

Discussion Paper No. 10-040

**Teaching, Organization, and
Personal Problems –
Evidence from Reforming Tertiary
Education in Germany**

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Zentrum für Europäische
Wirtschaftsforschung GmbH

Centre for European
Economic Research

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Non Technical Summary

Germany has made extensive reforms in its tertiary education system since 1999 as part of the European *Bologna* process. The traditional tertiary academic degree programs are being replaced by internationally comparable Bachelor and Master degree programs. During the period of transition from the traditional degrees to these new tertiary programs, different degree types co-existed.

In this study, I am interested in quantifying whether and how much the choice of a new Bachelor vs. a traditional degree program affected first year students' satisfaction with their study program. I draw on recent survey data containing detailed information on how the students judge their respective study programs with respect to teaching and organization. I also use a score that aggregates information on personal problems which the students experience in the academic context. In addition, self-reported grades are observed for a sub-sample of the students. Students' selection of the different programs is taken into account. The data allow controlling for prior performance, attitudes, and family background as well as inclusion of fixed effects on the level of subjects and the specific institution.

In light of the present skepticism towards the reforms, some of this paper's results are encouraging: I demonstrate that most of the considered outcomes improved since the beginning of the Bologna process. However, the changes are very modest. Also, according to students' self-reported problems, their situation hardly differs between traditional and new degree programs. Furthermore, the results imply no evidence that the new programs specifically attract students from a less advantaged family background. In other words: I do not observe that the new programs increase (or decrease) social mobility.

Das Wichtigste in Kürze

Das deutsche Hochschulsystem wurde insbesondere im Zuge des europäischen Bologna-Prozesses seit dem Jahr 1999 tiefgreifend reformiert. Traditionelle Studienabschlüsse wurden durch die international vergleichbaren Bachelor- und Master-Abschlüsse ersetzt. Die vorliegende Studie bezieht sich auf die Übergangsjahre zwischen diesen neuen und den traditionellen Studienabschlüssen. Insbesondere wird der Frage nachgegangen, wie sich die Studiengangsreform auf die Studienzufriedenheit der Studienanfänger messbar ausgewirkt hat. Zu diesem Zweck werden Umfragedaten verwendet, die Informationen zur Bewertung der Studierenden bezüglich der Lehre und der Studienorganisation umfassen. Zudem werden die durch die Studierenden berichteten persönlichen Probleme, die sie im akademischen Kontext haben, berücksichtigt. Außerdem werden eigene Angaben zu den Studienleistungen für einen Teil der Studierenden beobachtet.

Die Auswertungen tragen der möglichen Eingangsselektion von Studierenden in die unterschiedlichen Studiengänge Rechnung. Insbesondere ermöglichen es die Daten, vorangehende Leistungen (Abiturnoten), die Studiermotivation und den familiären Hintergrund zu berücksichtigen. Auch werden Schätzungen durchgeführt, die „fixe Effekte“ auf Ebene der Hochschule und der Fachrichtung einführen.

Im Lichte eines gewissen öffentlichen Reformskeptizismus, der bisher im Laufe des Bologna-Prozesses zu verzeichnen war, sind einige Ergebnisse dieser Studie ermutigend: Es zeigt sich, dass die meisten beobachteten Ergebnisgrößen sich im Beobachtungszeitraum tendenziell positiv entwickelt haben. Diese Veränderungen sind allerdings relativ gering. Außerdem implizieren die Ergebnisse, dass sich die persönliche Situation der Studierenden in Hinblick auf die von ihnen berichteten Probleme im Zuge der Studiengangsreform kaum verändert hat. Schließlich deuten die beobachteten Merkmale zur Eingangsselektion auch nicht darauf hin, dass die neuen Studiengänge die soziale Bildungsmobilität erhöhen konnten.

**Teaching, Organization, and Personal Problems
- Evidence from Reforming Tertiary Education in Germany**

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Abstract: Germany has recently made extensive reforms in its tertiary education system. Traditional degrees are being replaced by Bachelor and Master programs. This study examines the question of how the choice of a new Bachelor program as opposed to a traditional degree program has affected first-year students' satisfaction. Three dimensions of student satisfaction are focused upon: Student satisfaction with teaching, student satisfaction with the organization of the study programs, as well as an indicator for students' personal problems within the academic context. The selection into the type of program is taken into account as I control for individual performance at secondary school, motivation and family background and try different robustness checks. The main specification includes fixed effects on the level of institutions and subjects. Results robustly point to minor differences between the programs. The outcomes are slightly more favorable for students in the new programs compared to the traditional programs in recent years.

Keywords: Bologna, reforms, evaluation, fixed effects, student satisfaction

JEL Classification: I21, I28

Acknowledgement: This paper was partly written during a research visit at the Economics Department at the University of North Carolina at Greensboro. I thank my colleagues at UNCG for providing a stimulating research environment and many interesting discussions. Furthermore I thank my colleagues at the ZEW Mannheim for helpful comments. I am especially grateful to Georg Camehl, Katja Coneus, Julia Horstschräer, David Ribar and Maresa Sprietsma for the many fruitful discussions. Thanks to Hans Simeaner from the Forschungsprojekt Studiensituation at the University Konstanz for helping me to get access to the survey data.

1 Introduction

Germany has made extensive reforms in its tertiary education system since 1999 as part of the European *Bologna* process. The traditional tertiary academic degree programs are being replaced by internationally comparable Bachelor and Master degree programs. During the period of transition from the traditional degrees to these new tertiary programs, different degree types co-existed. The introduction of the new programs has been guided by the intention of creating a European area of higher education by 2010 (cf. European Ministers of Education 1999). In Germany, policy-makers also hoped that well organized new study programs that shorten the overall length of study of a first degree would attract more secondary school graduates and increase intergenerational educational mobility.¹ In fact, these have also been central aims of the European reform process since at least 2001 (cf. European Ministers of Education 2001).

In this study, I am interested in quantifying whether and how much the choice of a new Bachelor vs. a traditional degree program affected first year students' satisfaction with their study program. I draw on recent survey data containing detailed information on how the students judge their respective study programs with respect to teaching and organization. I also use a score that aggregates information on personal problems which the students experience in the academic context. In addition, self-reported grades are observed for a subsample of the students. Students' selection of the different programs is taken into account. The data allow controlling for prior performance, attitudes, and family background as well as inclusion of fixed effects on the level of subjects and the specific institution.

This study contributes to a new literature determining the impacts of the Bologna process. From an empirical point of view, it is still too early to study longer lasting impacts of

¹ Compared to the traditional programs, the Bachelor programs typically lead to a first degree within a shorter period of time (of about three years). Traditional German programs did not offer independent undergraduate degrees in a two tier system as it is the case in the Bachelor/Master-system. Instead, the comprehensive four to five year programs directly yielded a graduate degree like the *Diplom* or *Magister* (cf. HRK 2004).

the reform such as labor market effects.² For Germany, Horstschräer and Sprietsma (2010) suggest that aggregated enrollment and dropout rates hardly changed after the introduction of Bachelor degrees. The study draws on administrative data and is conducted at the aggregated level of departments. Similar descriptive evidence for Germany is provided in the policy report by Mühlenweg et al. (2010). In line with this, two further recent policy reports document little change of the contents of study programs due to the Bologna reform (cf. Winter et al. 2010) as well as modest impacts on the labor market perspective of students (cf. Alesi et al. 2010).³

Evidence related to the Bologna process has been presented for further European countries: Several empirical studies draw on the degree reforms in Italy and mainly demonstrate that the risk to drop out of university declined after the introduction of the new degree types (cf. Cappellari and Lucifora 2010; Di Pietro and Cutillo 2008; D’Hombres 2007). For Portugal Cardoso et al. (2008) and Portela et al. (2009) show that students’ demand for different academic programs at specific institutions tends to be higher for study courses that adapted to the new structure early in the Bologna process.

The present study adds to the recent literature in directly taking individual selection to the different degree programs into account. To my knowledge, this is the first study shedding light on student satisfaction during the transition period to the new type of degree programs. The results are especially important to policy-makers in Germany. Learning about the change

² In Germany, the first cohorts of Bachelor students have just entered the labor market and it will be an interesting future research topic to observe how they compare to the graduates from the traditional programs.

³ Winter et al. (2010) compare the curricula of traditional and new degree programs for three different subjects (chemistry, engineering and sociology). While the results are diverse for the different subjects as well as for different Universities they tentatively suggest that the contents of the study program are often very similar before and after the reform. The reform seems to be rather a formal reorganization of the study programs than a reform of the contents of the programs. Alesi et al. (2010) draw on their institute’s own survey data of German graduates and observe their success in entering the labor market. The (short-term) comparisons are descriptive in nature. Students’ selection into different programs is not taken into account when discussing the labor market outcomes. The findings point to the conclusion that there are no differences concerning the means and duration of job search as well as initial job satisfaction.

of the situation of students during the transition period to the new programs helps to determine drawbacks or successes of the new system.⁴

The German tertiary education system has recently been criticized. Student organizations state that the new study programs are not well organized and are concerned about the as of yet unknown acceptance of the new degrees on the labor market. Among their main aspirations are a better teaching quality (especially through smaller classes) as well as more financial resources for the tertiary institutions overall (cf. HRK 2009).

In light of the present skepticism towards the reforms, some of this paper's results are encouraging: I demonstrate that most of the considered outcomes improved since the beginning of the Bologna process. However, the changes are very modest. Also, according to students' self-reported problems, their situation hardly differs between traditional and new degree programs. Furthermore, the results imply no evidence that the new programs specifically attract students from a less advantaged family background. In other words: I do not observe that the new programs increase (or decrease) social mobility.

The following paper is structured as follows: Section 2 provides information on the data-base and summary statistics. Regression results and robustness checks are presented in Section 4. Section 5 discusses implications of the findings and concludes.

2 Data and Descriptive Evidence

I use data from a repeated cross-section survey of students in Germany (*Forschungsprojekt Studiensituation*). This survey is conducted by researchers at the University of Konstanz on behalf of the Federal Ministry of Education. The sample for each year of observation consists of students at about 25 German Universities and Universities of Applied Sciences which are

⁴ Examining the selection of students attracted by the new study programs also allows one to deduce whether social mobility changed with the introduction of the new programs.

assumed to be representative for tertiary institutions in Germany.⁵ One explicit aim of the survey is to learn about the study situation of students. The survey therefore asks for the students' satisfaction with teaching and the organization of the programs as well as for their personal problems related to the academic context.

In order to compare traditional and new study programs, I use the two available data waves relating to the post-Bologna years 2003/2004 and 2006/2007.⁶ I restrict the sample to students in their first year of study. Since the number of students opting for the newly generated Master programs is still too small in the period of observation, I do not analyze students in these programs.⁷ The subjects of medicine and law studies did not introduce Bachelor programs within the period of observation. Therefore students in these subjects are excluded from the analysis. Thus, I compare first year students choosing either a Bachelor or a traditional program. Additionally, I draw on the sample of first year students from the data wave of 2000/2001 in order to generally compare traditional degrees in the absence and in the presence of the alternative degree types.⁸

In the years of observation during the reform, my sample suggests that about 19 percent of first term students are enrolled in Bachelor programs. This is somewhat less than the number offered by the Federal Statistic Office, which reports that about 24 percents of students are enrolled in Bachelor programs in the relevant years (cf. Statistisches Bundesamt 2007). In line with the proportion from the administrative data I observe that about two percent of students are in Master programs. In light of the Bachelor students being somewhat under-represented and as the data do not provide sampling weights, the following descriptive

⁵ The researchers at the University of Konstanz state that “the sampling strategy as well as the response rates [...] allow one to assume that the results are representative for the current population of 1.65 million German students at Universities and Universities of Applied Sciences” (cf. <http://cms.uni-konstanz.de/ag-hochschulforschung/studierendensurvey/anlage/>, own translation of the German statement). The survey does not provide weighting factors. I assume that the absence of weighting factors is not problematic in light of the paper's central estimation strategy (cf. for example Cameron and Trivedi 2009 for weighting in fixed-effects regressions).

⁶ I pool the observations for these two years in order to increase the number of observations of students in Bachelor degrees. The insights of the present paper are robust if only the recent data wave (2006/07) is used.

⁷ As a fact, only 99 students would be observed in Master programs in the 2006/2007 data wave.

⁸ The traditional degrees mainly include degrees such as the traditional German “Diplom” and “Magister”.

statistics have to be taken with a grain of salt. However, the main (fixed-effects) estimates of this paper will hardly be affected by this lack of weights (compare footnote 5).

There are already some students in the new program types in the first year of observation: In 2000/01, I observe that nearly 4 percent of students are in Bachelor programs and less than one percent of students are in Master programs.⁹ However, most of the students did not have access to Bachelor programs which were offered by very few institutions. In this sense, 2000/2001 is considered as a pre-reform year.

Table 1 and Table 2 provide an overview of individual background variables. Besides basic individual characteristics (students' gender and age), the data contain information on parental education and occupational status (Table 1). These variables allow the consideration of social or educational mobility of the students. Further variables that may influence students' selection into the type of program are presented in Table 2. This table provides information on students' university entrance grade (Abitur) and their specific motivation to enter the program of study. I do not discuss the summary tables in detail. More detail on students' selection into the different programs is provided in the appendix based on a regression analysis. The variables (potentially) driving the selection are used as control variables when examining the outcomes of students in the different study programs.

The major outcome variables considered in this paper are evaluation scores created from the students' answers to questions on their satisfaction with their studies.¹⁰ The individual scores range from 0 to 60. For the so-called teaching score and the organization score, a smaller score indicates that the student is less satisfied (with teaching and

⁹ According to the Federal Statistic Office, the proportion is again somewhat lower for the Bachelor programs (about two percent).

¹⁰ Each score is generated by adding up the answers to ten underlying questions, where each answer is measured on a zero-to-six-scale. The detailed questions that underlie the scores are presented in the notes to Table 3. In the case of a missing observation for one of the questions, the answer is coded 3 in order to define the problem score. This implies the assumption that answers are missing for students who have no strong preference for expressing an opinion. For the teaching score, there are four individuals where all the underlying variables are missing in the sample. For the organization and personal score, there are no individuals where all the information is missing.

organization respectively). For the personal problem score, a lower score indicates that the student suffers from fewer personal problems related to the study situation.

An overview of the mean scores is given in Table 3. In the recent data waves, the overall mean teaching score is about 33. In other words: The mean is close to the middle of the scale ranging from zero to 60. The sample mean of the organization score is about 36. Both the distributions of the organization and the teaching score thus suggest that – according to the students’ statements – there is scope to improve the situation at the Universities.¹¹ The sample mean of the personal score is 22. Severe personal problems related to all the different dimensions underlying the score are rather rare (79 percent of university students reach a score of 30 or less).

Students’ performance is measured based on the self-reported average grade. Students are asked to report their expected grade if they do not have any examination results at the time of interview. Grades relate to the German grade scale ranging from 1.0 (top grade) to 6.0 (failed) and are reported to the precision of one digit in the data-set. For the following analysis, grades are multiplied by ten in order to ease the presentation of the effects (especially for the regression analysis). In contrast to the other outcome variables, grades are not observed for all students but only for a (selected) sub-group of the sample. Because of the high incidence of missing values for the grade observations the results for this outcome variable have to be taken with a grain of salt.

In Table 3, means of the outcome variables are provided for students entering traditional programs and Bachelor programs in the period of transition to the new programs, i.e. in the survey years 2003/04 and 2006/07 (columns 1 and 2). Also, for comparison I include the evidence for students who entered the traditional programs in 2000/01 (‘before’

¹¹ About 5 percent of university students reach only 20 points or fewer. About 25 percent of students reach fewer than 30 points. Intuitively, a score of 30 means that (only) six or fewer of the underlying questions are rated on the favorable side of the scale. A score of 20 means that less than one third of the underlying questions is rated in a favorable way. As many as nine percent of the students at traditional Universities reach an organization score of less than 20 (not presented in the table). This indicates that only a minority of organizational questions are answered in a favorable way.

the reform, column 3). Comparisons between students entering the traditional and new programs are shown in column 4. Column 5 compares students entering the traditional programs before the reform (in 2000/01) and after the reform (in 2003/04 or 2006/07). Table 3 reveals that the scores related to the teaching and organization of the study programs are slightly but significantly more favorable for students in the Bachelor programs. The average problem score is somewhat lower for Bachelor-students compared to students in traditional programs. It is interesting to note that the Bachelor programs perform in a more favorable way than the traditional programs even though there seems to be a positive time trend within the traditional programs: In comparison to the reference year 2000/2001 (i.e. since the beginning of the Bologna process) teaching and organization are slightly more positively evaluated by the average student in the recent data waves. Students' average grade has slightly improved within the traditional study programs (from 2.59 to 2.51 on the German grade scale).

However, this descriptive presentation does not really allow the conclusion of a general time trend: For example it might be that teaching and organization have become better in the traditional degree, but it just as well might be that the changing groups of students selecting into the traditional programs have different conceptions of teaching and organization.

3 Comparison of the Traditional Degrees and the Bachelor Degree

How do students' evaluations, their personal problems as well as their grades differ between the Bachelor and the traditional programs? As a starting point to answer this question, Table 4 presents OLS results where each of the outcome variables is regressed on an indicator variable for being in a Bachelor program as well as on the variables potentially driving selection into the programs. Including the selection variables aims at reducing the selection bias when estimating the effect of a Bachelor degree program. For example, from Table 2 we

know that students who chose the study program because of their own abilities and talents are less likely to have opted for a Bachelor degree. If (due to their inherent motivation) those students are also less likely to positively evaluate their teachers this will negatively bias the OLS estimate of the Bachelor degree choice on the teaching outcome if we fail to control for students' motivation.¹²

The OLS results suggest that Bachelor degree students fare a little better compared to the students in the traditional degree programs. The coefficients on the Bachelor indicator are statistically significant but very small (about two points) for the teaching, organization and personal score. The coefficient on the average grade is not significant. The last column of Table 4 also shows the result for the relative grade within the subject of specialization (i.e. the ratio of the individual grade and the average grade within the subject). There is no statistically significant relationship between being in a Bachelor program and the relative grade.¹³

The favorable results for the Bachelor programs as indicated in Table 4 may be due to the fact that the quality of the vanishing traditional programs decreased as the new Bachelor programs were introduced. In order to check this, the row labeled "Time effect of traditional degree" on the bottom of Table 4 compares the outcomes of students in traditional programs before and after the introduction of Bachelor degrees. These are the coefficients from separate regressions controlling for all the background characteristics and a dummy variable for entering university in 2003/2004 or 2006/07 instead of in the pre-reform year 2006/07. The results clearly suggest that *ceteris paribus* the quality of the traditional program rather *increased* as the new programs were introduced. Students tend to give better teaching and organization scores. At the same time, the grades of the students are getting better (decreasing

¹² In Table 4 as we control for motivation, we see that in fact there is a positive correlation between this motivation indicator and the teaching score.

¹³ I do not discuss the coefficients of the control variables in detail. They are included in order to control for selection into the different programs. Note that (as suggested above) students who state that they opted for the study course because of general interest in the topic, due to their own abilities and talents or specific professional aspiration yield better scores or results (with the exception of the insignificant coefficient for the teaching score).

towards the better grade in the German grade scale). This is likely to be an expression of general grade inflation.

There are two major types of tertiary academic institutions in Germany. The *Universität (University)* is the traditional type which generally offered four to five year programs before the introduction of the new programs. The programs are typically research-oriented and less applied. In contrast to this, so-called *Fachhochschulen (Universities of Applied Sciences)* tended to offer shorter and less research-oriented programs. It is possible that the selection of students into the new programs differs at the different types of institutions. Therefore, all estimations of this paper have alternatively been conducted based on a sample excluding the (fewer) observations of students at Universities of Applied Sciences. However, the findings (not shown for the previous tables) are robust to excluding the Universities of Applied Science from the sample. Table 5 repeats the results from the OLS regressions of Table 4 for the sample of students at traditional universities. Again, the major results are robust in this supposedly more homogeneous group of students.

In order to potentially reduce more of the bias related to the selection of students into the different programs, I conduct fixed-effects regressions.¹⁴ Now, the deviation of each of the outcome variables of its group mean (within a specific subject offered at a specific institution) and the grand mean is regressed on the deviation of each of the selection variables from its mean and the grand mean. Thus, any unobserved characteristic that drives the choice of institution and subject is eliminated from the estimation of the Bachelor program effect.¹⁵ The results as presented in Table 6 point to robustness of the estimates presented in Table 4 and Table 5: Students in Bachelor programs seem to be in a somewhat more favorable situation

¹⁴ All standard errors in this paper are estimated taking clustering within subjects and institutions into account.

¹⁵ The data allow identifying the specific institution. After excluding medicine and law studies, subjects are identified by seven categories related to the fields of study.

but the effects are not large. Bachelor students' evaluation of teaching and organization is slightly better while they have somewhat fewer personal problems.¹⁶

4 Discussion of the Results

The findings indicate that – at the time of transition to the new degree types in Germany – the study situation is not less favorable for students in Bachelor programs than for students in traditional programs. There are even small but robust positive effects of studying in a Bachelor program which are mostly statistically significant for students' satisfaction with the teaching and the organization of the study program as well as for the indicator of students' personal situation. This is true even though (*ceteris paribus*) the observed quality of the traditional programs increased over time after the start of the Bologna process.

These findings are contrary to the perception that students in the new Bachelor programs are worse off than students in traditional programs used to be (cf. Section 1). One likely interpretation of the difference of the public perception and the survey-based results is that the Bologna process enhanced the public alertness related to the situation of students. Also, the public impression of the students' situation is formed by the statements of the student representatives (*Fachschaft*). If the composition of the group of representatives changed over time this might also cause a changing representation style going along with a

¹⁶ In addition to these estimation strategies I also tried several instruments for 2SLS estimation of the Bachelor program effect. The most promising instrument is the dummy variable for the student's father being a public servant. This instrument is guided by the intuition that less risk-averse students are more likely to opt for the traditional study programs and assuming that the father's status as a public servant is a proxy for the family's risk aversion. The positive first stage F-statistic related to this instrument is just above 10 (12.10). The second stage point estimates for the Bachelor program effect on the scores are close to the fixed-effects and the OLS estimates and thus robust. The (insignificant) point estimates for the grade effects turn positive. However, it is not clear whether the potential local average treatment effect this instrument may identify is really an effect of interest. Students opting for the traditional programs because of their risk aversion which is identified by their fathers' being public servants may be a rather selected group. Therefore, the instrumental variable results are not presented in detail.

changed perception of the students' situation.¹⁷ However, these are just interpretations of the findings.

What the results tell for sure is that students' judgment of organization and teaching as well as their reported personal situation have not gotten worse with the introduction of the new degrees. However, the distributions and means of the considered outcome variables indicate that there is plenty of scope to improve the study programs (cf. Section 2). Also, the available data do not allow for an examination as to how the Bachelor students do with respect to outcome variables beyond the ones considered in this paper. For example the (often criticized) compatibility of the Bachelor and Master programs at different institutions or the labor market success of the graduates remain important research topics for the future – once data is available.

¹⁷ I checked this latter interpretation based on the survey data: Looking at the entire group of students indicating that they are part of the student representatives (*Fachschaft*) suggests that the composition in fact changed somewhat over time. Based on regression analysis, I find for example that student representatives who were insecure whether they should enroll in tertiary academic education are more likely to be observed in the recent panel waves. There are further differences in representatives' motivation over time. However, it is generally hard to interpret what kind of change in the representation style one would expect from these observed differences.

Tables

Table 1: Individual background of students in traditional and new programs

Means (standard errors)	Traditional	Bachelor	Traditional (Before reform)	Traditional – Bachelor	Before – After reform
Male	0.45 (0.01)	0.40 (0.02)	0.47 (0.01)	0.05 **	-0.02
Age (in years)	21.61 (0.07)	21.77 (0.14)	21.59 (0.10)	-0.15	0.03
Highest educational level of mother					
not available	0.03 (0.00)	0.03 (0.01)	0.04 (0.01)	0.00	-0.01 *
vocational	0.43 (0.01)	0.42 (0.02)	0.46 (0.01)	0.01	-0.03 *
higher vocational	0.21 (0.01)	0.22 (0.02)	0.18 (0.01)	-0.01	0.03 **
tertiary academic	0.33 (0.01)	0.33 (0.02)	0.32 (0.01)	0.00	0.01
Highest educational level of father					
not available	0.04 (0.00)	0.04 (0.01)	0.05 (0.01)	0.00	-0.01
vocational	0.31 (0.01)	0.32 (0.02)	0.27 (0.01)	-0.02	0.04 **
higher vocational	0.22 (0.01)	0.22 (0.02)	0.22 (0.01)	0.00	0.00
tertiary academic	0.43 (0.01)	0.42 (0.02)	0.45 (0.01)	0.01	-0.02
Occupation of mother					
not available	0.15 (0.01)	0.14 (0.01)	0.15 (0.01)	0.01	0.00
blue collar	0.08 (0.01)	0.07 (0.01)	0.07 (0.01)	0.01	0.00
white collar	0.54 (0.01)	0.56 (0.02)	0.56 (0.01)	-0.02	-0.02
public servant	0.14 (0.01)	0.12 (0.01)	0.11 (0.01)	0.02	0.03 **
self employed	0.09 (0.01)	0.11 (0.01)	0.10 (0.01)	-0.02	-0.01
Occupation of father					
not available	0.08 (0.01)	0.08 (0.01)	0.07 (0.01)	0.00	0.00
blue collar	0.20 (0.01)	0.22 (0.02)	0.17 (0.01)	-0.02	0.03 **
white collar	0.38 (0.01)	0.37 (0.02)	0.42 (0.01)	0.00	-0.04 **
public servant	0.18 (0.01)	0.11 (0.01)	0.16 (0.01)	0.07 **	0.02
self employed	0.16 (0.01)	0.22 (0.02)	0.18 (0.01)	-0.05 **	-0.02
Proportion missing observations (%) ^A	0.23	0.47	0.15		
Sample size	2,349	633	1,310		

Note: The column labeled ‘Traditional – Bachelor’ indicates the difference between the two programs in the years of transition to the new degree programs. The column ‘Before – After reform’ indicates the difference between students in the traditional programs in the beginning of the Bologna process and during the reform period. ^A The proportion of missing observations refers to the individual background variables in the sample.

* Difference is significant at the ten percent level (t-Test). ** Significant at the five percent level (t-Test).

Source: Forschungsprojekt Studiensituation, 2000/2001, 2003/2004 and 2006/2007, sample of first year students.

Table 2: Prior performance and motivation of students in traditional and new programs

Means (standard errors)	Traditional	Bachelor	Traditional (Before reform)	Traditional- Bachelor	Before – After reform
Prior performance and motivation					
Abitur degree * 10	23.77 (0.13)	24.01 (0.24)	23.55 (0.18)	-0.24	0.23
University enrolment decision: unsecure	0.21 (0.01)	0.23 (0.02)	0.24 (0.01)	-0.02	-0.04 **
Motivation: Interest in field of study	0.87 (0.01)	0.88 (0.01)	0.84 (0.01)	-0.01	0.03 **
Motivation: Own abilities and talents	0.83 (0.01)	0.78 (0.02)	0.79 (0.01)	0.05	0.04 **
Motivation: Expected income	0.48 (0.01)	0.54 (0.02)	0.52 (0.01)	-0.06 **	-0.03 **
Motivation: Specific professional aspiration	0.46 (0.01)	0.44 (0.02)	0.45 (0.01)	0.02	0.01
Motivation: Variety of job opportunities	0.66 (0.01)	0.72 (0.02)	0.71 (0.01)	-0.07 **	-0.05 **
Performance / motivation missing (%)	0.25	0.24	0.22		
Sample size	2,349	633	1,310		

Note: The column labeled ‘Traditional – Bachelor’ indicates the difference between the two programs in the years of transition to the new degree programs. The column ‘Before – After reform’ indicates the difference between students in the traditional programs in the beginning of the Bologna process and during the reform period. * Difference is significant at the ten percent level (t-Test). ** Significant at the five percent level (t-Test).

Source: Forschungsprojekt Studiensituation, 2000/2001, 2003/2004 and 2006/2007, sample of first year students.

Table 3: Outcome variables for students in traditional and new programs

Means (standard errors)	Traditional	Bachelor	Traditional (Before reform)	Traditional – Bachelor	Before – After reform
Evaluation score: Teaching	33.00 (0.29)	33.88 (0.64)	31.53 (0.35)	-0.89**	1.47**
Evaluation score: Organization	36.10 (0.27)	37.42 (0.57)	34.76 (0.32)	-1.32**	1.35**
Personal problem score	22.57 (0.32)	21.63 (0.71)	22.98 (0.42)	0.94**	-0.41
Grade * 10	25.11 (0.19)	24.87 (0.43)	25.92 (0.24)	0.24	-0.80**
Scores: Missing observations (%)	0.00	0.00	0.00		
Grade: Missing observations (%)	42.83	31.44	47.10		
Sample size	2,349	633	1,310		

Note: The column labeled ‘Traditional – Bachelor’ indicates the difference between the two programs in the years of transition to the new degree programs. The column ‘Before – After reform’ indicates the difference between students in the traditional programs in the beginning of the Bologna process and during the reform period. * Difference is significant at the ten percent level (t-Test). ** Significant at the five percent level (t-Test).

The *teaching score* adds up the answers to the following ten fields of evaluation (each coded 0 to 6, 6 = very good): (1) teachers are prepared for classes, (2) teachers explain objectives of classes, (3) teachers have a good oral teaching style, (4) teachers increase students' motivation, (5) teachers relate to other subjects, (6) teachers relate to applied skills, (7) teachers revise and summarize most important points, (8) teachers are interested in students' success, (9) teachers indicate importance of material with respect to examinations, (10) teachers explain test results.

The *organization score* adds up the answers to the following ten fields of evaluation (each coded 0 to 6, 6 = very good): (1) structure of study program, (2) structure of study courses in major subject, (3) transparency of degree requirements, (4) structuring of course contents, (5) consulting possibilities for study program, (6) consulting quality by faculty members, (7) quality of introductory classes for freshmen, (8) quality of classrooms and equipment, (9) small classes, (10) reliability of schedule (important appointments / lectures have not been canceled).

The *personal problem score* adds up the answers to the following ten fields (each coded 0 to 6, 6 = severe problems): (1) student suffers from lack of fixed study groups, (2) student suffers from lack of contacts to other students, (3) student suffers because of competition among students, (4) student suffers because of anonymity at university, (5) student suffers because of high number of students, (6) student suffers because of relation to teachers, (7) student suffers because of study work load, (8) student suffers because of problems to cope with university life, (9) student suffers from personal problems such as depressions or fears, (10) student suffers because of insecure professional future

Source: Forschungsprojekt Studiensituation, 2000/2001, 2003/2004 and 2006/2007, sample of first year students.

Table 4: Program effects on evaluation scores and grades (OLS regressions)

Sample: All institutions	Bachelor degrees vs. traditional degrees				
	Teaching	Organization	Personal	Grade	Relative grade
Bachelor degree	1.86 ** (0.47)	2.05 ** (0.50)	-1.52 ** (0.51)	-0.73 (0.45)	-0.02 (0.02)
Male	0.89 ** (0.38)	2.20 ** (0.34)	-2.25 ** (0.36)	0.64 * (0.35)	-0.01 (0.01)
Age	-0.18 (0.13)	-0.44 ** (0.12)	0.24 (0.15)	0.09 (0.21)	0.01 (0.01)
Age squared	0.00 ** (0.00)	0.01 ** (0.00)	0.00 ** (0.00)	0.00 (0.00)	0.00 (0.00)
Highest educational level of parents					
not available	-0.26 (1.47)	-0.22 (1.26)	0.51 (1.95)	-0.47 (1.57)	-0.04 (0.06)
higher vocational	0.02 (0.45)	0.35 (0.43)	-0.05 (0.49)	-0.80 (0.52)	-0.03 (0.02)
tertiary academic	-0.52 (0.44)	-0.02 (0.43)	-0.04 (0.47)	-0.65 (0.52)	-0.03 (0.02)
Occupation of mother					
not available	-0.77 (0.55)	0.31 (0.44)	-0.11 (0.49)	-0.41 (0.45)	-0.02 (0.02)
blue collar	-1.48 ** (0.67)	-1.01 (0.65)	1.12 (0.83)	1.02 (0.69)	0.05 * (0.03)
public servant	-0.73 (0.52)	-0.89 * (0.47)	0.32 (0.58)	-1.16 ** (0.56)	-0.04 ** (0.02)
self employed	-1.17 ** (0.59)	-0.35 (0.56)	0.32 (0.77)	-0.97 (0.64)	-0.04 (0.03)
Occupation of father					
not available	-0.79 (0.86)	-0.98 (0.67)	2.94 ** (0.93)	0.80 (0.77)	0.03 (0.03)
blue collar	-1.04 ** (0.46)	-0.57 (0.42)	1.92 ** (0.56)	0.82 * (0.48)	0.03 (0.02)
public servant	-0.31 (0.44)	-0.25 (0.46)	0.73 (0.60)	-0.14 (0.52)	-0.01 (0.02)
self employed	-0.14 (0.51)	-0.41 (0.48)	-0.10 (0.56)	0.32 (0.48)	0.01 (0.02)
Prior performance					
Entry grade	-0.08 (0.20)	-0.43 ** (0.18)	0.18 (0.19)	0.13 (0.19)	0.01 (0.01)
Entry grade squared	0.00 (0.00)	0.01 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Prior motivation					
undecided student	-0.89 * (0.47)	-0.58 (0.43)	1.78 ** (0.46)	0.72 (0.47)	0.04 ** (0.02)
interest in field of study	1.35 ** (0.53)	2.57 ** (0.46)	-2.21 ** (0.53)	-0.44 (0.44)	-0.01 (0.02)
own abilities and talents	0.83 * (0.45)	0.17 (0.40)	-0.83 * (0.45)	-1.78 ** (0.42)	-0.06 ** (0.02)
expected income	-1.15 ** (0.39)	0.30 (0.37)	0.50 (0.41)	0.40 (0.34)	-0.01 (0.01)
specific professional aspiration	1.44 ** (0.37)	0.48 (0.30)	-0.63 * (0.35)	-0.56 (0.34)	-0.02 * (0.01)
variety of job opportunities	1.89 ** (0.37)	1.76 ** (0.39)	-0.61 (0.40)	-0.42 (0.36)	-0.02 (0.01)
Constant	32.95 ** (3.46)	44.17 ** (2.61)	19.79 ** (3.42)	22.40 ** (3.79)	0.85 ** (0.15)
Time effect of traditional degree ^(A)	0.99 ** (0.31)	0.85 ** (0.30)	-0.06 (0.32)	-0.60 ** (0.29)	-0.02 ** (0.01)
Number of observation ^(B)	2,921	2,921	2,921	1,184	1,184

Note: ^(A) The time effect stems from a separate regression for the sample of traditional degree students before and after the reform. The coefficient indicates the change in the evaluation and performance after the reform. This time effects regression includes all variables as in the main regression. ^(B) The indicator of the number of observation refers to the main regression.

* Significant at the ten percent level. ** Significant at the five percent level.

Source: Forschungsprojekt Studiensituation, 2000/2001, 2003/2004 and 2006/2007, sample of first year students.

Table 5: Program effects on evaluation scores and grades (Traditional Universities)

Sample: Universities	Bachelor degrees vs. traditional degrees				
	Teaching	Organization	Personal	Grade	Relative grade
Bachelor degree	1.20 ** (0.49)	1.66 ** (0.57)	-1.53 ** (0.58)	-0.45 (0.54)	-0.01 (0.02)
Male	1.10 ** (0.40)	2.17 ** (0.37)	-2.50 ** (0.38)	0.14 (0.39)	-0.02 (0.01)
Age	-0.41 ** (0.14)	-0.67 ** (0.13)	0.47 ** (0.17)	0.08 (0.23)	0.01 (0.01)
Age squared	0.01 ** (0.00)	0.01 ** (0.00)	-0.01 ** (0.00)	0.00 (0.00)	0.00 * (0.00)
Highest educational level of parents					
not available	-0.58 (1.61)	-0.54 (1.47)	2.03 (2.23)	0.33 (1.74)	-0.02 (0.07)
higher vocational	0.04 (0.52)	0.74 (0.48)	-0.10 (0.57)	-0.74 (0.62)	-0.03 (0.02)
tertiary academic	-0.61 (0.49)	0.19 (0.49)	-0.21 (0.53)	-0.47 (0.64)	-0.02 (0.02)
Occupation of mother					
not available	-0.36 (0.62)	0.82 * (0.46)	-0.49 (0.52)	-0.84 (0.51)	-0.04 * (0.02)
blue collar	-1.22 (0.80)	-0.90 (0.76)	0.42 (0.94)	1.26 ** (0.69)	0.05 ** (0.03)
public servant	-0.66 (0.58)	-1.01 * (0.51)	0.67 (0.62)	-1.42 ** (0.62)	-0.06 ** (0.02)
self employed	-1.45 ** (0.65)	-0.64 (0.63)	0.87 (0.83)	-0.89 (0.70)	-0.04 (0.03)
Occupation of father					
not available	-0.86 (1.05)	-1.02 (0.72)	3.49 ** (1.07)	0.85 (0.94)	0.03 (0.04)
blue collar	-1.34 ** (0.54)	-0.58 (0.49)	2.33 ** (0.61)	1.20 ** (0.54)	0.04 ** (0.02)
public servant	-0.27 (0.46)	-0.13 (0.50)	0.51 (0.66)	0.17 (0.59)	0.01 (0.02)
self employed	0.09 (0.57)	-0.23 (0.55)	-0.23 (0.64)	0.17 (0.56)	0.00 (0.02)
Prior performance					
Entry grade	-0.10 (0.22)	-0.47 ** (0.20)	0.43 ** (0.21)	0.22 (0.21)	0.01 (0.01)
Entry grade squared	0.00 (0.00)	0.01 (0.00)	-0.01 (0.00)	0.00 (0.00)	0.00 (0.00)
Prior motivation					
undecided student	-1.01 * (0.57)	-0.80 (0.50)	2.29 ** (0.52)	0.73 (0.56)	0.04 ** (0.02)
interest in field of study	1.53 ** (0.59)	2.75 ** (0.53)	-2.49 ** (0.62)	-0.26 (0.51)	-0.01 (0.02)
own abilities and talents	0.83 (0.53)	-0.03 (0.44)	-0.74 (0.47)	-1.94 ** (0.48)	-0.07 ** (0.02)
expected income	-1.40 ** (0.43)	0.22 (0.41)	0.72 * (0.43)	0.36 (0.40)	0.00 (0.01)
specific professional aspiration	1.04 ** (0.41)	0.25 (0.34)	-0.54 (0.41)	-0.64 * (0.37)	-0.03 * (0.01)
variety of job opportunities	1.81 ** (0.41)	1.64 (0.44) **	-0.29 (0.45)	-0.35 (0.38)	-0.02 (0.01)
Constant	36.84 ** (3.66)	48.34 ** (2.87)	13.77 ** (3.65)	21.77 ** (4.14)	0.78 ** (0.16)
Time effect of traditional degree ^(A)	1.15 ** (0.32)	1.16 ** (0.33)	-0.51 (0.37)	-0.75 ** (0.35)	-0.03 ** (0.01)
Number of observation ^(B)	2,358	2,358	2,358	950	950

Note: ^(A) The time effect stems from a separate regression for the sample of traditional degree students before and after the reform. The coefficient indicates the change in the evaluation and performance after the reform. This time effects regression includes all variables as in the main regression. ^(B) The indicator of the number of observation refers to the main regression.

* Significant at the ten percent level. ** Significant at the five percent level.

Source: Forschungsprojekt Studiensituation, 2000/2001, 2003/2004 and 2006/2007, sample of first year students.

Table 6: Fixed-effects regressions of program effects (Subject/institution fixed-effects)

	Teaching	Organization	Personal	Grade
Bachelor degree	1.76 ** (0.52)	2.09 ** (0.59)	-1.98 ** (0.59)	-0.64 (0.52)
Male	1.09 ** (0.42)	1.20 ** (0.31)	-1.95 ** (0.42)	-0.42 (0.41)
Age	-0.39 ** (0.14)	-0.32 ** (0.11)	0.38 ** (0.18)	0.74 ** (0.22)
Age squared	0.01 ** (0.00)	0.00 ** (0.00)	-0.01 ** (0.00)	-0.01 ** (0.00)
Highest educational level of parents				
not available	-0.61 (1.53)	-0.32 (1.18)	0.42 (1.96)	-0.01 (1.42)
higher vocational	0.09 (0.45)	0.26 (0.42)	0.10 (0.51)	-0.84 (0.56)
tertiary academic	-0.54 (0.43)	0.20 (0.37)	-0.30 (0.47)	-0.81 (0.56)
Occupation of mother				
not available	-0.27 (0.60)	0.55 (0.42)	-0.01 (0.51)	-0.38 (0.47)
blue collar	-0.99 (0.69)	-0.69 (0.64)	1.04 (0.86)	1.19 * (0.71)
public servant	-0.57 (0.54)	-0.62 (0.42)	0.34 (0.58)	-0.66 (0.54)
self employed	-1.18 ** (0.56)	-0.35 (0.54)	0.54 (0.77)	-1.01 (0.65)
Occupation of father				
not available	-0.72 (0.93)	-1.17 * (0.71)	2.94 ** (0.99)	0.53 (0.84)
blue collar	-1.22 ** (0.48)	-0.52 (0.41)	1.85 ** (0.53)	0.87 * (0.50)
public servant	-0.27 (0.45)	-0.40 (0.44)	0.79 (0.59)	0.03 (0.53)
self employed	0.02 (0.52)	-0.15 (0.48)	-0.14 (0.58)	0.36 (0.48)
Prior performance				
Entry grade	-0.04 (0.20)	-0.11 (0.17)	0.04 (0.20)	0.30 (0.19)
Entry grade squared	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Prior motivation				
undecided student	-0.88 * (0.49)	-0.50 (0.39)	2.13 ** (0.46)	1.42 ** (0.48)
interest in field of study	1.18 ** (0.54)	1.72 ** (0.45)	-2.02 ** (0.57)	-0.40 (0.45)
own abilities and talents	0.82 ** (0.48)	0.53 (0.39)	-1.03 ** (0.46)	-1.76 ** (0.47)
expected income	-1.06 ** (0.39)	0.12 (0.35)	0.79 * (0.42)	0.00 (0.37)
specific professional aspiration	1.30 ** (0.38)	0.74 ** (0.29)	-0.71 * (0.36)	-0.38 (0.35)
variety of job opportunities	1.64 ** (0.36)	1.65 ** (0.38)	-0.26 (0.42)	-0.35 (0.35)
Constant	35.98 ** (3.32)	39.40 ** (2.68)	18.56 ** (3.64)	12.05 ** (3.87)
Time effect of traditional degree ^(A)	1.15 ** (0.31)	0.70 ** (0.31)	0.14 (0.35)	-0.30 (0.29)
Number of observation ^(B)	2,921	2,921	2,921	1,184

Note: ^(A) The time effect stems from a separate regression for the sample of traditional degree students before and after the reform. The coefficient indicates the change in the evaluation and performance after the reform. This time effects regression includes all variables as in the main regression. ^(B) The indicator of the number of observation refers to the main regression.

* Significant at the ten percent level. ** Significant at the five percent level.

Source: Forschungsprojekt Studiensituation, 2000/2001, 2003/2004 and 2006/2007, sample of first year students.

Appendix: Selection of Students into Study Programs

How do students who opt for a Bachelor program differ from students in traditional programs during the reform period? Table A 1 presents regression results related to students' selection. The dependent variable is a binary indicator for studying in a Bachelor program at the time of transition to the new degree programs (i.e. based on the survey years 2003/04 and 2006/07). Two different specifications are presented. Firstly, only parental background is controlled for.¹⁸ Secondly, students' prior grades and motivation to enter a degree program are added. Besides the comparison of traditional degrees and Bachelor degrees (columns 1 and 2 of Table A 1), the table also presents the comparison of the groups of students selecting the traditional programs in the years during the reform process as compared to the beginning of the reform (i.e. compared to the year 2000/01, columns 3 and 4 of Table A 1).

Fathers' occupation and students' motivation when entering tertiary education are significant determinants for the chosen type of degree program. The coefficients of parental education do not point to a general difference in intergenerational education mobility of the types of program. Students' whose fathers' are self-employed are more likely to opt for a Bachelor degree. If the father is a public servant, students' are less likely to be in a Bachelor program (difference of six percentage points in the full specification). One likely interpretation is that more conservative students (i.e. students whose fathers are public-servants) opt for the traditional degrees while less conservative or more risk-averse students (i.e. students whose fathers are self-employed) go for the new programs.

Concerning students' prior motivation students opting for their study programs because of a general interest in the field of study, higher expected incomes or a larger variety in expected job opportunities are significantly more likely to be in Bachelor programs than in

¹⁸ In order to save degrees of freedom, parental education is aggregated to categorical variables indicating the highest degree of education of mother and father. The results are also robust if separate indicators for both parents are included. None of the parental education dummies ever turns statistically significant.

traditional programs. Students' who are motivated by their own abilities and talents are more likely to opt for a traditional program than for a Bachelor program.

Columns 3 and 4 of Table A 1 include the pre-reform year 2000/01 in the sample and demonstrate how students' selection to the traditional degree changed since the beginning of the reform. Now, the outcome variable is a binary indicator for studying in the traditional programs in the years of the reform process as compared to 2000/01. The evidence suggests that the selection of students has changed by family background. Students whose fathers are blue collar workers are especially often observed in the recent data waves. This is likely to reflect a general increase in social mobility over time (independent of the reforms). Such an increase is documented in previous official reports on the development of student background in Germany (cf. BMBF/HIS 2007) and is similar to the development in other European countries (cf. EUROSTAT 2009).¹⁹

Additionally, the results point to a changing motivation to study in the traditional programs in the beginning and during the transition process: High school graduates who are unsure whether they should go on for a tertiary academic degree tend to enroll less often in more recent years. Also, students who indicate that their enrollment decision has been driven by their own abilities and talents are more likely to be observed in the traditional programs in the more recent years. Students who state that they attend their university program because of the variety of job opportunities are less often observed in traditional programs in the years of the reform.

In sum, the main insight from this appendix is that the new study programs did not specifically attract students from a more or less advantaged social background. There is a general trend of increasing social mobility but this trend seems not to be enforced by the new degree programs. There is some selection into the different programs according to students' motivation to attend the academic programs.

¹⁹ The evidence here together with Table 1 and Table 2 additionally points to the general educational expansion in the generation of parents and especially among mothers.

Table A 1: Selection into programs (Linear probability models)

Model	Bachelor degrees vs. traditional degrees		Traditional degrees after vs. before reform	
	Specification 1	Specification 2	Specification 1	Specification 2
Male	-0.04 (0.02)	-0.04* (0.02)	-0.02 (0.02)	-0.03 (0.02)
Age (in years)	0.01 (0.01)	0.01 (0.01)	0.00 (0.01)	0.01 (0.01)
Age squared	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Highest educational level of parents (reference category: vocational degrees or less)				
not available	-0.03 (0.06)	-0.02 (0.06)	-0.08 (0.06)	-0.08 (0.07)
higher vocational	-0.01 (0.02)	-0.01 (0.02)	0.00 (0.03)	0.00 (0.03)
tertiary academic	0.02 (0.02)	0.02 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Occupation of mother (reference category: white collar worker)				
not available	-0.02 (0.02)	-0.02 (0.02)	0.01 (0.03)	0.01 (0.03)
blue collar worker	-0.03 (0.03)	-0.03 (0.03)	-0.01 (0.03)	-0.02 (0.03)
public servant	-0.02 (0.02)	-0.02 (0.02)	0.07** (0.02)	0.08** (0.02)
self employed	0.01 (0.03)	0.01 (0.03)	-0.01 (0.03)	-0.01 (0.03)
Occupation of father (reference category: white collar worker)				
not available	0.00 (0.03)	0.00 (0.03)	0.04 (0.03)	0.03 (0.03)
blue collar worker	0.03 (0.02)	0.03 (0.02)	0.06** (0.02)	0.07** (0.02)
public servant	-0.07** (0.02)	-0.06** (0.02)	0.04* (0.02)	0.04* (0.02)
self employed	0.05** (0.02)	0.05** (0.02)	0.00 (0.02)	-0.01 (0.02)
Prior performance				
Entry grade	---	0.01 (0.01)	---	0.01 (0.01)
Entry grade squared	---	0.00 (0.00)	---	0.00 (0.00)
Prior motivation				
undecided student	---	0.02 (0.02)	---	-0.06** (0.02)
interest in field of study	---	0.04* (0.02)	---	0.04 (0.03)
own abilities and talents	---	-0.06** (0.02)	---	0.04* (0.02)
expected income	---	0.04* (0.02)	---	-0.02 (0.02)
specific professional aspiration	---	-0.02 (0.02)	---	0.00 (0.02)
variety of job opportunities	---	0.04** (0.02)	---	-0.05** (0.02)
Constant	0.06 (0.12)	-0.06 (0.17)	0.58** (0.14)	0.35* (0.18)
Number of observations	2,972	2,921	3,650	3,588

Note: The columns labeled 'Bachelor degrees vs. traditional degrees' indicate the selection of students into the different programs in the years of transition to the new degree programs. The columns labeled 'Traditional degrees after vs. before reform' indicate the different background of students in traditional programs during the reform period as compared to the in the beginning of the Bologna process. * Significant at the ten percent level. ** Significant at the five percent level.

Source: Forschungsprojekt Studiensituation, 2000/2001, 2003/2004 and 2006/2007, sample of first year students.

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