

# Is the grass greener on the other side of the fence?

## Analyses of students who change colleges

Linda Holmlund  
Department of Economics  
Umeå University  
SE-901 87 Umeå  
linda.holmlund@econ.umu.se

and

Håkan Regnér  
SACO  
Box 2206,  
SE-103 15 Stockholm  
hakan.regner@saco.se

### **ABSTRACT**

Using data on three cohorts of university entrances in Sweden this study finds that a third of all students have changed colleges at least once. The results show that individuals who change colleges have significantly lower earnings than students who do not change. Quantile regression estimates show that the earnings differences decrease over the wage distribution, but they are significant at the bottom as well as at the top of the earnings distribution. These results are not explained by differences in ability, family background, choices of fields or colleges. On average, there is an earnings penalty of six percent from changing colleges.

*JEL-classification: J24, J31*

## 1. Introduction

In theory, investment in university education is considered a determinant of long term economic growth. In practice, most OECD countries allocate between 1 and 3 per cent of GDP to college education (OECD 2007). Higher education is also a key area of the European Union Lisbon strategy, which aims at making the EU the world's leading knowledge economy. Obviously it is important to examine the outcome of the investments in higher education.

For the past 20 years, many OECD countries have experienced an increase in the earnings premium to college education (see e.g. Katz and Autor 1999). But all college educated workers have not gained from this change. For example, results for the US show that wages vary significantly between students who have attended different colleges (Black and Smith, 2004; Dale and Krueger, 2002; Monks, 2000; Brewer, Eide and Ehrenberg, 1999; Behrman, Rosenzweig and Taubman, 1996; Datcher Loury and Garman, 1995), earning premiums vary significantly across majors (Arcidiaconon 2004), wages of college educated workers depend on type of college degree and that wages are higher for students who switch colleges (Light and Strayer 2004). In comparison, little is known about earnings differences among college graduates in European countries<sup>1</sup>.

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<sup>1</sup> Lindahl and Regnér (2005) estimate the earnings effects of college type for a sample of Swedish siblings. Bratti (2002) examines the effects on degree performances of college choice for students in life sciences in the UK. None of these studies analyze representative samples of students at the colleges.

This paper provides new results for Sweden, a country that ranks among the top three OECD countries that spend most on higher education. Moreover, Swedish institutions of higher education are driven by public funding<sup>2</sup>, which might guarantee a high basic quality of college education and eliminate an important source of earnings differences observed in US studies. Particularly, this paper analyses the outcome of changing university<sup>3</sup>, using unique administrative data from Statistics Sweden on 138 000 students who enrolled into college education the period 1995-1997. Students are followed for six years in college and until 2005 on the labour market. About 33 % of the students have changed college at least once<sup>4</sup>. This paper investigates whether students receive a premium or penalty of changing colleges.

The results show that earnings are significantly lower for students who change colleges, even when we adjust for ability and family background. The level of the penalty is about 6 %. This result is the opposite of that reported for the US, where there is a significantly positive effect of the change (Light and Strayer, 2004).

The rest of the paper is organized as follows. Section 2 presents some stylized facts about higher education in Sweden and section 3 the empirical strategy. Section 4 presents the data and some descriptive analyses. Section

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<sup>2</sup> Aghion et al (2008) show that this is true for most EU-countries.

<sup>3</sup> University and college are used interchangeably throughout the paper.

5 reports the estimated effects of changing colleges, and section 6 some sensitivity analyses. Section 7 concludes.

## **2. Higher education in Sweden**

Prior to 1977, the Swedish system of higher education was centralised with national education policy determined by the Parliament and implemented by the government through the Ministry of Education and Science<sup>5</sup>. There were no admission constraints and in the early 1970s it became difficult for the existing universities to meet the excess demand of higher education. To meet the increased demand for education, the government decided to establish new colleges. This decision was part of a major reform of the higher education system in 1977.

The 1977 reform created a uniform system for all types of higher education and a broad geographic distribution of education. The reform also merged all higher education into an overall concept that encompassed traditional university education, and education at professional institutes and university colleges.

During the period 1977–1993, the Parliament and/or the government regulated the higher education system in detail. But since 1993, higher

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<sup>4</sup> Light and Strayer (2004) analyse the impact of college transfer in the US using survey data on 6 255 individuals. Based on their data, we calculate an average transfer rate of about 30 per cent among students in the US, which is almost the same as in our data.

<sup>5</sup> This section draws heavily from National Agency for Higher Education (2004, 2006, 2007).

education institutions have gradually gained increased autonomy in the organisation of studies, use of resources and general administration.

In 2008, there are 39 universities and university colleges. There are also independent course providers who are entitled to award higher education degrees or diplomas. Universities have permanent public funds for research and postgraduate education and can award doctoral degrees. Four university colleges have the same rights as universities but restricted to only one research area: Blekinge Institute of Technology in Technology, Malmö University College in Medical Sciences Kalmar University College in Natural Sciences, and Mälardalen University College in engineering.

About 30 university colleges have research links with the universities through special government grants. In addition to these state run institutions of higher education, there are the private Stockholm School of Economics, Chalmers University of Technology and the University College of Jönköping, which award doctoral degrees. These institutions receive some public funding<sup>6</sup>. A few private institutions are also recognised to award specific degrees. The Government determines whether a higher education institution is entitled to call itself a university and whether an independent course provider is to be empowered to award degrees or diplomas. In all, there are 61 providers of higher education in 2008.

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<sup>6</sup> For example, governmental support amounts only to about 10 percent of total revenue per annum for Stockholm School of Economics ([www.hhs.se/about](http://www.hhs.se/about)).

Higher education is free of charge for all students except for a small fee (about 25 EURO) to the student union. The government provides financial support to Swedish students and immigrants holding a permanent residence permit. This support is twofold: grants and loans, which combined constitute student aid of about SEK 7500 (EURO 800) per month in 2008. Parents' income or wealth does not affect the amounts that students receive.

A single administrative authority on the national level handles the admissions to higher education. However, since 1995 admission to programmes may be decentralised and handled by local admissions offices in the same way as admission to single courses. The admission to undergraduate education is determined by general and specific admission requirements. In 2008 there are two ways to fulfil general requirement: (i) completing an upper secondary school programme and obtaining a Pass grade or better in courses comprising at least 90 percent of the credits required for the programme (ii) having the potential to benefit from the education, by virtue of other education, practical experience or other circumstances. People who are at least 25 years old, who have been employed for four years and have a command of English and Swedish corresponding to that obtained by completing a national upper secondary programme also fulfil the general requirement. The specific requirement varies between fields of higher education, but is expressed in upper secondary school qualifications in specific subjects.

There is a supply constraint on higher education, and therefore admission to many programmes is selective. The selection of students is based on secondary school results and/or a university aptitude test. The university aptitude test is not compulsory and is not an entrance test. Instead it checks the aptitude for university studies. The test can be taken by all students who apply to the university.

Studies are organised either in the form of programmes or single courses, both leading to a degree. Sweden has a system of credit points, where a normal 40- week academic year corresponds to 60 higher education credits. The system is compatible with ECTS credits.

Diplomas from all higher education institutions recognised by the Government have equal official value. The same law governs all state higher education institutions. There are various types of degrees and all are issued in accordance with the same degree ordinance.

Figure 1 shows the number of registered students, degrees and university entrances during the period 1977/78-2003/2004. The number of registered students more than doubled during the 1990s, from about 193 000 in 1989/1990 to about 398 000 in 2003/2004. During the same period of time the number of university entrants and degrees increased by about 73%. Our data include all university entrances in the years 1995, 1996 and 1997.

<FIGURE 1 ABOUT HERE>

Students who study full time will reach the basic degree in about 3 years, which explain parts of the gap between number of registered students and number of degrees. But it does not fully explain the differences between the groups. Another explanation might be that there is no additional return to a formal degree, and therefore students have no incentives to study for a degree. Yet another explanation might be that students leave for a job before they reach a degree and remain registered at the local college.

### 3. Empirical considerations

In order to examine the premium/penalty of changing college we estimate the following standard earnings equation:

$$\ln(Y_i) = \beta_0 + \beta_{1i} X_i + \beta_{2i} \Delta C_i + \varepsilon_i \quad (1)$$

where  $Y_i$  is annual earnings of individual  $i$ ,  $X_i$  is a vector of demographic and job related characteristics,  $\Delta C_i$  is a dummy variable that indicates if the individual has changed colleges, and  $\varepsilon_i$  is a random error.  $\beta_{2i}$  is the earnings premium (or penalty) from changing colleges and the parameter of interest.

There are various reasons why students change colleges. One reason is that they believe that they can increase their future returns to their college education by changing colleges. One might assume that students repeatedly

evaluate their investments in education and change when the net benefits of their education are higher at the other college<sup>7</sup>. In this case,  $\beta_{2t} > 0$ .

Students consider the quality of education. If they learn that the quality of education is low (bad teachers, slow study pace and no productive peer pressure) they switch to a college where the quality is higher. They might even decide to change fields of study. The quality improvement might in turn affect students' likelihood of taking a degree. This means that the change of college can have indirect effects on earnings via its effect on degree attainment and choice of fields (and other college specific variables). But there will also be a direct effect if the change improves students' education and if this higher quality training affects future earnings. This also suggests that  $\beta_{2t} > 0$ .

If the decision to change college is driven by factors unrelated to individuals' marketable skills, the estimate of  $\beta_{2t}$  might be insignificant or even negative. For example, individuals who change colleges may not want to focus on one particular academic program. Instead they combine courses from various fields and colleges into an education, which is difficult to sell on the labour market. Students might also change to come closer to friends and/or family or because they want a different atmosphere (less students, smaller campus, different leisure activities etc.).

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<sup>7</sup> Altonji (1993) and Manski (1989) argue that students are uncertain about their educational choices and treat education as a sequential decision.

Factors that influence the decision to change college might also affect subsequent earnings, which mean that there might be a problem of selection bias. Numerous studies show that ability and family background are crucial for individuals' education decisions, and one might expect that these factors also affect the decision to change college. In the empirical section we investigate the potential bias from excluding ability and family background when estimating the impact of changing colleges. But it also possible that students leave the first college for one which is located in the area where they were born or went to compulsory schooling, because they want to be close to old friends. Therefore, we also estimate models that control for individuals' regions of birth and compulsory schooling.

We also use quantile regressions (*e.g.* Buchinsky 1994; Koenker and Bassett 1974; Koenker and Hallock 2001) to further examine the heterogeneity in the effects of changing college. We estimate the  $\theta^{\text{th}}$  percentile of  $Y_i$  conditional on individual characteristics ( $X_i$ ) and the dummy variable that indicates if an individual has changed college ( $\Delta C_i$ ). We assume that  $q_\theta$ , which is the value of  $Y_i$  conditional on  $X_i$  and  $\Delta C_i$  in percentile  $\theta$ , is linear in these variables. We estimate the equation:

$$q_\theta(Y_i) = \beta_{0\theta} + X_i\beta_{1\theta} + \Delta C_i\beta_{2\theta} + \varepsilon_{i\theta} \quad (2)$$

The coefficients are interpreted as the wage premium in percentile  $\theta$  of the conditional wage distribution. We estimate heteroskedastic-consistent

standard errors (bootstrapped standard errors). The percentile estimates are weighted by the total sample size. The method is robust to outliers of the dependent variable.

#### **4. Data**

The data are derived from administrative records kept by Statistics Sweden (SCB) and include all individuals who enrolled in college (for the first time) the period 1995-1997<sup>8</sup>. Students are followed for 12 semesters and in every semester we know at which college they are studying, which courses (field) they are taken and how many credit points they take each semester<sup>9</sup>. When they graduate, there is detailed information about the level and field. The analyses in this paper cover all university entrances during 1995-1997, which amount to about 138000 students.

The information about college education is collected from administrative records kept at the colleges and all colleges, with one exception, use identical reporting systems<sup>10</sup>. In Sweden, schools and colleges are required to report individuals' educational attainment to Statistics Sweden. Therefore, data on education are of high quality and identical for

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<sup>8</sup> We also have data on all individuals who graduated from college in 1993/1994 and 2000/2001, but we do not exploit these data in this paper.

<sup>9</sup> The data corresponds to undergraduate studies only, i.e., there is no information about graduate studies.

<sup>10</sup> Stockholm School of Economics uses a different reporting system, and is not included in this study.

all individuals and across colleges. Moreover, there is exact information about college type.

Information on individuals was collected in 1993, 1995, 1997, 1999, 2002, 2004 and 2005. We know their grades from compulsory school and high school, in which municipality they went to school and parents educational background. We have geographical information on the location of the place of residence, birth and compulsory schooling. We also have the standard individual background characteristics and basic work related data (sector and industry). There is also information about those who do not work. The outcome measure is gross annual earnings measured in 2005. Information on annual earnings has been collected from tax records.

Previous Swedish studies on higher education used data only on individuals who have a degree. But figure 1 indicates that a significant portion of college students leave without a degree. These students do not necessarily drop out. Instead they might leave near the end of their studies, because of a lucrative job offer. This study exploits information on number of credit points taken, and we investigate if the results vary between degree and non-degree students.

Table 1 presents outcomes of higher education measured six years after college enrolment for the three cohorts of university entrances included in the analyses<sup>11</sup>.

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<sup>11</sup> The empirical analyses use all individuals. We have run cohort specific regressions, but the results do not differ much from those reported in this paper.

Column 1 shows that 66.8 % of those who entered college in 1995 studied at only one college. As many as 26 % of the students have studied at two colleges and 7.5 % studied at three or more colleges. This means that a third of those who began studying in 1995 have changed college at least once. The percentages are similar for those who began studying in 1996 and 1997. The empirical analysis focuses on the earnings differences between the students who have changed at least once and those who have not changed.

Another interesting finding is that no more than 58.6 percent of those who entered college in 1995 have taken a degree during the six year period they have been followed in college. It seems as if students have weak incentives to take out a degree in Sweden. This finding also shows that it is important to include college students without a degree in analyses of the effects of higher education. The percentages are similar for the other samples.

<TABLE 1 about here>

We impose some restrictions on the data. We exclude independent program providers and university colleges specialized in nursing, agricultural science, music, arts and dance. In addition, we require non-missing information on educational attainment and college type, and that

all individuals are employed in the outcome year. We also exclude self employed.

Table 2 reports sample characteristics of the samples included in the analyses<sup>12</sup>. We have grades from pre-college schooling for individuals who left upper secondary school in 1990 and onwards, and the last three columns report information for this sample. The table also reports separate means for students who have changed college and those who have not changed.

<TABLE 2 about here>

The data indicates that there are differences between students who change colleges (movers) and students who do not change (stayers). Earnings are lower for movers and there is a larger share of women among movers than stayers. The marriage rate is lower among movers and movers have fewer children. The parental background characteristics on origin do not vary much between stayers and movers. However, there are large differences in parents' educational background. It is more common for movers to have a parent with a college or a PhD education, while stayers have a larger proportion of parents who have a lower education.

There are no major differences between the large sample and the sample with GPAs. Students who change colleges have higher level of

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<sup>12</sup> Table A1 in the appendix reports the distribution of students over colleges for the GPA sample.

measured ability than students who do not change. Interestingly, this is also the case among college transfer students in the US (Light and Strayer 2004).

## **5. Empirical findings**

### *OLS estimates*

Table 3 reports the baseline estimates of the relationship between college change and earnings. The table includes results from five different specifications. It also reports estimates of the full model conditional on various regional information.

<TABLE 3 about here>

Let us focus on the results for the GPA sample. The estimate in column one shows that students who change colleges have significantly lower earnings than individuals who do not change. Earnings are more than 9 % lower for movers than stayers, showing that there is a significant penalty of changing colleges. This result is the opposite of the results reported for students in the US (Light and Strayer, 2004). The results in column 2 are lower, but not statistically different from the one reported in column 1. This suggests that the earnings differences between movers and stayers are not explained by differences in parental background.

Column 3 reports estimates of the college change from a specification that controls also for differences in college educational choices (fields, degree or not, number of credits). This specification suggests that the earnings differences are about 14 %, which is significantly larger than the one reported in previous columns. The higher estimate suggests there is a group of movers who are educated in fields (or with degrees) that lead to relative high earnings jobs.

The estimate in column 4 is almost the same as that reported in column 3. Since specification 4 controls for grades from upper secondary schools, the result shows that earnings differences between stayers and movers cannot be explained by differences in ability.

The specification in column 5 also controls for a series of labour market related factors, such as unemployment experiences during the year and industries of employment. The inclusion of these variables leads to a significant reduction in the estimate of the impact of changing college. It seems as if individuals who change colleges end up in lower paid parts of the labour market or have more unemployment experiences than those who do not change. It might be an active decision, i.e. individuals change college because they place higher values on leisure activities than their career options. Even so, this specification still suggests that there is a significant earnings penalty of changing colleges.

Students might change college because they want to return to family and friends. Probably, this decision correlates with the individual's county of

birth. Therefore, we estimate the effects of changing college conditional on county of birth. However, the result is identical to that reported in row 1.

The college of destination might also affect the outcome of the change. For example, a student might change to one, which provides education mainly in fields where there is an excess supply of students and they face hard competition for the well paid jobs. But the estimate of college change does not change much when we include also college of destination. So the effects of college choice cannot be explained neither by students who return home nor bad second college choices.

The industry structure varies significantly between regions. If students change to a college located in a low wage region and stay in the region after their studies, then movers will have lower wages. Therefore, we estimate the impact of changing college conditional on the individual's county of work. The result is reported in the last row of the table, and it is not significantly different from the other estimates in column 5. That is, change of college does not correlate with region of work.

In all, the results show that students who change college have significantly lower earnings than students who do not change. These differences cannot be explained by differences in ability, family background, college education or choices in location. There is a six per cent earnings penalty of changing colleges, which based on mean sample characteristics amounts to about 11 500 SEK (1 210 EURO) per year.

### *Quantile regression estimates*

Table 4 reports the quantile regression estimates of the effects of changing colleges. The structure of the table is similar to that of the previous table, although we only report estimates using specification 5. The quantile regression estimates allow us to examine the potential heterogeneity of the effects of changing colleges. That is, we can investigate whether the negative effect observed in previous section is located to a certain part of the earnings distribution as *e.g.* low earnings jobs.

<TABLE 4 about here>

There is a significantly negative effect of about 12 percent of changing college in the bottom part of the earnings distribution. The estimate becomes less negative over the distribution and reaches its highest level at p90, where it is -2.4 per cent. The estimate is significantly lower in the bottom of the distribution, but it is negative and statistically significant over the whole earnings distribution.

## **6. Concluding remarks**

Using data on three cohorts of university entrances this study finds that 30 percent of the students have changed colleges at least once. Changing colleges result in an earnings penalty of about 6 per cent, which amounts to about 1183 EURO per year. The quantile regression estimates reveal that the impact of college choice varies over the earnings distribution, but the estimated earnings differences are significantly negative in every percentile.

The estimated earnings differences between students who change colleges and those who do not change are not explained by differences in ability, parental educational background, choices of fields or colleges. Since individuals who change colleges have taken more courses and are more likely to take a degree, the results can neither be explained by decreasing skill investments.

## References

Altonji, J. (1993) The demand for and return to education when education outcomes are uncertain. *Journal of Labor Economics*, 11(1), pp 48-83.

Arcidiacono, P. (2004) Ability sorting and the returns to college major. *Journal of Econometrics*, 121, pp. 343-375.

Behrman, J., M. Rosenzweig & P. Taubman (1996) College choice and wages. Estimates using data on female twins. *Review of Economics and Statistics*, Vol 78, pp 672-685.

Black, D. and Smith J. (2004) How robust is the evidence on the effects of college quality? Evidence from matching. *Journal of Econometrics*, 121, pp 99-124.

Bratti, M. (2002) Does the choice of university matter? A study of the differences across UK universities in life sciences students' degree performances. *Economics of Education Review*,

Brewer, D., E. Eide & R. Ehrenberg (1999) Does it pay to attend an elite private college? *Journal of Human Resources*, Vol 34, s 105-123.

Buchinsky, M. (1994) Changes in the U.S. wage structure 1963-1987: application of quantile regression. *Econometrica*, 62: 405-458.

Dale Berg, S. and Krueger, A. (2002) Estimating the payoff to attending a more selective college. An application of selection on observables and unobservables. *Quarterly Journal of Economics*, 117(4).

Datcher Loury, L. & Garman, D. (1995) College selectivity and earnings. *Journal of Labor Economics*, Vol 13, s 289-309.

Katz, L. F. and Murphy, K. M. (1999) Changes in the wage structure and earnings inequality. In *Handbook of Labor Economics*, Vol 3 A., pp 1463-1555. Amsterdam: North Holland.

Koenker, R. and Hallock, K.F. (2001) Quantile regression. *Journal of Economic Perspectives*, 15: 143-156.

Koenker, R. and Basett, G. Jr. (1974) Regression Quantiles. *Econometrica*, 46: 33-50.

Light, L. and Strayer, W. (2004) Who receives the college wage premium? Assessing the labor market returns to degrees and college transfer patterns. *Journal of Human Resources*, 39(3), pp 746-773

Lindahl, L. and Regnèr, H. (2005) College choice and subsequent earnings. Results using Swedish sibling data. *Scandinavian Journal of Economics*, 107(3), pp 437-457.

Manski, C. (1989) Schooling as experimentation. A reappraisal of the postsecondary dropout phenomenon. *Economics of Education Review*, 8(4), pp 305-12.

Monks, J. (2000). The returns to individual and college characteristics. Evidence from the national longitudinal survey of youth. *Economics of Education Review*, Vol 19, s 279-289.

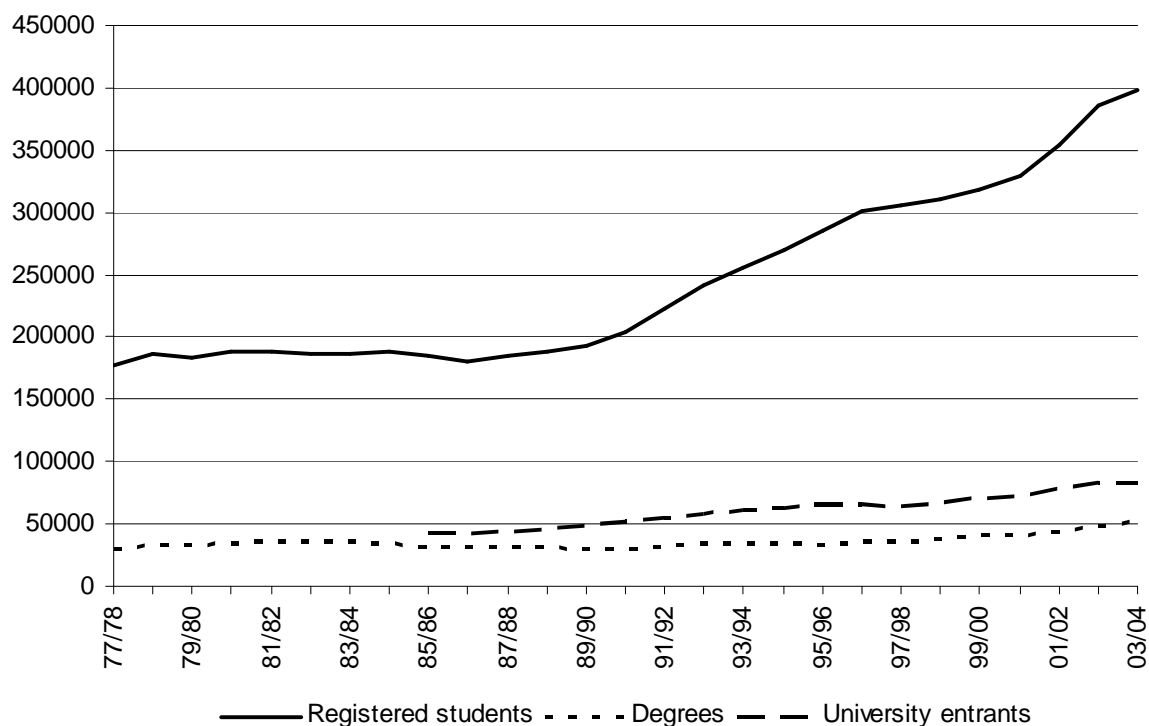
National Agency for Higher Education (2004) Swedish higher education. A survey 1977-2000.

National Agency for Higher Education (2006) OECD thematic review of tertiary education. Country background report for Sweden. Rapportserie 2006:41R. Stockholm: National Agency for Higher Education.

National Agency for Higher Education (2007) The Swedish higher education system. *HsvFs 2007:5*. Stockholm: National Agency for Higher Education.

OECD (2007) Education at a glance 2007, OECD indicators.

**Figure 1.** The number of registered students, number of college degrees and number of university entrants



*Note:* Individuals can have more than one degree. University entrants are students who are registered for the first time at a university. SOURCE: Statistics Sweden.

TABLE 1 The outcome of higher education six years after enrolment

	Beginners in 1995	Beginners in 1996	Beginners in 1997
% studied at one college	66.81	66.63	65.61
% studied at two colleges	25.67	25.74	26.41
% studied at three or more colleges	7.52	7.63	7.98
% with a degree	58.58	57.07	56.51
% with more than one degree	8.73	7.05	7.46
Average credit points for those without a degree	81.83 (63.16)	80.62 (63.03)	84.03 (63.37)
Average credit points for those with a degree	154.29 (51.37)	157.42 (47.83)	160.49 (45.76)
Number of semesters in college, non-degrees	4.96 (3.27)	5.53 (3.46)	5.71 (3.50)
Number of semesters in college, degrees	7.53 (2.49)	8.51 (2.44)	8.63 (2.35)
# observations	44 046	43 554	42 204

TABLE 2 Descriptive statistics

	ALL STUDENTS			GPA SAMPLE		
	ALL	stayers	movers	ALL	stayers	movers
Annual earnings (1000 SEK)	227.5 (140.0)	232.3 (140.0)	217.7 (139.6)	225.4 (140.0)	231.1 (140.9)	216.6 (138.1)
Age	33.1 (7.0)	34.0 (7.7)	31.2 (5.0)	29.5 (1.6)	29.6 (1.6)	29.4 (1.5)
Women, %	55.7	53.8	59.5	54.4	51.4	59.1
Married, %	29.5	32.0	24.3	22.7	24.0	20.7
Number of children, 0-6 years	0.41 (0.70)	0.44 (0.73)	0.34 (0.64)	0.40 (0.69)	0.45 (0.72)	0.32 (0.62)
Number of children, 7-12 years	0.15 (0.48)	0.19 (0.53)	0.08 (0.35)	0.03 (0.18)	0.03 (0.20)	0.02 (0.15)
Number of children, 13-18 years	0.14 (0.46)	0.16 (0.47)	0.12 (0.42)	0.08 (0.36)	0.08 (0.35)	0.09 (0.38)
GPA 9 <sup>th</sup> grade				51.4	49.8	53.9
GPA upper secondary				51.0	50.1	52.5
Degree, %	55.8	52.7	62.0	61.1	59.2	64.3
Number of credits	123.6 (67.1)	109.8 (67.1)	151.3 (58.0)	137.8 (62.6)	125.5 (63.6)	157.5 (55.6)
<i>Field of study, %</i>						
Education	4.2	3.9	4.7	2.9	2.5	3.7
Fine arts, humanities and religion	11.5	11.7	11.1	11.2	11.5	10.8
Administration, economics, social science and behavioural science	28.9	27.0	32.7	28.6	26.1	32.6
Natural science, mathematics and computing science, Technology and industry	15.8	15.9	15.7	16.6	17.0	16.0
Agriculture, gardening, forestry and fishing	20.1	21.9	16.5	21.4	23.8	17.5
Health care	0.30	0.19	0.51	0.35	0.21	0.55
Service and transports	11.8	12.0	11.5	10.9	10.7	11.2
<i>Parental background</i>						
Mother born in Sweden, %	92.0	92.0	92.0	92.6	92.7	92.5
Mother missing education	8.5	9.9	5.7	3.1	3.0	3.2
Mother compulsory %	25.1	27.1	21.0	20.8	22.5	18.1
Mother upper secondary, %	31.6	31.7	31.3	34.3	35.4	32.4
Mother college education, %	34.4	30.9	41.4	41.4	38.7	45.6
Mother PhD education, %	0.40	0.31	0.58	0.51	0.41	0.66
Father born in Sweden, %	90.9	91.1	90.6	91.7	91.9	91.4
Father missing education	14.5	16.2	10.9	6.6	6.4	6.8
Father compulsory, %	26.3	27.9	23.0	24.2	26.0	21.3
Father upper secondary, %	28.2	28.1	28.4	31.4	32.5	29.8
Father college education, %	29.0	26.0	34.9	35.2	32.9	39.0
Father PhD education, %	2.1	1.7	2.8	2.6	2.3	3.2
SAMPLE SIZE	138 325	92 497	45 828	93 596	57 440	36 156

NOTE: Standard deviations are in parentheses. GPA's are percentile ranked

TABLE 3: OLS estimates of the earnings effect of college change

THE COMPLETE SAMPLE					
Covariate	1	2	3	4	5
College change ( $\Delta C$ )	-0.074 (0.006)	-0.072 (0.006)	-0.114 (0.006)	N/A	-0.044 (0.005)
$\Delta C$ /County of birth					-0.044 (0.005)
$\Delta C$ /County of birth and college of destination					-0.048 (0.008)
$\Delta C$ /County of work					-0.045 (0.005)
THE GPA SAMPLE					
Covariate	1	2	3	4	5
College change ( $\Delta C$ )	-0.091 (0.007)	-0.088 (0.007)	-0.138 (0.007)	-0.133 (0.007)	-0.057 (0.005)
$\Delta C$ /County of birth					-0.057 (0.005)
$\Delta C$ /County of birth and college of destination					-0.057 (0.009)
$\Delta C$ /County of work					-0.057 (0.005)

NOTE: Regressions include a constant and the following additional covariates: 1) women, age, age<sup>2</sup>, number of children, 2) 1 + characteristics of mother and father (age, country of birth, education), 3) 2 + dummy variable which is one if students have a degree, number of credit points, 8 fields of education, 4) 3 + GPA from upper secondary school. 5) 4 + indicators of unemployment experiences, 10 sectors of employment and a dummy variable which is one if working in the Stockholm area. *Adj R*<sup>2</sup> of regression 5 is 0.51.

TABLE 4: Quantile regression estimates of the earnings effect of college change

	OLS	P10	P20	P30	P40	P50	P60	P70	P80	P90
Specification 5					GPA SAMPLE					
College change ( $\Delta C$ )	-0.057 (0.005)	-0.123 (0.012)	-0.082 (0.006)	-0.060 (0.004)	-0.049 (0.003)	-0.041 (0.003)	-0.036 (0.003)	-0.031 (0.002)	-0.026 (0.003)	-0.024 (0.004)

*Notes:* Bootstrap standard errors in parentheses.

## APPENDIX

TABLE A1: Distribution of students over colleges (GPA sample)

Colleges	All	Stayers	Movers	Degree	No degree
Blekinge	1.4	1.4	1.4	1.1	1.9
Borås	1.4	1.7	1.0	1.4	1.5
Chalmers	3.3	3.3	3.3	4.0	2.2
Dalarna	2.0	2.2	1.7	1.9	2.2
Göteborg	7.7	7.9	7.5	7.2	8.5
Gävle	1.9	2.2	1.6	1.7	2.3
Halmstad	1.9	1.6	2.3	1.6	2.3
Jönköping	2.3	2.6	1.8	2.5	2.0
Kalmar	2.2	2.3	2.1	2.1	2.4
Karlstad	3.5	3.6	3.3	3.4	3.6
KI	0.6	0.6	0.5	0.8	0.2
KTH	4.3	4.6	3.9	4.9	3.5
Kristianstad	2.0	1.9	2.0	2.0	1.8
LäroSthlm	1.8	2.2	1.1	2.3	1.0
Linköping	6.6	7.6	5.1	7.4	5.4
Luleå	3.4	4.0	2.4	3.6	3.1
Lund	11.7	10.4	13.9	11.8	11.6
Mittunivers	4.9	5.0	4.8	4.2	6.0
Mälardalen	3.3	3.2	3.4	3.0	3.7
Skövde	1.1	1.1	1.1	1.0	1.3
SLU	0.9	0.9	0.8	1.1	0.4
Stockholm	7.6	6.3	9.7	6.4	9.6
Södertörn	0.8	0.6	1.3	0.7	1.1
Umeå	7.3	7.8	6.6	7.7	6.8
Uppsala	8.4	7.3	10.0	8.7	7.8
Väst	1.3	1.4	1.1	1.1	1.6
Växjö	2.6	2.7	2.4	2.5	2.7
Örebro	3.8	3.8	3.7	3.8	3.7
Sample size	93596	57440	36156	57222	36374