nevertheless, the potential tradeoffs in the life-cycle should enter into policy debates on the degree of confidence on vocational programs. In this context, European Commission (2010) - the Bruges Communiqué - emphasized the need for enhanced vocational programs, largely to deal with high youth unemployment in Europe, but also recognizes that there must be a concomitant investment in "lifelong learning".[12] This is also highlighted by Hanushek *et al.* (2017), where they argue that vocational training should not substitute for providing strong basic skills because this and other analyses underscore the necessity in modern economies of developing general cognitive skills. Therefore, countries might want to contemplate programs that would ameliorate any later life disadvantages of vocational programs. This should be also a concern in Portugal.

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12 The Bruges Communiqué is a package of objectives and actions to increase the quality of vocational training in Europe by making it more accessible and relevant to the needs of the labour market.

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