The return to university degrees: the students' perspectives

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Abstract: We test two assumptions of Becker's human capital theory: 1) financial returns play an important role in students' choice of university degrees; and 2) students understand how such returns differ across degrees. Drawing on a large survey of Portuguese undergraduate students, we find that expected wages matter in degree choice but preferences for "degree content" are at least as important. Moreover, many additional factors also appear to influence students' wage expectations: parents' schooling, the student's gender, and whether they have a job. Our evidence also suggests students have a relatively good understanding of market rates, as they overestimate their future wages by only about 10%.

* Email: p.martins@qmul.ac.uk. Address: Centre for Business Management, Queen Mary, University of London, Mile End Road, London E1 4NS, UK. I thank comments from seminar participants at the University of Lisbon. Financial support from the European Commission (PL980182), *Fundação para a Ciência e a Tecnologia* (POCTI/ECO/33089/99 and SFRH/BD/934/2000) and the British Council is gratefully acknowledged. The survey used in the paper was obtained under the framework of the "Public Funding and Private Returns to Education" European Commission research project (www.etla.fi/PURE). Special thanks to Pedro Telhado Pereira and Rudolf Winter-Ebmer for facilitating my access to the data set.

1. Introduction

The human capital literature (Becker, 1964) assumes that the returns to different schooling levels are key variables in the demand for schooling. Prospective students equate their discount rate and the return to the schooling investment that they consider in order to decide whether or not to take an extra year of study. Consequently, Becker's model (and the very large literature on returns to education) assumes that students have a good understanding of the returns (or flow of earnings) that students can expect from different educational choices. In this paper, we provide a simple exam of this hypothesis by studying different aspects of the choices undertaken by youngsters as to what university course of study to follow.

Besides testing some aspects of Becker's model, we are also interested in providing evidence about how labour markets adjust to shifts in the demand for specific skills. Indeed, only if information on wages by types of skill is widely available will any occupational wage differentials erode. In this way, such differentials will be competed away as new cohorts enter the labour market, and the labour market will exhibit competitive features. To this extent, this paper also contributes to the literature on the sources of wage differentials (Krueger and Summers, 1988).

Other papers have previously examined the degree of knowledge of undergraduate students about the returns to education. These include Manski (1993), Betts (1996), Dominitz and Manski (1996) and Brunello et al (2003). For instance, Betts (1996) studies a survey of about 1,000 undergraduates at all faculties of a U.S. university about starting salaries for workers with different academic backgrounds and experience levels. The author finds that wage beliefs are far from uniform, as there is a substantial amount of variation in the salaries predicted. Betts' evidence suggests that, although some information is acquired in order to choose the optimal level of education, information is far from complete. Consequently, students lack the evidence to correctly forecast future wages.

In this paper, we follow a similar approach, but we focus on a survey of undergraduate students in two specific fields (economics/management and engineering) at various Portuguese universities. Several characteristics of these students are considered, namely their family background and academic performance. Moreover, evidence on real wages effectively earned by graduates of different fields is also examined. In this case, we draw on data from a large matched employer-employee survey, covering a large share of the Portuguese labour market. This allows us to compute rates of return that are comparable to those indicated by university students as their expectations.[1]

In summary, the questions this paper address are the following. What role do the expectations of financial rewards play in the choice of university degree by undergraduate students? What factors influence these expectations? To what extent are these expectations in line with the returns effectively received by workers? Our answers are structured in the following way: Section 2 presents the two data sets used, Section 3 describes the results obtained and Section 4 presents the conclusions.

[1] See Pereira and Martins (2001) for a detailed examination of the financial returns to education in Portugal. These returns are found to be particularly high (about 11% on average), especially at the transition between the secondary and the university levels.

2. Data

The main data set used in this study is a survey of undergraduates in economics, management and engineering courses undertaken at different Portuguese universities.[2] This survey enquires about the income prospects of students and several other background variables, having been conducted simultaneously across several European countries under the framework of the "Public Funding and Private Returns to Education" (PuRE) project.[3]

Several variables are obtained from this survey and more than 700 observations will be used in the analysis presented below. Table 1 presents the descriptive statistics of this data set.

Table 1 approximately here

The second data source provides information on the wages of workers in the Portuguese labour market in 1998. This was obtained from "Quadros de Pessoal", a large employer-based data set, with information on all employees for a large and representative number of firms.[4] The descriptive statistics are presented in Table 2. It is this data source that will be used to assess to what extent the wage expectations of undergraduate students are in line with the wages earned by the graduates in their fields.

Table 2 approximately here

Obviously, an assumption required for the validity of our approach is that the wages of current workers are good predictions for the wages to be earned by current undergraduates. We do not believe this is a strong hypothesis as students are unlikely to have sophisticated information on trends affecting the earnings in their future job. Moreover, we also disregard issues concerning the variability of returns to education and instead focus on averages.[5]

3. Results

The first question concerns the role of expectations of financial rewards in the choice of university degree. To address this matter, we looked at the students' rankings of different possible motives for the specific choice of university and degree. The results, presented in Table 3, clearly suggest that three options (out of a total of six) play a predominant role. These are: "income and job prospects", "interest in the subject" and "academic reputation". The other three options ("assignment", "costs" and "proximity to my home") deserve very little emphasis from students. From this simple analysis, one can conclude that, as assumed by the human capital theory, expected (higher) wages matter in the process of choice of degree. However, preferences for degree

[2] Other university courses were also considered but, for several reasons, in particular a small number of observations, are not used in the analysis presented in this paper.

[3] See Brunello et al. (2004) for an extensive and comparative analysis of the pan-European version of the data and for a detailed explanation of the goals and characteristics of the survey, including the questionnaire itself.

[4] See, *inter alia*, Pereira and Martins (2001) for a detailed description of this data set. The data is restricted to workers aged between 16 and 65 and working more than 80 hours per month. Outliers and observations with missing information relevant for the analysis are dropped.

[5] See Pereira and Martins (2002) and Martins and Pereira (2004) for some results on this matter.

content ("interest in the subject") are at least as important.

In terms of our discussion on wage differentials, although this result could be rationalised in terms of compensating differentials, one should distinguish between the enjoyment derived from studying a specific topic and the enjoyment obtained from the jobs available for individuals who have graduated in that topic. To the extent that the correlation between the two levels of enjoyment is not strong (and there is evidence supporting this possibility, mostly in the over-education literature), our result about the importance of degree content may help to rationalise the large and unexplained wage differentials found in the literature.

Table 3 approximately here

The second question asked in this paper is about what factors influence the undergraduate students' expectations. We address this by regressing the logarithm of expected wages on a number of variables. These variables include gender, age, the schooling of parents, whether the schooling types of the parents are similar to that of the student, the students' self-assessed relative academic performance, rate of time discount, whether the student works while studying, and the year when the student started his/her degree.

Overall, from a simple analysis of the regression results, we find (see Table 4) that wage expectations can be explained by four types of factors: the degree type, the schooling of parents, the student's gender and their involvement with the labour market. In particular, students of engineering expect higher wages than students of economics and business. Moreover, the schooling of parents is positively related to wage expectations. However, undertaking the same degree content as their parents is negatively related to wage predictions.

Table 4 approximately here

The students' gender also plays a very strong role, as girls expect lower wages. This result may help in understanding the ubiquitous gender wage differential, as it may support those that claim that women tend to ask for lower wages (see, for instance, Säve-Söderbergh, 2003). This in turn may be seen as evidence against the interpretation of these differentials as discrimination.

Finally, the involvement with the labour market has a mixed effect upon expectations: while working students expect higher wages, so do students at an earlier stage of their degrees. These results suggest that a greater involvement with the labour market, which occurs when students take a job and, probably, when they get closer to the completion of their degree, reduces the overestimation in wage expectations. We also find that students' self-assessed performance has the predictable positive effect upon wage expectations.

We finally consider the third question: to what extent are these expectations in line with the returns received by workers with the same university degree? From the expectations regression, the expected gross monthly wages for workers without experience are, for economists, €1,149 and €1,019 and, for engineers, €1,306 and €1,156 (men and women, respectively). Using the "Quadros de Pessoal" data – see Table 5 –, the average gross monthly wages for workers without experience are, for economists, €1,105 and €910 and, for engineers, €1,126 and €927 (men and women, respectively).

Table 5 approximately here

These results suggest that students overestimate their future wages, particularly in the engineering degrees. In engineering, the overestimation ranges between 14% and 20%, while the same values are only 4% and 11 % for economics (men and women, respectively).[6] Moreover, students' implicit perception of the wage differences between economics and engineering is of a 12% pay premium enjoyed by engineering. However, the pay differential implicit in the data is of only 2%.

We regard these findings as suggesting that there is a moderate level of overestimation in earnings, although concentrated in the engineering degree and within women. With respect to women, it is interesting to notice that although they expect, on average, lower wages, women still find themselves overestimating their earnings more than men.

4. Conclusions

This paper addressed the following questions: What role do the expectations of financial rewards play in the choice of university degree by undergraduate students? What factors influence these expectations? To what extent are these expectations in line with the returns received by workers with the same university degree?

The answers to these questions were obtained from a survey on students' expectations and a labour market survey. Firstly, we find that, as assumed by the human capital theory, expected (higher) wages matter in the process of choice of degree. However, preferences for degree content seem to be at least as important. This last result may help in understanding the common wage differentials for workers of similar characteristics.

Secondly, the process of wage expectations can be well explained by some of the students' characteristics, including their gender and degree type, the schooling of parents, and their labour market experience. In particular, men and engineering students expect higher wages than economics or business students. Moreover, parents' schooling is positively related to wage expectations although undertaking the same degree course as their parents is negatively related to wage predictions. The involvement with the labour market has a mixed effect upon expectations: while working students expect higher wages, so do students in an earlier stage of their degrees.

Contrasting the expectations data with that of the labour market, we find that students overestimate their future wages, particularly in the engineering degrees. However, the degree of overestimation is not too high, as it is about 10% on average across all groups.

[6] Brunello et al (2004) and most of the other studies mentioned above also find that students overestimate the returns to education. One advantage of our study is that we consider a much more precise measure of the comparison wage, as we focus on graduates with the same course of study as that of the students we analyse.

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Table 1 – Descriptive Statistics (Survey Questionnaire)

Variable	Obs	Mean	Std. Dev.	Min	Max	Brief description of variable
stecon	755	0,77	0,42	0	1	Economics or management course
sttech	755	0,23	0,42	0	1	Engineering course
schoolf	755	3,58	1,58	1	5	Schooling attainment of father
schoolm	755	3,42	1,60	1	5	Schooling attainment of mother
age	754	20,56	3,82	17	55	
lw_uni	755	1,95	0,06	1,53	2,22	Log monthly gross euros wages expected
fem	755	0,43	0,50	0	1	Female
smnow	755	0,16	0,36	0	1	Smoking behaviour
sm18	755	0,14	0,34	0	1	
workd	755	0,13	0,33	0	1	Whether works during degree
studyf2	755	0,16	0,37	0	1	Whether father studied same topic
studym2	755	0,08	0, 27	0	1	Whether mother studied same topic
start	752	1996,90	2,98	1967	1999	Year started degree
regular	743	4,28	0,46	4	6	Regular duration of degree
end	734	2002,00	1,43	2000	2006	Expected conclusion of degree
perform	739	2,71	0,73	0	5	Relative performance
inc_publ	755	0,11	0,31	0	1	Sources of information on wages
inc_cur	755	0,02	0,14	0	1	
inc_pres	755	0,50	0,50	0	1	
inc_spec	755	0,13	0,33	0	1	
inc_pers	755	0,75	0,43	0	1	
inc_no	751	0,11	0,31	0	1	
ch_dist	695	4,79	1,22	1	6	Motivations for choice of degree
ch_inc	710	2,21	1,02	1	6	
ch_rep	713	2,46	1,18	1	6	
ch_assig	690	4,72	1,25	1	6	
ch_costs	689	4,78	1,09	1	6	
ch_int	713	1,90	1,14	1	6	

Table 2 – Descriptive Statistics: "Quadros de Pessoal"

Variable	Mean	Std. Dev.	Min	Max	Description
female	0.417	0.493	0	1	
age	36.074	11.376	16	65	
remtot	141988	125218	30000	2479861	total earnings
htot	166.873	18.526	80	346	total hours
educ	7.305	3.821	0	17	schooling
d4	0.362	0.481	0	1	4 years of schooling
d6	0.230	0.421	0	1	
d9	0.160	0.367	0	1	
d12	0.161	0.367	0	1	
d15	0.021	0.144	0	1	
d17	0.045	0.208	0	1	
exp	22.769	12.862	0	59	experience
lny	6.416	0.583	5.067	9.482	log earnings
ten	7.580	8.699	0	51	tenure
econ	0.012	0.110	0	1	economics
tech	0.010	0.101	0	1	engineering
outr	0.022	0.148	0	1	other degrees

Notes: 50,278 observations.

Table 3 – Choice of degree: motivations

income & job prospects	Freq.	Percent	Cum.
1	181	25.49	25.49
2	287	40.42	65.92
3	189	26.62	92.54
4	29	4.08	96.62
5	15	2.11	98.73
6	9	1.27	100.00
Total	710	100.00	

interest in the subject	Freq.	Percent	Cum.
1	369	51.75	51.75
2	139	19.50	71.25
3	146	20.48	91.73
4	37	5.19	96.91
5	12	1.68	98.60
6	10	1.40	100.00
Total	713	100.00	

costs	Freq.	Percent	Cum.
1	16	2.32	2.32
2	15	2.18	4.50
3	33	4.79	9.29
4	149	21.63	30.91
5	304	44.12	75.04
6	172	24.96	100.00
Total	689	100.00	

assignment	Freq.	Percent	Cum.
1	18	2.61	2.61
2	18	2.61	5.22
3	46	6.67	11.88
4	230	33.33	45.22
5	121	17.54	62.75
6	257	37.25	100.00
Total	690	100.00	

proximity to my home	Freq.	Percent	Cum.
1	17	2.45	2.45
2	20	2.88	5.32
3	45	6.47	11.80
4	177	25.47	37.27
5	187	26.91	64.17
6	249	35.83	100.00
Total	695	100.00	

academic reputation	Freq.	Percent	Cum.

1	159	22.30	22.30
2	225	31.56	53.86
3	235	32.96	86.82
4	48	6.73	93.55
5	25	3.51	97.05
6	21	2.95	100.00
Total	713	100.00	

Table 4 – Regression results: students wage expectations

Dependent Variable: Log Wage (Expected)	Coef.	Standard Error
Engineering	0.026	0.005
School Attainment (Father)	0.003	0.002
School Attainment (Mother)	0.004	0.002
School Attainment (Mother) squared	-0.003	0.006
School Attainment (Father) squared	-0.012	0.008
Students performance	-0.004	0.003
Age	0.001	0.001
Female	-0.014	0.004
Rate	0.025	0.057
Student-worker	0.017	0.007
Year started degree	0.010	0.002
Constant	-17.074	3.311

Number of obs = 610
R-squared = 0.1759
Adj R-squared = 0.1607

Note : From these regressions, the expected gross monthly wages for workers without experience are, for economists, 1149€ and 1019€ (men and women, respectively) and 1306€ and 1156€ (men and women, respectively).

Table 5 – Regression results: wage equations

lny	Coef.	Std. Err.
Four years (schooling)	0.136	0.013
Six years	0.335	0.013
Nine years	0.632	0.014
Twelve years	0.878	0.014
Fifteen years	1.308	0.020
Other degrees	1.445	0.035
Economics	1.627	0.035
Engineering	1.646	0.037
Experience	0.046	0.001
Experience^2	-0.001	0.000
Exp*University Dummy	0.020	0.004
Exp^2*University Dummy	-0.001	0.000
Female	-0.294	0.004
Female*University Dummy	0.099	0.024
_cons	5.381	0.015
Number of obs = 50278		
R-squared = 0.4264		

Notes: From these regressions, the average gross monthly wages
for workers without experience are, for economists, 1106€ and 910€ and, for engineers, 1127€ and 927€ (men and women, respectively). All coefficients significant at 1%.
Regression with robust standard errors