

Meyer, Tobias; Thomsen, Stephan

Conference Paper

Are 12 Years of Schooling Sufficient for Preparation for Tertiary Education? Evidence from the Reform of Secondary School Duration in Germany

Beiträge zur Jahrestagung des Vereins für Socialpolitik 2014: Evidenzbasierte Wirtschaftspolitik
- Session: Labor Economics II, No. E13-V2

Provided in Cooperation with:

Verein für Socialpolitik / German Economic Association

Suggested Citation: Meyer, Tobias; Thomsen, Stephan (2014) : Are 12 Years of Schooling Sufficient for Preparation for Tertiary Education? Evidence from the Reform of Secondary School Duration in Germany, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2014: Evidenzbasierte Wirtschaftspolitik - Session: Labor Economics II, No. E13-V2, ZBW - Deutsche Zentralbibliothek für Wirtschaftswissenschaften, Leibniz-Informationszentrum Wirtschaft, Kiel und Hamburg

This Version is available at:

<https://hdl.handle.net/10419/100305>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

ARE 12 YEARS OF SCHOOLING SUFFICIENT FOR PREPARATION FOR
TERTIARY EDUCATION? - EVIDENCE FROM THE REFORM OF
SECONDARY SCHOOL DURATION IN GERMANY

Tobias Meyer*

NIW Hannover & Leibniz Universität Hannover

Stephan L. Thomsen†

NIW Hannover & Leibniz Universität Hannover & ZEW Mannheim

This version: February 28, 2014

Abstract

An important education reform in Germany reduced the duration of university preparatory schooling from 13 to 12 years, but left the curriculum unchanged. In the state of Saxony-Anhalt the reform was completed in 2007 with a double cohort of graduates, providing a natural experiment. We use primary panel data from this double cohort to evaluate the effects on success in tertiary education. Our findings show that the reform has heterogeneous effects on success in university education. Among others, students with only 12 years of schooling have some difficulties and skill deficits at university, but no higher drop-out probability.

Keywords: school duration, learning intensity, postsecondary education, natural experiment

JEL Classification: I21, J18, C21

*Tobias Meyer, Niedersächsisches Institut für Wirtschaftsforschung (NIW), Königstr. 53, D-30175 Hannover, e-mail: meyer@niw.de, telephone: +49 511 123316-31, fax: +49 511 123316-55.

†Stephan L. Thomsen, Niedersächsisches Institut für Wirtschaftsforschung (NIW), Königstr. 53, D-30175 Hannover, e-mail: thomsen@niw.de, telephone: +49 511 123316-32, fax: +49 511 123316-55.

1 Introduction

A recent fundamental reform of the education system in Germany is the reduction of university preparatory schooling by one year, from 13 to 12 school years. This was done in order to enable students to start their university education and subsequently their professional career one year earlier. However, academic requirements for final school examination were not changed. Thus, students had to learn the same curriculum in a shorter time, which means they faced a higher learning intensity at school.¹ In this paper we analyze the effect of the reduced secondary school duration on success in tertiary education. Success includes the manner of studying, the stress and burden of university education, the existence of difficulties and skill deficits, and the drop-out or successful completion of studies.

The literature on success and persistence in tertiary education includes a large number of empirical studies, which suggest performance in high school as the most important determinant (see, for example, Win and Miller, 2005; Cunha, 2009; Dooley et al., 2012). With respect to Germany, this finding is confirmed by Henn and Polaczek (2007) for engineering subjects, by Erdel (2010) for economic science and by Zwick (2012) in an analysis considering all university subjects. In addition to that, duration of secondary school is also relevant. By analyzing a reform in Ontario/Canada, which is similar to the one in Germany, Krashinsky (2013) and Morin (2013) find that a longer duration has a positive effect on performance in university, which is significantly larger for low ability students. Furthermore, some studies find that students with higher achievement in secondary school have a lower probability to drop-out of university education (e.g. Erdel, 2010; Dooley et al., 2012). Especially in engineering subjects, high drop-out rates are mainly caused by inadequate previous schooling in mathematics (Henn and Polaczek, 2007). However, Georg (2008) rather emphasizes the importance of goal-commitment, by showing that a drop-out of university education is not due to inadequate abilities or high study load, but rather due to a lack of commitment to the chosen course of study. We contribute to this literature by investigating the question whether a reduced school duration combined with a higher learning intensity has an impact on success in tertiary education.²

In order to answer this question we use the natural experimental setting provided by the implementation of the reform in the state of Saxony-Anhalt.³ This state announced and implemented the reform in 2003 within a few months. The first affected cohort of students was enrolled in grade 9 at that time and graduated from secondary school in 2007 after 12 years of schooling, together with the last cohort graduating after 13 years. We collected primary panel

¹The effects of this reform have been analyzed so far in three studies. Büttner and Thomsen (forthcoming) identify a causal negative impact of the reform on mathematical skills at school graduation, but no effect on achievement in German language. Büttner, Thiel, and Thomsen (2011) investigate the reform with respect to non-cognitive skills, finding no effect on several personality measures. In the analysis of post-school education decisions, Meyer and Thomsen (2013) especially find evidence for lower and delayed university enrollment of female students in the first three years after school graduation as well as some effects with respect to university subjects.

²The studies of Krashinsky (2013) and Morin (2013) only analyze students' performance in the first year at university and only with respect to grades.

³Education policy in Germany is a responsibility of the federal states. Nevertheless, almost all states introduced the reform, but at different points in time.

data from this double cohort of graduates to analyze the effects of the reform. The necessary assumption for the identification of causal effects is that students were randomly assigned into treatment group (students with 12 years of schooling) and control group (students with 13 years of schooling) and therefore do not differ systematically from each other, with the exception of being affected by the reform. This can be assumed to hold for at least two reasons. Firstly, the reform was rapidly implemented. Secondly, affected students had already been enrolled in secondary school for several years and were just told to graduate one year earlier without having the option to evade the reform. Nevertheless, self-selection after high school graduation into different pathways of post-secondary education may be a problem for identification. Treatment and control groups, however, show on overall a similar share of enrollment in university education and therefore do not differ systematically from one another with respect to their background characteristics. Nevertheless, we control for different starting years, subjects and types of university education in the analysis.

From a theoretical perspective, the reform could have positive as well as negative effects on the success in tertiary education. On the one hand, the higher learning intensity may improve the efficiency of students' learning and working. On the other hand, however, it may overtax students, decrease their school performance, and leave them less prepared for higher education. Furthermore, if the reduced school duration is not long enough for students to learn the skills required at university or to discover their talents and occupational preferences, the probability of university drop-out could increase. The empirical findings show that shortening secondary school duration has an impact on some aspects of success in post-school education. Female students graduating after 12 years of schooling are, on the one hand, significantly more likely to experience difficulties and skill deficits in university education, but, on the other hand, they feel less burdened by personal problems⁴. Male university students affected by the reform feel more burdened by performance requirements and time pressure. However, learning academic contents is easier for them. Compared with this, we find no evidence for an increase in the probability to drop-out of university education.

The remainder of the paper is structured as follows. The next section provides background information on the German education system and the reform. The natural experiment and concerns to its validity are addressed in section 3, which also includes the data, descriptive results and the estimation strategy. The results are presented in section 4. Section 5 concludes.

2 The Education Reform

2.1 Schooling and Post-school Education in Germany

Schooling in Germany⁵ normally starts at the age of six. The primary school with a duration of mostly four years is followed by a tripartite system of secondary schooling. Basic and in-

⁴Personal problems include e.g. mental disorders, anxieties, depressions, problems with self-esteem, or problems in the own social environment (e.g. family, partner, friends).

⁵Although education policy is a matter of the federal states, the education system is in principle nationwide identical. An overview of the German education system is provided by Eurydice (2010).

intermediate schools include schooling up to grade 9 or 10, whereas the higher secondary school track (*Gymnasium*) contains schooling up to grade 12 or 13 and leads to the university entrance qualification (*Abitur*).⁶

Having obtained the university entrance qualification, high school graduates can choose from a range of different post-secondary education possibilities, which can be summarized into two main tracks: university education and vocational education. Male high school graduates are on average more likely to be enrolled in university education than female graduates, which in turn have a higher probability for choosing vocational education than males. Besides these two main tracks, high school graduates could also enter the labor market directly without further education, but this possibility is only rarely chosen. *University education* is chosen by most high school graduates and includes studying at a university (about 65% of high school graduates⁷), at a university of applied sciences (15%) or at a professional college⁸ (5%). A degree from university education belongs to an ISCED qualification level of 5 (UNESCO, 1997).

University education in Germany was structurally reformed in the last decade (the so-called Bologna process). The former system with the German degrees *Diplom* and *Magister*, which were obtained after four to five years of study, was gradually replaced by a new system consisting of the consecutive Bachelor and Master degrees. In the new system, it takes three to four years of study to achieve a Bachelor degree, and one or two further years to obtain the Master degree.⁹ The new system was implemented between 2003 and 2009 (see e.g. Willich et al., 2011).

About 25% of high school graduates decide to start *vocational education*, mostly an apprenticeship.¹⁰ This contains practical on-the-job training in a company or an institution where the trainee is employed, and part-time vocational schooling. The German apprenticeship system is fairly unique compared to most other countries, but is acknowledged as providing high quality education (see, for example, OECD, 2010).¹¹ However, vocational education does not belong to tertiary but to secondary education, and corresponds to an ISCED qualification level of 4.

2.2 The Reform

The objective of the reform was to reduce the relative long duration of education of German university graduates and thereby to allow them an earlier labor market participation. For this

⁶The duration of 13 years of university preparatory schooling was introduced in the 1920s, but shortened to 12 years in 1936. After second world war, the West-German states reintroduced the 13 years in 1949, whereas East Germany runs a 12-year policy. After the German reunification in 1990, the former East-German states (with the exception of Saxony and Thuringia) adopted the West-German duration of 13 years.

⁷Data provided by the German Centre for Research on Higher Education and Science Studies (DZHW, formerly HIS), in addition to Spangenberg et al. (2011).

⁸Education at professional colleges combines academic instruction and vocational training, therefore representing a kind of intermediate stage between vocational and university education. Since accredited Bachelor degrees from professional colleges are equated to those from universities of applied sciences (Kultusministerkonferenz, 2004), they are considered in this paper as university education.

⁹At universities, the Master degree is equivalent to the former *Diplom/Magister* degree, whereas at universities of applied sciences the Bachelor degree could be considered as equivalent to the former *Diplom* degree.

¹⁰85% of high school graduates attend university and 25% start vocational education. This is more than 100% because some students start vocational and university education one after the other.

¹¹Several occupations, which require university education in other countries are qualified in Germany through vocational training.

reason, the total duration of schooling for obtaining the university entrance qualification was reduced from 13 to 12 years. However, it was the intention that students achieve the same level of skills after 12 years of schooling. Since education policy is a responsibility of the federal states, the reform was not implemented nationwide, but successively in the most states between 2001 and 2008. As one of the first states, Saxony-Anhalt announced, adopted and implemented the reform in 2003 within a few months. The first students, who were affected by the reform, were enrolled in grade nine at the beginning of the school year 2003/2004. They were just told to graduate after 12 years of schooling (in the following called G12 students; treatment group). Students in grade ten at that time were the last cohort graduating after 13 years of schooling (G13 students; control group). Both cohorts graduated together from high school in June 2007 by taking the same final examinations.¹² Since requirements for graduation were not changed, students affected by the reform had to learn the same curriculum in less time. The course of instruction of the former grades 9 to 13 now had to be taught and learned in grades 9 to 12. As a consequence, the learning intensity notably increased. In addition, the possibilities for revising the subject matter and teaching the curriculum in the necessary depth were probably reduced.

The direction of the induced effects of the reform on subsequent education outcomes is not obvious *ex ante*. On the one hand, the higher learning intensity could improve the efficiency of learning, which would be beneficial for later education outcomes. On the other hand, the reform could negatively impact students' learning. Students could be less prepared to university education if the same level of skills was not achieved in the shorter time or if students were overtaxed by the higher learning intensity. Furthermore, the reform takes away one year from students to discover their talents and preferences. As a consequence, students could be less oriented with respect to post-school education, which among others could raise the probability to drop-out of university.

3 Empirical Analysis

3.1 The Data

The empirical analysis is based on data of students of the 2007 double *Abitur* cohort in Saxony-Anhalt. Since official data are not available and other nationally representative data sources do neither contain a sufficient number of students nor the required information, data were collected by our own by means of survey questionnaires, which were sent to the graduates from 12 secondary schools. We focus on Saxony-Anhalt because the implementation of the reform was completed there much earlier than in other German states, and the way of implementation provides a clean natural experiment.

The data were collected in two waves. The first survey was conducted in February and March

¹²With this Saxony-Anhalt was the first state which completed the reform with a double cohort of high school graduates. From 2008 to 2010, three other small states completed the reform implementation, while in all other, mostly large states the double cohorts graduated in 2011, 2012 and 2013.

2009, the second one in November and December 2011. Both waves were collected by written (and partly online) questionnaires, which were sent to the students by (e-)mail. The addresses were provided by some schools, but for other schools they had to be collected by ourselves. The questionnaire of the first wave was responded by 55% of the students, the second one by 50%. The response rates do not differ between students with 12 and 13 years of schooling.

The estimation sample of the first wave includes 717 students, whereas the second wave contains 529 students. From the latter, 430 students had already participated in the first wave, while 99 students constitute a refreshment sample, which was collected in order to reduce the problem of panel attrition. Both waves do not differ significantly from one another, since students in the refreshment sample are similar to those who did no longer participate. Both waves include students from the treatment group (G12) and from the control group (G13) in equal shares. However, more female students are included, which is mostly due to the fact that females are more likely to graduate from high school than males.¹³

The questionnaires of both waves contained each about 100 questions with respect to students' family background and childhood, school education, extracurricular activities and education decisions after school graduation.¹⁴ Detailed information on experiences and success in post-secondary education was only collected in the second wave; therefore, we consider in the analysis individuals who have participated in this wave.

3.2 Outcome Measures

The reform effects are measured by a number of outcome variables. At first, we have variables on students' experiences at university. These include, firstly, categorical variables on the *manner of learning and studying*, which contain students' self-assessment on a Likert scale ranging from 1 to 4, where a higher value indicates that the statement is more applicable. Secondly, there are variables on the *stress and burden of university education* (also called "study load"), with values ranging from 0 (problem not existent) or 1 (feeling no pressure) to 4 (feeling strong pressure). Thirdly, *health-related complaints and feelings* during university education are measured according to their frequency of occurrence, ranging from 0 (never) to 4 (more than two or three times a week). Fourthly, the existence of *difficulties and skill deficits* is contained in a dummy variable indicating that these problems have occurred while studying at university. Fifthly, the *preparation for university by secondary school* is evaluated on a 1-6-grading-scale, with a higher value indicating better preparation. All these variables are only observed for persons who have been or actually are enrolled in university education.

In addition to that, we analyze outcome variables related to persistence and completion of the chosen post-school education. These are dummy variables which indicate (1) a drop-out of vocational education, (2) drop-out of university education, (3) completion of vocational education, and (4) completion of university education. A further dummy variable indicates whether students would choose the same post-secondary education once again. The last measure

¹³The Statistical Office of Saxony-Anhalt (2011) reports that 59% of high school graduates in 2007 were female.

¹⁴A description of the items collected by both questionnaires is provided in the appendix.

of success is the standardized final grade of completed university education, ranging from very good to sufficient, with a higher value indicating higher achievement.

3.3 The Natural Experiment

The implementation of the reform provides a natural experiment for identification of causal effects, since students were randomly assigned into treatment and control groups. As a consequence it can be assumed that both groups do not show systematical differences, with the exception of being affected by the reform. This is supported by the way the reform was implemented. Affected students just received the information that they have to graduate one year earlier. Since they had already been enrolled in secondary school for some years and since the implementation of the reform took place within a few months, students had no virtually possibility to evade the shortend school duration.

Nevertheless, there are some threats to the internal and external validity of natural experiments which could limit the causal interpretation of the empirical findings. With respect to *internal validity*, a selection bias could occur if students have evaded the reform, for example by attending a school in another state within Germany. However, this possibility is not likely since moving or commuting to another federal state would include very high costs, given the rapid implementation of the reform and the fact that for the sample used here the nearest border is quite far away (about 50 km). Moreover, most parents were familiar with the shorter school duration of twelve years, which had existed in Saxony-Anhalt until 1997.¹⁵ Grade retention could be another reason for a selection bias, for example if more students with lower performance have dropped out of their cohort. However, no significant increase can be established in available statistics, neither with respect to voluntary nor involuntary grade retention. Altogether, a selection bias is unlikely to exist.

The assumption of a natural experiment is further supported by our sample. If there had been a selection bias, it would be probably observable in the pre-reform characteristics of the students. But as Table 1 shows, students from treatment and control groups have similar background characteristics. By and large, the data from the first survey wave do not show significant differences between both groups with respect to pre-reform school achievements, education and occupation of the family, and other (not shown) background variables. The reason why we initially concentrate on the first wave (and not on the second wave), is the following: The first wave is our base survey, which contains a larger number of observations and variables on students' background than the second wave. Moreover, problems of panel attrition are not existent. Nevertheless, the second wave will also be considered below.

Insert Table 1 about here

Regarding *external validity*, generalizability of the findings could be limited if the analyzed

¹⁵As mentioned above, university preparatory schooling was 12 years in the former German Democratic Republic, to which Saxony-Anhalt had belonged to. The 13-year duration was introduced in Saxony-Anhalt in 1997, but in 2003 they decided to return to 12 years.

sample is not representative for the basic population of German high school graduates. However, this is checked by Meyer and Thomsen (2013), finding that the data collected from the double cohort of graduates can be considered as representative. In addition, since there are only minor differences between the education systems of the German states, the reform effects presented in this paper could be considered as being of general significance for Germany.

A further concern could be the existence of implementation effects, for example if teachers needed some time to adapt to the new instructional requirements. If this was the case, the reform effects would disappear for subsequent cohorts. However, the majority of teachers and school principals in Saxony-Anhalt had already been involved in the old 12-year graduation policy, which makes implementation effects less likely. Finally, the special situation of the double cohort of school graduates in 2007 could impair the external validity. At first, transition into post-school education could be affected. If students had to fear more competition for places at universities, some students could have changed their post-school education decision. However, universities in Saxony-Anhalt increased the number of places for study (see e.g. Ministry of Education, 2007). Moreover, students had the possibility to study in one of the surrounding federal states which had no double cohort at that time.¹⁶ Berthold et al. (2011) suggest that this in fact has taken place. In our sample, only 45 percent of students are enrolled at a university in Saxony-Anhalt, whereas 55 percent are studying in another state. Secondly, the higher number of students could have worsened the quality of university education. However, universities in East Germany have on average less problems with overcrowded study programmes than universities in West Germany (Heine et al., 2009). More importantly, the ratio of (new) students per academic staff at universities in Saxony-Anhalt has not largely changed during the relevant period (Berthold et al., 2011; Federal Statistical Office, n.y.). Furthermore, as already mentioned, many students are enrolled at a university outside Saxony-Anhalt and thus are not affected by this potential problem. Altogether, it is unlikely that the quality of university education has been influenced by the reform.¹⁷

Correction of Panel Attrition Bias

The existence of a natural experiment is supported by the fact that in our sample (based on the first survey wave) students in the treatment group are not systematically different from those in the control group. However, it is important that this still holds for the students who have participated in the second survey wave, given some panel attrition. A comparison between Tables 1 and 2 shows that female students are very similar between waves and cohorts. However, male students in the second wave differ somewhat with respect to average grade in year 7 and having a sibling with an academic degree. This is because within the group of male G12 students the probability to participate in the second wave is correlated with some background characteristics. Individuals with higher school achievements and from higher educated families

¹⁶Until 2011 only three other, very small states completed the reform with a double cohort of high school graduates.

¹⁷For a more detailed analysis of the internal and external validity of the natural experiment, see Meyer and Thomsen (2013).

have a higher participation probability.

Insert Table 2 about here

We therefore adjust the male sample of the second wave to the sample of the first wave by introducing sampling weights. The weights are calculated on the basis of the two variables on students' background mentioned above – the average grade in year 7 and a dummy variable indicating an academic degree of at least one sibling. The share of each grade category in the second wave is weighted so that its share is equal to the respective share in the first wave. The same is done with respect to siblings academic degree. Afterwards, both weights are multiplied and the resulting total weight is regarded in the estimation. After adjustment, the means of average grade in year 7 and academic degree of at least one sibling are similar to the ones in the first wave. No significant difference between cohorts exists any longer (see Table 3).

Insert Table 3 about here

3.4 Self-selection into Post-secondary Education

The natural experimental setting ensures that there are no systematic differences between G12 and G13 students, except for being affected by the reform. But after high school graduation, students could select themselves into different educational pathways. High school graduates choosing university education, for example, might be different from graduates not attending university and a potential self-selection bias has to be considered in the analysis of success in university education.

However, endogeneity of post-secondary education should not be a problem for our analysis. At first, like in the whole sample, there are no significant differences between treatment and control groups in the subsample of university students (Table 4). Moreover, also the probability of university enrollment does not differ significantly between both groups (Table 5). Nevertheless, there is a difference in the timing pattern of university enrollment. Female G12 students are more likely to delay enrollment, since they have a higher probability to do vocational education before attending university. The choice of university subjects slightly differs between female cohorts, too. We therefore control in the analysis for different starting years and university subjects as well as for having completed a vocational education before attending university. Additionally, the analysis is not only carried out for the whole sample, but also for different subgroups according to these characteristics. For reasons of comparability only the first chosen university education is analyzed.¹⁸

Insert Tables 4 and 5 about here

A potential bias may further be caused by selection into different types of university education with specific requirements concerning the manner of studying or the study load. Especially

¹⁸The reason for this is that some students have already started a second university education (mostly a Master programme after having obtained the Bachelor degree), but female G12 students have a lower probability for this due to their delayed enrollment.

with respect to the structural reform of university education in Germany (see section 2.1) it has been established that the introduction of Bachelor programmes has increased the study load, at least in some aspects (Bargel et al., 2012). However, G12 and G13 students in our sample are similarly enrolled in the different types of university education. The share of students enrolled at a university (compared to a university of applied sciences or a professional college) is about 0.75 in both groups. With regard to the study programme, about three-quarters of students from treatment and control groups study in a Bachelor programme. Thus, results should not be biased. Nevertheless, we also control for the type of university education in the analysis.

3.5 Description of Outcome Variables

Mean values of the outcome variables are presented in Table 6. Significant differences between cohorts are highlighted in boldface. Most variables on the manner and burden of studying show similar values for G12 and G13 students. In both cohorts it is important for the majority of students to achieve a good degree. Most students also report that they have good organizational and learning abilities. On average, students feel most burdened by performance and exam requirements, but also have stress with orientation problems and problems related to their personal life or financial situation.¹⁹ However, some differences can be observed between G12 and G13 students. Male students affected by the reform report more often that learning academic contents is easy. They also have fewer stress with orientation problems. Affected females feel less burdened by personal problems, but are more often confronted with skill deficits and difficulties in university education.

Insert Table 6 about here

The variables on drop-out and completion of post-secondary education are presented in the lower part of Table 6. The share of students who have dropped out of their post-secondary education is similar between G12 and G13 students,²⁰ with the exception that affected males are more likely to drop out of vocational education. If students had to decide again on their post-secondary education, female G12 students would more often decide on the same university education as they already had. Compared with this, affected females are significantly less likely to have obtained a university degree by the end of 2011, which could correspond to delayed enrollment. With respect to the final grade of completed university education, no significant difference between groups can be observed.

3.6 Estimation

We estimate the treatment effects of the reform on the outcome variables by running separate regressions for each outcome. The explaining variable of interest is the binary treatment

¹⁹These descriptive results are in line with other statistics on German university students, see e.g. Ramm et al. (2011).

²⁰About 20 percent of students drop-out of their first university education, which is in line with other statistics for Germany (e.g. Heublein et al., 2010; Heublein et al., 2012).

variable, which has the value 1 if the individual is a G12 student (i.e. being affected by the reform) and 0 if the individual is a G13 student. In order to obtain more efficient estimates of the reform effect, several exogenous variables influencing post-secondary education are included in the regressions. The basic specification (*specification A*) includes the average grade in year 7 as a proxy of pre-reform school achievements. Furthermore, the educational background of students family is considered by two dummy variables indicating whether at least one parent has an academic degree and whether at least one sibling has an academic degree as well as by a categorical variable on the number of books in the parental home. Finally, age of school enrollment is included. The extended specification (*specification B*) additionally contains variables on the characteristics of the first chosen university education. These are six dummy variables, which indicate whether the student

- is enrolled at a university (compared to a university of applied sciences or a professional college),
- studies in a Bachelor programme (compared to a study programme leading to the former German degrees *Diplom*, *Magister* or *Staatsexamen*),
- studies a scientific-technological subject (e.g. engineering, mathematics, medicine, natural sciences, technology),
- works ten or more hours per week during semester,
- has started university in 2007 (compared to a start in 2008 or later),
- has completed a vocational education before attending university.

Specification A has the advantage of including only variables, which are unaffected by the reform, but it leaves out further determinants of post-school education outcomes. These determinants are included in specification B, but they could be influenced by the reform.

Potential gender differences with respect to the impact of the reform²¹ are considered by running separate estimations for male and female students. Characteristics of the attended secondary school (e.g. institutional characteristics, teaching quality, socio-economic background of the student body, regional location) could also have an influence on post-secondary education. For that reason school-fixed effects are included in the regressions. Similarly, school class characteristics may be relevant. In order to take the correlation of outcomes within classes into account and obtain consistent variance estimates, class-level clustering is implemented by applying a cluster-robust sandwich estimator of variance. Finally, sampling weights which correct for panel attrition within the group of male G12 students, are implemented in the estimations (see section 3.3).²²

²¹The literature suggests that female and male students differ with respect to school and post-school education, see for example De Bellis et al. (2001), Buchmann et al. (2008), Vincent-Lancrin (2008), Zafar (2009).

²²As an alternative, we also have applied the Heckman Selection Model by estimating the participation probability in a first step and including the obtained inverse mills ratio as an additional regressor in the outcome

The treatment effect of the reform is estimated separately for each binary outcome by using the probit model

$$Prob(Y_{b,i} = 1|D_i, X_i) = \Phi(\alpha_b + \beta_b D_i + \gamma_{b,s} + \delta_b \mathbf{X}_i). \quad (1)$$

$Y_{b,i}$ denotes the binary outcome measure b for individual i . $Prob(Y_{b,i} = 1)$ is then the probability of the respective outcome. D_i is the treatment dummy with β_b as the corresponding parameter of interest, from which the average treatment effect (ATE) is derived. The ATE denotes the average marginal change in the dependent variable that is solely due to the reform, i.e. the average change in the outcome Y_b over all individuals if D is increased from 0 to 1, holding all other variables constant. $\gamma_{b,s}$ indicates the school-fixed effects of schools j , α_b is the constant, and \mathbf{X}_i is a matrix including all other explaining variables, with the corresponding coefficient vector δ_b .

The effect on the categorical outcome variables is estimated by using the ordered probit model

$$Prob(Y_{c,i} = j|D_i, X_i) = \Phi(\beta_c D_i + \gamma_{c,s} + \delta_c \mathbf{X}_i). \quad (2)$$

Here $Prob(Y_{c,i} = j)$ indicates the probability of a particular category j of the dependent variable Y_c for individual i .

Effect Heterogeneity

In order to investigate whether the reform implies heterogeneous effects for different groups of students and whether the effects are driven by certain characteristics of the chosen university education (see section 3.4), equations (1) and (2) are estimated separately for several subsamples. Four subsamples are generated with respect to *characteristics of the first university education* – (1) students enrolled at universities, (2) students enrolled in a Bachelor programme, (3) students with a scientific-technological subject, and (4) students having started university education in 2007 or 2008.

Effect heterogeneity with respect to *previous school achievements* is analyzed by supplementing equations (1) and (2) with an interaction term between the treatment dummy and the average grade in year 7. The effect on the binary outcome variables is then estimated by

$$Prob(Y_{b,i} = 1|D_i, X_i) = \Phi(\alpha_b + \beta_b D_i + \theta_b [D_i \times Grade7_i] + \gamma_{b,s} + \delta_b \mathbf{X}_i), \quad (3)$$

according to the approach suggested by Norton et al. (2004), whereas for the categorical outcome variables the linear probability model

$$Y_{c,i} = \alpha_c + \beta_c D_i + \theta_c [D_i \times Grade7_i] + \gamma_{c,s} + \delta_c \mathbf{X}_i \quad (4)$$

is applied (since interaction effects are difficult to calculate in an ordered probit model).²³

equations. However, results are sensitive to the explaining variables in the selection equation (Briggs, 2004). Therefore, we concentrate on the weighting approach, although results obtained by the Heckman model are not that different.

²³In the same way, interaction terms between the treatment dummy and the above mentioned characteristics of university education, for example the dummy variable indicating a scientific-technological field of study, are

4 Empirical Results

4.1 Studying at University

Manner of Learning and Studying

The effects of the reform on the manner of studying and learning in university education are shown in Table 7. Most coefficients are insignificant, but male students affected by the reform are significantly more likely to report that learning academic contents is easy for them. The probability that the statement “I find/found it easy to learn academic contents” is applicable or fully applicable (the upper two categories on the 4-point Likert scale) is increased for G12 males by 0.15 on average.²⁴

Insert Table 7 about here

Stress and Burden of University Education

In general, many students report on stress and burden of studying at university.²⁵ Table 8 presents the corresponding effects of the reform. It should be noted that the variables analyzed here do not so much contain the existence of study load, but rather a self-evaluation of how strong students feel pressure from the study load. The results show that the reform has both, positive but also negative effects. On the one hand, females with only 12 years of schooling have significantly fewer personal problems (which include e.g. mental disorders, anxieties, depressions or problems in social environment) and feel less burdened by the absence of a partner relationship²⁶. On the other hand, affected females are slightly more likely to have orientational problems. Male G12 students feel less burdened by orientational problems and by their financial situation. However, they report more stress with performance requirements. The magnitude of the marginal effects ranges between 0.04 and 0.08 per response category on the 5-point Likert scale. For example, the probability that female students feel (strong) pressure from personal problems is reduced by 0.15 on average (the sum of the upper two response categories).

Insert Table 8 about here

Health Complaints

A further type of outcomes related to the burden of university education are (psychosomatic) health complaints. On overall, students affected by the reform do not report a higher level of health problems (see seventh row in Table 8). However, when investigating this in more detail, affected males are significantly more likely to feel time pressure, which corresponds to a marginal increase of 0.04 and 0.08 in the higher response categories (see Table 9). On the other hand, affected females are less likely to experience severe physical pain.

introduced. Results obtained by this approach are in line with the ones from the separate estimations.

²⁴Marginal effects are not shown, but are available upon request.

²⁵An overview on stress among university students is provided by Robotham (2008). With respect to the situation in Germany see, for example, Ramm et al. (2011).

²⁶Related to personal problems, absence of a partner relationship could be seen as an indicator of loneliness.

Insert Table 9 about here

Difficulties and Skill Deficits

The existence of difficulties and skill deficits is reported by a majority of students (see Table 6). For females the reduction of school duration has increased the probability to have difficulties and skill deficits by 0.14 (Table 10). Moreover, affected females are slightly more likely to state that bad preparation for university by school is the main reason for difficulties. Compared with this, male students have a similar probability to experience skill deficits. For males there is only a shift in the main reason for deficits. G12 students are less likely to have problems due to insufficient own efforts, but are more likely to have problems due to a poor quality of study.

Insert Table 10 about here

Preparation for University by School

Students are asked in the survey to evaluate, how well they felt prepared for university by skills taught at school. Table 11 provides the reform effect on the quality of this preparation, once shown as a standardized score and once as a dummy indicating a good or very good preparation. Although all effects have a negative sign, a slightly significant effect is only found for the standardized score of females in specification A.

Insert Table 11 about here

Altogether the results suggest that students with only 12 years of schooling do not on overall feel a higher burden of university education. With respect to more personal affairs affected students even show fewer problems, whereas with respect to challenges directly related to the study they are more likely to experience at least some difficulties and problems.

Effect Heterogeneity: Findings for Different Groups of Students

For the sake of brevity, we refrain from showing the detailed results on effect heterogeneity here, but we describe them in the following.²⁷ The main findings – namely that affected females have less personal problems but more skill deficits and that learning academic contents is easier for affected males – remain stable in all subsamples based on different characteristics of university education. This suggests that they are not driven by selection into different post-secondary educational pathways. Nevertheless, some effect heterogeneity is present. In the subsample of students with a *scientific-technological university subject*, also females affected by the reform are significantly more likely to have problems with learning academic contents and feel notably more burdened by performance requirements and orientational problems. Furthermore, the reduced probability of females to experience physical pain does not apply to this subsample. In addition, affected males studying a scientific-technological subject are less likely to evaluate their preparation by school as good as students from the control group. Altogether, the reform

²⁷Results on effect heterogeneity can be found in the appendix.

seems to affect students with a scientific-technological subject more negatively than the whole group of students. Nevertheless, it should be noted that the positive effects of the reform with respect to the burden of personal problems (e.g. partner, finances) are also valid for this subsample. Heterogeneity with respect to *previous school achievement* only exists for one result. The effect on learning academic contents for males is more pronounced for students with higher school achievements. Regarding all other findings, estimation of interaction effects suggests that findings are existent above all achievement levels.

4.2 Drop-out and Completion of Post-secondary Education

Persistence in post-secondary education could also be affected by the reform. Drop-out rates could increase as a result of an insufficient school preparation leading to skill deficits by which students would fail to meet the requirements of university education. Another reason could be bad decision-making with respect to the chosen course of post-school education, since affected students had one year less to discover their talents and occupational preferences. However, we find no effect on drop-out probabilities – neither in the whole sample nor in the subsamples of different groups of students. There is only a higher drop-out rate regarding vocational education of male G12 students (see Table 6), but there are too few observations to robustly estimate this effect. Affected females are even more likely to say that they would decide on the same university education as they already had decided. However, this effect becomes smaller and insignificant in specification B, since it seems to be driven by the different enrollment pattern of females. Students who delay their university enrollment are in our sample on average more satisfied with the decision they made on post-school education than students with enrollment directly after high school graduation.

Insert Table 12 about here

The probability of having completed at least one university education is negatively affected by the reform (Table 13). Female students are less likely to have obtained a university degree, which in the majority of cases is an obtained bachelor degree, by the end of 2011. Again, this effect disappears in specification B, since enrollment in university education in 2007 explains a large fraction of the result. This suggests that the lower graduation probability is not due to a longer duration of study, but reflects the later enrollment of females. With respect to the final grade of the completed university education, no significant difference is observed.²⁸

Insert Table 13 about here

4.3 Robustness Analysis

In order to check the robustness of our estimates, we test different specifications of the outcome measures (results not shown, but available upon request). At first we use – instead of categorical

²⁸The effect on final grades is based on a relatively small number of students, since only 40 percent of female students and 25 percent of male students have obtained a first university degree. Since this are only 33 observations in the male sample, the effect for males cannot be estimated robustly.

variables – binary variables indicating whether the value of the respective categorical outcome is in the upper two categories of the 4- or 5-point Likert scale. Estimations are then carried out by using a probit model. Secondly, we apply a linear probability model for the categorical variables instead of an ordered probit model. Thirdly, we rerun the analysis regarding study load, but exclude the lowest response category (0, problem not existent) so that the variables only have values from 1 (feeling no pressure) to 4 (feeling strong pressure). The main findings of section 4.1 remain stable in all robustness checks, except for the ones which have been significant only at the 10%-level (orientational problems at university and problems with the absence of a partner relationship). They become insignificant and thus have to be interpreted with caution. In contrast, the coefficients of a few other outcomes (e.g. feeling dejected and gloomy) become significant, but only in some specifications.

As a further robustness check, different sampling weights are implemented in the sample of male students (see section 3.3). Here we do not only adjust the sample of the second wave to the one of the first wave, but also adjust the sample of G12 students to the one of G13 students. This means that both groups are even more similar with respect to family background. Once again, the main results remain stable. Male students are still more likely to feel burdened by performance requirements and time pressure, but show easier learning of academic contents. This ensures that our findings are not driven by specific family background characteristics of students.

Finally, we test alternative computations of robust standard errors. Instead of clustering at the level of school classes we run estimations with clustering at the level of universities or university subjects as well as without clustering. However, the significance of the findings changes only slightly or – for the main results – even remains unchanged.

4.4 How can the Findings be Explained?

The question arises how the findings can be explained. At least two possible explanations come into consideration. The reform effects could be caused by the reduced school duration (in combination with a higher learning intensity) as well as by the younger age of G12 students at school graduation and university enrollment. The former reflects a *schooling effect*, whereas the latter represents an *age effect*. However, we cannot really identify these effects separately, since the reform has simultaneously affected school duration, learning intensity and age of high school graduates.²⁹ Nevertheless, we try to investigate this issue by applying several estimations with respect to students' age. At first, we restrict our analysis to students who have a more similar age. Since the cutoff date for school enrollment is the 1st of July, G13 students are mostly born between July 1987 and June 1988, while G12 students are mostly born between July 1988 and June 1989. We therefore repeat our analysis with the subsample of students born in 1988, which includes the younger G13 students and the older G12 students. Within this sample students still have a different school duration, but the age difference is only one year (compared to two

²⁹See Meyer and Thomsen (2013) for a more detailed discussion of this problem.

years in the full sample). Secondly, we run estimations separately for G12 and G13 students, but instead of the treatment dummy we include a dummy indicating that an individual belongs to the older students in the cohort (i.e. born in 1987 in the G13 cohort, or born in 1988 in the G12 cohort respectively). Thirdly, we repeat our analysis for the whole sample but replace the treatment dummy by *age at university enrollment* as the variable of interest. However this approach can only provide supportive evidence, since age of university enrollment is correlated with the treatment. Therefore we also take a look at the descriptive statistics of the outcome variables separately for cohorts and age of university enrollment.

The results from these estimations (not shown, but available upon request) suggest that schooling as well as age effects are relevant. For the first main finding regarding *male students*, namely that learning academic contents has become easier, both effects apply. On the one hand, learning is easier for younger university students, which is in line with some other studies (Erdel, 2010; Pellizzari and Billari, 2012). On the other hand, G12 students show easier learning even for a given age of university enrollment. Therefore, this finding seems to be partly caused by the younger age of affected students, but also by an improvement in the efficiency of learning. With respect to the second main finding in the male sample – an increase in the burden of performance requirements – no connection with age can be observed, which suggests the duration of schooling as explanation. At first sight, both findings for male students seem to contradict each other. However, it could be the case that age and schooling have different impacts on different outcomes. Thus, on the one hand, learning is easier for younger university students, whereas on the other hand students with more schooling have more experience in dealing with stress arising from performance requirements. Another interpretation could be that affected students show easier learning *because* they feel more burdened by performance requirements, in the sense that requirements increase the motivation to learn. Last but not least, these two effects could also be explained by the results on skill deficits (see Table 10): easier learning could correspond to the lower probability of insufficient own efforts, while higher stress with performance requirements could be caused by a lower quality of study. However, we are not able to empirically test these considerations. With respect to *female students*, we also have identified two main findings. The first one – feeling less burdened by personal problems – does not reveal a clear age pattern, although older students tend to feel more burdened. Hence, both age and schooling seem to be relevant. Compared with this, the second finding of a higher probability of skill deficits can mostly be attributed to the shorter school duration, although younger G12 students are much more affected than older G12 students. Regarding health of university students, the effects seem to be caused more by age than by schooling. However, age works in opposite directions, with some advantages and some disadvantages for younger students. Younger females have fewer physical pain, whereas older males tend to feel less time pressure.

5 Conclusion

We have empirically investigated the effects of a large school reform that took place in the German state of Saxony-Anhalt between 2003 and 2007, which reduced the duration of secondary schooling by one year but left the curriculum unchanged. The implementation of the reform provides a clean natural experiment, which allows us to identify the effects of reduced school duration and increased learning intensity by comparing several post-secondary education outcomes of affected and non-affected students.

Our findings reveal a mixed picture. Students affected by the reform do not generally have more problems with studying at university. Female university students with only 12 years of schooling feel even less burdened by problems related to their personal life, and G12 males report easier learning of academic contents. However, a few negative effects are observed. The reform has increased the probability of females to face difficulties and skill deficits at university. For males, the stress with performance requirements and time pressure is raised. Moreover, especially students enrolled in the field of technological and natural sciences are more likely to have problems with learning and requirements of study.

The lower probability of personal problems when enrolled in university could be interpreted in the way that students affected by the reform are used to a more challenging education environment due to the higher learning intensity in secondary school. Thus, they could be trained better to cope with stress and challenges, at least with respect to their personal lives. This more challenging preparation could also have improved the learning abilities of male students. On the other hand, having more difficulties, skill deficits and problems with requirements of study indicates that students with only 12 years of schooling are not prepared as good for university education as students with 13 years of schooling. This interpretation is supported by the observation that G12 students tend to assess their preparation by school on average with a lower score than G13 students. The finding that these difficulties and problems are more pronounced for students with scientific-technological university subjects, is in line with two previous studies, which have shown that the reform has negatively affected achievement in mathematics at school graduation (Büttner and Thomsen, forthcoming) and the probability to study mathematics or natural sciences at university (Meyer and Thomsen, 2013).

The fear that students with a shorter school duration are more likely to drop-out of their chosen post-secondary education cannot be confirmed. Drop-out rates are similar between students with 12 and 13 years of schooling. If dropping-out is seen as an indicator of being overtaxed by university education or of bad decision making, both effects do not seem to apply to the reform. This is an important and possibly surprising finding. However, this does not mean that affected students have no problems with deciding on their post-school education, since female G12 students are more likely to delay university enrollment (Meyer and Thomsen, 2013). Moreover, this delay is responsible for the lower probability of affected females to have obtained a university degree by the end of 2011.

Altogether, our findings indicate that the duration of schooling and the learning intensity

experienced at school is, at least to some extent, relevant for success in tertiary education. On the one hand, the reduction of school duration does not lead to a general increase of study load and drop-out of university education. On the other hand, the higher probability of skill deficits and problems with study requirements indicates that preparation for university has suffered somewhat from the shorter school duration.

Acknowledgements

Financial support from the *German Research Foundation (DFG)*, projects TH 1499/2-1 and TH 1499/2-2, and the *Stifterverband für die Deutsche Wissenschaft (Claussen-Simon-Stiftung)* is gratefully acknowledged. This paper has benefited from discussions at the annual conferences of the European Society for Population Economics 2013 in Aarhus, the European Economic Association 2013 in Gothenburg and the European Association of Labour Economists 2013 in Torino, and from discussions at the research workshop of NIW Hannover. We would like to thank all discussants for their helpful comments.

Important research assistance was provided by Björn Jahnke, Valeriia Pishchanska and Antonia Reinecke in the preparation and implementation of the second wave of the survey, and by Kathleen Hoppe, Diem Nguyen, Christian Rusche and Christoph Wiese in the preparation of the data. We thank Bettina Büttner for valuable support in the preparation of the first and second wave of the survey.

References

- BARGEL, T., M. RAMM, AND F. MULTRUS (2012): “Schwierigkeiten und Belastungen im Bachelorstudium - wie berechtigt sind die studentischen Klagen,” *Beiträge zur Hochschulforschung*, 34(1), 26–41.
- BERTHOLD, C., G. GABRIEL, G. HERDIN, AND T. VON STUCKRAD (2011): “Hochschulpakt Phase 1 - eine Erfolgsstory?,” Arbeitspapier 147, Centrum für Hochschulentwicklung.
- BRIGGS, D. C. (2004): “Causal Inference and the Heckman Model,” *Journal of Educational and Behavioral Statistics*, 29(4), 397–420.
- BÜTTNER, B., H. THIEL, AND S. L. THOMSEN (2011): “Variation of Learning Intensity in Late Adolescence and the Impact on Noncognitive Skills,” ZEW Discussion Paper No. 11-007.
- BÜTTNER, B., AND S. L. THOMSEN (forthcoming): “Are We Spending Too Many Years in School? Causal Evidence of the Impact of Shortening Secondary School Duration,” *German Economic Review*.
- BUCHMANN, C., T. A. DIPRETE, AND A. MCDANIEL (2008): “Gender Inequalities in Education,” *Annual Review of Sociology*, 34, 319–337.
- CUNHA, F. (2009): “Crossing the Finish Line: A Review Article,” *Journal of Human Capital*, 3(4), 354–378.
- DE BELLIS, M. D., M. S. KESHAVAN, S. R. BEERS, J. HALL, K. FRUSTACI, A. MASALEHDAN, J. NOLL, AND A. M. BORING (2001): “Sex Differences in Brain Maturation During Childhood and Adolescence,” *Cerebral Cortex*, 11(6), 552–557.
- DOOLEY, M. D., A. A. PAYNE, AND A. L. ROBB (2012): “Persistence and Academic Success in University,” Canadian Labour Market and Skills Researcher Network, Working Paper No. 94.
- ERDEL, B. (2010): “Welche Determinanten beeinflussen den Studienerfolg?,” Berichte des Lehrstuhls für Soziologie und Empirische Sozialforschung 2010-2, Friedrich-Alexander-Universität Erlangen-Nürnberg.
- EURYDICE (2010): “Organisation of the education system in Germany 2009/2010,” European commission, Education, Audivisual & Culture Executive Agency (EACEA), Brussels.
- FEDERAL STATISTICAL OFFICE (n.y.a): “Statistisches Bundesamt, Fachserie 11 Reihe 4.1, Bildung und Kultur, Studierende an Hochschulen,” several years.
- (n.y.b): “Statistisches Bundesamt, Fachserie 11 Reihe 4.4, Bildung und Kultur, Personal an Hochschulen,” several years.

- GEORG, W. (2008): “Individuelle und institutionelle Faktoren der Bereitschaft zum Studienabbruch - eine Mehrebenenanalyse mit Daten des Konstanzer Studierendensurveys,” *Zeitschrift für Soziologie der Erziehung und Sozialisation*, 28(2), 191–206.
- HEINE, C., J. WILlich, H. SCHNEIDER, AND D. SOMMER (2009): “Studienqualität in Ost- und Westdeutschland - Eine Sekundäranalyse des Studienqualitätsmonitors 2008,” Projektbericht, HIS.
- HENN, G., AND C. POLACZEK (2007): “Studienerfolg in den Ingenieurwissenschaften,” *Das Hochschulwesen*, 55(5), 144–147.
- HEUBLEIN, U., C. HUTZSCH, J. SCHREIBER, D. SOMMER, AND G. BESUCH (2010): “Ursachen des Studienabbruchs in Bachelor- und in herkömmlichen Studiengängen,” *Forum Hochschule* 2/2010, HIS.
- HEUBLEIN, U., J. RICHTER, R. SCHMELZER, AND D. SOMMER (2012): “Die Entwicklung der Schwund- und Studienabbruchquoten an den deutschen Hochschulen,” *Forum Hochschule* 3/2012, HIS.
- KRASHINSKY, H. (2013): “How Would One Extra Year of High School Affect Academic Performance in University? Evidence from a Unique Policy Change,” *Canadian Journal of Economics*, forthcoming.
- KULTUSMINISTERKONFERENZ (2004): “Einordnung der Bachelorausbildungsgänge an Berufsakademien in die konsekutive Studienstruktur,” Beschluss der Kultusministerkonferenz vom 15.10.2004, http://www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2004/2004_10_15-Bachelor-Berufsakademie-Studienstruktur.pdf.
- MEYER, T., AND S. L. THOMSEN (2013): “How Important is Secondary School Duration for Post-School Education Decisions? Evidence from a Natural Experiment,” NIW Discussion Paper No. 6.
- MINISTRY OF EDUCATION AND CULTURAL AFFAIRS OF SAXONY-ANHALT (2007): “Hochschulen in Sachsen-Anhalt stellen Studienplätze für 2000 zusätzliche Studienanfänger bereit,” Press Release No. 163/07, July 20, 2007.
- MORIN, L.-P. (2013): “Estimating the benefit of high school for university-bound students: evidence of subject-specific human capital accumulation,” *Canadian Journal of Economics*, 46(2), 441–468.
- NORTON, E. C., H. WANG, AND C. AI (2004): “Computing interaction effects and standard errors in logit and probit models,” *The Stata Journal*, 4(2), 154–167.
- OECD (2010): *Learning for Jobs*, OECD Reviews of Vocational Education and Training. OECD Publishing, Paris.

- PELLIZZARI, M., AND F. BILLARI (2012): “The younger, the better? Age-related differences in academic performance at university,” *Journal of Population Economics*, 25(2), 697–739.
- RAMM, M., F. MULTRUS, AND T. BARGEL (2011): “Studiensituation und studentsiche Orientierungen. 11. Studierendensurvey an Universitäten und Fachhochschulen,” Bericht, Bundesministerium für Bildung und Forschung.
- ROBOTHAM, D. (2008): “Stress among higher education students: towards a research agenda,” *Higher Education*, 56(6), 735–746.
- SPANGENBERG, H., M. BEUSSE, AND C. HEINE (2011): “Nachschulische Werdegänge des Studienberechtigtenjahrgangs 2006 - Dritte Befragung der studienberechtigten Schulabgänger/innen 2006 3 1/2 Jahre nach Schulabschluss im Zeitvergleich,” Forum Hochschule 18/2011, HIS.
- STATISTICAL OFFICE OF SAXONY-ANHALT (2011): “Schulabgängerinnen und Schulabgänger nach Abschlussarten seit dem Schuljahr 1991/92,” Statistisches Landesamt Sachsen-Anhalt, Halle (Saale), http://www.stala.sachsen-anhalt.de/Internet/Home/Daten_und_Fakten/2/21/211/21111/Schulabgaenger_-innen_nach_Abschlussarten.html (update 26/10/2011).
- UNESCO (1997): “International Standard Classification of Education - ISCED 1997,” http://www.unesco.org/education/information/nfsunesco/doc/isced_1997.htm.
- VINCENT-LANCRIN, S. (2008): “The Reversal of Gender Inequalities in Higher Education: An On-going Trend,” in *Higher Education to 2030, Volume 1: Demography*, ed. by OECD, pp. 265–298. OECD Publishing, Paris.
- WILLICH, J., D. BUCK, C. HEINE, AND D. SOMMER (2011): “Studienanfänger im Wintersemester 2009/10 - Wege zum Studium, Studien- und Hochschulwahl, Situation bei Studienbeginn,” Forum Hochschule 6/2011, HIS.
- WIN, R., AND P. W. MILLER (2005): “The Effects of Individual and School Factors on University Students’ Academic Performance,” *Australian Economic Review*, 38(1), 1–18.
- ZAFAR, B. (2009): “College Major Choice and the Gender Gap,” Federal Reserve Bank of New York, Staff Report 364.
- ZWICK, T. (2012): “Determinants of Individual Academic Achievement - Group Selectivity Effects Have Many Dimensions,” ZEW Discussion Paper No. 12-081.

Tables and Figures

Table 1: Means of Selected Background Characteristics of Students by Year and Gender (1st Survey Wave)

| | Female Sample | | | Male Sample | | |
|---|---------------|---------|------------------------------|-------------|---------|------------------------------|
| | Year 12 | Year 13 | <i>p</i> -value ^a | Year 12 | Year 13 | <i>p</i> -value ^a |
| <i>Preschool Experiences</i> | | | | | | |
| Country of Birth: Germany ^b | 0.98 | 0.99 | (0.65) | 0.99 | 0.98 | (0.93) |
| Number of Siblings | 0.91 | 0.94 | (0.69) | 1.01 | 0.91 | (0.36) |
| Childhood mostly with Both Parents ^{b,c} | 0.83 | 0.83 | (0.98) | 0.83 | 0.76 | (0.14) |
| Attendance of Day Nursery ^b | 0.88 | 0.86 | (0.66) | 0.80 | 0.83 | (0.65) |
| Attendance of Day Nursery for more than 2 Years ^b | 0.20 | 0.17 | (0.48) | 0.18 | 0.19 | (0.92) |
| Attendance of Kindergarten ^b | 0.99 | 0.99 | (0.61) | 0.99 | 0.98 | (0.28) |
| Attendance of Kindergarten for more than 2 Years ^b | 0.92 | 0.90 | (0.48) | 0.82 | 0.82 | (0.95) |
| <i>School Achievements before Reform Introduction</i> | | | | | | |
| Age at School Enrollment | 6.12 | 6.19 | (0.06) | 6.22 | 6.22 | (0.96) |
| Primary School in Saxony-Anhalt ^b | 0.98 | 0.99 | (0.22) | 0.97 | 0.99 | (0.21) |
| Average Grade in Year 7 ^d | 2.14 | 2.20 | (0.28) | 2.27 | 2.36 | (0.22) |
| Mathematics Grade in Year 7 ^d | 2.32 | 2.29 | (0.60) | 2.14 | 2.19 | (0.59) |
| <i>Education of Parents and Siblings</i> | | | | | | |
| Academic Degree of Father | 0.43 | 0.44 | (0.91) | 0.44 | 0.52 | (0.20) |
| Academic Degree of Mother | 0.50 | 0.49 | (0.78) | 0.43 | 0.54 | (0.07) |
| Academic Degree of at least one Sibling | 0.24 | 0.30 | (0.15) | 0.22 | 0.18 | (0.40) |
| <i>Occupation of Parents^b (categorical)</i> | | | | | | |
| Father: Not employed | 0.06 | 0.10 | | 0.04 | 0.09 | |
| Father: Blue-/White-collar Worker | 0.69 | 0.69 | | 0.79 | 0.70 | |
| Father: Civil Servant | 0.07 | 0.05 | | 0.04 | 0.07 | |
| Father: Self-employed | 0.18 | 0.16 | (0.35) | 0.13 | 0.14 | (0.26) |
| Mother: Not employed | 0.09 | 0.08 | | 0.09 | 0.07 | |
| Mother: Blue-/White-collar Worker | 0.76 | 0.79 | | 0.74 | 0.74 | |
| Mother: Civil Servant | 0.06 | 0.07 | | 0.08 | 0.11 | |
| Mother: Self-employed | 0.09 | 0.06 | (0.73) | 0.09 | 0.08 | (0.89) |
| <i>Occupation of Parents</i> | | | | | | |
| Leading Occupational Position of Father ^b | 0.34 | 0.35 | (0.80) | 0.35 | 0.31 | (0.53) |
| Leading Occupational Position of Mother ^b | 0.21 | 0.23 | (0.54) | 0.21 | 0.27 | (0.21) |
| Unemployment of Father (during childhood) ^e | 0.23 | 0.31 | (0.04) | 0.22 | 0.27 | (0.32) |
| Unemployment of Mother (during childhood) ^e | 0.27 | 0.28 | (0.80) | 0.32 | 0.28 | (0.39) |
| <i>Leisure Activities of Parents^f</i> | | | | | | |
| Father: Cultural Events | 0.23 | 0.20 | (0.54) | 0.23 | 0.22 | (0.78) |
| Father: Active Sports | 0.49 | 0.41 | (0.10) | 0.47 | 0.51 | (0.53) |
| Father: Honorary Activities | 0.15 | 0.14 | (0.81) | 0.16 | 0.25 | (0.11) |
| Mother: Cultural Events | 0.34 | 0.32 | (0.71) | 0.37 | 0.39 | (0.74) |
| Mother: Active Sports | 0.52 | 0.48 | (0.44) | 0.56 | 0.46 | (0.10) |
| Mother: Honorary Activities | 0.15 | 0.13 | (0.56) | 0.13 | 0.16 | (0.57) |
| <i>Number of Books of Parents (categorical)</i> | | | | | | |
| 0 to 100 | 0.26 | 0.26 | | 0.33 | 0.30 | |
| 101 to 500 | 0.50 | 0.55 | | 0.37 | 0.38 | |
| More than 500 | 0.23 | 0.19 | (0.51) | 0.30 | 0.32 | (0.89) |
| <i>N</i> | 219 | 232 | | 139 | 127 | |

^a *p*-value from *t*-test on equality of means; for categorical variables: *p*-value from Pearson χ^2 -test of independence. Values are shown in parenthesis for better readability.

^b Variables only available in the 1st wave.

^c Living with both parents at least one half of childhood.

^d Grades range from 1 (excellent) to 6 (failed), i.e. lower grades indicate higher achievement.

^e Occurrence of unemployment during childhood of students.

^f Leisure activities: practised at least monthly

Table 2: Means of Selected Background Characteristics of Students by Year and Gender (2nd Survey Wave)

| | Female Sample | | | Male Sample | | |
|---|---------------|---------|-------------------------|-------------|---------|-------------------------|
| | Year 12 | Year 13 | p -value ^a | Year 12 | Year 13 | p -value ^a |
| <i>School Achievements before Reform Introduction</i> | | | | | | |
| Age at School Enrollment | 6.13 | 6.21 | (0.07) | 6.20 | 6.20 | (1.00) |
| Average Grade in Year 7 ^b | 2.14 | 2.23 | (0.16) | 2.18 | 2.36 | (0.03) |
| Mathematics Grade in Year 7 ^b | 2.30 | 2.33 | (0.64) | 2.13 | 2.17 | (0.75) |
| <i>Education of Parents and Siblings</i> | | | | | | |
| Academic Degree of Father | 0.42 | 0.44 | (0.69) | 0.56 | 0.47 | (0.27) |
| Academic Degree of Mother | 0.54 | 0.47 | (0.21) | 0.49 | 0.58 | (0.24) |
| Academic Degree of at least one Sibling | 0.26 | 0.29 | (0.49) | 0.28 | 0.19 | (0.18) |
| <i>Number of Books of Parents (categorical)</i> | | | | | | |
| 0 to 100 | 0.22 | 0.22 | | 0.33 | 0.27 | |
| 101 to 500 | 0.55 | 0.58 | | 0.33 | 0.43 | |
| More than 500 | 0.24 | 0.21 | (0.77) | 0.33 | 0.30 | (0.44) |
| <i>N</i> | 182 | 179 | | 79 | 89 | |

^a p -value from t -test on equality of means; for categorical variables: p -value from Pearson χ^2 -test of independence. Values are shown in parenthesis for better readability.

^b Grades range from 1 (excellent) to 6 (failed), i.e. lower grades indicate higher achievement.

Table 3: Means of Selected Background Characteristics of Students by Year and Gender (2nd Survey Wave, with Sampling Weights)

| | Female Sample | | | Male Sample ^c | | |
|---|---------------|---------|-------------------------|--------------------------|---------|-------------------------|
| | Year 12 | Year 13 | p -value ^a | Year 12 | Year 13 | p -value ^a |
| <i>School Achievements before Reform Introduction</i> | | | | | | |
| Age at School Enrollment | 6.13 | 6.21 | (0.07) | 6.19 | 6.20 | (0.90) |
| Average Grade in Year 7 ^b | 2.14 | 2.23 | (0.16) | 2.24 | 2.36 | (0.15) |
| Mathematics Grade in Year 7 ^b | 2.30 | 2.33 | (0.64) | 2.19 | 2.17 | (0.89) |
| <i>Education of Parents and Siblings</i> | | | | | | |
| Academic Degree of Father | 0.42 | 0.44 | (0.69) | 0.55 | 0.47 | (0.29) |
| Academic Degree of Mother | 0.54 | 0.47 | (0.21) | 0.49 | 0.58 | (0.21) |
| Academic Degree of at least one Sibling | 0.26 | 0.29 | (0.49) | 0.24 | 0.19 | (0.46) |
| <i>Number of Books of Parents (categorical)</i> | | | | | | |
| 0 to 100 | 0.22 | 0.22 | | 0.33 | 0.27 | |
| 101 to 500 | 0.55 | 0.58 | | 0.33 | 0.43 | |
| More than 500 | 0.24 | 0.21 | (0.77) | 0.33 | 0.30 | (0.44) |
| <i>N</i> | 182 | 179 | | 79 | 89 | |

^a p -value from t -test on equality of means; for categorical variables: p -value from Pearson χ^2 -test of independence. Values are shown in parenthesis for better readability.

^b Grades range from 1 (excellent) to 6 (failed), i.e. lower grades indicate higher achievement.

^c Male sample is weighted according to the 1st survey wave.

Table 4: Means of Selected Background Characteristics of Students by Year and Gender (2nd Survey Wave, only University Students, with Sampling Weights)

| | Female Sample | | | Male Sample ^c | | |
|---|---------------|---------|------------------------------|--------------------------|---------|------------------------------|
| | Year 12 | Year 13 | <i>p</i> -value ^a | Year 12 | Year 13 | <i>p</i> -value ^a |
| <i>School Achievements before Reform Introduction</i> | | | | | | |
| Age at School Enrollment | 6.10 | 6.21 | (0.03) | 6.22 | 6.15 | (0.40) |
| Average Grade in Year 7 ^b | 2.14 | 2.19 | (0.47) | 2.20 | 2.29 | (0.32) |
| Mathematics Grade in Year 7 ^b | 2.29 | 2.28 | (0.92) | 2.12 | 2.10 | (0.87) |
| <i>Education of Parents and Siblings</i> | | | | | | |
| Academic Degree of Father | 0.47 | 0.47 | (1.00) | 0.59 | 0.51 | (0.35) |
| Academic Degree of Mother | 0.55 | 0.48 | (0.20) | 0.50 | 0.63 | (0.12) |
| Academic Degree of at least one Sibling | 0.28 | 0.30 | (0.70) | 0.26 | 0.18 | (0.27) |
| <i>Number of Books of Parents (categorical)</i> | | | | | | |
| 0 to 100 | 0.19 | 0.22 | | 0.28 | 0.21 | |
| 101 to 500 | 0.56 | 0.54 | | 0.37 | 0.45 | |
| More than 500 | 0.25 | 0.24 | (0.78) | 0.35 | 0.34 | (0.53) |
| <i>N</i> | 146 | 146 | | 69 | 71 | |

^a *p*-value from *t*-test on equality of means; for categorical variables: *p*-value from Pearson χ^2 -test of independence.

Values are shown in parenthesis for better readability.

^b Grades range from 1 (excellent) to 6 (failed), i.e. lower grades indicate higher achievement.

^c Male sample is weighted according to the 1st survey wave.

Table 5: Post-School Education of Students by Year and Gender

| | Female Sample | | | Male Sample | | |
|--|---------------|---------|------------------------------|-------------|---------|------------------------------|
| | Year 12 | Year 13 | <i>p</i> -value ^a | Year 12 | Year 13 | <i>p</i> -value ^a |
| <i>University Education^b</i> | | | | | | |
| University Education (at least once) | 0.82 | 0.82 | (0.82) | 0.88 | 0.81 | (0.17) |
| Start of University Education in 2007 | 0.44 | 0.60 | (0.00) | 0.24 | 0.27 | (0.67) |
| Start of University Education in 2008 | 0.18 | 0.14 | (0.35) | 0.49 | 0.40 | (0.25) |
| Start of University Education in 2009-2011 | 0.19 | 0.08 | (0.00) | 0.14 | 0.12 | (0.77) |
| <i>Vocational Education^c</i> | | | | | | |
| Vocational Education (at least once) | 0.39 | 0.32 | (0.14) | 0.29 | 0.35 | (0.43) |
| Start of Vocational Education in 2007 | 0.25 | 0.17 | (0.08) | 0.14 | 0.19 | (0.37) |
| Start of Vocational Education in 2008 | 0.09 | 0.08 | (0.89) | 0.11 | 0.08 | (0.44) |
| Start of Vocational Education in 2009-2011 | 0.05 | 0.06 | (0.79) | 0.04 | 0.08 | (0.27) |
| <i>Institution of University Education^d</i> | | | | | | |
| University | 0.75 | 0.77 | (0.68) | 0.70 | 0.77 | (0.29) |
| University of Applied Sciences | 0.18 | 0.20 | (0.65) | 0.30 | 0.18 | (0.10) |
| Professional College | 0.08 | 0.04 | (0.21) | 0.04 | 0.04 | (0.97) |
| <i>Subject of University Education^e</i> | | | | | | |
| Humanities | 0.19 | 0.24 | (0.32) | 0.12 | 0.13 | (0.85) |
| Education and Social Sciences | 0.24 | 0.18 | (0.25) | 0.13 | 0.08 | (0.38) |
| Law and Economics | 0.23 | 0.19 | (0.39) | 0.13 | 0.18 | (0.40) |
| Natural Sciences and Mathematics | 0.09 | 0.17 | (0.04) | 0.16 | 0.15 | (0.94) |
| Engineering | 0.12 | 0.13 | (0.86) | 0.45 | 0.42 | (0.75) |
| Medical Sciences | 0.14 | 0.06 | (0.03) | 0.06 | 0.06 | (0.97) |
| <i>Characteristics of University Education^f</i> | | | | | | |
| Type of Study: Bachelor Degree | 0.73 | 0.77 | (0.42) | 0.78 | 0.72 | (0.38) |
| Working during Semester (at least 10 h/week) | 0.19 | 0.23 | (0.44) | 0.12 | 0.18 | (0.28) |
| Vocational Education prior to University | 0.13 | 0.04 | (0.00) | 0.05 | 0.09 | (0.33) |
| <i>N</i> | 182 | 179 | | 79 | 89 | |

^a *p*-value from *t*-test on equality of means. Values are shown in parenthesis for better readability.

^b Share of students enrolled in a university, a university of applied sciences or a professional college.

^c Share of students enrolled in an apprenticeship or a vocational/professional school.

^d Share of *university students* enrolled (in their first study) in each type of university.

^e Share of *university students* enrolled (in their first study) in each subject field. (Note that students could study more than one subject, which explains differences in the sum of all subjects.)

^f Share of *university students* studying in a Bachelor programme, working more than 10 hours per week during the semester (for at least three semesters), and having completed a vocational education before attending university.

Table 6: Success in Post-School Education by Year and Gender

| | Female Sample | | | Male Sample | | |
|--|---------------|-------------|------------------------------|-------------|-------------|------------------------------|
| | Year 12 | Year 13 | <i>p</i> -value ^a | Year 12 | Year 13 | <i>p</i> -value ^a |
| <i>Studying in University Education^b</i> | | | | | | |
| Working Hard and Intensively | 2.83 | 2.91 | (0.38) | 2.67 | 2.59 | (0.55) |
| Having Good Organisational Abilities | 2.92 | 2.97 | (0.55) | 2.65 | 2.76 | (0.42) |
| Learning Easily Academic Contents | 2.71 | 2.77 | (0.44) | 2.90 | 2.66 | (0.04) |
| Often Nervous Before Exams | 2.21 | 2.04 | (0.14) | 1.82 | 1.97 | (0.31) |
| Achieving a Good Degree is Important | 3.37 | 3.34 | (0.75) | 3.16 | 3.19 | (0.84) |
| Achieving a Degree Fastly is Important | 2.63 | 2.62 | (0.92) | 2.51 | 2.67 | (0.34) |
| <i>Study Load in University Education^c</i> | | | | | | |
| Performance Requirements | 2.83 | 2.87 | (0.67) | 3.00 | 2.84 | (0.27) |
| Orientation Problems | 2.14 | 1.97 | (0.19) | 1.60 | 1.99 | (0.05) |
| Anonymity at University | 1.60 | 1.42 | (0.18) | 1.62 | 1.61 | (0.96) |
| Forthcoming Exams | 2.90 | 2.80 | (0.34) | 2.72 | 2.81 | (0.51) |
| Personal Financial Situation | 2.04 | 2.19 | (0.24) | 1.77 | 1.97 | (0.25) |
| Personal Problems | 1.73 | 2.10 | (0.00) | 1.59 | 1.73 | (0.45) |
| Health Problems | 1.08 | 1.14 | (0.63) | 1.19 | 1.04 | (0.33) |
| Absence of a Partner Relationship | 0.95 | 1.12 | (0.17) | 1.28 | 1.40 | (0.53) |
| Uncertain Career Prospects | 1.60 | 1.67 | (0.55) | 1.22 | 1.27 | (0.78) |
| <i>Health in University Education^d</i> | | | | | | |
| Feeling Time Pressure | 2.40 | 2.39 | (0.89) | 2.45 | 2.23 | (0.24) |
| Feeling Dejected and Gloomy | 1.53 | 1.82 | (0.01) | 1.76 | 1.48 | (0.11) |
| Having Severe Physical Pain | 0.61 | 0.78 | (0.07) | 0.39 | 0.49 | (0.31) |
| Feeling Calm and Balanced | 2.40 | 2.20 | (0.11) | 2.31 | 2.50 | (0.32) |
| Feeling Energetic | 2.12 | 1.94 | (0.10) | 2.24 | 2.11 | (0.42) |
| <i>Deficits in University Education</i> | | | | | | |
| Existence of Difficulties and Skill Deficits ^e | 0.72 | 0.61 | (0.06) | 0.72 | 0.76 | (0.66) |
| Reason for Difficulties: Bad Preparation by School | 0.12 | 0.06 | (0.07) | 0.16 | 0.10 | (0.29) |
| Reason for Difficulties: Insufficient Own Efforts | 0.22 | 0.22 | (1.00) | 0.29 | 0.42 | (0.10) |
| Reason for Difficulties: Poor Quality of Study | 0.26 | 0.23 | (0.59) | 0.22 | 0.14 | (0.24) |
| Preparation to University by Secondary School ^f | 2.92 | 2.78 | (0.28) | 3.06 | 2.76 | (0.13) |
| <i>Drop-out of Post-Secondary Education^g</i> | | | | | | |
| Drop-out of Vocational Education | 0.11 | 0.12 | (0.86) | 0.26 | 0.06 | (0.05) |
| Drop-out of First University Education | 0.19 | 0.19 | (0.95) | 0.23 | 0.21 | (0.77) |
| Drop-out of First Post-Secondary Education | 0.17 | 0.17 | (0.85) | 0.27 | 0.18 | (0.18) |
| Deciding Again on the Same University Education ^h | 0.56 | 0.44 | (0.04) | 0.53 | 0.55 | (0.83) |
| <i>Completion of Post-Secondary Education</i> | | | | | | |
| Completion of Vocational Education ⁱ | 0.80 | 0.79 | (0.85) | 0.61 | 0.77 | (0.19) |
| Completion of University Education ⁱ | 0.34 | 0.46 | (0.04) | 0.22 | 0.25 | (0.62) |
| <i>Final Grade of Completed University Education</i> | | | | | | |
| Very Good | 0.25 | 0.21 | | 0.13 | 0.12 | |
| Good | 0.60 | 0.72 | | 0.60 | 0.69 | |
| Satisfactory | 0.15 | 0.07 | (0.35) | 0.27 | 0.19 | (0.86) |
| <i>N</i> | 182 | 179 | | 79 | 89 | |

^a *p*-value from *t*-test on equality of means; for categorical variables: *p*-value from Pearson χ^2 -test of independence. Values are shown in parenthesis for better readability.

^b Mean of self-evaluation on a Likert-scale, ranging from 4 (fully applicable) to 1 (not applicable).

^c Mean of self-evaluation on a Likert-scale, ranging from 4 (feeling strong pressure) to 1 (feeling no pressure) and 0 (problem not existent).

^d Mean of self-evaluation on a Likert-scale, ranging from 4 (more than 2 or 3 times a week) to 0 (never).

^e Share of students with difficulties and skill deficits in university education (and main reason for difficulties).

^f Mean of students' evaluation of the preparation to university by school, ranging from 1 (excellent) to 6 (inadequate), i.e. a lower grade indicates better evaluation.

^g Share of students dropping out of their vocational education, first university education and first started post-secondary education (university and vocational education).

^h Share of students that would decide once again on the same university education as they already had decided.

ⁱ Share of students that completed their vocational or university education (at least one degree) by the end of the year 2011.

Table 7: Studying in University Education (Ordered Probit Estimates)

| Independent Variables | Female Sample | | Male Sample | |
|---|-------------------|-------------------|--------------------|--------------------|
| | Spec. A Coeff. | Spec. B Coeff. | Spec. A Coeff. | Spec. B Coeff. |
| D: Working Hard and Intensively | -0.160 (0.132) | -0.179 (0.137) | 0.053 (0.192) | 0.122 (0.195) |
| D: Having Good Organisational Abilites | -0.127 (0.110) | -0.120 (0.120) | -0.172 (0.205) | -0.183 (0.211) |
| D: Learning Easily Academic Contents | -0.140 (0.117) | -0.160 (0.113) | 0.487** (0.202) | 0.512** (0.215) |
| D: Often Nervous Before Exams | 0.210 (0.142) | 0.213 (0.143) | -0.300 (0.219) | -0.359 (0.225) |
| D: Achieving a Good Degree is Important | 0.025 (0.112) | -0.041 (0.117) | -0.174 (0.261) | -0.185 (0.265) |
| D: Achieving a Degree Fastly is Important | 0.054 (0.125) | 0.016 (0.136) | -0.151 (0.210) | -0.091 (0.221) |
| <i>N</i> | 278 | 276 | 133 | 133 |

- Dependent variable: Categorical variables indicating manner of learning and studying in first university education, ranging from 4 (statement fully applicable) to 1 (statement not applicable).
- Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.
- All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below coefficients. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Study Load in University Education (Ordered Probit Estimates)

| Independent Variables | Female Sample | | Male Sample | |
|--------------------------------------|----------------------|----------------------|---------------------|--------------------|
| | Spec. A Coeff. | Spec. B Coeff. | Spec. A Coeff. | Spec. B Coeff. |
| D: Performance Requirements | -0.024 (0.116) | 0.024 (0.126) | 0.308 (0.191) | 0.426** (0.204) |
| D: Orientational Problems | 0.175 (0.127) | 0.256** (0.130) | -0.401* (0.214) | -0.425* (0.220) |
| D: Anonymity at University | 0.143 (0.132) | 0.194 (0.134) | -0.123 (0.165) | -0.209 (0.175) |
| D: Forthcoming Exams | 0.099 (0.115) | 0.138 (0.120) | -0.165 (0.206) | -0.235 (0.205) |
| D: Personal Financial Situation | -0.168 (0.119) | -0.202 (0.135) | -0.373** (0.177) | -0.331* (0.184) |
| D: Personal Problems | -0.400*** (0.134) | -0.430*** (0.133) | -0.173 (0.206) | -0.238 (0.206) |
| D: Health Problems | -0.078 (0.126) | -0.112 (0.118) | 0.032 (0.202) | 0.013 (0.196) |
| D: Absence of a Partner Relationship | -0.228* (0.132) | -0.208* (0.125) | -0.207 (0.194) | -0.216 (0.205) |
| D: Uncertain Career Prospects | -0.000 (0.110) | -0.009 (0.125) | -0.017 (0.191) | -0.037 (0.196) |
| <i>N</i> | 277 | 275 | 132 | 132 |

- Dependent variable: Categorical variables indicating study load in first university education, ranging from 4 (feeling strong pressure) to 1 (feeling no pressure) and 0 (problem not existent).
- Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.
- All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below coefficients. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Health in University Education (Ordered Probit Estimates)

| Independent Variables | Female Sample | | Male Sample | |
|--------------------------------|--------------------|---------------------|--------------------|--------------------|
| | Spec. A Coeff. | Spec. B Coeff. | Spec. A Coeff. | Spec. B Coeff. |
| D: Feeling Time Pressure | 0.051 (0.150) | 0.084 (0.155) | 0.363** (0.149) | 0.370** (0.161) |
| D: Feeling Dejected and Gloomy | -0.239 (0.151) | -0.232 (0.143) | 0.342 (0.219) | 0.277 (0.234) |
| D: Having Severe Physical Pain | -0.252* (0.143) | -0.285** (0.142) | -0.106 (0.247) | -0.057 (0.248) |
| D: Feeling Calm and Balanced | 0.148 (0.128) | 0.175 (0.130) | -0.191 (0.168) | -0.223 (0.187) |
| D: Feeling Energetic | 0.182 (0.112) | 0.141 (0.113) | 0.155 (0.157) | 0.193 (0.169) |
| <i>N</i> | 274 | 272 | 134 | 133 |

- Dependent variable: Categorical variables indicating health assessment in university education, ranging from 4 (more than 2 or 3 times a week) to 0 (never).
- Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.
- All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below coefficients. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Difficulties and Skill Deficits in University Education (Probit Estimates, Marginal Effects)

| Independent Variables | Female Sample | | Male Sample | |
|---------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | Spec. A Marg. eff. | Spec. B Marg. eff. | Spec. A Marg. eff. | Spec. B Marg. eff. |
| D: Existence of Difficulties/Deficits | 0.137*** (0.046) | 0.141*** (0.048) | -0.028 (0.083) | -0.058 (0.080) |
| D: Reason - Bad Preparation by School | 0.061* (0.035) | 0.071* (0.040) | 0.036 (0.051) | 0.066 (0.055) |
| D: Reason - Insufficient Own Efforts | 0.015 (0.046) | 0.019 (0.050) | -0.130* (0.074) | -0.178** (0.080) |
| D: Reason - Poor Quality of Study | 0.049 (0.048) | 0.047 (0.046) | 0.135** (0.058) | 0.137** (0.063) |
| <i>N</i> | 252-279 | 250-277 | 123-132 | 118-131 |

- Dependent variable: Dummy indicating the existence of and main reasons for difficulties and skill deficits in first university education.
- Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.
- Marginal effects are average marginal effects. All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below marginal effects. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 11: Preparation for University Education by Secondary School (Regression/Probit Estimates, Marginal Effects)

| Independent Variables | Female Sample | | Male Sample | |
|---|---------------|------------|-------------|------------|
| | Spec. A | Spec. B | Spec. A | Spec. B |
| | Marg. eff. | Marg. eff. | Marg. eff. | Marg. eff. |
| D: Preparation to University (Score) ^a | -0.186* | -0.135 | -0.171 | -0.177 |
| | (0.102) | (0.111) | (0.178) | (0.178) |
| D: Preparation to University (Dummy) ^b | -0.082 | -0.048 | -0.107 | -0.082 |
| | (0.052) | (0.056) | (0.096) | (0.080) |
| <i>N</i> | 277 | 276 | 129 | 128 |

^a Dependent variable: Standardized score of the evaluation of preparation to university by school (a higher score indicates better evaluation).

^b Dependent variable: Dummy indicating a good or very good evaluation of preparation to university by school.

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.

· Marginal effects are average marginal effects. All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below marginal effects. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 12: Drop-out of Post-Secondary Education (Probit Estimates, Marginal Effects)

| Independent Variables | Female Sample | | Male Sample | |
|---|---------------|------------|-------------|------------|
| | Spec. A | Spec. B | Spec. A | Spec. B |
| | Marg. eff. | Marg. eff. | Marg. eff. | Marg. eff. |
| D: Drop-out of Vocational Education ^a | -0.058 | – | – | – |
| | (0.055) | | | |
| <i>N</i> | 110 | | | |
| D: Drop-out of First University Education ^b | 0.010 | 0.014 | -0.001 | -0.045 |
| | (0.050) | (0.052) | (0.084) | (0.084) |
| <i>N</i> | 276 | 274 | 126 | 118 |
| D: Drop-out of First Post-secondary Education ^c | -0.018 | -0.004 | 0.092 | 0.041 |
| | (0.039) | (0.056) | (0.064) | (0.081) |
| <i>N</i> | 344 | 249 | 155 | 125 |
| D: Deciding Again on Same University Education ^d | 0.103* | 0.051 | 0.026 | 0.072 |
| | (0.053) | (0.051) | (0.083) | (0.084) |
| <i>N</i> | 270 | 269 | 133 | 133 |

^a Dependent variable: Dummy indicating drop-out of vocational education (only Specification A for female students, since Specification B refers to university education and the male sample includes only 54 students with vocational education).

^b Dependent variable: Dummy indicating drop-out of first university education.

^c Dependent variable: Dummy indicating drop-out of first post-secondary education (university and vocational education).

^d Dependent variable: Dummy indicating whether a student would decide once again on the same university education as already decided.

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.

· Marginal effects are average marginal effects. All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below marginal effects. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 13: Completion of Post-Secondary Education (Probit Estimates, Marginal Effects)

| Independent Variables | Female Sample | | Male Sample | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| | Spec. A Marg. eff. | Spec. B Marg. eff. | Spec. A Marg. eff. | Spec. B Marg. eff. |
| D: Completion of Vocational Education ^a | -0.040 (0.069) | – | – | – |
| <i>N</i> | 121 | | | |
| D: Completion of University Education ^b | -0.109* (0.058) | -0.018 (0.049) | -0.052 (0.089) | -0.074 (0.083) |
| <i>N</i> | 279 | 277 | 111 | 102 |
| D: Grade of Completed University Education ^c | -0.222 (0.161) | -0.276 (0.184) | – | – |
| <i>N</i> | 112 | 111 | | |

^a Dependent variable: Dummy indicating completion of vocational education by the end of 2011 (only Specification A for female students, since Specification B refers to university education and the male sample includes only 54 students with vocational education).

^b Dependent variable: Dummy indicating completion of university education (at least one degree) by the end of 2011.

^c Dependent variable: Standardized final grade of completed university education. A higher grade indicates better achievement.

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.

· Marginal effects are average marginal effects. All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below marginal effects. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

A Appendix

The following section contains an overview of the available information provided by both waves of the survey.

The 101 questions of the first survey can be divided into the following categories:

1. *Personal information:* The first set of questions covers certain personal characteristics of the student, such as date of birth, gender, legal address, place of residence during schooling, number of relocations, nationality, number of close friends, etc.
2. *Family background:* This category provides details concerning the family of the student, including information about the parents, the siblings, and the household in general. Information about the father and the mother are separate and cover such items as: age, death, divorce, change of partners, school and occupational education, occupational position, unemployment and personal involvements, e.g. cultural, political, religious, or sport. The family background includes household details, including the number of books owned by the parents and other relevant equipment in the household and the use of these items by the student. Information about the siblings of the student includes: number, gender, age and education.
3. *Schooling:* Included are general information about the age of school enrollment, the duration of pre-school, primary and secondary schooling, changes of residence during that time and grade repetition. Detailed information contains the curriculum of the student, for example grades in main subjects in year 7, the duration and number of foreign languages learned at school, information on natural sciences, and details of additional in-school education which the students attained. Furthermore, a number of questions is devoted to assessing the stress and burden of schooling on the students, an assessment of the skills learned at school and the evaluation of teaching these skills at school.
4. *Education outside school:* Classes at school provide a relevant part of individual's education but many students participate in a number of educational activities outside school. These activities comprise, for example, music classes, sports, student newspapers, political activities, etc. Information on different activities and the number of years of these activities is provided in this category.
5. *Last year of school and graduation:* Questions describing the last year of school and graduation cover the class size, the types of the main courses (basic courses and courses taught at an advanced level with more hours per week), the final examination score in each of these courses, the overall achievement score, activities outside school (working, homework, etc.), the state of health during the last year of school, spending of leisure time and leisure activities (dating friends, reading, chatting, etc.), and consumption of alcoholic beverages and smoking behavior.

6. *Support from parents, teachers and other persons:* This category comprises the incidence and amount of support with schooling tasks and homework from close relatives, particularly the parents, teachers, and other persons such as friends, siblings and peers.
7. *Education after graduation:* Since students graduated in 2007, about 18 months passed between graduation and the date of the first survey. The activities that took place during that time are reported in a retrospective monthly calendar covering various states of education, employment, civil and military service, and time spent abroad. In addition, information is provided on the financing of living today, the type of education (apprenticeship, university or university of applied sciences studies), the university subject, the degree aspired to (e.g., Bachelor, Master, PhD), and reasons for the choice of education program.
8. *Assessment of school:* In this category the students were asked to assess the value of schooling for different skills: logical thinking, independence, ability to accept criticism, cooperation in teamwork, practical skills, technical skills, etc. In addition, several items evaluating the relationship between teachers and students were collected.
9. *Attitudes and non-cognitive skills:* Information concerning various items was collected in order to identify certain aspects of the student's personality. The set of items could be used to derive measures of non-cognitive skill levels.

The questionnaire of the second survey includes about 110 (additional) questions, which can be categorized as follows:

1. *Family background:* In order to complete the data of the first wave, information was collected on the subject of university or vocational education of father and mother, as well as an on the intended and completed university or vocational education of siblings.
2. *Education plans and activities after school graduation:* The activities that took place between school graduation and the time of the second survey (November and December 2011) are reported in a retrospective quarterly calendar, which covers several types of post-secondary education and employment, civil and military service, time spent abroad, parental leave and care of relatives. This section also contains information on the education plans at the time of school graduation, motives for these plans as well as problems with realizing the planned post-school education.
3. *Details of vocational education:* Students having started a vocational education were asked about the beginning, duration and end of their vocational education. The type and field of vocational education as well as a potential drop-out and reasons for this was collected. Information on the place and financing of this education is included as well.
4. *Details of university education:* This category includes information about up to three courses of university education. This covers the beginning and end of university education, the chosen subject and type of university, some questions about stays abroad,

completed internships and working during university education. Furthermore, questions were asked with respect to the manner of learning and studying, the stress and burden of university education, the existence of skill deficits and reasons for these difficulties, reasons for dropping-out of the course of study, and the final grade of study if completed. In addition, students were asked to evaluate their preparation for university by school, to say how they would decide if they had to decide again on their post-secondary education, which further degrees they plan to obtain, and in which area they want to work after graduation.

5. *Employment*: This category was only answered by students who have worked in a main occupation. Information on several characteristics of the occupation is included, for example the beginning, duration, type and position of the job, the occupational area and job location, as well as reasons for choosing this job. Further information was collected on the duration and ways of finding the job, difficulties in the first months of working, and on self-employment.
6. *Leisure time activities, political participation, and family*: This category contains the frequency of several leisure time activities, the participation at activities of several university groups, as well as personal interest for politics, political participation and attitudes. Furthermore, students were asked about their current family status, number of children and future family plans.
7. *Health status and behavior*: The final section of the questionnaire contains a self-evaluation of students' health status and life satisfaction, current health problems, students' size and weight, as well as questions with respect to health problems during vocational or university education and employment. Information on health behavior includes consumption of alcoholic drinks, smoking behavior and health-conscious nutrition.

Table A.1: Studying in University Education, Separate Estimations for Different Subsamples of Students (Ordered Probit Estimates)

| Independent Variables | Female Subsamples | | | | Male Subsamples | | | |
|---|--------------------|-------------------|---------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| | (1) Coeff. | (2) Coeff. | (3) Coeff. | (4) Coeff. | (1) Coeff. | (2) Coeff. | (3) Coeff. | (4) Coeff. |
| D: Working Hard and Intensively | -0.259* (0.154) | -0.140 (0.147) | -0.352 (0.262) | -0.117 (0.143) | -0.001 (0.208) | -0.117 (0.226) | 0.298 (0.279) | -0.175 (0.213) |
| D: Having Good Organisational Abilites | -0.201 (0.137) | -0.030 (0.133) | -0.148 (0.222) | -0.105 (0.122) | -0.140 (0.188) | -0.426* (0.237) | 0.065 (0.322) | -0.352 (0.218) |
| D: Learning Easily Academic Contents | -0.222 (0.143) | -0.226 (0.151) | -0.466** (0.216) | -0.227* (0.131) | 0.468** (0.210) | 0.449* (0.229) | 1.103*** (0.331) | 0.530** (0.244) |
| D: Often Nervous Before Exams | 0.107 (0.157) | 0.141 (0.152) | -0.118 (0.255) | 0.101 (0.157) | -0.273 (0.282) | -0.206 (0.231) | -0.380* (0.205) | -0.498** (0.227) |
| D: Achieving a Good Degree is Important | -0.070 (0.142) | 0.041 (0.151) | -0.114 (0.237) | -0.080 (0.130) | -0.291 (0.275) | -0.352 (0.321) | -0.143 (0.292) | -0.332 (0.276) |
| D: Achieving a Degree Fastly is Important | 0.142 (0.152) | 0.044 (0.139) | -0.128 (0.225) | 0.036 (0.136) | -0.329 (0.235) | -0.144 (0.263) | 0.005 (0.309) | 0.133 (0.270) |
| <i>N</i> | 207 | 212 | 99 | 228 | 98 | 99 | 83 | 111 |

· Dependent variable: Categorical variables indicating manner of learning and studying in first university education, ranging from 4 (statement fully applicable) to 1 (statement not applicable).

· Regressions are separately run for each subsample:

(1) students enrolled in a Bachelor programme

(2) students enrolled at universities

(3) students with a scientific-technological subject

(4) students having started university education in 2007 or 2008.

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A). School fixed effects are included as well.

· All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below coefficients. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.2: Study Load in University Education, Separate Estimations for Different Subsamples of Students (Ordered Probit Estimates)

| Independent Variables | Female Subsamples | | | | Male Subsamples | | | |
|--------------------------------------|----------------------|----------------------|---------------------|----------------------|----------------------|-------------------|----------------------|-------------------|
| | (1) Coeff. | (2) Coeff. | (3) Coeff. | (4) Coeff. | (1) Coeff. | (2) Coeff. | (3) Coeff. | (4) Coeff. |
| D: Performance Requirements | -0.123 (0.141) | -0.084 (0.149) | 0.563*** (0.204) | -0.070 (0.135) | 0.386* (0.221) | 0.011 (0.225) | 0.190 (0.291) | 0.182 (0.262) |
| D: Orientational Problems | 0.110 (0.144) | 0.143 (0.147) | 0.524** (0.227) | 0.126 (0.136) | -0.503*** (0.241) | -0.289 (0.269) | -0.425 (0.317) | -0.330 (0.257) |
| D: Anonymity at University | 0.016 (0.160) | 0.114 (0.135) | 0.176 (0.257) | 0.173 (0.147) | -0.003 (0.178) | -0.076 (0.187) | -0.202 (0.306) | -0.040 (0.199) |
| D: Forthcoming Exams | 0.025 (0.130) | -0.027 (0.127) | 0.127 (0.282) | 0.000 (0.127) | -0.201 (0.217) | -0.276 (0.245) | 0.015 (0.272) | -0.041 (0.255) |
| D: Personal Financial Situation | -0.157 (0.112) | -0.166 (0.147) | -0.548** (0.278) | -0.270** (0.138) | -0.447** (0.206) | -0.251 (0.192) | -0.910*** (0.285) | -0.284 (0.223) |
| D: Personal Problems | -0.362*** (0.137) | -0.494*** (0.172) | -0.472* (0.250) | -0.490*** (0.147) | -0.142 (0.229) | 0.207 (0.238) | -0.343 (0.279) | -0.104 (0.245) |
| D: Health Problems | -0.098 (0.147) | -0.086 (0.147) | 0.079 (0.217) | -0.113 (0.131) | 0.320 (0.219) | 0.274 (0.226) | -0.005 (0.319) | -0.018 (0.249) |
| D: Absence of a Partner Relationship | -0.230 (0.151) | -0.314** (0.150) | -0.463** (0.234) | -0.215* (0.124) | -0.100 (0.194) | -0.166 (0.233) | -1.005*** (0.322) | -0.161 (0.242) |
| D: Uncertain Career Prospects | -0.036 (0.137) | 0.031 (0.123) | -0.604** (0.253) | -0.092 (0.118) | -0.047 (0.201) | 0.095 (0.219) | -0.478* (0.290) | -0.099 (0.227) |
| <i>N</i> | 206 | 210 | 99 | 228 | 97 | 99 | 82 | 110 |

· Dependent variable: Categorical variables indicating study load in first university education, ranging from 4 (feeling strong pressure) to 1 (feeling no pressure) and 0 (problem not existent).

· Regressions are separately run for each subsample:

(1) students enrolled in a Bachelor programme

(2) students enrolled at universities

(3) students with a scientific-technological subject

(4) students having started university education in 2007 or 2008.

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A). School fixed effects are included as well.

· All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below coefficients. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3: Health in University Education, Separate Estimations for Different Subsamples of Students (Ordered Probit Estimates)

| Independent Variables | Female Subsamples | | | | Male Subsamples | | | |
|--------------------------------|---------------------|--------------------|-------------------|---------------------|---------------------|-------------------|--------------------|-------------------|
| | (1) Coeff. | (2) Coeff. | (3) Coeff. | (4) Coeff. | (1) Coeff. | (2) Coeff. | (3) Coeff. | (4) Coeff. |
| D: Feeling Time Pressure | -0.001 (0.168) | 0.030 (0.152) | 0.119 (0.293) | -0.056 (0.158) | 0.526*** (0.196) | 0.283 (0.197) | 0.310 (0.276) | 0.395* (0.213) |
| D: Feeling Dejected and Gloomy | -0.349** (0.151) | -0.246 (0.171) | -0.328 (0.298) | -0.361** (0.160) | 0.456* (0.245) | 0.377 (0.243) | 0.406 (0.331) | 0.336 (0.278) |
| D: Having Severe Physical Pain | -0.355** (0.167) | -0.314* (0.168) | -0.108 (0.212) | -0.280* (0.151) | -0.034 (0.265) | -0.065 (0.296) | 0.135 (0.351) | -0.093 (0.303) |
| D: Feeling Calm and Balanced | 0.129 (0.145) | 0.223 (0.150) | 0.047 (0.277) | 0.276** (0.135) | -0.285 (0.180) | -0.191 (0.212) | -0.411* (0.245) | -0.258 (0.205) |
| D: Feeling Energetic | 0.170 (0.143) | 0.193 (0.129) | 0.090 (0.222) | 0.244** (0.123) | 0.129 (0.228) | 0.237 (0.198) | -0.064 (0.220) | 0.184 (0.216) |
| <i>N</i> | 203 | 209 | 97 | 226 | 99 | 99 | 83 | 111 |

· Dependent variable: Categorical variables indicating health assessment in university education, ranging from 4 (more than 2 or 3 times a week) to 0 (never).

· Regressions are separately run for each subsample:

(1) students enrolled in a Bachelor programme

(2) students enrolled at universities

(3) students with a scientific-technological subject

(4) students having started university education in 2007 or 2008.

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A). School fixed effects are included as well.

· All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below coefficients. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4: Difficulties and Skill Deficits in University Education, Separate Estimations for Different Subsamples of Students (Probit Estimates, Marginal Effects)

| Independent Variables | Female Subsamples | | | | Male Subsamples | | | |
|---------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------------------|
| | (1) | (2) | (3) | (4) | (1) | (2) | (3) | (4) |
| D: Existence of Difficulties/Deficits | Marg. eff. 0.160*** (0.051) | Marg. eff. 0.143*** (0.054) | Marg. eff. 0.291*** (0.078) | Marg. eff. 0.098** (0.050) | Marg. eff. -0.033 (0.096) | Marg. eff. -0.012 (0.101) | Marg. eff. 0.122 (0.120) | Marg. eff. -0.067 (0.094) |
| D: Reason - Bad Preparation by School | 0.056 (0.040) | 0.082** (0.041) | 0.095 (0.068) | 0.004 (0.040) | 0.058 (0.070) | 0.011 (0.075) | -0.040 (0.105) | 0.070 (0.086) |
| D: Reason - Insufficient Own Efforts | 0.036 (0.051) | 0.024 (0.052) | 0.149* (0.077) | 0.048 (0.053) | -0.166** (0.079) | -0.082 (0.089) | 0.038 (0.119) | -0.102 (0.092) |
| D: Reason - Poor Quality of Study | 0.063 (0.056) | 0.012 (0.053) | 0.043 (0.071) | 0.025 (0.053) | 0.129* (0.074) | 0.157* (0.081) | 0.168 (0.104) | 0.085 (0.072) |
| <i>N</i> | 184-206 | 165-208 | 72-88 | 204-226 | 71-91 | 63-85 | 59-70 | 74-104 |

· Dependent variable: Dummy indicating the existence of and main reasons for difficulties and skill deficits in first university education.

· Regressions are separately run for each subsample:

(1) students enrolled in a Bachelor programme

(2) students enrolled at universities

(3) students with a scientific-technological subject

(4) students having started university education in 2007 or 2008.

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A). School fixed effects are included as well.

· Marginal effects are average marginal effects. All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below marginal effects. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: Preparation for University Education by Secondary School, Separate Estimations for Different Subsamples of Students (Regression/Probit Estimates, Marginal Effects)

| Independent Variables | Female Subsamples | | | | Male Subsamples | | | |
|---|----------------------------------|---------------------------------|----------------------------------|---------------------------------|----------------------------------|---------------------------------|-----------------------------------|---------------------------------|
| | (1) | (2) | (3) | (4) | (1) | (2) | (3) | (4) |
| D: Preparation to University (Score) ^a | Marg. eff. -0.186 (0.125) | Marg. eff. -0.192 (0.116) | Marg. eff. -0.264 (0.208) | Marg. eff. -0.122 (0.116) | Marg. eff. -0.352* (0.205) | Marg. eff. -0.218 (0.211) | Marg. eff. -0.212 (0.236) | Marg. eff. -0.092 (0.216) |
| D: Preparation to University (Dummy) ^b | Marg. eff. -0.121* (0.062) | Marg. eff. -0.081 (0.062) | Marg. eff. -0.141* (0.086) | Marg. eff. -0.055 (0.061) | Marg. eff. -0.119 (0.108) | Marg. eff. -0.115 (0.099) | Marg. eff. -0.257** (0.118) | Marg. eff. -0.086 (0.088) |
| <i>N</i> | 200 | 209 | 99 | 227 | 95 | 93 | 76 | 105 |

^a Dependent variable: Standardized score of the evaluation of preparation to university by school (a higher score indicates better evaluation).

^b Dependent variable: Dummy indicating a good or very good evaluation of preparation to university by school.

• Regressions are separately run for each subsample:

- (1) students enrolled in a Bachelor programme
- (2) students enrolled at universities
- (3) students with a scientific-technological subject
- (4) students having started university education in 2007 or 2008.

• Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A). School fixed effects are included as well.

• Marginal effects are average marginal effects. All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below marginal effects. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.6: Drop-out of Post-Secondary Education, Separate Estimations for Different Subsamples of Students (Probit Estimates, Marginal Effects)

| Independent Variables | Female Subsamples | | | | Male Subsamples | | | |
|---|-------------------|------------------|------------------|--------------------|-------------------|-------------------|-------------------|-------------------|
| | (1) | (2) | (3) | (4) | (1) | (2) | (3) | (4) |
| D: Drop-out of First University Education ^a | 0.015 (0.054) | 0.006 (0.060) | 0.015 (0.090) | 0.017 (0.054) | 0.064 (0.088) | -0.039 (0.101) | -0.101 (0.156) | -0.015 (0.100) |
| <i>N</i> | 204 | 199 | 84 | 226 | 90 | 86 | 63 | 106 |
| D: Deciding Again on Same University Education ^b | 0.102* (0.062) | 0.094 (0.066) | 0.143 (0.102) | 0.115** (0.056) | -0.069 (0.081) | 0.059 (0.088) | 0.062 (0.141) | 0.098 (0.100) |
| <i>N</i> | 199 | 207 | 96 | 223 | 98 | 98 | 79 | 111 |

^a Dependent variable: Dummy indicating drop-out of first university education.

^b Dependent variable: Dummy indicating whether a student would decide once again on the same university education as already decided.

• Regressions are separately run for each subsample:

(1) students enrolled in a Bachelor programme

(2) students enrolled at universities

(3) students with a scientific-technological subject

(4) students having started university education in 2007 or 2008.

• Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A). School fixed effects are included as well.

• Marginal effects are average marginal effects. All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below marginal effects. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.7: Completion of Post-Secondary Education, Separate Estimations for Different Subsamples of Students (Probit/Regression Estimates, Marginal Effects)

| Independent Variables | Female Subsamples | | | | Male Subsamples | | | |
|---|-----------------------------------|----------------------------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------------------|
| | (1) | (2) | (3) | (4) | (1) | (2) | (3) | (4) |
| D: Completion of University Education ^a | Marg. eff. -0.090 (0.077) | Marg. eff. -0.117* (0.063) | Marg. eff. -0.175** (0.088) | Marg. eff. -0.066 (0.066) | Marg. eff. -0.059 (0.095) | Marg. eff. -0.055 (0.105) | Marg. eff. 0.044 (0.103) | Marg. eff. -0.054 (0.116) |
| <i>N</i> | 208 | 212 | 99 | 229 | 79 | 75 | 66 | 94 |
| D: Grade of Completed University Education ^b | Marg. eff. -0.373** (0.178) | Marg. eff. -0.048 (0.204) | Marg. eff. -0.006 (0.547) | Marg. eff. -0.221 (0.170) | | | | |
| <i>N</i> | 102 | 83 | 32 | 108 | | | | |

^a Dependent variable: Dummy indicating completion of university education (at least one degree) by the end of 2011.

^b Dependent variable: Standardized final grade of completed university education. A higher grade indicates better achievement. (The male sample only includes very few observations.)

• Regressions are separately run for each subsample:

- (1) students enrolled in a Bachelor programme
- (2) students enrolled at universities
- (3) students with a scientific-technological subject
- (4) students having started university education in 2007 or 2008.

• Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A). School fixed effects are included as well.

• Marginal effects are average marginal effects. All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below marginal effects. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.8: Studying in University Education, Interaction Effects with respect to Previous School Achievements (Regression Estimates)

| Independent Variables | Female Sample | | Male Sample | |
|---|--------------------|--------------------|---------------------|----------------------|
| | Spec. A Coeff. | Spec. B Coeff. | Spec. A Coeff. | Spec. B Coeff. |
| <i>Working Hard and Intensively</i> | | | | |
| D | -0.127 (0.149) | -0.148 (0.149) | -0.037 (0.233) | -0.036 (0.246) |
| D × Grade 7 very good | 0.119 (0.461) | 0.156 (0.471) | -0.335 (0.632) | -0.101 (0.717) |
| D × Grade 7 satisfactory/fair | -0.133 (0.319) | -0.110 (0.306) | 0.491 (0.383) | 0.611 (0.406) |
| <i>Having Good Organizational Abilities</i> | | | | |
| D | -0.254* (0.140) | -0.280* (0.153) | 0.011 (0.214) | 0.122 (0.240) |
| D × Grade 7 very good | 0.783* (0.469) | 0.845* (0.472) | -1.053** (0.447) | -1.726*** (0.526) |
| D × Grade 7 satisfactory/fair | 0.180 (0.262) | 0.249 (0.272) | -0.190 (0.385) | -0.529 (0.423) |
| <i>Learning Easily Academic Contents</i> | | | | |
| D | -0.215 (0.133) | -0.244* (0.139) | 0.434* (0.247) | 0.470* (0.252) |
| D × Grade 7 very good | 0.191 (0.403) | 0.202 (0.403) | 1.260** (0.477) | 1.077** (0.513) |
| D × Grade 7 satisfactory/fair | 0.283 (0.292) | 0.320 (0.298) | -0.152 (0.486) | -0.293 (0.560) |
| <i>Often Nervous Before Exams</i> | | | | |
| D | 0.278 (0.181) | 0.267 (0.194) | -0.400** (0.180) | -0.520** (0.205) |
| D × Grade 7 very good | 0.007 (0.406) | 0.023 (0.407) | -0.169 (0.592) | 0.102 (0.542) |
| D × Grade 7 satisfactory/fair | -0.346 (0.282) | -0.307 (0.300) | 0.615 (0.497) | 0.823 (0.546) |
| <i>Achieving a Good Degree is Important</i> | | | | |
| D | -0.096 (0.145) | -0.147 (0.155) | -0.141 (0.299) | -0.217 (0.286) |
| D × Grade 7 very good | 0.484 (0.452) | 0.481 (0.468) | 0.259 (0.712) | 0.276 (0.806) |
| D × Grade 7 satisfactory/fair | 0.133 (0.237) | 0.119 (0.248) | -0.120 (0.410) | 0.157 (0.427) |
| <i>Achieving a Degree Fastly is Important</i> | | | | |
| D | -0.016 (0.159) | -0.079 (0.169) | -0.258 (0.172) | -0.283 (0.193) |
| D × Grade 7 very good | -0.436 (0.385) | -0.421 (0.381) | -0.347 (1.188) | 0.003 (1.067) |
| D × Grade 7 satisfactory/fair | 0.505 (0.323) | 0.571* (0.316) | 0.456 (0.409) | 0.642 (0.465) |
| <i>N</i> | 278 | 276 | 133 | 133 |

· Dependent variable: Categorical variables indicating manner of learning and studying in first university education, ranging from 4 (statement fully applicable) to 1 (statement not applicable).

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.

· All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below coefficients. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.9: Study Load in University Education (I), Interaction Effects with respect to Previous School Achievements (Regression Estimates)

| Independent Variables | Female Sample | | Male Sample | |
|---------------------------------|--------------------|-------------------|--------------------|--------------------|
| | Spec. A Coeff. | Spec. B Coeff. | Spec. A Coeff. | Spec. B Coeff. |
| <i>Performance Requirements</i> | | | | |
| D | 0.055 (0.148) | 0.094 (0.144) | 0.335 (0.244) | 0.217 (0.239) |
| D × Grade 7 very good | 0.054 (0.368) | 0.080 (0.372) | -0.541 (0.642) | 0.134 (0.810) |
| D × Grade 7 satisfactory/fair | -0.357 (0.285) | -0.353 (0.274) | -0.163 (0.378) | 0.298 (0.418) |
| <i>Oriental Problems</i> | | | | |
| D | 0.063 (0.123) | 0.131 (0.115) | -0.290 (0.230) | -0.397 (0.246) |
| D × Grade 7 very good | 0.283 (0.435) | 0.317 (0.447) | -0.172 (0.850) | 0.499 (0.948) |
| D × Grade 7 satisfactory/fair | 0.205 (0.279) | 0.165 (0.276) | -0.101 (0.500) | 0.243 (0.498) |
| <i>Anonymity at University</i> | | | | |
| D | 0.011 (0.156) | 0.038 (0.149) | 0.018 (0.192) | 0.050 (0.213) |
| D × Grade 7 very good | 0.572 (0.392) | 0.602 (0.390) | -1.275* (0.744) | -1.677* (0.951) |
| D × Grade 7 satisfactory/fair | 0.288 (0.293) | 0.245 (0.290) | -0.037 (0.416) | -0.282 (0.424) |
| <i>Forthcoming Exams</i> | | | | |
| D | 0.129 (0.158) | 0.155 (0.143) | -0.058 (0.215) | -0.209 (0.222) |
| D × Grade 7 very good | -0.721* (0.429) | -0.695 (0.427) | -1.406 (0.892) | -1.295 (1.068) |
| D × Grade 7 satisfactory/fair | 0.182 (0.335) | 0.191 (0.309) | 0.052 (0.408) | 0.389 (0.440) |
| N | 277 | 275 | 132 | 132 |

- Dependent variable: Categorical variables indicating study load in first university education, ranging from 4 (feeling strong pressure) to 1 (feeling no pressure) and 0 (problem not existent).
- Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.
- All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below coefficients. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.10: Study Load in University Education (II), Interaction Effects with respect to Previous School Achievements (Regression Estimates)

| Independent Variables | Female Sample | | Male Sample | |
|--|--------------------|--------------------|---------------------|---------------------|
| | Spec. A Coeff. | Spec. B Coeff. | Spec. A Coeff. | Spec. B Coeff. |
| <i>Personal Financial Situation</i> | | | | |
| D | -0.083 (0.129) | -0.098 (0.147) | -0.243 (0.227) | -0.321 (0.227) |
| D × Grade 7 very good | -0.626 (0.418) | -0.654 (0.418) | -0.983** (0.484) | -0.444 (0.532) |
| D × Grade 7 satisfactory/fair | 0.121 (0.285) | 0.106 (0.273) | -0.046 (0.408) | 0.307 (0.378) |
| <i>Personal Problems</i> | | | | |
| D | -0.259* (0.148) | -0.285* (0.152) | -0.367* (0.214) | -0.424** (0.200) |
| D × Grade 7 very good | -0.353 (0.348) | -0.300 (0.347) | 1.761*** (0.383) | 1.749*** (0.528) |
| D × Grade 7 satisfactory/fair | -0.193 (0.235) | -0.194 (0.253) | 0.449 (0.435) | 0.572 (0.431) |
| <i>Health Problems</i> | | | | |
| D | -0.029 (0.176) | -0.067 (0.173) | 0.147 (0.215) | 0.153 (0.194) |
| D × Grade 7 very good | 0.268 (0.396) | 0.304 (0.403) | 0.358 (0.660) | 0.183 (0.842) |
| D × Grade 7 satisfactory/fair | -0.351 (0.272) | -0.362 (0.287) | -0.426 (0.458) | -0.465 (0.415) |
| <i>Absence of a Partner Relationship</i> | | | | |
| D | -0.088 (0.146) | -0.070 (0.150) | -0.233 (0.237) | -0.228 (0.241) |
| D × Grade 7 very good | -0.444 (0.420) | -0.410 (0.436) | 0.644 (0.564) | 0.391 (0.595) |
| D × Grade 7 satisfactory/fair | -0.136 (0.297) | -0.156 (0.300) | 0.194 (0.480) | 0.222 (0.514) |
| <i>Uncertain Career Prospects</i> | | | | |
| D | -0.058 (0.142) | -0.043 (0.139) | 0.022 (0.225) | 0.056 (0.217) |
| D × Grade 7 very good | -0.155 (0.430) | -0.226 (0.413) | 0.325 (0.502) | -0.311 (0.442) |
| D × Grade 7 satisfactory/fair | 0.284 (0.229) | 0.224 (0.235) | -0.162 (0.412) | -0.271 (0.433) |
| <i>N</i> | 277 | 275 | 132 | 132 |

· Dependent variable: Categorical variables indicating study load in first university education, ranging from 4 (feeling strong pressure) to 1 (feeling no pressure) and 0 (problem not existent).

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.

· All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below coefficients. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.11: Health in University Education, Interaction Effects with respect to Previous School Achievements (Regression Estimates)

| Independent Variables | Female Sample | | Male Sample | |
|------------------------------------|--------------------|--------------------|--------------------|---------------------|
| | Spec. A Coeff. | Spec. B Coeff. | Spec. A Coeff. | Spec. B Coeff. |
| <i>Feeling Time Pressure</i> | | | | |
| D | 0.143 (0.149) | 0.178 (0.154) | 0.345* (0.193) | 0.239 (0.192) |
| D × Grade 7 very good | -0.285 (0.428) | -0.264 (0.429) | 0.228 (1.216) | 0.480 (1.219) |
| D × Grade 7 satisfactory/fair | -0.247 (0.269) | -0.279 (0.268) | -0.013 (0.437) | 0.308 (0.418) |
| <i>Feeling Dejected and Gloomy</i> | | | | |
| D | -0.012 (0.160) | 0.000 (0.163) | 0.172 (0.238) | 0.008 (0.265) |
| D × Grade 7 very good | -0.626 (0.506) | -0.617 (0.495) | 0.671 (0.783) | 0.924 (0.762) |
| D × Grade 7 satisfactory/fair | -0.504* (0.275) | -0.529* (0.286) | 0.329 (0.488) | 0.654 (0.467) |
| <i>Having Severe Physical Pain</i> | | | | |
| D | -0.211 (0.177) | -0.259 (0.196) | -0.130 (0.240) | -0.100 (0.225) |
| D × Grade 7 very good | 0.050 (0.408) | 0.015 (0.405) | -0.541 (0.425) | -0.984** (0.382) |
| D × Grade 7 satisfactory/fair | -0.137 (0.282) | -0.134 (0.291) | 0.092 (0.401) | 0.123 (0.399) |
| <i>Feeling Calm and Balanced</i> | | | | |
| D | -0.005 (0.149) | 0.014 (0.152) | -0.109 (0.223) | -0.021 (0.235) |
| D × Grade 7 very good | 0.339 (0.306) | 0.308 (0.316) | -1.193* (0.696) | -1.498** (0.748) |
| D × Grade 7 satisfactory/fair | 0.375 (0.261) | 0.375 (0.273) | 0.036 (0.451) | -0.253 (0.445) |
| <i>Feeling Energetic</i> | | | | |
| D | 0.105 (0.133) | 0.051 (0.135) | 0.068 (0.172) | 0.181 (0.171) |
| D × Grade 7 very good | 0.041 (0.422) | 0.055 (0.419) | 0.556 (0.619) | 0.189 (0.715) |
| D × Grade 7 satisfactory/fair | 0.183 (0.258) | 0.234 (0.253) | 0.229 (0.473) | -0.010 (0.437) |
| <i>N</i> | 274 | 272 | 134 | 133 |

· Dependent variable: Categorical variables indicating health assessment in university education, ranging from 4 (more than 2 or 3 times a week) to 0 (never).

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.

· All standard errors are clustering-robust based on class as the sampling unit. Standard errors are shown in parenthesis below coefficients. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.12: Difficulties and Skill Deficits in University Education, Interaction Effects with respect to Previous School Achievements (Probit Estimates)

| Independent Variables | Female Sample | | Male Sample | |
|---|----------------------|----------------------|----------------------|----------------------|
| | Spec. A Int. eff. | Spec. B Int. eff. | Spec. A Int. eff. | Spec. B Int. eff. |
| D × Grade 7: Existence of Difficulties/Deficits | 0.072 (0.104) | 0.070 (0.106) | 0.036 (0.182) | 0.068 (0.199) |
| D × Grade 7: Reason - Bad Preparation by School | -0.002 (0.076) | 0.007 (0.082) | -0.098 (0.136) | -0.159 (0.214) |
| D × Grade 7: Reason - Insufficient Own Efforts | 0.133 (0.119) | 0.139 (0.118) | 0.208 (0.194) | 0.236 (0.230) |
| D × Grade 7: Reason - Poor Quality of Study | 0.072 (0.095) | 0.053 (0.091) | 0.151 (0.222) | 0.145 (0.234) |
| <i>N</i> | 249-276 | 247-274 | 123-131 | 118-130 |

- Dependent variable: Dummy indicating the existence of and main reasons for difficulties and skill deficits in first university education.
- Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.
- Interaction effects between treatment dummy and grade in year 7 (ranging from 1 [very good] to 4 [fair]) are mean interaction effects. Standard errors are shown in parenthesis below interaction effects. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.13: Preparation for University Education by Secondary School, Interaction Effects with respect to Previous School Achievements (Regression/Probit Estimates)

| Independent Variables | Female Sample | | Male Sample | |
|---|----------------------|----------------------|----------------------|----------------------|
| | Spec. A Int. eff. | Spec. B Int. eff. | Spec. A Int. eff. | Spec. B Int. eff. |
| Preparation to University (Score): ^a | | | | |
| D | -0.252* (0.130) | -0.214 (0.141) | -0.230 (0.244) | -0.168 (0.228) |
| D × Grade 7 very good | 0.271 (0.344) | 0.312 (0.347) | -0.338 (1.112) | -0.334 (1.140) |
| D × Grade 7 satisfactory/fair | 0.111 (0.307) | 0.140 (0.303) | 0.366 (0.470) | 0.098 (0.456) |
| D × Grade 7: Preparation to University (Dummy) ^b | 0.041 (0.109) | 0.038 (0.110) | 0.040 (0.235) | -0.049 (0.233) |
| <i>N</i> | 277 | 276 | 129 | 128 |

^a Dependent variable: Standardized score of the evaluation of preparation to university by school (a higher score indicates better evaluation).

^b Dependent variable: Dummy indicating a good or very good evaluation of preparation to university by school.

- Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.
- Interaction effects (in the lower part of the table) between treatment dummy and grade in year 7 (ranging from 1 [very good] to 4 [fair]) are mean interaction effects. Standard errors are shown in parenthesis below interaction effects. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.14: Drop-out of Post-Secondary Education, Interaction Effects with respect to Previous School Achievements (Probit Estimates)

| Independent Variables | Female Sample | | Male Sample | |
|---|----------------------|----------------------|----------------------|----------------------|
| | Spec. A Int. eff. | Spec. B Int. eff. | Spec. A Int. eff. | Spec. B Int. eff. |
| D × Grade 7: Drop-out of Vocational Education ^a | -0.084 (0.149) | – | – | – |
| <i>N</i> | 110 | | | |
| D × Grade 7: Drop-out of First University Education ^b | 0.006 (0.085) | 0.011 (0.087) | 0.159 (0.165) | 0.196 (0.178) |
| <i>N</i> | 276 | 274 | 126 | 118 |
| D × Grade 7: Drop-out of First Post-secondary Education ^c | 0.042 (0.071) | 0.035 (0.092) | 0.048 (0.147) | 0.089 (0.173) |
| <i>N</i> | 344 | 249 | 155 | 125 |
| D × Grade 7: Deciding Again on Same University Education ^d | -0.063 (0.121) | -0.042 (0.114) | -0.204 (0.188) | -0.188 (0.184) |
| <i>N</i> | 270 | 269 | 133 | 133 |

^a Dependent variable: Dummy indicating drop-out of vocational education (only Specification A for female students, since Specification B refers to university education and the male sample includes only 54 students with vocational education).

^b Dependent variable: Dummy indicating drop-out of first university education.

^c Dependent variable: Dummy indicating drop-out of first post-secondary education (university and vocational education).

^d Dependent variable: Dummy indicating whether a student would decide once again on the same university education as already decided.

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.

· Interaction effects between treatment dummy and grade in year 7 (ranging from 1 [very good] to 4 [fair]) are mean interaction effects. Standard errors are shown in parenthesis below interaction effects. Stars denote significance of the interaction effects as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.15: Completion of Post-Secondary Education, Interaction Effects with respect to Previous School Achievements (Probit/Regression Estimates)

| Independent Variables | Female Sample | | Male Sample | |
|--|----------------------|----------------------|----------------------|----------------------|
| | Spec. A Int. eff. | Spec. B Int. eff. | Spec. A Int. eff. | Spec. B Int. eff. |
| D × Grade 7: Completion of Vocational Education ^a | -0.179 (0.215) | – | – | – |
| <i>N</i> | 121 | | | |
| D × Grade 7: Completion of University Education ^b | 0.142 (0.116) | 0.115 (0.103) | 0.269 (0.222) | 0.130 (0.208) |
| <i>N</i> | 279 | 277 | 111 | 102 |
| Grade of Completed University Education: ^c | | | | |
| D | -0.316* (0.188) | -0.343 (0.223) | – | – |
| D × Grade 7 very good | 0.966** (0.374) | 0.820** (0.345) | – | – |
| D × Grade 7 satisfactory/fair | -0.354 (0.477) | -0.359 (0.513) | – | – |
| <i>N</i> | 112 | 111 | | |

^a Dependent variable: Dummy indicating completion of vocational education by the end of 2011 (only Specification A for female students, since Specification B refers to university education and the male sample includes only 54 students with vocational education).

^b Dependent variable: Dummy indicating completion of university education (at least one degree) by the end of 2011.

^c Dependent variable: Standardized final grade of completed university education. A higher grade indicates better achievement.

· Regressions are separately run for each outcome. Regressions include further explaining variables: school achievements until reform, educational background of family, age of school enrollment (Specification A), institution, type, subject and starting year of university education, working during semester and completed vocational education before attending university (additional in Specification B). School fixed effects are included as well.

· Interaction effects (in the upper parts of the table) between treatment dummy and grade in year 7 (ranging from 1 [very good] to 4 [fair]) are mean interaction effects. Standard errors are shown in parenthesis below interaction effects. Stars denote significance of the estimates as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.