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ABSTRACT

Are Student Exchange Programs Worth It?*

The number of university students participating in exchange programs has risen sharply over the last decade, but a survey of Swiss university graduates (class of 1999 and 2001) shows that participation in student exchange programs significantly prolongs the period of time spent studying at university. Given this fact, the advantages of exchange programs for students need to be identified. Analyses show that student exchange programs are associated with higher starting salaries and an increased likelihood of opting for postgraduate study – but only if all exchange semesters are factored in, not just those accredited by the university of matriculation. Using instrumental variable estimations (IV), however, shows that the cited outcomes are not causally related to participation in exchange programs. Therefore the big question is: Where's the benefit that justifies having to study for almost a whole year longer?

JEL Classification: I23, J24, J31, J44

Keywords: exchange semester, ERASMUS, graduate survey, instrumental variables, Switzerland

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Introduction

Student mobility, or studying at universities other than the institution at which the student originally matriculated, was for a long time an important element in a fully-rounded academic education. Then, in the latter decades of the twentieth century, young people from a wider socioeconomic background gained access to universities, student populations increased, the average duration of study rose, and academic education became progressively "school-like". In association with these trends, the number of students choosing to spend their entire university education at their "home university" started to rise. Another factor contributing to this development was the reluctance of many universities to give their students academic credits for semesters spent at other universities. The resulting prolongation of the study period was a deterrent to many students who might otherwise have participated in an exchange program. In an attempt to break with this trend, many countries – especially in Europe – set up special programs to promote student mobility.

Though not an EU member state, Switzerland has participated in the EU's ERASMUS program since 1992. In accord with the goals of this program, the number of exchange students subsequently rose, as did the endeavors of Swiss universities to support the new mobility by making it easier for students to receive academic credit for classes taken at other universities. The students who primarily benefited from these new developments were those who had participated in an exchange program with a foreign university. The accreditation rate for semesters spent at non-Swiss universities rose from approximately 50% in 1991 to approximately 75% in 2001 (see BBW 2002, p. 9), a rate similar to the one for exchange semesters spent at other Swiss universities. The number of students spending at least one semester at another university during their studies virtually doubled from less than 15% to more than 25% in the period from 1991 to 2001.

Issues and objectives

Given the sharp increase in the number of exchange-program students in recent years, the benefit derived by students from their added mobility merits

investigation. Past surveys indicated that improving knowledge of foreign languages was a primary motivation for Swiss students in particular (79.8% of Swiss respondents cited the language factor, see BBW 2002, p. 7). A desire to improve their specialist knowledge took second place (69.8%). Establishing useful connections (18.6%) were not (yet) considered important.

Despite these figures, an empirical analysis of the consequences of exchange semesters on a graduate's future academic career or labor market success has not been performed to date to our knowledge. And yet, an investigation into these issues should be of obvious interest given the level of public and private funding of exchange programs. In Switzerland, Erasmus scholarships cover less than 20% of the expenses incurred during the exchange study period, more or less regardless of the students' destination (see BBW 2002, p. 8).

The purpose of this study is to measure the impact of exchange programs on students' subsequent university education and their post-university career on the basis of two potential indicators. Among all the possible indicators available, it is necessary to choose ones that are genuinely observable on the basis of empirical data. We are adopting the hypothesis that a semester spent at another university (regardless whether in Switzerland or in a foreign country) represents a positive input in building human capital and that the benefits in this respect are greater than if the semester had been spent at the students' home university. This assumption is based on the reasoning that encountering the unfamiliar and establishing new personal and specialist contacts broaden one's horizon and enhances individual human capital in a manner that could not have been achieved by studying an additional semester at the university of matriculation. Based on this assumption, we can also expect in accordance with human capital theory that the enhanced human capital arising from a higher-quality education might have a positive impact on the young graduates' entry into the labor market. The latter can be measured on the basis of two factors: firstly, the probability of finding a job, and secondly, the starting salary, which in turn should be a reflection of the graduate's productivity. This paper focuses on the second factor, i.e. the starting salary, because the recruitment rate among Swiss university graduates – especially in comparison with other countries – is fairly high and it is somewhat hard to distinguish between

voluntary and involuntary non-employment among those graduates who are not gainfully employed.

Some students who do not enter the labor market after their primary degree go on to do postgraduate work. This gives us a second indicator in respect of which we would expect the same effect as with the starting salary. Enhanced human capital, more extensive experience and a larger network of contacts in the specialist field should – all other things being equal – help to convince professors that these students are more interesting candidates for postgraduate projects.

However, both these indicators only measure a fairly short-term potential impact of student exchanges and disregard the notion that exchange programs might also have positive effects in the longer term. One can nonetheless assume that any added specialist knowledge genuinely acquired by a student during an exchange program would have to become manifest within a short period of time in the form of quantifiable positive effects.

A causality problem is immediately apparent with regard to both parameters. Students who opt for an exchange semester are likely to generally differ from their non-mobile peers both in terms of motivation and ability. Therefore, the impact of student exchange experience on salary level and the probability of doing postgraduate work cannot legitimately be causally attributed to the student exchange per se, because non-observable differences between students may also produce these effects. Since it is impossible to rule out the possibility that – for instance – a higher probability of having a postgraduate degree is due not to the time spent studying at exchange universities but to a higher but unobservable baseline level of motivation among the students concerned, prompting them both to embark on an exchange program and write a masters or doctoral thesis, it is important that these issues are not judged simply on the basis of a link (correlation) between the probability of an exchange program and the postulated effects. To address these issues and facilitate proper analysis, we employ additional instrumental variable estimations (so-called IV estimations; for a review of the method, see for example Angrist & Krueger 2001) to investigate the causal relationship between exchange experience, salary levels and likelihood of engaging

in postgraduate work. Without wanting to go into any great methodological detail at this point, the challenge with this method is the necessity of finding a variable that is not in itself a potentially exogenous variable but rather is correlated with the independent variable (in our case, the semesters spent on exchange). If the explanatory variable thus "instrumentalized" still has a significant influence on the dependent variables, it is legitimate (in contrast to normal OLS or probit estimation) to assume not just a correlation but also a causal relationship between the variables.

Data

All of the data used here is taken from two rounds (1999 & 2001) of surveys among Swiss university graduates. This survey is a full census and has been performed every two years since 1981. Graduates from Universities of Applied Sciences have been surveyed since 1993, but this subset of data is not of primary interest here in view of the particular hypothesis we are investigating. Although the basic elements of the questionnaires have remained unchanged since 1981, a number of important questions were included only in the latter rounds. Our investigation therefore does not include older rounds of surveys. Finally, although the 2003 survey has been conducted and the overall results have been published, the authors did not have access to the micro-dataset at the time of researching this paper.

Graduates are contacted in writing approximately one year after completing their studies. Among other things, the questions elicit information on their transition to the labor market, their first job or their continuing academic studies (e.g., PhD studies). Respondents are also asked to provide information on study patterns which can be used to trace their study career (at least to some extent).

The dataset used here pools data from the 1999 and 2001 survey rounds in order to give a population large enough to investigate the variable that interests us most (exchange semesters). The pooling of two surveys is taken into account in the regressions through the use of a dummy for the year of graduation.

Three important organizational aspects of university study in Switzerland have been addressed in a specific form during the subsequent processing of the data and the analysis. Firstly, a number of university degree programs have a fairly rigid, school-like structure. Students in these degree programs have little or no freedom of choice in planning their studies. Deviations from the regular study period are mainly observed only if a student fails exams and has to repeat one or more years of study. With regard to degree programs of this kind, therefore, variation in terms of study duration has less to do with individual study planning than with student performance. Although exchange semesters may occur in degree programs of this nature, they are – practically of necessity – organized to dovetail with the curriculum of the home university or may in certain instances be compulsory; as such, these exchange semesters and their implications are less interesting than modular degree programs with a selection of electives. Accordingly, rigid degree programs of this kind were not included in the sample for the time being.

Secondly, as already mentioned, some exchange semesters may not be accredited or recognized by a student's home university. This may have to do with the home university's policy. It may also be due to the students' choice of host university. For example, if learning a foreign language or simply getting to know a specific country is considered more important, students might intentionally choose not to study subjects matching their primary university's curriculum when deciding where to spend an exchange semester. Since we cannot assume that accredited semesters at a host university will have the exact same impact on a student's employment and study career as the aggregate of all exchange semesters, all the analyses were also conducted separately using only the data from the accredited semesters. In qualitative terms, however, it transpires that the outcomes in either case are ultimately fairly identical.

Finally, a distinction is made between internal and external mobility, the former referring to mobility between different Swiss universities and the latter to exchange programs with foreign universities. Separate analyses of internal and external mobility disclosed no meaningful differences in the empirical analysis, however. Therefore, in order to achieve the largest possible number of observations, separate

analysis was not performed. Consequently, the exchange semester variable includes both forms of student mobility.

The first descriptive analyses

The dataset employed comprises 3,589 observations[2]. 837 (23.3%) of the graduates surveyed said that they had participated in exchange programs during their time at university. 651 of the 837 received academic credits for their time spent on exchange, corresponding to an accreditation rate of approximately 78% in this sample. Sixty percent of these exchange semesters were at other Swiss universities and 40% at universities in foreign countries.

The results of an initial probit estimation (see Table 1) show the characteristics of students who spent time on exchange. This first descriptive analysis shows that there is no gender- or nationality-related difference predicting which students are likely to opt for an exchange program. However, there are very definite socioeconomic variables and other background features which are significant predictors of student mobility; this agrees with statistics from other countries (cf. ADMIT 2002). One significant variable in this regard relates to whether the student attended university in the canton where his or her parents reside. This variable displays a significant negative correlation with the probability of participation in an exchange program. The effect is amenable to two different interpretations which, however, are not mutually exclusive. On the one hand, students who do not study in the canton where their parents are based have already displayed some mobility in terms of their choice of home university. In that respect, a decision to spend one or more semesters at another university is probably fairly immaterial to them. Economically speaking, the marginal cost of an exchange program for these students would be virtually zero. On the other hand, this variable might be a sign of a student's socioeconomic status, because a lack of financial resources may be the reason why a student chose a university in his or her home area in the first place. In

[2] The following analyses relate only to university graduates receiving their first degree. Second degrees or postgraduate degrees have not been included owing to their non-comparability with graduates getting their primary degree.

such cases, the probability of engaging in an exchange program is, of course, reduced because a not insignificant share of the costs incurred during an exchange program is privately funded.

Table 1: Probit analysis, dependent variables: exchange semesters

Independent variables	*All semesters*		*Accredited semesters*	
	Coefficients	Marginal effects	Coefficients	Marginal effects
Female	0.069	0.020	0.027	0.006
Swiss	-0.266**	-0.083	-0.301**	-0.079
Age starting university	-0.815**	-0.234	-1.089**	-0.253
Age starting university (squared)	0.014**	0.004	0.019**	0.004
Resides in university canton	-0.161**	-0.046	-0.129*	-0.030
Mother's educational level[3]	0.257**	0.080	0.244**	0.063
2001 survey	-0.069	-0.020	-0.033	-0.008
Gainfully employed while studying (unrelated only)[4]	0.059	0.017	0.034	0.008
Gainfully employed while studying (related only)	0.031	0.009	0.055	0.013
Gainfully employed while studying (related and unrelated)	0.172*	0.050	0.168*	0.040
Vocational apprenticeship before university	0.384**	0.124	0.485**	0.137
Degree qualifying for secondary school teaching	0.104	0.031	0.096	0.023
Constants	11.462**		14.873**	
Log likelihood	-1724.91		-1459.52	
LR $chi^2(26)$	448.75		479.68	
Observed probability		0.233		0.181
Estimated probability		0.208		0.149
N	3589		3589	
Pseudo R^2	0.12		0.14	

*,** stand for a level of significance of 95% and 99%; respectively. Dummies for universities and fields of study are used as control variables.

"Mother's educational level" is another significant variable. The latter variable is the best marker for the educational background of the student's family, as having a mother with a tertiary education is a very good indication that both parents are university graduates.[5]

[3] This variable is coded 0/1 as a dummy and assumes a value of 1 if the mother has a tertiary education.

[4] Related or unrelated means whether the job engaged in during university was related to the subjects studied. The reference group comprised those graduates who said they had not been gainfully employed at any time during their studies.

[5] Only about one-third of fathers with an academic degree are married to a woman with an academic degree. The inverse ratio applies in the case of women: 80% of women with an academic degree are married to a man with an academic degree. The figures are due, firstly, to differences in marriage patterns between the genders (see Behrmann & Rosenzweig 2002 and others) and secondly, to the fact that the percentage of female university graduates was still very low in the parent generation of the students analyzed here.

The student's age when starting university is another factor impacting on student mobility (the older the student, the lower the probability of participating in an exchange program). The probability of going on exchange rises if students have already completed a professional/vocational education program when they matriculate (the "vocational apprenticeship before university" variable). The latter is difficult to explain at face value.

Empirical analysis

Duration of studies

The empirical analysis investigates the effects and consequences that student mobility exchange programs can have on the academic and professional biographies of the students. We initially focused on the question as to whether a semester (or several semesters) spent in a mobility program had any influence on the overall period of time studied. Around three-quarters of all exchange semesters were fully recognized by the home university, so it can be assumed that, because of this compensation, a semester spent at a host university would not have a material impact on the duration of study. In table 2 the entire duration of study is estimated by means of an OLS regression. A comparison of the results of the analysis in which only the accredited semesters are used as the dependent variables with those derived from the total of all semesters shows that the outcomes are virtually identical. This indicates that the study-prolonging effect of exchange semesters cannot be specifically traced to the fact that some of these semesters were not accredited by the home university but rather that such semesters prolonged the course of study in a very general sense.

Since exchange semesters significantly prolong the duration of studies by almost one year, the second question that immediately arises concerns the potential advantages deriving from participation in a student mobility program. Judging by qualitative student surveys in Switzerland and other countries, it can be presumed that many students are willing to accept a lengthier course of study for reasons not directly related to curricular subject matter (foreign languages, interaction with foreign cultures, travel) but which nevertheless result in a personal gain and

perhaps, at a later point in time, a professional benefit. All in all, however, it would be difficult to imagine why students would be willing to prolong their studies by practically one year if there were not any ensuing tangible benefits for their future academic or professional career.

Table 2: OLS estimation, dependent variables: Number of semesters studied up to graduation

Independent variables	Number of semesters	
	All	Accredited only
Exchange semesters (all)	1.780**	
Exchange semesters (accredited only)		1.567**
Female	-0.038	-0.034
Swiss	-0.095	0.031
Age starting university	-0.318*	-0.404**
Age starting university (squared)	0.007*	0.008**
Resides in university canton	-0.124	-0.085
Mother's educational level	-0.229	-0.232
2001 survey	-0.323**	-0.290**
Gainfully employed while studying (unrelated)	0.486**	0.463**
Gainfully employed while studying (related)	0.218	0.213
Gainfully employed while studying (related & unrelated)	0.515**	0.502**
Vocational apprenticeship before university	-0.164	-0.142
Degree qualifying for secondary school teaching	0.090	0.103
Constants	17.395	18.478
F (25, 3589)	84.02	79.79
Prob > F	0.000	0.000
N	3589	3589
Adjusted R^2	0.367	0.355

*,** stand for a level of significance of 95% and 99%; respectively. Dummies for universities and fields of study are used as control variables.

To test this, we analyzed the influence of exchange semesters on two tangible facts: starting salaries and subsequent academic careers. The starting salary is arguably a better indicator for this purpose than later salary data because the competency advantages acquired through participation in exchange programs should actually pay off immediately, meaning when these students enter the labor market. As a means of depicting the subsequent academic career, we selected whether the students wrote a dissertation after obtaining their first degree as the indicator.

Starting salary when entering the labor market

Table 3 presents the results of the salary regressions. The sample comprises only those students who entered the labor market directly after graduation. Not included in the sample are those graduates who were unemployed or not gainfully employed,

those who pursued another full-time education program without pay and those graduates who did not pursue regular employment but instead, for example, worked as an intern or trainee. Including the latter graduates would have led to an excessive distortion of the salary data.

The results derived from all exchange semesters show that there is a slight salary advantage of 3.3% with regard to the starting salary.[6] If, however, only those exchange semesters that were also accredited by the home university are taken into consideration, no significant salary advantage is discernible. The remaining variables reveal the generally expected, and in specialist literature often cited, relationships, for example, a slight "salary discrimination" of women is observed or that temporary jobs pay a significantly lower salary.

Another expected outcome is that employment positions that required a degree in the respective field of study exhibited a salary advantage while employment positions that did not require any university degree whatsoever offered significantly lower salaries (see for example Groot & Massen van den Brink 2000).

Despite the positive influence exchange semesters have on starting salary (in the specification "all exchange semesters"), the question arises as to whether this can be interpreted in a causal sense or whether this advantage is because the students who participate in an exchange program differ from the other students due to unobservable characteristics that also have an influence on salary. If the latter were to be the case, then the students participating in an exchange program would also earn more even if they did not study at another university and, conversely, those students without exchange semester experience would not have a higher starting salary even if they had participated in an exchange program.

[6] We also tested the possibility that the exchange semesters not only had a direct impact on salary but also indirectly on the quality of the employment position acquired by a graduate. In order to test this, we estimated a regression in which we did not impute all characteristics of an employment position (temporary, degree required, part-time, etc.) as independent variables. In such a regression the salary-enhancing effect of exchange semesters rises from 3.3% to 4.1%. Taking into consideration only the recognized exchange semesters raises the salary effect from 1.5% to 2.6% and becomes significant at a level of 5%. One can thus assume that a small share of the positive salary effect of mobility semesters is taken into consideration in the variables which describes the quality of the employment position and that graduates with exchange semester experience are more likely to obtain good jobs than other graduates. In the instrumental variable regression, however, the results are not qualitatively affected by this specification.

Table 3: OLS estimation, dependent variables: Salary (logarithmized)

Independent variables	Number of semesters	
	All	Accredited only
Exchange semesters (all)	0.033*	
Exchange semesters (accredited only)		0.015
Number of semesters (all)	0.005**	
Number of semesters (accredited only)		0.005*
Female	-0.032**	-0.032**
Swiss	0.010	0.010
Age starting university	0.059**	0.052**
Age starting university (squared)	-0.001*	-0.001
Resides in university canton	0.008	0.008
2001 survey	0.023*	0.023**
Works part-time	0.020	0.020
Still has a secondary occupation	-0.030*	-0.030*
Employment contract is temporary	-0.050**	-0.049**
Working on a dissertation	0.030	0.029
A degree in respective field of study was required	0.033**	0.034**
No degree required for employment position[7]	-0.087**	-0.087**
Gainfully employed while studying (unrelated)	-0.028	-0.029*
Gainfully employed while studying (related)	0.010	0.010
Gainfully employed while studying (related & unrelated)	-0.030*	-0.030*
Vocational apprenticeship before university	-0.070**	-0.068**
Degree qualifying for secondary school teaching	0.112**	0.111**
Constants	7.800**	7.900**
F (50,1900)	14.22	14.03
Prob > F	0.000	0.000
N	1951	1951
Adjusted R^2	0.253	0.251

*,** stand for a level of significance of 95% and 99%; respectively. Dummies for universities, fields of study, canton of residence and employment fields are used as control variables.

In order to clarify the question of the causality of exchange semesters, we instrumented the "exchange semester" variable, selecting the educational level of the graduates' mothers as the instrument. This means we utilize the factor that the mother's level of education has a significant influence on whether a student spends a semester studying at a host university or not (see table 1) and yet at the same time has no direct influence on starting salary after graduation. The additional condition that the instrumental variable does not correlate with the unobservable factors must, however, be assumed and cannot be directly tested (see for example Wooldridge 2003, p. 484ff).

The results of the two instrumental variable estimations are presented in table 4. The results show that the influence of the exchange semesters is not significant in

[7] Reference groups are graduates who were required to have a university degree but not in a specific field of study.

either case if the exchange semester variable is instrumented. A causal and positive influence of exchange semesters on salary can therefore not be confirmed.

Table 4: IV (2SLS) – estimation, dependent variable: Salary (logarithmized) exchange semester instrumented

Independent variables	Number of semesters	
	All	Accredited only
Exchange semesters (all)	-0.052	
Exchange semesters (accredited only)		-0.058
Number of semesters (all)	0.008	
Number of semesters (accredited only)		0.008
Female	-0.030*	-0.031**
Swiss	0.004	0.003
Age starting university	0.040	0.037
Age starting university (squared)	-0.000	-0.000
Resides in university canton	0.007	0.007
2001 survey	0.023*	0.023*
Works part-time	0.018	0.017
Still has a secondary occupation	-0.029*	-0.029*
Employment contract is temporary	-0.049**	-0.049**
Is working on a dissertation	0.035	0.034
A degree in respective field of study was required	0.034**	0.035**
No degree required for employment position	-0.091**	-0.091**
Gainfully employed while studying (unrelated)	-0.030*	-0.032
Gainfully employed while studying (related)	0.012	0.011
Gainfully employed while studying (related & unrelated)	-0.028	-0.030
Vocational apprenticeship before university	-0.063*	-0.06
Degree qualifying for secondary school teaching	0.111**	0.012**
Constants	8.068**	8.097**
F (50,1900)	13.79	13.77
Prob > F	0.000	0.000
N	1951	1951
Adjusted R^2	0.239	0.235

*,** stand for a level of significance of 95% and 99%; respectively. Dummies for universities, fields of study, canton of residence and employment fields are used as control variables.

Probability of writing a dissertation

Conducting the same analysis with respect to the probability of commencing dissertation research after graduation, a positive correlation between exchange semesters (total) and the probability of writing a dissertation can be established for the simple probit estimation (see table 5). Exchange semesters would raise the roughly 20% share of graduates who begin to work on a dissertation after obtaining their first degree by 3.8 percentage points. No significant connection can be established, however, with regard to the specification in which only accredited exchange semesters are imputed.

Table 5: Probit estimation, dependent variables: Dissertation (marginal effects)

Independent variables	Number of semesters	
	All	Accredited only
Exchange semesters (all)	0.038*	
Exchange semesters (accredited only)		-0.021
Number of semesters (all)	-0.013**	
Number of semesters (accredited only)		-0.014**
Female	-0.067**	-0.067**
Swiss	-0.100**	0.099**
Age starting university	-0..054*	-0.059*
Age starting university (squared)	0.001	0.001
Mother's educational level	0.064**	0.064*
2001 survey	-0.000	-0.000
Gainfully employed while studying (unrelated)	-0.018	-0.018
Gainfully employed while studying (related)	-0.008	-0.008
Gainfully employed while studying (related & unrelated)	-0.028	-0.028
Vocational apprenticeship before university	0.078*	0.080**
Degree qualifying for secondary school teaching	-0.074*	-0.074*
Log likelihood	-1581.63	-1580.89
LR $chi^2(29)$	437.49	438.96
Observed probability	0.201	0.201
Estimated probability	0.175	0.175
N	3589	3589
Pseudo R^2	0.122	0.122

*,** stand for a level of significance of 95% and 99%; respectively. Dummies for universities and fields of study are used as control variables.

In contrast to the salary regression, we cannot apply the "mother's educational level" variable as an instrument because this has a direct influence on the probability of starting a dissertation.[8] We therefore used the variable "Resides in university canton" as the instrument. This variable fulfils the qualities of an instrumental variable because it influences the probability of studying in an exchange program (see table 1) but it does not directly influence the probability of writing a dissertation. These connections can be theoretically explained relatively easily. For one, it is clear that students who decided to study at the university closest to their parent's place of residence already express a certain degree of restricted mobility. Secondly, it is not assumed that this possibly financially induced immobility during their studies would have an effect on the probability of their writing a dissertation, one reason being that a dissertation is generally accompanied by a paid university position as an assistant and, therefore, a dissertation should not be precluded by primarily financial considerations.

[8] A socioeconomic "preferential treatment" of students with regard to the continuation of scientific careers has already been established in earlier studies (see for example Leemann 2002). This study also discovered a lower participation rate among women, a result that is again confirmed here.

Table 6: IV probit estimation, dependent variables: Dissertation, exchange semester instrumented (marginal effects)

Independent variables	Number of semesters	
	All	Accredited only
Exchange semesters (all)	0.301	
Exchange semesters (accredited only)		0.381
Number of semesters (all)	-0.023	
Number of semesters (accredited only)		-0.024
Female	-0.071**	-0.068**
Swiss	-0.081	-0.073
Age starting university	-0.009	0.012
Age starting university (squared)	0.000	-0.000
Mother's educational level	0.046	0.045
2001 survey	0.000	-0.001
Gainfully employed while studying (unrelated)	-0.016	-0.015
Gainfully employed while studying (related)	-0.07	-0.009
Gainfully employed while studying (related & unrelated)	-0.032	-0.032
Vocational apprenticeship before university	0.053	0.045
Degree qualifying for secondary school teaching	-0.079*	-0.079*
Log likelihood	-1583.73	1581.35
LR $chi^2(29)$	433.29	438.05
Observed probability	0.201	0.201
Estimated probability	0.175	0.175
N	3589	3589
Pseudo R^2	0.120	0.122

*,** stand for a level of significance of 95% and 99%; respectively. Dummies for universities and fields of study are used as control variables.

Table 6 lists the estimations with the instrumented variables for exchange semesters. The results do reveal a strong but no longer significant relationship between the exchange semesters and the probability of commencing dissertation research. The significance is, despite the high coefficients, no longer given because the standard error also increased considerably in the regression with instrumental variables. Accordingly, however, the correlation between exchange semesters and the probability of beginning a dissertation can no longer be interpreted in a causal sense. Expressed differently, one can assume that the probability of writing a dissertation would still be higher among the exchange students even if they had not participated in any student mobility programs. Conversely, the probability of writing a dissertation among those students who did not participate in an exchange program would not be positively influenced.

Conclusions

The study presented in this article investigates to what extent an exchange semester may affect the academic and professional career of university graduates. Starting from the observation that the popularity of exchange programs at domestic and foreign universities has grown considerably in recent years, also in Switzerland, and that universities have made accordingly extensive efforts to attract students from other universities, the question as to the benefits students may reap from this mobility certainly merits closer attention. This question becomes all the more significant when considering that the data analyzed in this study show that exchange semesters lead to a significant extension of study duration (almost an entire year), even when exchange semesters are accredited by the home university.

Starting salaries upon entry to the labor market and the probability of writing a dissertation were examined as possible expressions of the benefits deriving from exchange semesters. Both forms of a potential benefit are based on the hypothesis that students participating in exchange programs acquire more, or a different quality of human capital than if they had spent this time at their home university and that they consequently have potentially better prospects both in the labor market and in the university environment.
The empirical analysis indicated for both forms of the potential benefit of exchange semesters that they correlate positively and significantly with student mobility when all exchange semesters are imputed and not just those semesters that have been accredited by the home universities.

The testing of the causality of these relationships via instrumental variable estimations indicates, however, that none of these correlations can be interpreted as having a causal role. In other words, one would have established salary advantages and a greater probability of embarking on a dissertation among these graduates even if they had not participated in any exchange programs. This indication, in connection with the observation that it is only in the specification “all exchange semesters” that the significant correlations between exchange semesters and the said effects, were seen suggests that the characteristics of graduates who chose to participate in an exchange program, more or less regardless whether the exchange

semester was accredited by the home university or not, is simply better. Accordingly, the advantages these graduates have in the labor market and their subsequent scientific or academic career are simply attributable to the better capabilities of these graduates and not to the fact that they had studied in an exchange program.

Does this mean that exchange semesters are not worthwhile? No, because students also derive other benefits from exchange programs that have not been examined in this study. However, one can probably go so far in the analysis of these results as to establish that the personal gain must be so high that it is capable of compensating for the personal costs of exchange semesters because no directly realizable gain in the labor market or subsequent academic pursuits is derived as a result of this exchange experience. From an organizational/political point of view, one might ask whether the financial support given to exchange programs is justified under these circumstances. Three aspects must be critically examined in this regard. First, the public funding can be questioned if this ultimately represents subsidization of a personal "consumption benefit" that does not actually serve the enhancement of the productive potential of the student population. Second, these public funds are currently primarily benefiting those students who already have the personal financial means to afford such exchange semesters. This is, then, to a large extent, subsidization of students who are better off in a socioeconomic sense. Third, exchange semesters prolong the duration of study and therewith burden the public purse a second time without there being a compensating benefit from a public standpoint.

The present situation certainly warrants further study of the effect of exchange semesters, in more detail and possibly from a longer-term perspective. Not least when considering the significance attached to exchange semesters by politicians, university leaders and the student body itself.

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Appendix

Descriptive statistics

Variables	Mean	Minimum	Maximum
Exchange semesters (all)	0.233	0	1
Exchange semesters (accredited only)	0.181	0	1
Number of semesters (all)	12.22	8	20
Number of semesters (accredited only)	12.36	8	20
Female	0.492	0	1
Swiss	0.924	0	1
Mother's educational level (tertiary)	0.091	0	1
Resides in university canton	0.568	0	1
Age starting university	23.08	17	35
Vocational apprenticeship before university	0.064	0	1
Degree qualifying for secondary school teaching	0.035	0	1
Gainfully employed while studying (unrelated)	0.335	0	1
Gainfully employed while studying (related)	0.154	0	1
Gainfully employed while studying (related and unrelated)	0.345	0	1
Dummy for 2001 survey	0.534	0	1
Social sciences	0.225	0	1
Economic sciences	0.172	0	1
Exact sciences	0.050	0	1
Natural sciences	0.174	0	1
Humanities	0.379	0	1
University of Zurich	0.335	0	1
University of Bern	0.197	0	1
University of Basel	0.123	0	1
University of Freiburg	0.103	0	1
University of Geneva	0.099	0	1
University of Lausanne	0.095	0	1
University of Neuenburg	0.048	0	1