

Can students predict starting salaries? Yes!

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Abstract

We use Dutch panel data in which students have been asked to state their expected starting salary and confront these with realisations four years later. Both level and structure of expectations and realisations are remarkably close: we barely find systematic under- or overestimation effects.

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1. Introduction

Expectations of earnings lie at the heart of the ‘human capital’ model. The model states that students, in deciding on the amount of education, compare the outcomes of the different options and choose the option with the highest return. Considering the pivotal role of expectations in the choice process, one would expect that the expectations of pupils and students have been studied extensively. Such is not the case, however. After the classic studies by Freeman (1971, 1975), only a few studies have been carried out in this field. Manski (1993) commented as follows: ‘The profession has traditionally been sceptical of subjective data; so much that we have generally been unwilling to collect data on expectations. Instead, the norm has been to make assumptions about expectations formation’. Many economic researchers plainly assume equality of expectations and realisations (for example Willis and Rosen (1979)) without empirical testing.

Other disciplines in educational research like soci-

ology or psychology have fewer problems with collecting subjective data in this field (see for instance Smith and Powell (1990); Berndt and Miller (1990)), but also among economists this scepticism of subjective data seems to be fading, considering some recent studies (Dominitz and Manski (1996); Betts (1996)). One of the main features of these studies is that expectations of earnings are compared with realisations of earnings on the labour market by other individuals with similar characteristics.

Only a few studies assess the accuracy of income expectations (Dominitz (1998) and Das and van Soest (1999)). However, these studies do not examine educational decisions. The present paper contributes to this small literature and relates the accuracy of income expectations to educational decisions. We compare students’ earnings expectations with realisations for the same student by using data from the panel study ‘Continued Education’ (‘Verder Studeren’). The analysis is relevant to test a common assumption in theoretical models and can also throw light on questions about over- or underinvestments in education. For instance, if students with certain characteristics have much higher realisations than expectations there might be under-investment in education.

As noted, studies on labour market expectations and

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their relation to educational decisions start with Freeman (1971, 1975). In these classic studies Freeman showed that the expectations of students correspond to a high degree with the performance of earlier cohorts on the labour market. This applies both to the initial wages for various occupations and to the wages after 15 years and at the end of the respective professional careers. The analysis also showed that expected income differences between occupations have an influence on the choice of education, assuming a limited set of educational alternatives.

Dominitz and Manski (1996) asked students in the USA to complete a computerised questionnaire in order to obtain information about income expectations for various levels of education. The main conclusions drawn from this explorative study were that students are capable of making realistic estimates of future incomes, and that the general expectation was that education leads to higher income. Betts (1996) analysed income expectations of undergraduates, and showed that there was no great divergence between expectations and realisations in the labour market (by others). Students in higher years proved to be much better informed with respect to the labour market than first-year students. In the Netherlands, the influence of income expectations on educational decisions was analysed in detail by Kodde and Ritzen (1986) and Oosterbeek and Webbink (1995). However, they did not analyse the expectations themselves. A similar approach was used in Menon (1997) for the case of Cyprus. Das and van Soest (1999) compare earnings predictions with realisations one year ahead. People were asked to predict whether in the next year their household income would decrease, remain unchanged or increase. They find that between 1984 and 1989 income predictions were too pessimistic on average. Dominitz (1998) compares income predictions one-year ahead in 1993, elicited in the form of subjective probabilities, with peoples' actual income in 1994. He finds income expectations were too optimistic.

The economic literature on earnings expectations is small, in particular the validity of expectations has seldom been analysed at the individual level. In this paper we make a contribution to fill that gap. Section 2 discusses the data, Section 3 gives the analysis and Section 4 concludes.

2. The data and frame of analysis

We use data from the longitudinal research project "Continued Education" ("Verder Studeren"). In particular, we use data from the panel among students whose higher education started in 1991. It started with 3845 students in higher education. The sample was stratified by two levels and nine types of higher education. With this sample, all years, levels and types of higher edu-

cation in the Netherlands were covered. In particular, it covers both university students and students in higher vocational education. Also, both freshmen and students in higher years were included. The students were questioned about their position and history in education and their motives for choosing this type of education. In the following years individuals were questioned every year about their position in or outside higher education, the motivation for the decisions made and their future plans. The last survey was held in 1995. During the project all students who participated in the first survey received all the subsequent questionnaires. This includes students who left the educational system or students who did not participate in one or more surveys. In each questionnaire several retrospective questions were asked. The answers to these questions made it possible to 'repair' gaps in the longitudinal data collection. Student participation was encouraged by offering prizes in each questionnaire. All these actions resulted in a modest panel-mortality even after five surveys. In 1995, the overall retention rate was 54%. Non response analysis in the project "Continued Education" did not indicate any serious selectivity bias due to attrition (see De Jong, Roelvelde & Webbink, 1997, p. 4–5). For instance, the difference in the average starting salary expected in 1991 for those included in the first and fifth sample is only 0.2 percent (5 guilders). Table A2 in Appendix A presents sample statistics from the first and fifth survey.

In 1991 students were asked an open question about their expected starting salary after graduation (the exact wording of the questions is given in Appendix A). In 1995 1013 students (of the remaining 2082 students in the panel) had left higher education and entered the labour market. These students were asked about their earnings in 1995. For 676 students we have information on both expected earnings in 1991 and realised earnings after graduation. Information is missing on at least one of the earnings variables for 337 students: 154 students did not report expected earnings, 133 students did not report realised earnings and 50 students did not report either. Moreover, we excluded 19 observations with expectations or realisations far below the minimum wage level, leaving 657 observations for our analysis. Comparing sample statistics for the observations used in the analysis and for those with missing values indicates that missing values are not completely random. A probit analysis confirms that several variables are significantly related with the probability of being in the sample of observations used in the analysis (Table A3 in Appendix A). At the end of the next section we will comment on the implications for our findings.

In the analysis we only use variables known at the first survey in 1991. We distinguish four groups of variables:

background variables. We have gender, age, parent's education, parental income;

higher education variables. We have level and type of education, year of education, and part-time student status;

secondary education variables. We know secondary school marks, marks in languages science and humanities which are given on a 10-point scale. We also know whether the student repeated classes in secondary school and the school advice at the end of primary education; *motivation in higher education.* We know study efforts in 1991, measured as weekly hours spent on class attendance, assignment, study, etc. We also have measures on extrinsic and intrinsic motivations, based on the psychological literature. The first measure is the average of scores on questions about the importance of labour market perspectives in choosing a field of study and is believed to proxy extrinsic motivation. The second measure is based on a question relating to interest in the contents of the study and is an indication of intrinsic motivation (see also the appendix). Students had also been asked, in 1991, their subjective probability to graduate, a variable shown to have good predictive performance for actual graduation (see Webbink, 1999, p 136).

As we do not know the precise starting earnings (the dependent variable is earnings in 1995) we control for potential work experience (time since graduation). A full characterisation of the data is given in Table A1 in Appendix A. The data have been used for extensive analysis of educational choices in Webbink (1999) and in other publications of the research project (De Jong et al., 1997). Further details of data and related research findings are given in these publications.

3. Empirical analysis of expected and realised earnings

We estimate a model for the expected earnings of students in 1991 and for the realised earnings in 1995. The aim is to find out whether the structure of the determinants for expected earnings is the same as the structure for realised earnings. Results of the OLS-regression are presented in Table 1. The dependent variables are the natural logarithm of expected and realised earnings. We include potential work experience as a control variable because for realised earnings we observe actual earnings in 1995 without knowing whether these are starting salaries or not.

Most of the effects on expected earnings have the same sign and comparable size as the effect on realised earnings. In fact, several coefficients are very close. Female students expect to earn 5 percent less than male students do, four years later they earn 6 percent less. Effects of type of education on both expectations and realizations are remarkably close in both size and sign. Students in economics, health, technical and law studies

expect more income than students in social studies and earn more after four years. Students in languages and cultural studies might be disappointed with their earnings; they expect the same as students in social studies but earn considerably less. Students who repeat classes expect more and also realise higher incomes than other students.

The effects of marks in secondary education on expected earnings are not translated into realised earnings. Students with high scores in science subjects expect more income than others but do not earn more four years later. The opposite is true for students with high scores in humanities subjects: they do not expect more than others but realise higher incomes. We also see that students from high-income families expect higher incomes after graduation but do not earn more after four years than students from low-income families. Exposure to a high family income apparently generates too rosy expectations. It may be a factor in explaining higher participation in extended education for wealthy background students.

The main conclusion is that the pattern of effects on expected earnings is quite comparable with the effects on realised earnings.¹ However, these effects do not have to hold at the individual level. Therefore we compared expectations and realisations at the individual level in two ways.² First by analysing the systematic differences between expectations and realisations. Second, by cross-tabulating the distribution of expected earnings and realised earnings (Table 3). In the right hand column of Table 1 we analyse the systematic differences between expectations and realisations at the individual level. The dependent variable is the difference between the natural logarithm of expected earnings and the natural logarithm of realised earnings. In fact, we estimate an equation with the following structure:

$$\ln W_e - \ln W_r = (\alpha_e - \alpha_r) + (\beta_e - \beta_r)X_i + (\delta_e - \delta_r)Z_i + (u_{ei} - u_{ri}) \quad (1)$$

where W is earnings, X and Z are independent variables, α , β , δ are parameters to be estimated, u is unobserved factors and indexes e and r refer to expected and realised. Hence, testing the coefficients in this regression against zero is equal to testing the difference of the coefficient for expected and for realised earnings. As mentioned before, in the model we controlled for potential work experience because we did not observe the starting earnings but the earnings in 1995. Therefore, the effect of

¹ This conclusion is robust for specifications without variables on motivation and secondary education. These estimation results are available from the authors on request.

² Predicting realized income from expected income has an adjusted R-square of 0.06 and a coefficient of 0.25 (t-value 6.7).

Table 1
Regression analysis of expected and realised earnings

	Expected earnings		Realised earnings		Difference ^a	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	6.927	25.46	7.256	25.62	−0.329	−0.93
Female	−0.046	−2.05	−0.055	−2.37	0.009	0.32
Age	0.008	2.33	0.004	1.08	0.004	0.93
Parents education	−0.017	−1.66	0.007	0.66	−0.024	−1.80
Log parental income	0.049	2.01	0.003	0.13	0.046	1.44
<i>Higher education</i>						
Field of study (ref. social studies)						
Economics	0.091	2.46	0.067	1.75	0.023	0.49
Law studies	0.083	1.40	0.118	1.90	−0.035	−0.45
Health/medical studies	0.078	2.00	0.118	2.90	−0.040	−0.78
Agricultural studies	0.074	1.67	0.055	1.19	0.019	0.33
Technical studies	0.069	1.66	0.093	2.14	−0.023	−0.43
Educational studies	−0.016	−0.38	0.006	0.15	−0.022	−0.41
Languages/cultural studies	−0.018	−0.36	−0.129	−2.50	0.111	1.72
Science studies	−0.030	−0.72	−0.018	−0.43	−0.011	−0.21
Part-time study	0.123	3.18	0.032	0.79	0.091	1.81
Weekly study hours '91	0.000	−0.08	−0.002	−1.99	0.002	1.53
<i>Motivation in '91</i>						
Extrinsic motivation	0.015	2.64	0.007	1.17	0.008	1.09
Intrinsic motivation	0.000	−0.04	−0.007	−0.91	0.007	0.69
Expected prob. graduation '91	0.001	1.11	0.002	2.99	−0.001	−1.53
<i>Secondary education</i>						
Average mark languages	−0.024	−1.54	−0.015	−0.91	−0.009	−0.45
Average mark humanities	0.017	1.11	0.047	2.93	−0.030	−1.49
Average mark science	0.029	2.21	−0.005	−0.35	0.033	1.97
School advice	−0.006	−0.92	−0.001	−0.09	−0.005	−0.63
Repeated classes	0.057	2.59	0.049	2.15	0.008	0.27
<i>Educational position in '91 (ref. = university older)</i>						
Vocational freshmen	−0.131	−3.94	−0.111	−3.21	−0.020	−0.46
Vocational older	−0.137	−5.13	−0.113	−4.05	−0.024	−0.70
University freshmen	−0.007	−0.19	0.004	0.11	−0.012	−0.23
Potential work experience	−0.025	−2.60	0.047	4.72	−0.071	−5.76
Adjusted R-square	0.14		0.16		0.07	
# Observations	657		657		657	

^a $\ln(\text{exp}) - \ln(\text{real})$.

Table 2
Correlation between systematic and stochastic part of expected and realised earnings

Expected earnings	Realised earnings	
	Systematic part	Error term
Systematic part	0.81	0
Error term	0	0.15

this variable should not be interpreted as the difference between expectations and realisations.

The estimates from this third model show that systematic difference between earnings expectations and realisations are nearly absent. At the 5%-level we only find a significant effect of average marks for science: students with higher scores on science subjects overestimate their earnings after graduation. The difference between the intercepts, 0.33, relates to expectations and realisations four years apart. While not significant, we may relate a substantial part to actual earnings growth. Over the relevant period, starting salaries for the higher educated grew with approximately 30 percent, according to estimates by Statistics Netherlands.

The explained variance in the third model drops to

Table 3

Expectations and realisations at the individual level (% of total sample, $n = 657$)

Expected earnings (mean $\mu = 7.77$, st. dev. $\sigma = 0.29$)	Realised earnings (mean $\mu = 7.67$, st. dev. $\sigma = 0.28$)					
	1	2	3	4	5	6
1 ^a	0.2	0.5	0.8	0.6	0.0	0.0
2	0.6	1.6	1.7	4.3	0.9	0.2
3	1.1	2.2	9.9	15.9	4.5	1.4
4	0.6	2.2	11.0	17.8	8.5	2.2
5	0	0.5	1.1	4.2	2.5	1.4
6	0	0.3	0.5	0.2	0.6	0.5

^a Earnings classes based on standard deviations from the mean: 1) $W < \mu - 2\sigma$; 2) $\mu - 2\sigma \leq W < \mu - \sigma$; 3) $\mu - \sigma \leq W < \mu$; 4) $\mu \leq W < \mu + \sigma$; 5) $\mu + \sigma \leq W < \mu + 2\sigma$; 6) $\mu + 2\sigma \leq W$.

about 1 percent if we leave out the control variable ‘potential work experience’. This poor overall fit clearly shows that differences between expected earnings and realised earnings are not systematically related to variables commonly available, to type of study or to the additional, less common, variables that we have available. The correlation between the systematic part and the non-systematic part of the earnings equations confirm these findings (Table 2). Predicted expected earnings and predicted realised earnings correlate very well, the error terms are orthogonal.

The regressions for expected and realised earnings explain 14 and 16 percent of observed variance. Hence, unobserved heterogeneity is substantial. This is common in individual earnings regressions: our R squareds are not particularly low. The unobserved heterogeneity may refer to many factors: firm, sector, region, job type, abilities, motivation, investment profiles, measurement errors, etc. One might distinguish market heterogeneity, related to the job that the individual obtains, from individual heterogeneity (related to the individuals’ specific abilities, drives, etc). Apparently, the unobserved heterogeneity in expected and realised earnings is largely uncorrelated. One might speculate that expected earnings contain mostly individual heterogeneity and realised earnings include mostly market heterogeneity. Independence of the two types of heterogeneity at the start of the career would then suggest that matching of jobs and workers is still very poor. This would fit in with high search activities in the early career stage, a well-documented fact.

As a second way to compare expectations and realisations of earnings we cross-tabulate these variables. In Table 3 we see that the mean of expected income is about 10 percent higher than the mean of the realised income (mean of 7.77 versus 7.67) and that the standard deviations are very close. This optimistic view of student foresight was also found by Smith and Powell (1990). Each earnings distribution in Table 3 is divided in 6

classes (one, two, or more than two standard deviations below or above average earnings). Most of the sample lies just below or just above the average. Only a small fraction of students (approximately 2%) have responded in the right tail of expectations of earnings and the left tail of realised earnings or vice versa (shaded area in Table 3). The results are also shown in Fig. 1.

We conclude that large differences between expectations and realisations at the individual level are rare.

3.1. External validity

In the previous section we noted that one third of the students did not respond on at least one of the two earnings variables, and one quarter of the students did not give an earnings expectation. These missing values might have an impact on the external validity of our findings. A probit analysis reveals that missing values are not random (see Table A3 in Appendix A). Women, students in languages/cultural studies, students with low extrinsic motivation, high marks in science or who experience low school advice have a significantly higher probability of not answering on one of the earnings variables. Moreover, students with low potential work experience, that is students far from graduation, are more likely not to respond on the earnings variables. It is possible that students did not answer the earnings question, especially the one on earnings expectation, because they did not have a clue about their earnings prospects or they attached a low value to future earnings. It is quite conceivable that the latter explanation is valid for women, students in languages and cultural studies, students with low extrinsic motivation and students with low probabilities to graduate. So, our findings may not generalise to the whole population of students. Hence, some caution is needed with respect to the external validity of our findings.

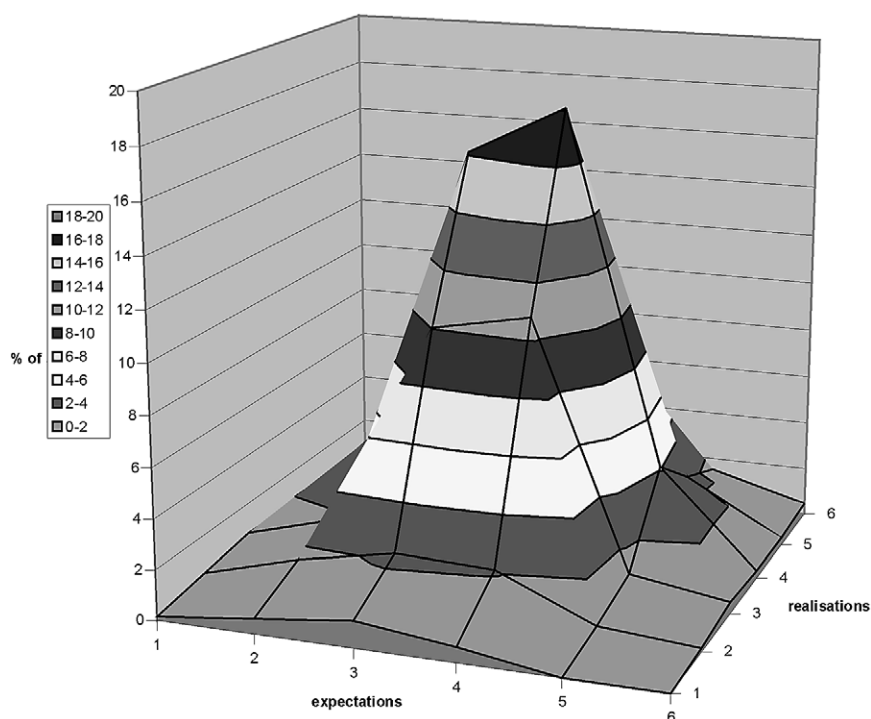


Fig. 1. Expectations and realisations of earnings at the individual (interval size one standard deviation).

4. Conclusions

At the individual level, large differences between earnings expectations of students on their starting salaries and realisations by graduates are rare. Moreover, there are no systematic differences between expectations and realisations. These results show that findings by Dominitz and Manski (1996) that students are capable of making realistic estimates of future incomes not only hold at the group level but also at the individual level. Hence, their choices on continued education are well-informed choices.

Our key finding is that the structure of student's earnings expectations is quite similar to the structure of realised incomes. Especially the closeness of the effects of the type of education on earnings expectations and realisations is remarkable. Students anticipated earnings differences quite well between social studies, economics, health, agricultural studies and technical studies. Students in languages substantially overestimated their starting salary and also students from high-income families tended to be too optimistic.

We have estimated a reduced form to explain the vari-

ation in individuals' expected starting salaries. While this is not a model to explain the determination of these expectations, our results still mean that individuals have rational expectations: the starting salaries expected by individuals obey the same relation to the individuals' characteristics as the actual starting salaries.

We conclude that directly measured individual expectations of starting salaries quite accurately mimic the differences in starting salaries by type of study and by various individual characteristics. However, we have to be cautious to apply our results to the entire population, as we faced a non-response rate of about one third on the earnings variables and there is some evidence that it is not fully random.

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Appendix A

Table A1
Description of the data

Variable	Description	Mean	st. dev.
Log expected earnings ^a	Expected net starting salary after graduation measured in October 1991, log of guilders per month	7.77	0.29
Log realised earnings ^b	Realised earnings after graduation measured in December 1995, log of guilders per month net	7.67	0.28
Female	female=1; male=0	0.48	
Age	Age of student in October 1991	23.1	4.87
Parents education	Maximum educational level of father and mother; scale from 1 (primary education) to 5 (university education)	3.00	1.12
Log parental income	Guilders per month net of taxes and premiums	8.22	0.48
<i>Higher education</i>			
Field of study			
Social studies	Yes=1; no=0	0.14	
Economics	Yes=1; no=0	0.17	
Health/medical studies	Yes=1; no=0	0.13	
Agricultural studies	Yes=1; no=0	0.10	
Science studies	Yes=1; no=0	0.12	
Technical studies	Yes=1; no=0	0.14	
Language/cultural studies	Yes=1; no=0	0.06	
Educational studies	Yes=1; no=0	0.10	
Law studies	Yes=1; no=0	0.04	
Part-time study	Yes=1; no=0	0.12	
Weekly study hours '91	Average weekly hours spent on study	32.3	13.0
Vocational freshmen	Yes=1; no=0	0.20	
Vocational older	Yes=1; no=0	0.33	
University freshmen	Yes=1; no=0	0.09	
University older	Yes=1; no=0	0.38	
Potential work experience	December 1995 minus graduation date	1.73	1.16
<i>Secondary education</i>			
Average mark languages	Scale from 1 (lowest) to 10 (highest)	6.78	0.68
Average mark humanities	Scale from 1 (lowest) to 10 (highest)	6.93	0.72
Average mark science	Scale from 1 (lowest) to 10 (highest)	6.71	0.90
School advice	Advice at the end of primary school; scale from 1 (lowest level) to 7 (highest level)	5.16	1.72
Repeated classes	Yes=1; no=0	0.36	
<i>Motivation in '91</i>			
Extrinsic motivation ^c	Average of scores on questions about importance of labour market perspectives in choosing a study	5.74	1.81
Intrinsic motivation ^c	Average score on question about the importance of interest in the contents of the study in choosing a study	8.64	1.39
Expected prob. graduation '91	Expected probability of graduating in present study (indicated by student in 1991)	89.1	15.4
# Observations		657	

Extrinsic: By following this type of education I can get a job where I can work autonomously
 By following this type of education I can get a management job
 By following this type of education I am sure to get a paid job
 By following this type of education I will be able to get into a particular occupation
 With this type of education I increase my chances of working abroad

Intrinsic: I am interested in the content of this type of education

^a Expected earnings: How much will your net starting salary be after graduation? I expect a starting salary of guilders net per month.

^b Realised earnings: What is your net income per month from work (wage)? My net-income in my present job is guilders net per month.

^c Questions on motivation: How important are the following considerations for choosing your type of higher education. Give a score between zero (not important) and 10 (extremely important).

Table A2

Sample means and standard deviations from the first and fifth survey

	1991-survey <i>n</i> = 3845	1995-survey <i>n</i> = 2082	
	Mean	Mean	Std. deviation
Female	0.493	0.500	0.500
Age in October '91	21.82	21.53	4.94
Parents education	3.16	3.16	1.16
Log parental income	8.27	8.26	0.49
<i>Field of study</i>			
Economics	0.141	0.139	0.346
Social studies	0.154	0.151	0.358
Health/medical studies	0.124	0.138	0.345
Agricultural studies	0.117	0.132	0.338
Science studies	0.110	0.114	0.318
Educational studies	0.053	0.054	0.226
Law studies	0.057	0.054	0.227
Languages/ cultural studies	0.107	0.083	0.276
Technical studies	0.136	0.134	0.341
Part-time study	0.088	0.078	0.269
Weekly study hours '91	32.50	33.18	12.85
Extrinsic motivation '91	5.64	5.61	1.89
Intrinsic motivation '91	8.66	8.70	1.47
Expected prob. graduation '91	83.83	84.31	18.26
<i>Secondary education</i>			
Average mark languages	6.84	6.84	0.72
Average mark humanities	6.86	6.91	0.84
Average mark science	6.71	6.77	0.97
School advice	5.25	5.32	1.64
Repeated classes	0.372	0.326	0.469
<i>Educational position in '91</i>			
Vocational freshmen	0.238	0.255	0.436
Vocational older	0.213	0.191	0.393
University freshmen	0.254	0.268	0.443
University older	0.295	0.287	0.452
Expected starting salary (guilders)	2618	2613	1156

Table A3

Probit analysis on missing values (dependent variable is missing for one or both of the earnings variables, *n* = 1013)

	Coeffi	std. err.	z-value
Female	0.186	0.097	1.92
Age in October '91	0.022	0.012	1.76
Parents education	0.042	0.043	0.98
Log parental income	−0.173	0.105	−1.65
<i>Field of study</i>			
Economics	−0.160	0.176	−0.91
Health/medical studies	0.253	0.165	1.53
Agricultural studies	0.225	0.186	1.21
Science studies	0.101	0.177	0.57
Technical studies	0.052	0.185	0.28
Languages/ cultural studies	0.585	0.190	3.09
Educational studies	0.206	0.172	1.2
Law studies	0.117	0.259	0.45
Part-time study	−0.325	0.167	−1.95
Weekly study hours '91	0.002	0.004	0.61
Extrinsic motivation '91	−0.099	0.023	−4.23
Intrinsic motivation '91	0.013	0.031	0.43

(continued on next page)

Table A3 (continued)

	Coeffi	std. err.	z-value
Expected prob. graduation '91	−0.006	0.003	−1.96
<i>Secondary education</i>			
Average mark languages	0.028	0.067	0.42
Average mark humanities	−0.111	0.068	−1.64
Average mark science	0.148	0.056	2.65
School advice	−0.057	0.027	−2.08
Repeated classes	0.070	0.092	0.76
<i>Educational position in '91</i>			
Vocational freshmen	0.134	0.130	1.03
Vocational older	0.003	0.118	0.02
University freshmen	−0.004	0.167	−0.02
Potential work experience	−0.194	0.041	−4.76
Intercept	1.332	1.122	1.19

Table A4a

Regression analysis of expected and realised earnings

	Expected earnings		Realised earnings		Difference ^a	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	7.264	34.00	7.525	33.76	−0.297	−1.07
Female	−0.067	−3.09	−0.074	−3.24	0.008	0.29
Age	0.009	2.81	0.006	1.70	0.003	0.63
Parents education	−0.019	−1.87	0.009	0.82	−0.029	−2.12
Log parental income	0.050	2.05	0.014	0.53	0.039	1.20
<i>Higher education</i>						
Field of study (ref. social studies)						
Economics	0.097	2.63	0.066	1.72	0.022	0.46
Health/medical studies	0.086	2.23	0.116	2.88	−0.025	−0.50
Agricultural studies	0.087	2.00	0.043	0.94	0.034	0.60
Science studies	−0.021	−0.52	−0.032	−0.77	0.013	0.25
Technical studies	0.095	2.35	0.097	2.30	−0.007	−0.14
Languages/cultural studies	−0.027	−0.55	−0.137	−2.64	0.104	1.60
Educational studies	−0.021	−0.51	0.007	0.16	−0.037	−0.69
Law studies	0.083	1.39	0.126	2.01	−0.040	−0.52
Part-time study	0.128	3.67	0.057	1.56	0.075	1.63
Weekly study hours '91						
<i>Motivation in '91</i>						
Extrinsic motivation						
Intrinsic motivation						
Expected prob. graduation '91						
<i>Secondary education</i>						
Average mark languages						
Average mark humanities						
Average mark science						
School advice						
Repeated classes						
<i>Educational position in '91</i> (ref. = university older)						
Vocational freshmen	−0.126	−4.20	−0.150	−4.80	0.060	1.60
Vocational older	−0.125	−4.97	−0.120	−4.56	−0.003	−0.09
University freshmen	−0.021	−0.56	−0.039	−0.98	0.032	0.65
Potential work experience	−0.026	−2.75	0.047	4.71	−0.065	−4.77
Adjusted R-square	0.12		0.16		0.04	
# Observations	657		657		657	

^a $\ln(\exp) - \ln(\text{real})$.

Table A4b

Regression analysis of expected and realised earnings

	Expected earnings		Realised earnings		Difference ^a	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	7.103	30.46	7.452	30.77	−0.387	−1.27
Female	−0.064	−2.93	−0.068	−3.00	0.006	0.22
Age	0.009	2.67	0.006	1.60	0.003	0.62
Parents education	−0.018	−1.76	0.008	0.77	−0.027	−1.98
Log parental income	0.047	1.91	0.005	0.21	0.043	1.34
<i>Higher education</i>						
Field of study (ref. social studies)						
Economics	0.092	2.50	0.066	1.71	0.018	0.38
Health/medical studies	0.078	2.00	0.113	2.78	−0.030	−0.59
Agricultural studies	0.093	2.10	0.053	1.16	0.031	0.53
Science studies	−0.017	−0.42	−0.028	−0.66	0.013	0.24
Technical studies	0.090	2.19	0.093	2.19	−0.008	−0.16
Languages/cultural studies	−0.021	−0.42	−0.133	−2.58	0.107	1.65
Educational studies	−0.014	−0.35	0.007	0.16	−0.030	−0.55
Law studies	0.092	1.54	0.124	2.00	−0.029	−0.38
Part-time study	0.146	3.84	0.043	1.10	0.105	2.12
Weekly study hours '91	0.000	0.05	−0.002	−1.87	0.002	1.52
<i>Motivation in '91</i>						
Extrinsic motivation	0.016	2.83	0.008	1.34	0.009	1.20
Intrinsic motivation	0.000	0.02	−0.007	−0.88	0.007	0.67
Expected prob. graduation '91	0.001	1.09	0.002	3.12	−0.002	−1.62
<i>Secondary education</i>						
Average mark languages						
Average mark humanities						
Average mark science						
School advice						
Repeated classes						
<i>Educational position in '91 (ref. = university older)</i>						
Vocational freshmen	−0.123	−3.76	−0.105	−3.08	0.017	0.41
Vocational older	−0.133	−5.12	−0.110	−4.06	−0.022	−0.65
University freshmen	−0.016	−0.41	−0.009	−0.21	0.007	0.13
Potential work experience	−0.024	−2.53	0.046	4.66	−0.062	−4.48
Adjusted R-square	0.12		0.15		0.05	
# Observations	657		657		657	

^a $\ln(\text{exp}) - \ln(\text{real})$.

Table A4c

Regression analysis of expected and realised earnings

	Expected earnings		Realised earnings		Difference ^a	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	7.057	27.16	7.286	26.81	−0.294	−0.86
Female	−0.048	−2.17	−0.061	−2.61	0.014	0.49
Age	0.008	2.43	0.004	1.18	0.003	0.76
<i>Higher education</i>						
Field of study (ref. social studies)						
Economics	0.094	2.56	0.065	1.67	0.020	0.42
Health/medical studies	0.085	2.21	0.118	2.95	−0.029	−0.58

Table A4c
Regression analysis of expected and realised earnings

Agricultural studies	0.067	1.53	0.043	0.93	0.014	0.24
Science studies	−0.034	−0.83	−0.026	−0.61	−0.008	−0.15
Technical studies	0.073	1.77	0.093	2.15	−0.027	−0.49
Languages/cultural studies	−0.024	−0.48	−0.132	−2.56	0.102	1.56
Educational studies	−0.022	−0.54	0.006	0.14	−0.038	−0.70
Law studies	0.075	1.27	0.119	1.91	−0.043	−0.54
Part-time study	0.107	3.04	0.050	1.34	0.061	1.31
Weekly study hours '91						
Motivation in '91						
Extrinsic motivation						
Intrinsic motivation						
Expected prob. graduation '91						
Secondary education						
Average mark languages	−0.025	−1.62	−0.017	−1.04	−0.006	−0.29
Average mark humanities	0.020	1.31	0.049	3.04	−0.030	−1.50
Average mark science	0.029	2.27	−0.003	−0.21	0.034	2.00
School advice	−0.006	−0.95	0.003	0.46	−0.007	−0.88
Repeated classes	0.057	2.59	0.048	2.11	0.009	0.30
Educational position in '91 (ref. = university older)						
Vocational freshmen	−0.134	−4.37	−0.151	−4.71	0.056	1.44
Vocational older	−0.130	−4.99	−0.120	−4.40	−0.005	−0.16
University freshmen	−0.013	−0.33	−0.024	−0.60	0.027	0.53
Potential work experience	−0.026	−2.79	0.047	4.80	−0.066	−4.83
Adjusted R-square	0.13		0.15		0.05	
# Observations	657		657		657	

^a $\ln(\text{exp}) - \ln(\text{real})$.

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