Working Paper Series

No. 27

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December 2003

Núcleo de Investigação em Microeconomia Aplicada
Universidade do Minho

FCT
Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA E DA TECNOLOGIA

Students' Expectations of the Economic Returns to College Education
Results of a Controlled Experiment

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Abstract

This study reports the results of an experiment designed to elicit students' subjective beliefs about the economic returns to college education. An important feature of our experimental design is the inclusion of financial incentives for accurate reporting. We also consider the extent to which individuals' beliefs about their own returns differ from their beliefs about the returns for others. The evidence shows that students do have a self-enhancement tendency, and this finding cannot be attributed to previously uncontrolled order effects. The evidence also indicates that there is no significant difference between beliefs elicited using hypothetical surveys or real financial incentives in the elicitation procedure. This finding suggests that economists' reluctance to gather subjective data on earnings expectations may not be warrant.

Keywords: rate of return, human capital
JEL classification: C91, I20, J24, J31

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The authors thank the Fundação para a Ciência e a Tecnologia (FCT) for partial research support under grant PRAXIS/C/ECO/13014/98. We are grateful to Rute Mendes and Ana Lima for assistance, and to Elisabet Rutström for comments.

1. Introduction

To what extent are students aware of the market returns to education? To what extent are students' perceived market returns to education realistic? To what extent students' perceived market returns to education differ by gender? To what extent students' about to enter the labor force possess more realistic information concerning the markets returns to education vis-à-vis other students? To what extent students' appraisal of the economic returns to education for themselves differs from their appraisal of the economic returns to education for others? To what extent are students' responses to questions eliciting their earnings expectations meaningful? To date only a few studies have attempted to address some of these questions, and, to our knowledge, none has attempted to address all of these questions in a systematic manner. Among the most recent investigations of students' expected returns to education, and most related to ours, are those of Williams and Gordon (1981), Smith and Powell (1990), Blau and Ferber (1991), Betts (1996), Menon (1997a, 1997b), Carvajal *et al.* (2000), and Brunello *et al.* (2002).

Williams and Gordon (1981) asked a sample of senior high school students from England to give an estimate of expected own earnings when they started work, at the age of 26 and at the age of 46. Students were also asked when they intended to leave full-time education and the highest qualification they expected to obtain. They found that students are aware of the relationship between educational qualifications and average earnings. They also found that male students expect to earn more than female students regardless of their education. In addition, they included in the analysis a number of social background variables, and found that they exert little influence on students' expectations.

Smith and Powell (1990) questioned a sample of college students at two midwestern universities to predict annual earnings for self, college peers, and high school peers who did not attend college, for one and 10 years in the future. They found that students expected earnings for college peers and high school peers are consistent with actual earnings. They also found that females' expectations of own earnings are indistinguishable from their estimates of the earnings of their college peers. However, male students reveal a pronounced tendency to "self-enhance" in that their expectations of own earnings are substantially higher than their estimates of the earnings of their college peers.

Blau and Ferber (1991) asked a sample of college business school seniors from the University of Illinois, Urbana-Champaign, how much they would expect to earn initially and after 10 and 20 years if they were to be continuously employed in their preferred occupation after graduation. One of the main goals of their analysis was to determine whether expected labor force participation has a significant effect on expected earnings as predicted by human capital theory. Thus, they also asked students to provide information concerning the numbers of years they plan to work full-time and part-time. The results indicate that male students plan to work more years full-time and fewer years part-time than female students. They also found that female students expect to earn about as much as male students at the beginning of their careers, but significantly less in later years. However, and contrary to the predictions of human capital theory, they found no significant effect of expected labor force participation on expected earnings, irrespective of gender. In addition, they found that both men and women tend to overestimate salaries as compared to prevalent ones.

Betts (1996) asked a sample of undergraduates from the University of California, San Diego, to estimate average annual earnings at the national level for

several types of workers – some with and some without a college degree – at labor market entry and for several years of labor market experience. Betts regressed students' beliefs about college earnings, high-school earnings and college wage gain on a set of variables that included individual characteristics, family background, and students' year of study. The overall results indicate that female students estimate lower earnings for high-school graduates than their male counterparts, but there is no statistical difference between male and female estimates of college graduates' earnings or college wage gains. The results also indicate that fourth-year students know significantly more about salary levels than first-year students, and that students' knowledge of earnings of younger workers is quite good, but becomes progressively worse as the experience of the worker in question increases. In addition, Betts found that on average students' have an accurate perception of the gains associated with a college education, with expected gains exceeding actual gains by less than 10 percent.

Menon (1997a,b) questioned a sample of senior high-school students from Cyprus to predict their own monthly earnings with and without a college degree at three points in time: labor market entry, after 4 years at work, and age 46 years, corresponding to about 20 years of labor market experience. Students were also asked to provide information on their future educational and/or employment plans after high-school graduation. A measure of expected lifetime earnings corresponding to the students' plans was regressed on a set of variables that included individual characteristics and family background, and the results of the regression analysis were reported for the whole sample and for boys and girls separately. The included regressors were not consistent in statistical significance across the estimated equations. Moreover, it was found that while girls intending to pursue a college degree expected higher earnings than those intending to work right after high-school graduation, the boys from

Cyprus failed to perceive a link between education and earnings. In addition, it was found that, irrespective of gender, the perceived rates of return to higher education were much lower than the actual rate of return to higher education in Cyprus.

Based on the assumption that college seniors possess more accurate job-related information than other students, Carvajal *et al.* (2000) asked a sample of Business college seniors and recent graduates from Florida International University, Miami, about own starting salaries. One of the main goals of their research was to determine whether students' earnings expectations are realistic. They found that female students expect significantly lower earnings than male students, and that female graduates earn significantly less than their male counterparts. Overall, their results indicate that students' expectations are quite realistic irrespective of gender.

Assuming that students are better able to forecast wages for themselves than for a "typical graduate", Brunello *et al.* (2001) asked a sample of college students from 10 European countries to predict their own monthly earnings in the following contingencies: starting earnings after college graduation and 10 years after graduation; starting earnings with only a high-school degree and 10 years after obtaining a high-school degree. They regressed students' beliefs about college earnings, high-school earnings and college wage gain for each level of labor market experience on a set of variables that included individual characteristics and family background. Except for gender, the included regressors were not consistent in statistical significance across the estimated equations. It was found that female students expect significantly lower college earnings and high-school earnings than their male counterparts, and for some countries (Germany, Italy, Portugal and Switzerland), female students also expect lower wage gains both at labor market entry and 10 years after labor market entry. Comparing expected college wage gains with actual gains, Brunello *et al.* (2001) found that, on

average, European students substantially overestimate actual gains irrespective of gender.

As this brief review of the literature shows, the diversity of data and approaches taken by different authors make a summary of these expectations data difficult to attain. In general, however, these studies appear to be inconclusive concerning the accuracy of students' earnings expectations or the sources of its variability. Given the centrality of individuals' expectations of the returns to continued education in empirical analyses of college choice and labor market returns to education, the results reported in previous studies call for further investigation of these issues.

The objective of this paper is to address each of the above questions within a controlled laboratory environment. The experimental design used to investigate these questions is presented in Section 2. Results are presented in Section 3, and Section 4 concludes.

2. Experimental design

A total of 273 freshman and senior students from the College of Business and Economics at the University of Minho, Portugal, participated in this study. Students were recruited in classes in April 2001 and were told that there was to be an economic experiment which would pay them 2.5 Euros for participating. They were given no other prior information concerning the nature of the experiment.

When the subjects arrived they were sent to four different rooms corresponding to four experimental sessions differing with respect to the elicitation framework, and

hereafter referred to as sessions HA, RA, HAS, HS.[1] In all sessions students were first asked to read and sign an Informed Consent Form and then complete a short questionnaire requesting some information about their socio-demographic characteristics.

Following the completion of that questionnaire, students in session HA were asked the following question: "How much do you think is the current average monthly salary of college graduates in your field of specialization who are working full-time and have the following years of experience in the labor market: no experience; one year of experience; four years of experience; twenty years of experience". Students' were also asked to answer the following question: "How much do you think is the current average monthly salary of workers with a high school diploma in your field who are working full-time and have the following years of experience in the labor market: no experience; one year of experience; four years of experience; twenty years of experience". Responses to all questions about earnings were the same close-ended salary categories.[2]

Session RA differed from session HA in that students in session RA were provided with monetary incentives for accuracy. One reason that has been pointed out for the paucity of studies eliciting individuals' earnings expectations is the distrust by economists in the reliability of subjective data (Manski (1995), Dominitz and Manski

[1] The first letter in these acronyms refers to whether or not incentives for accuracy were provided. Thus, H stands for "hypothetical" and R for "real". The second (and third) letter refers to whether students were asked to predict average (A) earnings and/or earnings for self (S).

[2] The motivation for using the closed-ended response option is to maintain the response format constant across all sessions so that meaningful comparisons of the results can be made. As described below in the text, this option is necessary for the construction of the payoff table provided to participants in session RA. Rather than having participants in this session calculate the rewards for their accuracy these values are easily provided in a table containing closed-ended salary categories. The potential drawback is that the distribution of earnings expectations may be sensitive to the available response categories, but we believe that this cost is worth the confusion and possible errors that more complicated alternatives would entail. In addition, given the findings of Smith and Powell (1990, p. 198), we believe that the measures of *relative* earnings expectations under analysis in this study are not subject to the problems which beset the measures of the absolute level of earnings elicited using the close-ended response option.

(1996)).[3] In fact, subjective data on expectations gathered through direct interrogation can be criticized on the grounds that individuals have no incentives to make their assessments correspond with their judgements. There is, therefore, no way of knowing if the resulting assessments are actually in accordance with the individuals' beliefs and judgements. As Winkler (1967) points out, however, this criticism can be removed by using direct interrogation in conjunction with scoring methods which lead the rational assessor to reveal his true beliefs, because any departure from his personal beliefs results in a diminution of his own average score as he sees it.

A scoring method involves the computation of a reward (or a score) based on the assessor's stated belief and on the event which actually occurs. The scoring method must be tied in with the use of a monetary reward, the amount of which should be directly proportional to the score, in order to encourage careful assessments. This method, then, can be thought of as a reward function in the sense that the assessor should attempt to maximize his expected score. On the other hand, this method can be thought of as a penalty function in the sense that the assessor is penalized (through a lower expected score and the related lower expected reward) for deviating from his true beliefs. A scoring method is said to be (strictly) proper if assessors maximize their expected score by reporting their true beliefs.

[3] Dominitz and Manski (1996) addressed the question of whether or not students are able to respond meaningfully to questions eliciting their earnings expectations in probabilistic form. To do so, they evaluated whether the probabilities elicited from each student are coherent and logically consistent, and they found that they are (see also Wolter (2000) for a replication of this study). Beyond the basic criteria of coherence and logical consistency, however, a question arises as to whether students' responses are actually in accordance with their true subjective beliefs. The latter is, therefore, the criterion of "meaningfulness" adopted in the present study. We do not, however, elicit a whole probability distribution of earnings expectations. The motivation not to do so is two-fold: first, we want to maintain our elicitation questions close to the questions posed in previous studies so that our results can be compared; second, we want to keep students' assessment task as simple as possible so that unambiguous conclusions concerning the "meaningfulness" issue as posed here can be drawn from our testing procedures.

The proper scoring method used in the present study is the quadratic scoring method, which is a quadratic function of the difference between the actual outcomes and the assessor's assessment of such outcomes. Specifically, the reward function used is

$$\text{payoff} = K - k(r - x)^2$$

where K and k are positive constants, x is the actual outcome, and r the assessor's reported point estimate of x. The properness of this reward function can be easily shown in the following example. Suppose that x can take only two values x_1 and x_2, and that the assessor's subjective belief for outcome x_1 is p. It is easily checked that the assessor's expected payoff (EP) is

$$[K - k(r - x_1)^2]p + [K - k(r - x_2)^2](1 - p)$$

The properness of the reward function can be shown by taking the derivative of assessor's expected payoff with respect to *r* and equating this derivative to zero.

$$\frac{\partial EP}{\partial r} = 2pk(r - x_1) - 2(1 - p)k(r - x_2) = 0$$

So

$$r = (x_1 - x_2)p + x_2$$

This shows that if the assessor believes that the actual outcome is x_1 so that p=1, his expected payoff is maximized at $r=x_1$; if the assessor believes that the actual outcome is x_2 so that p=0, his expected payoff is maximized at $r=x_2$. In general, where the assessor is asked to predict the value of a random variable subject to a penalty proportional to the square of his error, it is in his interest to give the mean of his distribution.

With respect to the use of scoring methods, a note of caution is warranted: the scoring method encourages honest revelation of beliefs if and only if the assessor understands the method. Experimental subjects are not likely to understand the method

at first because of difficulties with the concepts and terminology. To address this problem we avoided any mathematical formulae in the experimental instructions. The instructions were developed so as to ensure students' comprehension still being accurate. Students in this session were also informed of the purpose of payoff function used, and explicitly informed that it was in their best interest to honestly reveal their beliefs. Further, a trial experiment was conducted to ensure that students knew how to read the payoff table used in this session, and to convince them that the method used would penalize them for assessments which were not consistent with their personal judgments.

Students in this session were asked to answer the same questions posed to students in session HA by circling one of the close-ended salary categories included in their payoff tables for the given levels of education and years of experience. Students were told that these close-ended salary categories represented ranges in which the current average monthly salary might fall in each case. Depending on how close their answers were to the current average monthly salary, students could earn between 2,5 and 14 euros. Students were also told that the current average monthly salaries, which were to be told to them at the end of the experiment, were computed using a well-known database (Quadros de Pessoal) gathered annually by the Portuguese Ministry of Labor, which is a census of all firms and their employees.

Session HAS differed from session HA in that students in session HAS were asked to predict not only current average monthly salaries but also their own monthly salaries in the following contingencies: starting earnings if they were working full-time and had already completed their college degree; and if they had one, four and twenty years of experience. Students were also asked to answer the same question but for the contingency where they had not gone to college but entered the labor market right after

high-school graduation. The motivation for conducting this session is Smith and Powell (1990)'s observation that although students may have a good understanding of the national average market returns to education, their appraisal of their own earnings might be biased upwards due to individuals' tendency to "self-enhance", that is, to positively differentiate their own characteristics from those of others. Thus, studies that compare the expectations of own earnings with actual average wages might *erroneously* conclude that students overestimate the actual average returns to schooling. The data gathered from this session is intended to test the hypothesis that individuals "self-enhance". However, it is also possible that when answering questions about earnings for self *after* answering questions about earnings for others, students feel compelled to give a different answer not because they self-enhance but because they think they are expected to give a different answer. In order to test for this alternative hypothesis we conducted a further session, session HS, where students were asked only to predict their own current monthly salaries in the contingencies described above.

3. Results

Table 1 presents descriptive statistics for the raw responses to each question posed to students by session.[4] As seen in the Table, on average students in every session clearly perceive higher earnings for a higher level of educational attainment. In addition, for any one educational level, students perceive higher earnings for each successively higher level of labor market experience.

[4] Table A1 at the end of the paper describes the sample.

Table 1 – Descriptive statistics by session (mean and standard deviation)

Session	Level Education	*Expected Average salaries* Beginning	One year	Four years	Twenty years
HA	College graduates	107.83	165.77	284.02	528.49
		(31.11)	(47.13)	(97.49)	(211.10)
	High school graduates	77.67	111.8	168.94	252.28
		(15.22)	(53.10)	(103.61)	(164.80)
RA	College graduates	129.17	167.02	251.13	469.83
		(36.68)	(44.41)	(71.81)	(173.97)
	High school graduates	79.17	101.13	140.39	229.15
		(14.62)	(32.45)	(41.55)	(93.35)
HAS	College graduates	110.99	148.18	223.18	445.57
		(34.66)	(44.63)	(62.04)	(194.78)
	High school graduates	77.13	99.5	136.34	204.75
		(11.31)	(27.88)	(40.99)	(97.66)
		Expected Own salaries			
		Beginning	One year	Four years	Twenty years
HAS	College graduates	106.93	151.53	250.82	489.00
		(31.66)	(43.45)	(89.85)	(212.80)
	High school graduates	77.13	102.88	137.66	225.85
		(11.31)	(27.74)	(46.04)	(122.75)
HS	College graduates	113.56	169.12	270.65	519.13
		(35.04)	(55.99)	(94.50)	(201.23)
	High school graduates	78.47	101.42	144.5	235.27
		(13.62)	(29.42)	(52.14)	(127.32)

Note: Metric used is 1000 PTE. The exchange rate with respect to the Euro is 1 Euro = 200.482 PTE.

To compute students' perceived market returns to education in each session we estimate the following Mincerian equation:

$$\ln W = a + bC + cEXP + dEXP^2 + u$$

where lnW is the natural logarithm of perceived earnings, C is a dummy variable taking the value of 1 for responses concerning perceived earnings with a college degree, and 0 for responses concerning perceived earnings with a high-school diploma, and EXP is the number of years of labor market experience. Within this formulation, the coefficient estimate b is considered to be an estimate of the earning differential attributable to a

college degree relative to the excluded category, and the rate of return per year of extra study is computed as[5]

$$r_{(\text{college vs. high school})}=\exp[b/(n_c-n_h)]-1$$

where n_c and n_h are the years of education associated with a college degree and a high school diploma, respectively. In the present study, a random effect is added to account for the repeated observations for students, and estimation of this equation by generalized least squares using the data from each session yields the estimates of students' perceived marginal rates of return to college education displayed in Table 2.[6]

Table 2 – Mincer-type rates of return to rollege education by session (percent)

	HA	RA	HAS_A	HAS_S	HS
$r_{(\text{college vs. high school})}$	13.52	13.80	13.75	13.94	15.37

Since students in session HAS were asked to predict both average salaries and own salaries, the results for this session are presented under the headings HAS_A for students' responses on average salaries, and HAS_S for students' responses on own salaries. The results in Table 2 show that students' perceived marginal rates of return to college education fall within the 13.52 – 13.80% in sessions HA, RA and HAS_A, and formal statistical testing reveals that they are not statistically different from each other at conventional significance levels. Recall that session RA is designed as a test of the effect on students' responses of providing incentives for accuracy relative to settings were such incentives do not exist. Our results indicate that on average students do not respond differently when facing incentives for accuracy relative to settings where students' expected earnings are elicited only through direct interrogation and no

[5] See Cohn and Addison (1998) for a review of methods that can be used to compute the rate of return to schooling.
[6] The generalized least squares estimates of all the coefficients of the Mincerian equation are shown in Table A2 in the Appendix.

monetary rewards are in place.[7] To the extent that further work replicates this finding, we may conclude that economists' distrust of subjective data on earnings expectations does not seem warrant.

The results in Table 2 for session HAS also show that students' expected return per year of extra study for themselves is higher than their expectations about typical or "average" others, and this is not an effect of having students' answering questions about themselves followed by questions about others since the results for session HS also show a higher expected rate of return to education for oneself than any of those found in sessions HA and RA. We therefore conclude that students do show a propensity to "self-enhance".

Having found no statistically significant difference in students' appraisal of the returns to college education in sessions HA, RA and HAS_A, the remaining analysis pools these data and examines whether students' expected returns to college education differs by gender and/or year of study. Estimation of the above described Mincerian equation by generalized least squares segmenting the data by gender, year of study, and the earnings questions posed (self vs. average others) yields the estimates of students' perceived marginal rates of return to college education displayed in Table 3.[8]

[7] This finding might be surprising given the vast literature finding evidence that individuals' responses to hypothetical surveys differ from responses in real surveys under controlled experiments. See Cummings, Harrison and Rutström (1995) for evidence of hypothetical bias in surveys using the dichotomous-choice elicitation format, and Botelho and Pinto (2002) in surveys using the open-ended elicitation format. For a review of the experimental literature on hypothetical bias, see Harrison and Rutström (2003a). However, two differences between these experiments and the experiment reported here should be noted. First, the hypothetical surveys reported in the literature typically do not reward subjects for participating, while students in the hypothetical sessions conducted here were rewarded for participating with a fixed show-up fee of 2.5 Euros. This raises the possibility for a difference in subjects' behaviour in traditional "hypothetical experiments" and our hypothetical sessions. Secondly, the literature bearing on the existence of hypothetical bias refers mostly to the difference between responses to real and hypothetical valuation questions concerning environmental goods, while this experiment refers to questions eliciting individuals' earnings expectations. Recently, Harrison and Rutström (2003b) also found no evidence of hypothetical bias in an experiment designed to elicit subjective beliefs about mortality risk orderings. This result, along with ours, suggests that the evidence on hypothetical bias in valuation questions about environmental goods may not transfer readily to other settings.

[8] Tables A3 and A4 at the end of the paper display the full results of this estimation procedure.

Table 3 – Mincer-type rates of return to college education by gender and year of study (percent)

		Freshman		Senior	
		Male	Female	Male	Female
$r_{(\text{college vs. high school})}$	Average	15.93	14.42	13.59	13.26
	Self	19.69	16.09	13.94	14.04

The results show that in all cases college students clearly perceive large returns to a college education. While these results do not demonstrate unambiguously that students' choice to attend college is based on financial considerations, they do suggest that students are aware of the economic returns to college education as assumed by human capital theory.[9] The results in Table 3 also reveal that first year students (freshman) expect higher returns to a college education than senior students, irrespective of gender, and the differences are statistically significant at conventional levels of significance. Apart from senior female students' appraisal of the returns to college education for themselves, female students expect significantly lower returns to education than male students. In addition, in all cases, students expected returns for themselves exceeds their expectations about the average returns to college education, and this tendency to "self-enhance" is stronger among first year students, and within these, is stronger among male students.

We now turn to the question concerning whether students' earnings expectations are realistic. Three of the most recent studies providing Mincer-type estimates of the

[9] Human capital theory posits that students choose to attend college as long as the expected discounted stream of increased earnings (over high school) exceeds costs. The link between economic returns and the decision to pursue a college education, however, presupposes that students are aware of these returns: students' schooling decisions will not be influenced by economic returns, no matter how high they actually are, if such returns are not perceived. It remains, however, an open empirical question whether students respond to changes in perceived rates of return to education. Future research might provide a response to this question by tracking changes in both such perceptions and in college enrolment rates over time.

returns to schooling in Portugal are Kiker and Santos (1991), Kiker *et al.* (1997), and Hartog *et al.* (2001). All studies use samples drawn from the Quadros de Pessoal database compiled by the Portuguese Ministry of Labor. Here we take as estimates of the actual marginal rate of return to a college education the figures in Hartog *et al.* (2001) since this is the study that uses the most recent available data.[10] Their OLS estimate of the marginal rate of return to college education is 12.82% for the full sample of workers for 1992; comparable estimates for males and females are 13.20% and 12.64%, respectively. Assuming that the private marginal rates of return to college education have not changed much over the last decade, and there is no particular reason to believe that they have changed in any substantial way, we take these figures as a reference for the purpose of evaluating how realistic students' are in their appraisal of these returns.[11]

Looking at the perceived average market returns to college education by first-year students we see that male students overestimate the actual returns by 3.11 percentage points (24.3%), while female students overestimate it by 1.6 percentage points (12.5%). Senior students, however, seem to have a quite good understanding of what the market bears. Male senior students overestimate the actual returns by 0.77 percentage points (6.0%), and the comparable figure for female senior students is 0.44 percentage points (3.4%). Overall, female students seem to be more accurate in their appraisal of the average returns to a college education. Consistent with Betts (1996)'s findings, senior students possess more realistic information concerning the average market returns to education than first-year students, irrespective of gender. Comparing

[10] Years covered are 1985 in the study by Kiker and Santos (1991); 1991 in the study by Kiker et al. (1997), and 1982, 1986, 1992 in the study by Hartog *et al.* (2001).

[11] We caution that this evaluation provides mostly intuitive results since these figures are possibly biased estimates of the "true" marginal rates of return to college education namely because they apply only to the private sector of the Portuguese economy, public employment being excluded from the Quadros de Pessoal database. We thank an anonymous referee for pointing this out to us.

students' perceptions of the returns to a college education for themselves with actual returns by gender, the data also reveals that senior students have more accurate perceptions than first-year students.

4. Conclusions

With a number of modifications in survey design from previous literature and its implementation within a controlled experimental environment, we are able to replicate *and extend* previous results concerning students' expectations of the returns to schooling. Our design also allows us to test some of the implicit or explicit assumptions in previous empirical investigations of students' earnings expectations. Explicitly stated in some of those studies are the assumptions that students are better able to predict wages for themselves than for typical or "average" students or the assumption that students about to enter the labor market are more realistic in their appraisal of the returns to education than other students. At odds with conventional wisdom, these studies make the implicit assumption that students respond meaningfully to questions eliciting their earnings expectations and, consequently, valid inferences can be extracted from these data.

Our results point to six conclusions. First, our results suggest that students tend to respond meaningfully to questions eliciting their earnings expectations and that, as a consequence, economists' reluctance to gather subjective data on expectations does not seem warrant.

Second, students clearly perceive large returns to a college education. This finding provides evidence that students are aware of the economic returns to college

education, which is a first fundamental stage in any model linking the decision to pursue further education to economic returns.

Third, and in line with previous findings, female students perceive lower average returns to a college education than male students, and their appraisal of these returns appear to be closer to actual values than the perceptions of their male counterparts.

Fourth, students' perceived market returns to a college education differs by year in college. Our results provide clear evidence that senior students perceive lower returns to a college education than first-year students. These results are in line with those found by Betts (1996), and suggest that care must be taken with respect to the composition of the sample with respect to year of study in studies eliciting college students' expectations of the returns to schooling.

Fifth, and related with this finding, our results suggest that senior students, who are in the verge of entering the labor market, possess more realistic information concerning the market returns to education than first-year students. In addition, our results suggest that, irrespective of gender, senior students have a quite accurate understanding of the national average market returns to education.

Finally, and in line with the results of Smith and Powell (1990), we find that students reveal a tendency to "self-enhance" in that their expectations of own returns to education are higher than their estimates of the average returns to schooling. This result does not arise from potential ordering effects in survey designs, and suggest that great caution must be exercised when drawing conclusions concerning the accuracy of students' earnings perceptions in empirical studies that elicit own expected earnings.

Appendix

Table A1 – Composition (proportions) of the sample by session and demographic variables used in the analysis

Sessions:	
HA	0.23
RA	0.39
HAS	0.14
HS	0.24
Sex:	
Female	0.69
Male	0.31
Year in College:	
Freshman	0.41
Senior	0.59
Number of Respondents	273

Table A2 – Generalized Least Squares Estimates of Mincerian Equations by Session

	HA	RA	HAS_A	HAS_S	HS
Intercept	4.3005	4.3678	4.3039	4.2796	4.2683
	(0.0385)	(0.0235)	(0.0415)	(0.0460)	(0.0379)
College	0.5071	0.5171	0.5155	0.5220	0.5721
	(0.0242)	(0.0170)	(0.0351)	(0.0318)	(0.0235)
EXP	0.2273	0.1635	0.1651	0.1841	0.2019
	(0.0102)	(0.0062)	(0.0149)	(0.0134)	(0.0099)
EXP2	-0.0083	-0.0052	-0.0056	-0.0062	-0.0070
	(0.0005)	(0.0003)	(0.0007)	(0.0006)	(0.0005)
Wald $\chi^2_{(3)}$	1973.07	4767.47	737.02	1143.35	2060.93
LM $\chi^2_{(1)}$	339.59	445.13	37.71	148.87	367.02
Hausman $\chi^2_{(3)}$	0.01	1.09	0.01	0.01	0.01

Notes: Dependent variable is the logarithm of students' expected monthly salaries. All coefficients are statistically significant at better than the 0.01 level of significance. The values of the Wald statistic show that the model is globally statistically significant. The Breusch-Pagan Lagrangian multiplier test statistic for random effects (LM) shows that OLS estimation of a classical regression model is inappropriate for these data. The Hausman statistic for fixed vs. random effects shows that the random effects specification is appropriate for these data.

Table A3 – Generalized Least Squares Estimates of Mincerian Equations for "average salaries" by Gender and Year of Study

	Freshman		Senior	
	Male	Female	Male	Female
Intercept	4.4384	4.3065	4.3427	4.3018
	(0.0584)	(0.0419)	(0.0362)	(0.0250)
College	0.5912	0.5389	0.5096	0.4980
	(0.0461)	(0.0271)	(0.0266)	(0.0185)
EXP	0.1873	0.1881	0.1766	0.1828
	(0.0185)	(0.0107)	(0.0109)	(0.0075)
EXP2	-0.0067	-0.0063	-0.0059	-0.0062
	(0.0009)	(0.0005)	(0.0005)	(0.0004)
Wald $\chi^2_{(3)}$	506.57	1685.51	1580.51	3192.02
LM $\chi^2_{(1)}$	58.24	287.83	119.80	263.08
Hausman $\chi^2_{(3)}$	0.01	0.59	0.01	1.13

Notes: Dependent variable is the logarithm of students' expected monthly salaries. All coefficients are statistically significant at better than the 0.01 level of significance. The values of the Wald statistic show that the model is globally statistically significant. The Breusch-Pagan Lagrangian multiplier test statistic for random effects (LM) shows that OLS estimation of a classical regression model is inappropriate for these data. The Hausman statistic for fixed vs. random effects shows that the random effects specification is appropriate for these data.

Table A4 – Generalized Least Squares Estimates of Mincerian Equations for "self salaries" by Gender and Year of Study

	Freshman		Senior	
	Male	Female	Male	Female
Intercept	4.2830	4.2140	4.3286	4.2688
	(0.1313)	(0.0748)	(0.0623)	(0.0359)
College	0.7190	0.5967	0.5219	0.5255
	(0.0745)	(0.0426)	(0.0334)	(0.0276)
EXP	0.1693	0.2273	0.1836	0.1901
	(0.0314)	(0.0179)	(0.0141)	(0.0117)
EXP2	-0.0053	-0.0083	-0.0065	-0.0064
	(0.0015)	(0.0008)	(0.0007)	(0.0006)
Wald $\chi^2_{(3)}$	237.87	641.11	910.24	1558.19
LM $\chi^2_{(1)}$	47.23	174.51	212.38	97.71
Hausman $\chi^2_{(3)}$	0.01	0.01	0.01	0.01

Notes: Dependent variable is the logarithm of students' expected monthly salaries. All coefficients are statistically significant at better than the 0.01 level of significance. The values of the Wald statistic show that the model is globally statistically significant. The Breusch-Pagan Lagrangian multiplier test statistic for random effects (LM) shows that OLS estimation of a classical regression model is inappropriate for these data. The Hausman statistic for fixed vs. random effects shows that the random effects specification is appropriate for these data.

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