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Abstract

We use a change in Iceland's education system as a natural experiment to measure the effect of years spent in upper secondary school on subsequent first year outcomes at university. The duration of Iceland´s upper-secondary education was shortened by one year through compression of the curriculum. The study benefits from a large variation in the age within both the treatment and the control groups, allowing us to separate the effects of shorter upper-secondary education from the effect of age when university studies are initiated. We find that shorter upper-secondary education, three years instead of the previous four, leads to first-year university students completing fewer credits, getting a lower average grade in completed courses, and being more likely to drop out. Results indicate that the effects are partly explained by the age at university enrollment. This applies particularly to women while men are adversely affected even when age is accounted for.

JEL classification

I21; I26

Keywords

Years of schooling; upper-secondary school; university grades.

1. Introduction

Spending more years in school should increase an individual's human capital but at an opportunity cost of postponing labor-market participation. Phelps (1967) introduced the concept of the golden rule of education, highlighting the utility maximizing length of education, where the marginal cost of extending education in terms of sacrificed wage income is set equal to the marginal benefit in the form of higher future income. Subsequently, Jacob Mincer (1974) pioneered the study of the returns to education using regression analyses, but his work did not utilize exogenous variation in the length of education, and thus results could be biased, for example as the duration of education may be confounded by ability and motivation. This gave rise to a literature attempting to isolate the effect of schooling. Griliches (1977) included IQ scores as a measure of ability, which reduced the estimated rate of return to schooling. A reduction in the returns-to-schooling effect was also evident when Ashenfelter and Krueger (1994) used educational variation between identical twins, who naturally have similar gene pools and upbringing. Mostly, this has however been tackled by utilizing variations in compulsory education (see for example Acemoglu and Angrist,2000; Angrist and Krueger, 1991; Devereux and Heart, 2010; Oreopoulos, 2006).[1]

We add to that literature by taking advantage of a recent policy change in Iceland to explore whether the shortening of upper-secondary school, from four years to three, harms subsequent performance at the university level.[2] The policy change shortened the Icelandic upper-secondary education so that students who graduated on time pre-reform did so in the year they turned 20, but post-reform in the year they turned 19. We examine how this shortening of upper-secondary education affected grades and progression at the university level using register data from two entry cohorts at the University of Iceland. Thus, we can separate the effects of age and duration of education, which has been difficult to disentangle in this literature. Such distinction is nevertheless important as policy implications may differ substantially if found effects are not due to the actual time in school, but the maturing of the

[1] For surveys of the literature on the effect of educational preparations on various performance measures, see Hanushek (2003) and Krueger (2003).

[2] The studies on the consequences of years of schooling have often used decades-old reforms that affect school duration for early teens. This creates effects of schooling in age ranges that are generally no longer at the relevant margin in the western world. Examples of studies using changes in schooling that took place at a time when years of schooling was generally much shorter would be Lleras-Muney (2005) using changes in US compulsory-schooling policies and child-labor laws during the first half of the 20th century and Clark and Royer (2013) using changes to British compulsory-schooling laws in 1947 and 1972. The literature on reforms affecting older teenagers is not rich.

students, regardless of them staying in school or not. There is also the possibility that the reform could influence selection into university by ability, but we can use upper-secondary grades as ability measures to tackle such selection concerns.

The experiment that most closely resembles the Icelandic experiment took place in Ontario, Canada where students who started upper-secondary school in 1999 (or later) graduated four years later, while those who started school in the years prior to 1999 graduated five years after their enrollment. Post-reform students could graduate with a university entrance qualification with 12 years of schooling, rather than 13 years while the workload within each year did not increase. Students were simply taught less in some subjects and the change in the curriculum thus subject-specific. Krashinsky (2014) examined the effect of the reforms on university achievement for one thousand students enrolled in an introductory course in management at the university of Toronto. Those who graduated in four years received a significantly lower grade point average (GPA) in their first year, a lower grade in the management class, and were less likely to receive an A in the class. Krashinsky also found higher university dropout rates for the four-year high-school graduates than their five-year counterparts, and they had a lower GPA in their second, third, and fourth year of university. The five-year graduates obtained 5 percentage points higher numerical grades on the 0-100 scale than the four-year graduates. Morin (2013) used the same reforms to estimate the effects on university grades and, in contrast to Krashinsky, found only small effects on performance at university (2.2 points on the 0-100 scale).[3] He took advantage of the fact that after the reforms, fewer math classes were taught in secondary school, while the number of biology classes remained the same. The effects of the reforms were identified by observing students' university performance in two subjects, biology and mathematics, where only mathematics was affected by the reforms, making it possible to control for potential unobserved differences across groups. He found the extra year of secondary-school mathematics to be associated with a slight increase in math grades at the university level. Further, Morin also found indication of increased educational achievement disparities after the reforms, since lower-ability students were more affected. The larger effects of an additional year of schooling found by Krashinsky may be attributable to a lower average ability level in his sample, which suggests that an extra year of secondary school benefits the lower ability students more.

[3] The estimated effect of the fifth year of secondary school found by Morin is 0.17 standard deviations, which is below the 0.5-1.2 standard deviation range found in Krashinsky.

We separate the effects of age and length of education, which has been difficult to disentangle in this literature. Krashinsky also tested for an age effect by comparing the academic performance at university for four-year and five-year graduates within narrow age bands and found that the four-year students underperformed no less when the age effect was removed. Thus, relatively young five-year graduates outperformed relatively old four-year graduates. Morin also found that the benefits of longer education were not due to differences in age at graduation by repeating the analysis after restricting the sample to students close in age. In comparison, there is wide age dispersion in both our treatment and control groups as described below because some upper-secondary schools started the reforms earlier than others, before they became mandatory. Moreover, the average age of graduation is higher and the age dispersion larger due to a high drop-out rate and the ease of re-entering secondary school.[4]

Another example of recent reforms took place in Germany. In most German states a shortening of the academic-track secondary school, *Gymnasium*, was implemented in 2001-2007. Thus, students could graduate with a university entrance qualification with a total of 12 years of schooling, rather than 13. The number of required credits for graduation remained the same after the reforms so instruction hours and student workload within a school year increased. Thus, on average, weekly instruction hours increased by two over a three-year period post reform. Studies on the effect of this change have yielded mixed results. Huebener, Krueger, and Marcus (2017) found that the reforms slightly improved performance on the ninth-grade internationally standardized PISA tests. The effect was larger for high-performing students than for low-performing students. German classes have a positive effect on student performance in reading and mathematics classes have a positive effect on performance in mathematics on the PISA tests. Huebener and Marcus (2017) took advantage of the staggered implementation of the reforms by region, using difference-in-differences analyses to estimate the effect on grade repetition rates, graduation rates, and final grade point averages (GPA). They found that students were more likely to repeat a year after the reforms, this effect being stronger for boys, but that the shortening did not influence graduation rates. Thus, the average age of graduates fell with the shortening but by less than a year. Finally, the reforms reduced the average GPA. The authors interpret the results as showing a moderate effect of the school shortening, since graduation rates did not fall and the

[4] A student who followed the new system without dropping out would graduate from secondary school at age 19 and a student who followed the old system would graduate at age 20. In our data, we find that the average age in the treatment group was 19.55 while the average age in the control group was 21.32.

effect on the GPA was small. Büttner and Thomsen (2015) measure the effect of the reforms on graduation grades in mathematics and German literature. They find negative effects of the reforms on math grades, but very small and insignificant effects in German literature. The negative mathematics effect is larger for boys.

Finally, two studies examine the effect of the reforms in Germany on educational choice rather than achievement. According to Meyer and Thomsen (2016) and Marcus and Zambre (2019), the reforms made students more likely to postpone their university enrollment after graduation. Further, following the reforms, students were more likely to drop out of university and to change their major.

2. The school reform

In the school year of 2015-2016, the Icelandic upper-secondary curriculum was reduced from four to three years, while the number of required credits for graduation did not change. Students entered the secondary school at age 16 and graduated at age 20 before the change and at age 19 after the change. The first students from the new system graduated in the spring of 2018 after thirteen years of formal education (Ministry of Education, Science and Culture, 2014). Students' workload and the number of instruction hours within a year increased because the changes were intended to compress the time used to teach the material. However, because they required extensive organizational changes in the curriculum it cannot be completely ruled out that the study material decreased somewhat.

The shortening of upper secondary school in Iceland started prior to 2015 in some schools in anticipation of the country-wide changes while in other schools it was delayed until 2016. This, as well as the fact that our data includes two cohorts starting university in 2018 and 2019 (school years 2018-2019 and 2019-2020), allows us to examine *age effects* and *schooling effects* separately. Due to the shortening of the upper secondary education, students from four-year programs as well as three-year programs finished their degrees at the same time and could thus also start university at the same time. However, the reform does not provide a perfectly clean natural experiment. Both before and after the reform, there was flexibility in some schools within the upper secondary school system. Students were able to complete credits at a faster pace than the organized curriculum in some schools and graduate from upper-secondary school in three years. Similarly, after the reform, students were able to complete credits at a slower pace in some schools and graduate from upper secondary school in four years.

3. Data and methods

We use register data from the University of Iceland on every new student during the schoolyears of 2018-2019 and 2019-2020. We have information on the number of completed credits in the first year of study, average grades in completed courses in the first year, the field of study of each student, the upper-secondary school from which each student graduated, and GPA from their upper secondary school, in addition to gender and age. These data were paired with information from the Ministry of Education, Science and Culture on the year of entering upper secondary school as well as the graduation date. From this information, we were able to construct dummy variables for a) reform exposure and b) for the actual length of upper-secondary education for each student. In addition, for the university entry cohort of 2018-2019, the Ministry supplied information on upper-secondary GPA scores for all secondary school graduates standardized based on their upper-secondary school graduation cohort including those who did not go straight to university. However, due to the COVID-19 pandemic, the spring semester of the school year 2019-2020 was heavily affected with distance learning and many special testing arrangements that make test results less reliable. Therefore, we only use the autumn semester of the school year 2019-2020, a semester not affected by the COVID-19 pandemic, in addition to the 2018-2019 school year.

We use four measures of university achievement:

(a) *Average grade*, on a scale of 0-10, from every course completed in the first year of university for the entry cohort of 2018-2019 and from every completed course of the first semester for the entry cohort of 2019-2020. If a student does not complete any course, his or her average grade is given the value of zero, but results are generated both with and without those zeros. (b) Number of *completed credits* in the first year for the first-year student in academic year 2018-2019 and from the first semester for the entry cohort of 2019-2020. If a student does not receive a passing grade in a course, credits are not counted as completed.[5] (c) Total grades – defined as the *product of average grade and the number of completed credits* – are used as a wider measure of student achievement. We standardize these variables, (a)-(c), so that their average value is zero and their standard deviation is one. (d) Finally, we constructed a binary variable for *dropout* that takes the value one if no credits are completed and zero otherwise.

[5] As the curriculum is organized around an average of 30 credits per semester, we multiply the credits of the first-year cohort of 2019-2020 by two to make their one semester comparable to the full year of 2018-2019 first-year students.

A total of 1,901 new students enrolled at the University of Iceland in the fall of 2018 and 2,188 enrolled in the fall of 2019. Of those, information about the year of entry into upper secondary school and exposure to the reform was missing for 821 first-year students (363 from the 2018 cohort and 458 from the 2019 cohort) who were removed from our sample. Furthermore, 25 students had finished their upper secondary education in two years, and they were also removed from the sample because their early completion is most likely a result of self-selection and would have biased our results. Finally, information on a student's GPA in upper-secondary school was missing for 71 of our remaining sample. As GPA in upper secondary school turns out to be an important explanatory variable for university achievement these individuals were removed from our sample as well. Finally, 25 students were removed as their university average grade was missing. The final sample consists of the remaining 3,147 students**.**

Table 1 shows mean differences in outcome variables and main covariates, by exposure for our final sample of 3,174 students. We see that 36% of our final sample was exposed to the reform, that is completed post-secondary education in three years instead of four. The average first-year grade of the exposed is 5.86 out of 10 and 6.22 for the unexposed, a statistically significant difference of 0.36. However, a large part of this difference is explained by those completing zero credits. When dropouts (who complete 0 credits) are omitted, the exposed group only scored 0.13 (out of 10) lower on average than those unexposed, although the difference is still statistically significant. Moving to completed credits, we see that on average students complete around 36-37 credits, but 60 credits would be considered full-time studies. When dropouts are omitted, average completed credits are 44-46 for those exposed and those unexposed. The mode of completed credits is nevertheless 60 regardless of whether zeroes are included or not for both the exposed and unexposed groups, and very few students complete more than 60 credits. There is no statistical difference in completed credits by exposure, but when dropouts are omitted those exposed complete significantly more credits at the 10% level. For the product of average grade and completed credits, we see no significant differences but the sign of the difference changes depending on whether dropouts are included or not. Overall, the variation in differences of the dependent variables, depending on whether dropouts are included or not, warrants further exploration of the subsample of students who completed at least 1 credit, which we address. Finally, the dropout rate is statistically significantly higher for the exposed, as expected.

Table 1. Summary statistics (N = 3,147)

Variable	Exposed (n = 1,122) Mean (SD)	Unexposed (n = 2,025) Mean (SD)	Difference Mean (SE)
Average grade university	5.86	6.22	-0.36***
	(3.08)	(2.90)	(0.11)
Average grade university[a]	7.32	7.44	-0.13***
	(1.07)	(0.99)	(0.04)
Completed credits	36.46	36.95	-0.49
	(24.10)	(22.45)	(0.86)
Completed credits[a]	45.56	44.36	1.20*
	(17.64)	(16.62)	(0.70)
Product of grade*credits	273.03	280.96	-7.93
	(192.73)	(181.82)	(6.91)
Product of grade*credits[a]	341.14	337.25	3.89
	(152.19)	(143.84)	(6.06)
Dropout	0.20	0.17	0.03**
	(0.40)	(0.37)	(0.01)
Female	0.67	0.59	0.08***
	(0.47)	(0.49)	(0.02)
Upper-secondary GPA	7.77	7.34	0.43***
	(0.87)	(0.89)	(0.03)
Age at university start	19.55	21.32	-1.77***
	(0.91)	(1.32)	(0.04)
Freshman 2018-2019	0.29	0.56	-0.28***
	(0.45)	(0.50)	(0.02)

Notes: *** p<0.01, ** p<0.05, * p<0.1. [a] denotes only those who complete at least one credit.

For our main covariates, we see that there are more women than men in both the exposed and unexposed group, but the share of women is significantly higher in the exposed group. Upper-secondary GPA is also significantly higher in the exposed group. We treat this as evidence of a stronger selection into university on ability in the exposed group, i.e., after the reform, those who entered university soon after their graduation were on average of higher ability than the new university students in the two school years from the control group. The difference in mean age at university entry is statistically significant as expected (p<0.0001), highlighting the importance of a research setting that allows for age controls, as is the case here. The statistically different upper-secondary GPA (p<0.0001), an important control for ability, is also of concern and could be interpreted in two different ways. The most likely reason is that among upper-secondary students who are exposed to the reform, there is a stronger positive selection on ability into university. The difference in gender by exposure (p=0.0051) supports this hypothesis since women on average have higher GPA in secondary school. We will control for this effect by including upper-secondary GPA as a control for the different ability between our exposure groups. It is however also conceivable, that teachers

overcompensated with higher grades after the reform, which can be tackled by measuring ability by ranking GPA within the exposed and unexposed groups separately.

It may seem counterintuitive that the exposed group completes more credits than the unexposed group when dropouts are omitted. However, remember that those who enter university soon after graduating upper-secondary school in 3 years could be positively self-selected on ability, as compared to those graduating from the 4-year system, leading to more credits completed among those exposed to the reform. In our regression models, this can be controlled for by the inclusion of upper-secondary grades.

Table 2 displays the age distribution of our sample and by exposure to the reform. Most students are 19 to 21 years old, although considerable variation in the age of first-year students at university exists. All 17 and 18-year-old first-year students and most 19-year-old first-year students in our sample were exposed to the reform. Because of this variation, we can separate the effects of age and upper-secondary school length, which has been difficult in this literature so far.

Table 2. Age distribution of sample

	Full sample		**Exposed**		**Unexposed**	
Age	Frequency	Percent	Frequency	Percent	Frequency	Percent
17	1.0	0.0	1.0	0.1	0.0	0.0
18	13.0	0.4	13.0	1.2	0.0	0.0
19	656.0	20.9	632.0	56.3	24.0	1.2
20	997.0	31.7	402.0	35.8	595.0	29.4
21	744.0	23.6	33.0	2.9	711.0	35.1
22	350.0	11.1	17.0	1.5	333.0	16.4
23	194.0	6.2	10.0	0.9	184.0	9.1
24	133.0	4.2	9.0	0.8	124.0	6.1
25	59.0	1.9	5.0	0.5	54.0	2.7
Total	3147.0	100.0	1122.0	100.0	2025.0	100.0

As we do not have a clean natural experiment, we include controls in ordinary least squares regressions. We estimate a total of five models for each of our four dependent variables. All models include our binary treatment variable for exposure to the changes. In addition, Model 1 includes basic controls; gender, proxy for ability (upper-secondary GPA), and an entry-year cohort dummy (2018-2019 vs 2019-2020). In Model 2 we add binary variables for each upper-secondary school (estimates not shown). In Models 3 and 4 we add age and age squared to Models 1 and 2. In Model 5, we additionally interact the three-year secondary-school binary variable and upper-secondary GPA to Model 4. This variable will shed light on whether students are differentially affected by the reform based on their upper-

secondary GPA. A positive coefficient would indicate that the shortening of upper-secondary education increased inequality in educational achievement, as it disproportionately affected students with lower upper-secondary GPA. For these models, we have standardized average grades, completed credits, and the multiple of the two by subtracting the mean and dividing by the standard deviation, so that the average of the standardized variables is zero and their standard deviation is one. Coefficient estimates are thus measured in standard deviations of the dependent variable. We do this to ease interpretation between different educational systems and grading traditions.

4. Robustness checks and sensitivity analyses

We do various robustness checks and sensitivity analyses. As those who complete zero credits receive the average grade of zero, average grade is influenced by completed credits (or completing none) in some cases. We therefore re-estimate Models 1-3 with a subsample of only those who received an average grade higher than zero. We also estimate the models for each gender separately and for each of the five schools of the University of Iceland separately.

As mentioned above, we do not have a clean natural experiment because of the flexibility within the upper secondary school system both before and after the implementation of the reform. In order to get a cleaner treatment effect, we filter out those who were not exposed to the reform but still graduated in three years, and those exposed to the reform but still graduated in four or more years. In this way we limit our sample to only those who complied with the organizational structure of the upper-secondary curriculum.

The shortening of upper secondary education does not only affect the years of formal education a university entrant has received but also their average age. This needs to be considered carefully. In models that include age variables, we calculate the age that maximizes expected average grade, completed credits, or minimizes the likelihood of dropout. We also include binary variables for each year of age, as well as interacting these and a binary variable for reform exposure. This model was estimated with the basic controls, and with and without binary variables for each upper-secondary school. These analyses allow us to examine the effect of a shorter upper-secondary education within each year of age, thus distinguishing even further the effects of age on one hand and shorter upper-secondary education on the other. We also examine robustness to the exclusion of all those entering university at 23 years of age or older, as to verify that our results concerning age are not driven by those in the right tail of the age distribution of our sample.

Finally, we use upper secondary GPA as a proxy for general ability in every model. It is conceivable that the distribution of nominal GPAs may vary between upper-secondary graduation cohorts, for example due to grade inflation. As those graduating from the 3-year system are on average in later graduation cohorts, grade inflation might bias our results downwards. However, for the entry-into-university cohort of 2018-2019 we have information on GPA scores standardized based on their full upper-secondary graduation cohort. This information therefore represents each student's GPA's place in the distribution of GPAs in their cohort, irrespective of time trends in nominal grading practices and irrespective of which students from the cohort choose to enter university. Proxying general ability using this cohort-based standardized GPAs thus rids us of biases induced by changes in nominal grading practices over time and can shed light on the danger of such biases in our main analysis.

5. Results

Our main results are reported in Tables 3-6. For models including age we calculate the age at which university achievement is highest and report it as Age*.

We see that upper secondary GPA is significantly and positively related to average university grade. The correlation is of economic significance as well, a rise of 1 on the 0-10 scale of upper secondary GPA is associated with a rise in average university grade close to 0.35 standard deviations in every model. The coefficient for the gender dummy is positive in every model, indicating that women receive higher average grades in the first year of university.

Our main coefficient of interest is the one related to exposure to the reform. We see that when age is not controlled for, a student who was exposed to the reform is expected to receive an average grade almost 0.3 standard deviations lower than his or her unexposed classmates, who spent four instead of three years in secondary school. This relationship is statistically significant at the 1% level.

Table 3. Average university grade as the dependent variable

Average university grade	(1)	(2)	(3)	(4)	(5)
Reform	-0.282***	-0.288***	-0.212***	-0.089	-0.542*
	(0.038)	(0.043)	(0.053)	(0.061)	(0.312)
Dummy = 1 if woman	0.079**	0.074**	0.074**	0.067*	0.068*
	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
Upper-secondary GPA	0.350***	0.329***	0.360***	0.359***	0.337***
	(0.019)	(0.020)	(0.021)	(0.021)	(0.026)
Age			0.585*	0.952***	1.008***
			(0.318)	(0.325)	(0.327)
Age^2			-0.013*	-0.020***	-0.022***
			(0.007)	(0.007)	(0.008)
Reform x Upper-secondary GPA					0.060
					(0.040)
Constant	-2.579***	-1.881**	-9.109***	-13.140***	-13.570***
	(0.145)	(0.949)	(3.481)	(3.701)	(3.712)
Secondary-school dummies	No	Yes	No	Yes	Yes
R^2	0.103	0.131	0.105	0.137	0.138
Age*			22.16	23.33	23.23

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. N=3,147 in every model. Those who receive an average grade of zero are included. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected average grade is denoted by Age*.

The effect of the treatment is somewhat weakened with the introduction of age in Model 3. The relationship diminishes even more and becomes statistically insignificant when we add binary variables for the different secondary schools in Model 4. We see that when estimating Model 5, the interaction term of the three-year upper secondary education dummy and upper secondary GPA is not strongly related to average university grade. The coefficient for the interaction term is small and statistically insignificant. The sign of the coefficient, however, suggests that the shortening increased achievement disparities between students somewhat. Thus, there is only suggestive evidence that the shortening affected students with lower upper secondary GPAs disproportionately.

Finally, age is strongly associated with average grade in Models 4 and 5 while only weakly in Model 3, when secondary school dummies are not included. The age maximizing average grade as a first-year student is much higher than the expected age of a first-year student who finished upper-secondary school in three years. It is above 22 years for Model 4 and above 23 years for Models 4 and 5.

Table 4. Number of completed credits as the dependent variable

Number of completed credits	(1)	(2)	(3)	(4)	(5)
Reform	-0.291***	-0.301***	-0.216***	-0.102*	-0.556*
	(0.037)	(0.042)	(0.053)	(0.060)	(0.306)
Dummy = 1 if woman	0.059*	0.051	0.055	0.044	0.045
	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
Upper-secondary GPA	0.353***	0.324***	0.365***	0.355***	0.333***
	(0.019)	(0.020)	(0.020)	(0.021)	(0.025)
Age			0.487	0.854***	0.910***
			(0.314)	(0.320)	(0.322)
Age^2			-0.011	-0.018**	-0.019***
			(0.007)	(0.007)	(0.007)
Reform x Upper-second. GPA					0.0598
					(0.040)
Constant	-2.796***	-3.610***	-8.365**	-13.870***	-14.310***
	(0.143)	(0.932)	(3.434)	(3.634)	(3.645)
Secondary-school dummies	No	Yes	No	Yes	Yes
R^2	0.128	0.162	0.129	0.168	0.169
Age*			23.76	23.59	23.45

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=3,147 in every model. Those who receive an average grade of zero are included. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected number of completed credits is denoted by Age*.

When analyzing the number of completed credits in Table 4 a similar story appears. The upper-secondary GPA is strongly related to the number of completed credits. There is a significant negative coefficient for the treatment when age is not controlled for, that decreases somewhat with the inclusion of age. The treatment variable becomes insignificant when both age and the binary variables for secondary schools are included. Age is strongly associated with completed credits when secondary schools are controlled for, but the association is insignificantly different from zero without secondary-school controls. The age that maximizes completed credits is well above 23 years for all models including age. When Model 5 is estimated, the coefficient for the interaction term for the treatment and upper-secondary GPA is positive, but the magnitude of the relationship again remains small and statistically insignificant, indicating some, although weak, evidence that the shortening affected students with lower upper-secondary GPAs disproportionately.

Table 5 reports results using the product of average grade and the number of completed credits as dependent variable, the overarching story remains similar. The main differences between the estimation results when using completed credits or the product of completed credits and average grade, in comparison with using the average grade, as the dependent

variable is that the coefficient for the gender dummy variable is smaller and indistinguishable from zero when completed credits or total credits are used as the dependent variable.

Table 5. The product of grade and number of completed credits as the dependent variable

The product of average grade and the number of completed credits	(1)	(2)	(3)	(4)	(5)
Reform	-0.338***	-0.339***	-0.248***	-0.087	-0.429
	(0.036)	(0.041)	(0.051)	(0.058)	(0.296)
Dummy = 1 if woman	0.024	0.017	0.019	0.009	0.010
	(0.034)	(0.034)	(0.034)	(0.033)	(0.033)
Upper-secondary GPA	0.433***	0.402***	0.449***	0.443***	0.427***
	(0.019)	(0.019)	(0.020)	(0.020)	(0.024)
Age			0.469	0.979***	1.021***
			(0.306)	(0.309)	(0.311)
Age^2			-0.010	-0.020***	-0.021***
			(0.007)	(0.007)	(0.007)
Reform x Upper-second. GPA					0.0451
					(0.038)
Constant	-3.345***	-4.036***	-8.842***	-15.990***	-16.320***
	(0.140)	(0.903)	(3.350)	(3.512)	(3.523)
Secondary-school dummies	No	Yes	No	Yes	Yes
R^2	0.169	0.212	0.171	0.223	0.223
Age*			23.22	24.00	23.86

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=3,147 in every model. Those who receive an average grade of zero are included. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing the expected product of the number of completed credits and average grade is denoted by Age*.

When we estimate the models with a binary variable for dropout (defined as zero credits completed) as the dependent variable, a mirror image of the other estimation results emerges. A higher upper-secondary GPA decreases the probability of a dropout. If a student's GPA increases by 1/10, the probability of dropout decreases by 7-8pp other things equal. If age is not controlled for, being exposed to the reform is associated with an increase in the probability of a dropout by 7-8pp, but the relationship diminishes and becomes indistinguishable from zero when age and secondary schools are controlled for. Age is not as strongly related to the likelihood of dropout as it is to the other dependent variables, and the age that minimizes the probability of dropout is somewhat lower than the age that maximizes the expected value of our other dependent variables. Students around 21-22 years of age are the least likely to complete no credits. Furthermore, when estimating Model 5 we continue to get some evidence that the shortening disproportionately affects the likelihood of dropout for

students with lower upper-secondary GPAs, as the sign of the coefficient for the interaction term is negative. Finally, women are about 4-5pp less likely to drop out.

Table 6. Dropout as the dependent variable

Dropout	(1)	(2)	(3)	(4)	(5)
Reform	0.071***	0.075***	0.061***	0.0391	0.288**
	(0.015)	(0.017)	(0.021)	(0.024)	(0.124)
Dummy = 1 if woman	-0.045***	-0.047***	-0.044***	-0.041***	-0.042***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Upper-secondary GPA	-0.082***	-0.075***	-0.082***	-0.080***	-0.068***
	(0.008)	(0.008)	(0.008)	(0.009)	(0.010)
Age			-0.178	-0.234*	-0.265**
			(0.126)	(0.130)	(0.131)
Age^2			0.004	0.005*	0.006**
			(0.003)	(0.003)	(0.003)
Reform x Upper-second. GPA					-0.033**
					(0.016)
Constant	0.793***	0.560	2.685*	3.226**	3.465**
	(0.057)	(0.378)	(1.378)	(1.478)	(1.482)
Secondary-school dummies	No	Yes	No	Yes	Yes
R^2	0.043	0.061	0.044	0.062	0.064
Age*			21.39	22.46	22.34

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=3,147 in every model. Those who receive an average grade of zero are included. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age minimizing expected probability of dropout is denoted by Age*.

6. Robustness checks and sensitivity analyses

6.1 At least one credit completed

Students who do not pass any course will have an average grade of zero because they have not completed any credits. To separate the effect of a three-year upper-secondary education on average grades, on the one hand, and on the number of completed credits on the other, we estimate Models 1-4 again with dependent variables a) average grade b) completed credits c) total grade (the product of the two), using a sample of only those completing at least one credit and thus receiving a non-zero average university grade.

The results are shown in Tables A1-3 in the Appendix. In general, the main story remains the same. Finishing upper-secondary school in three years still has a significantly negative association with average university grades, completed credits, and the product of the two in the first year of university, when age is not controlled for. However, when age and dummies for secondary schools have been added, the association becomes insignificant. It is worth mentioning that the magnitude of the association is smaller when those with zero completed credits are omitted. Further, the age that maximizes achievement measured by average grade,

completed credits, or the product of the two is somewhat higher when those with an average grade of zero are filtered out. The achievement-maximizing age is around 25 years rather than 22-24 as in our main results.

6.2 Subsamples

In order to test if the reform affected some groups of students differently from others, we estimate the models again with a sample of men and women separately and also separately for each of the schools of the University of Iceland.

6.2.1 Gender

Tables A4-11 in the Appendix show results by gender. Although upper-secondary GPAs are significantly correlated with our dependent variables for both men and women, coefficient sizes are larger for men.

For both men and women, being exposed to the reform is associated with lower university achievement. The relationship is particularly strong for men and survives the addition of age and secondary-school binary variables. In contrast, the reform coefficient becomes statistically insignificant for women when these variables are added.

Age is never statistically significantly associated with the university achievement for men and the achievement maximizing (or minimizing) age varies greatly both with inclusion of upper-secondary school controls and for different dependent variables. For women however, age is significantly associated with average grade and the number of completed credits and the achievement maximizing age is in most cases between 23 and 25 years of age.

In sum, the treatment appears to affect the genders differently. Men are on average adversely affect by the compressions of the curriculum, while women are adversely affected by entering university at a younger age.

6.2.2 Field of Study

The University of Iceland is separated into five schools: The School of Social Sciences, The School of Health Sciences, The School of Humanities, The School of Education and The School of Engineering and Natural Sciences. Results from estimating the models for each school separately are shown in Tables A12-A30.

While substantial power is naturally lost with this stratification, upper-secondary GPAs are almost always significantly and positively associated with achievement, with dropout

probabilities in the School of Education being the exception. In general, it can be said that upper-secondary GPAs are most strongly correlated with university achievement in the School of Engineering and Natural Sciences and the lowest correlation in the School of Education. Women perform significantly better in the School of Education but men perform significantly better in the School of Engineering and Natural Sciences. For other schools, the gender variable is seldom statistically different from zero but in most cases small and positive, indicating slightly better performance by women.

In the School of Humanities and the School of Education, the treatment effect is smaller than in our main results and insignificant. The association is even positive (although insignificant) when we control for age for the School of Education. For the School of Health Sciences and the School of Engineering and Natural Sciences the treatment effect is of similar magnitude as in our main results, although measured with less precision. However, in the School of Social Sciences the treatment effect remains significantly different from zero in all cases and the coefficients are even larger than in our main results, indicating that the reform affected Social Science students most adversely.

Age only has significant correlations with achievement in the School of Engineering (for average grades and dropout probability when upper-secondary schools are controlled for) and in the School of Education. In the School of Education, the achievement maximizing age is between 22.74 and 23.0, depending on the dependent variable and controls, but in the School of Engineering and Natural Sciences the achievement maximizing age is much lower, from 17.27 to 22.64.

6.3 Self-selection

Our results could suffer a bias due to self-selection in our data. The bias might lead to an underestimation of the negative association between the shortening of upper-secondary school and university performance.

To tackle the self-selection resulting from the flexibility in the upper-secondary school system, i.e. the self-selection of those who voluntarily graduated from upper-secondary school in three years prior to the reform, we estimate Models 1-4 again using a sample of only those who comply to the reform. That is, where we filter out all students who were enrolled in the "three-year" system in upper-secondary school but graduated in more than 3 years, and all students who were enrolled in the old "four-year" system but graduated in 3 or fewer years. Estimation results are reported in Tables A31-A34 in the Appendix. The results hold in general. The coefficient of the gender dummy is very similar although generally

slightly lower than in our main results. Upper-secondary GPAs are still highly significant both statistically and economically. The coefficients on upper-secondary GPAs are even slightly higher in absolute value (they are a larger negative number for models using dropout likelihood as the dependent variable) in Models 1-3, that don´t control for age and the one controlling for age but not upper-secondary schools. However, the coefficient is slightly lower (although still very similar to our main results) when both age and upper-secondary schools are controlled for in Model 4. The treatment effect is also very similar to our main results. Thus, our results are robust to the exclusion of non-compliance with the reform. For estimation using average grade or total grades, the coefficient is slightly larger than our main results when we do not control for secondary schools, but slightly lower when they are controlled for. For completed credits or the likelihood of dropout, the coefficient is slightly lower except for Model 3, when age is controlled for but not secondary school. For that model the coefficient is slightly higher.

6.4 Age effects

In order to examine the relationship between age, three years of upper-secondary education, and university performance more thoroughly, we construct binary variables for each year of age in our sample (ages 17 to 25), and another set of variables interacting age dummies and the treatment dummy for the ages including individuals who were exposed to the reform and not exposed (ages 19 to 25, all 17 and 18 year old new students in our sample were exposed to the reform). We estimated models using these sets of dummies while controlling for gender and upper-secondary GPAs, both with and without secondary-school dummies for each of our dependent variables. The results are reported in Tables A35 and A36 in the Appendix. Most of the coefficients of our new age dummies are statistically significant. However, many interaction terms are statistically insignificant. More specifically, all interaction terms for ages 21, 22 and 23 were insignificantly different from zero while interaction terms for ages 19, 20, 24 and 25 were in most cases at least significantly different from zero at the 10% significance level. This means that for individuals who were 19, 20, 24 or 25 years old as university entrants, our estimation results suggest a significant difference in achievement depending on their exposure to the reform, while for individuals who were 21, 22 or 23 years old as entrants our results do not suggest a significant difference in achievement by exposure.

Figure 1 shows the relationship between age and each of our dependent variables for those who complete upper-secondary school in three years and in four years separately. Although

some coefficients are insignificantly different from zero, we use the point estimates from the estimated model without secondary-school dummies.

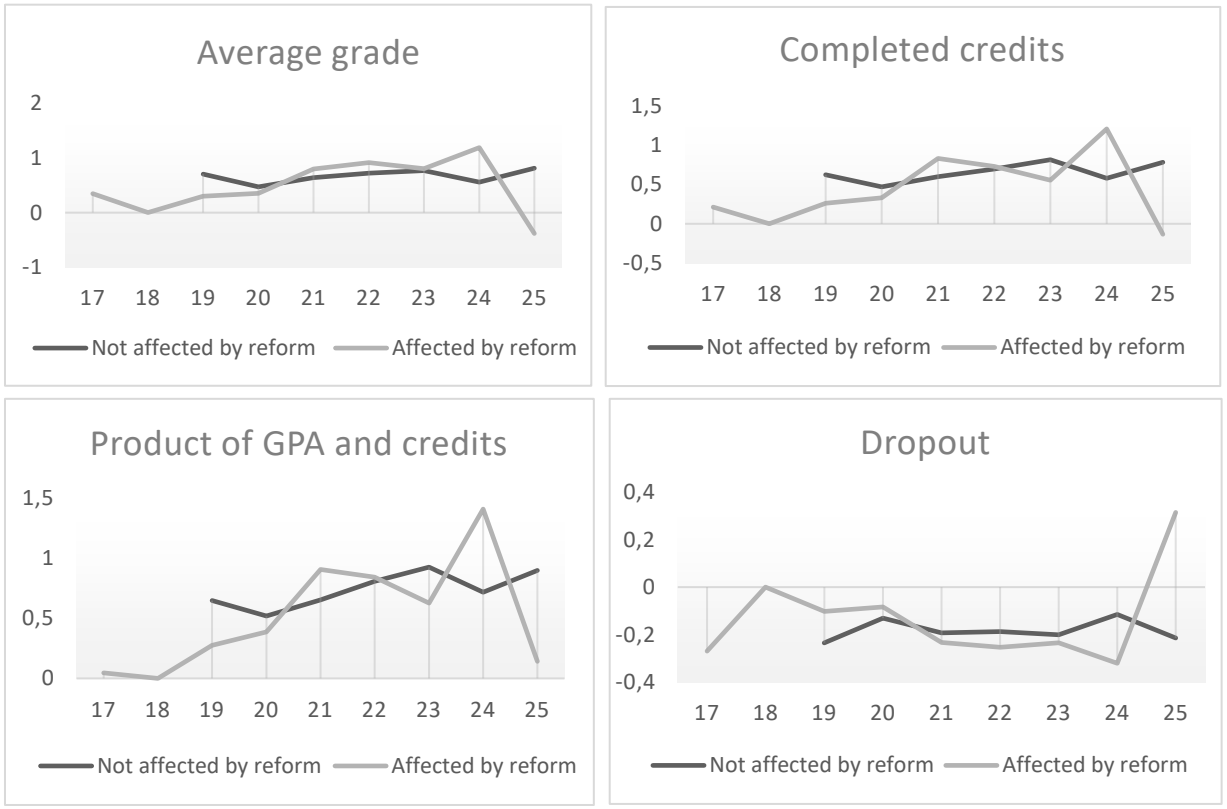

Figure 1. The association between age and university performance, by length of upper secondary education.

The Y-axis shows standard deviations of the relevant dependent variable. Comparison group is 18 year old first-year students who were affected by the reform and secondary school dummies are included in these estimations. Thus, the picture shows estimated differences from 18 year old first-year students exposed to the reform.

The difference in expected performance by age is greater for those who were exposed to the reform – spent three years in secondary school. For those exposed to the reform, expected average grade and expected number of completed credits are about 1.2 SD higher, the product of the two is 1.4 SD higher and the dropout likelihood is about 32 percentage points lower for 24 year old than for 18 year old first-year students, for example. For those not exposed to the reform, the largest difference between age years in expected average grade or expected number of credits is about 0.34SD, the largest difference between age years in the expected product of the two is 0.41SD and the largest difference between age years in likelihood of dropout is about 12 percentage points.

Finally, for those 19 and 20 years old, university achievement is higher if not affected by the reform, but for older entrants, achievement is generally higher for those affected by the reform with the exception of 25 year old students and 23 year old students when it comes to

completed credits. We should pay special attention to entrants aged 19-21 years old as individuals from the "double cohort" should be within this age range if they complied fully to the organization of the Icelandic education system. Students from the double cohort who were exposed to the reform would be 19 years old as first-year students in the 2018-2019 schoolyear but 20 years old if they delayed enrollment and were first-year students in the 2019-2020 schoolyear. Similarly, students from the double cohort who were not exposed to the reform would be 20 and 21 years old as first-year students depending on their enrollment year. Thus, our results generally indicate that for these ages, the expected achievement is lower for those who were exposed to the reform than for those not exposed to the reform.

Those results are of great interest as it may be argued that a stricter range should be used in general for our main results, including only those graduating shortly before and shortly after the reform. For this reason, results from our main models were also generated using only those ≤22 years of age and are reported in Tables A37-A40 in the Appendix. The most notable change in results is that the coefficients associated with the female dummy decrease substantially in size and lose their statistical significance, indicating better achievements by females than males at the university level is largely driven by those 23 years and older. However, our main results of interest – the effects of the exposure – are not affected by this sample restriction.

6.5 Separately standardized upper secondary GPAs

Finally, it is possible that that changes in distribution of nominal GPA's over time do not represent changes in ability distribution between cohorts, but represent changes in grading practices. We have GPA scores that are standardized on the basis of the full upper-secondary graduation cohorts for the university entrant cohort of 2018-2019, which should therefore represent a student's place in the ability distribution of her cohort. We estimate Models 1-4 again using these standardized GPAs, instead of the original GPAs, and results are shown in Tables A41-A44 in the Appendix.

Generally, our treatment coefficients are robust to this change. The broad picture here is that the treatment effect is slightly lower than before for models not controlling for age, but for models controlling for age the treatment effect is slightly higher. The female-dummy is never statistically significant, as expected since we have already established that the gender effects are driven by those over 22 years of age who are excluded from this estimation.

Finally, in these estimations, the age effects differ somewhat from our main results as can be expected given the smaller age range in this sub-sample. There is not a statistically

significant relationship between age and average grade at university, while in our main results (using the non-standardized upper secondary GPAs) we have a statistically significant relationship. This could of course stem from power issues as the sample is smaller. For models using completed credits or total grade as the dependent variable, our estimations of age effects from this sensitivity analysis have similar statistical accuracy as our main results, but the achievement maximizing age is in most specifications considerably higher and above the maximum age in our sample (indicating a strictly positive relationship between age and the dependent variables in this sub-sample). Finally, age does not seem to have any correlation with dropout likelihood in these estimations.

Overall, we can say that our results are robust to measuring ability by GPAs standardized by the upper-secondary graduation-cohort specific distribution of GPAs, from the full cohort (including those who did not enter the University of Iceland).

7. Discussion

The recent system change in upper-secondary educational length in Iceland allows us to measure the added value of the fourteenth year of formal university-preparatory education for achievement at the university level. A student who never repeats a grade and continues his or her educational path continuously until university will enroll at university on their 19th birthyear if their upper-secondary education was 3 years, but on the 20th if their upper-secondary education was 4 years. We found that completing upper-secondary school in three years instead of four has a negative effect on student's first-year university performance measured as grade point average, the number of credits completed, the product of the two, and probability of dropping out.

Our contributions to the literature are several. First, the age dispersion of secondary school graduates in Iceland makes it possible to separate the effect of students graduating at a younger age from the effect of the compression of the secondary school curriculum. The expected performance-maximizing age of first-year students in all our main models is at least 21 years of age. A 19 year old first-year university student is expected to receive about a 0.08-0.17SD lower GPA, complete 0.06-0.17SD fewer credits and are 2-4 percentage points more likely to complete zero credits than a 20 year old first-year student. The difference in expected performance by age is greater for those exposed to the reform. Second, the distributional effects of the reform are also of interest. Our results indicate increased performance disparities after the reform, although not measured with great precision. This is in accordance with results from Germany and Canada. It would be worthwhile to follow

through with further studies on this. Third, there are implications about gender effects. Our results on gender differences reinforce the story about increased disparities. Consistent with previous results (Hubner and Marcus 2017; Büttner and Thomsen 2015), we find men to be more affected by the reform than females, a result that survives controls for age and ability. Women are already more than two thirds of university students in Iceland and the shortening of secondary education may possibly skew the distribution further.

Finally, we find separate effects of the compression of the curriculum and the age at graduation. While being exposed to the reform is associated with lower university achievement for both men and women, the relationship is particularly strong for men and survives the addition of age and secondary-school binary variables. In contrast, the reform coefficient becomes statistically insignificant for women when age and secondary-school binary variables are added. Age is never statistically significantly associated with the university achievement for men and the achievement maximizing (or minimizing) age varies greatly both with inclusion of upper-secondary school controls and for different dependent variables. For women however, age is significantly associated with average grade and the number of completed credits. In sum, the treatment appears to affect the genders differently. Men are on average adversely affect by the compressions of the curriculum to three years while women are adversely affected by entering university at a younger age. The lower age of university entrants seems, in the case of women, to be the main cause of the performance change, rather than their shorter secondary education, while for men the effect is robust to the inclusion of age.

It should be kept in mind that this study only measures the short-term effect of the policy change, that is the effect on the first two cohorts of the newly shortened upper secondary school system. Therefore, it is possible that we have some self-selection in our data if the reform affect the likelihood of students delaying university enrollment, as research from the German upper-secondary education reforms found (Marcus and Zambre, 2019; Meyer and Thomsen, 2016). It is also possible that teachers and schools could adjust to the new three-year system and deliver better students in the future than they did in the immediate aftermath of the changes. Therefore, it would be valuable to repeat the study later to measure its longer-term effects.

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Appendix

Table A1. Average university grade as the dependent variable, at least one completed credit

Average university grade	(1)	(2)	(3)	(4)
Reform	-0.128***	-0.126***	-0.0659***	0.0118
	(0.0135)	(0.0149)	(0.0189)	(0.0209)
Dummy = 1 if woman	-0.0352***	-0.0281**	-0.0402***	-0.0355***
	(0.0126)	(0.0123)	(0.0126)	(0.0121)
Upper-secondary GPA	0.180***	0.173***	0.193***	0.197***
	(0.00692)	(0.00706)	(0.00733)	(0.00731)
Age			0.180	0.426***
			(0.113)	(0.112)
Age^2			-0.00348	-0.00848***
			(0.00261)	(0.00258)
Constant	-0.866***	-0.708**	-3.212***	-6.146***
	(0.0523)	(0.299)	(1.237)	(1.268)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.210	0.271	0.219	0.301
Age*			25.86	25.12

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=2,585 in every model. Those who complete zero credits and thus have an average grade of zero have been filtered out. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected average grade is denoted by Age*.

Table A2. Number of completed credits as the dependent variable, at least one completed credit

Number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.193***	-0.201***	-0.122***	-0.0408
	(0.0299)	(0.0334)	(0.0419)	(0.0475)
Dummy = 1 if woman	-0.0226	-0.0208	-0.0283	-0.0293
	(0.0278)	(0.0276)	(0.0278)	(0.0275)
Upper-secondary GPA	0.234***	0.213***	0.249***	0.241***
	(0.0153)	(0.0158)	(0.0162)	(0.0166)
Age			0.220	0.512**
			(0.251)	(0.256)
Age^2			-0.00432	-0.0103*
			(0.00577)	(0.00588)
Constant	-1.606***	-2.775***	-4.430	-9.260***
	(0.115)	(0.672)	(2.740)	(2.888)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.167	0.205	0.169	0.214
Age*			25.46	24.85

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=2,585 in every model. Those who complete zero credits and thus have an average grade of zero have been filtered out. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected number of completed credits is denoted by Age*.

Table A3. The product of average grade and number of completed credits as the dependent variable, at least one completed credit

The product of average grade and the number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.265***	-0.264***	-0.171***	-0.0335
	(0.0313)	(0.0346)	(0.0438)	(0.0489)
Dummy = 1 if woman	-0.0541*	-0.0461	-0.0617**	-0.0584**
	(0.0290)	(0.0286)	(0.0291)	(0.0283)
Upper-secondary GPA	0.345***	0.320***	0.365***	0.361***
	(0.0160)	(0.0164)	(0.0170)	(0.0171)
Age			0.231	0.694***
			(0.262)	(0.263)
Age^2			-0.00427	-0.0137**
			(0.00603)	(0.00605)
Constant	-2.404***	-3.411***	-5.518*	-12.31***
	(0.121)	(0.695)	(2.863)	(2.971)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.207	0.260	0.211	0.276
Age*			27.05	25.33

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=2,585 in every model. Those who complete zero credits and thus have an average grade of zero have been filtered out. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing the expected product of the number of completed credits and average grade is denoted by Age*.

Table A4. Average university grade as the dependent variable, females.

Average university grade	(1)	(2)	(3)	(4)
Reform	-0.296***	-0.305***	-0.115*	-0.017
	(0.045)	(0.052)	(0.065)	(0.075)
Upper-secondary GPA	0.300***	0.282***	0.332***	0.330***
	(0.024)	(0.026)	(0.026)	(0.027)
Age			0.683*	0.849**
			(0.386)	(0.394)
Age^2			-0.014	-0.017*
			(0.003)	(0.003)
Constant	-2.117***	-1.485	-10.500**	-12.340***
	(0.186)	(0.925)	(4.204)	(4.418)
Secondary school dummies included	No	Yes	No	Yes
R^2	0.080	0.104	0.088	0.120
Age*			24.39	25.27

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,945 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is not reported. The age maximizing expected average grade is denoted by Age*.

Table A5. Number of completed credits as the dependent variable, females.

Number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.291***	-0.298***	-0.135**	-0.039
	(0.046)	(0.053)	(0.065)	(0.075)
Upper-secondary GPA	0.307***	0.276***	0.332***	0.315***
	(0.025)	(0.026)	(0.026)	(0.027)
Age			0.863**	1.049***
			(0.391)	(0.399)
Age^2			-0.019**	-0.022**
			(0.009)	(0.009)
Constant	-2.401***	-3.230***	-12.440***	-15.910***
	(0.188)	(0.933)	(4.260)	(4.471)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.107	0.135	0.112	0.145
Age*			23.07	23.84

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,945 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected number of completed credits is denoted by Age*.

Table A6. The product of average grade and number of credits, females.

The product of average grade and the number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.349***	-0.349***	-0.159**	-0.022
	(0.045)	(0.051)	(0.064)	(0.073)
Uppe-secondary GPA	0.375***	0.346***	0.407***	0.398***
	(0.024)	(0.025)	(0.025)	(0.026)
Age			0.911**	1.207***
			(0.382)	(0.388)
Age^2			-0.019**	-0.025***
			(0.009)	(0.009)
Constant	-2.893***	-3.637***	-13.680***	-18.450***
	(0.184)	(0.911)	(4.162)	(4.345)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.139	0.170	0.147	0.188
Age*			23.48	24.14

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,945 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing the expected product of the number of completed credits and average grade is denoted by Age*.

Table A7. Dropout as the dependent variable, females.

Dropout	(1)	(2)	(3)	(4)
Reform	0.069***	0.071***	0.028	0.013
	(0.018)	(0.020)	(0.025)	(0.029)
Upper-secondary GPA	-0.067***	-0.060***	-0.074***	-0.070***
	(0.010)	(0.010)	(0.010)	(0.011)
Age			-0.150	-0.149
			(0.152)	(0.156)
Age^2			0.003	0.003
			(0.003)	(0.004)
Constant	0.635***	0.412	2.487	2.385
	(0.073)	(0.363)	(1.652)	(1.746)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.028	0.049	0.031	0.054
Age*			24.35	26.05

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,945 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age minimizing expected probability of dropout is denoted by Age*.

Table A8. Average university grade as the dependent variable, males.

Average university grade	(1)	(2)	(3)	(4)
Reform	-0.253***	-0.269***	-0.347***	-0.205*
	(0.067)	(0.074)	(0.093)	(0.105)
Upper-secondary GPA	0.421***	0.382***	0.393***	0.386***
	(0.032)	(0.033)	(0.034)	(0.035)
Age			0.182	0.822
			(0.552)	(0.570)
Age^2			-0.006	-0.019
			(0.013)	(0.013)
Constant	-3.095***	-2.623***	-4.183	-10.470
	(0.235)	(1.011)	(6.075)	(6.394)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.130	0.200	0.135	0.201
Age*			15.91	21.52

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,202 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected average grade is denoted by Age*.

Table A9. Number of completed credits as the dependent variable, males.

Number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.286***	-0.313***	-0.340***	-0.212**
	(0.064)	(0.070)	(0.089)	(0.100)
Upper-secondary GPA	0.417***	0.382***	0.405***	0.399***
	(0.030)	(0.032)	(0.033)	(0.033)
Age			-0.249	0.425
			(0.527)	(0.540)
Age^2			0.005	-0.009
			(0.012)	(0.012)
Constant	-3.248***	-4.514***	-0.260	-8.280
	(0.224)	(0.958)	(5.801)	(6.057)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.153	0.229	0.153	0.230
Age*			**23.76**	23.88

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,202 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected number of completed credits is denoted by Age*.

Table A10. The product of average grade and number of completed credits as the dependent variable, males.

The product of average grade and the number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.312***	-0.332***	-0.380***	-0.205**
	(0.062)	(0.067)	(0.086)	(0.095)
Upper-secondary GPA	0.513***	0.471***	0.500***	0.494***
	(0.029)	(0.030)	(0.032)	(0.032)
Age			-0.407	0.435
			(0.511)	(0.516)
Age^2			0.009	-0.009
			(0.012)	(0.012)
Constant	-3.920***	-5.149***	0.804	-8.958
	(0.217)	(0.915)	(5.621)	(5.781)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.214	0.304	0.215	0.307
Age*			**22.92**	24.80

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,202 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing the expected product of the number of completed credits and average grade is denoted by Age* and if estimations yield an achievement minimizing age, it is shown in bold.

Table A11. Dropout as the dependent variable, males.

Dropout	(1)	(2)	(3)	(4)
Reform	0.074***	0.083***	0.107***	0.0782*
	(0.027)	(0.030)	(0.037)	(0.043)
Upper-secondary GPA	-0.103***	-0.092***	-0.092***	-0.090***
	(0.013)	(0.014)	(0.014)	(0.014)
Age			-0.148	-0.295
			(0.222)	(0.232)
Age^2			0.004	0.007
			(0.005)	(0.005)
Constant	0.945***	0.748*	2.176	3.633
	(0.095)	(0.412)	(2.438)	(2.602)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.053	0.105	0.060	0.108
Age*			18.32	20.80

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,202 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age minimizing expected probability of dropout is denoted by Age*.

Table A12. Average grade as the dependent variable, The School of Social Sciences

Average grade	(1)	(2)	(3)	(4)
Reform	-0.295***	-0.372***	-0.262**	-0.314**
	(0.076)	(0.088)	(0.108)	(0.126)
Dummy = 1 if woman	0.123*	0.130*	0.120*	0.123*
	(0.067)	(0.068)	(0.067)	(0.068)
Upper-secondary GPA	0.241***	0.258***	0.244***	0.267***
	(0.041)	(0.044)	(0.042)	(0.045)
Age			0.221	-0.070
			(0.626)	(0.649)
Age^2			-0.005	0.002
			(0.014)	(0.015)
Constant	-1.714***	-1.200	-4.216	-2.029
	(0.296)	(0.944)	(6.851)	(7.183)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.059	0.108	0.059	0.110
Age*			22.69	**14.40**

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=762 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected average grade is denoted by Age* and if estimations yield an achievement minimizing age, it is shown in bold.

Table A13. Number of completed credits as the dependent variable, The School of Social Sciences.

Number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.377***	-0.462***	-0.291***	-0.321***
	(0.073)	(0.084)	(0.104)	(0.120)
Dummy = 1 if woman	0.096	0.078	0.086	0.0651
	(0.064)	(0.065)	(0.064)	(0.065)
Upper-secondary GPA	0.293***	0.308***	0.304***	0.326***
	(0.039)	(0.042)	(0.040)	(0.043)
Age			0.354	0.248
			(0.600)	(0.620)
Age^2			-0.007	-0.004
			(0.014)	(0.014)
Constant	-2.376***	-1.808**	-6.620	-7.788
	(0.284)	(0.904)	(6.564)	(6.867)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.117	0.165	0.119	0.170
Age*			24.02	29.45

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=762 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected number of completed credits is denoted by Age*.

Table A14. The product of average grade and number of completed credits as the dependent variable, The School of Social Sciences.

The product of average grade and the number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.388***	-0.465***	-0.288***	-0.290**
	(0.070)	(0.081)	(0.100)	(0.115)
Dummy = 1 if woman	0.094	0.086	0.081	0.069
	(0.061)	(0.063)	(0.062)	(0.063)
Upper-secondary GPA	0.356***	0.365***	0.369***	0.389***
	(0.038)	(0.040)	(0.039)	(0.041)
Age			0.338	0.267
			(0.577)	(0.595)
Age^2			-0.007	-0.004
			(0.013)	(0.014)
Constant	-2.824***	-2.327***	-7.006	-8.737
	(0.273)	(0.869)	(6.312)	(6.581)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.150	0.199	0.153	0.207
Age*			24.78	31.56

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=762 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing the expected product of the number of completed credits and average grade is denoted by Age*.

Table A15. Dropout as the dependent variable, The School of Social Sciences.

Dropout	(1)	(2)	(3)	(4)
Reform	0.095***	0.125***	0.097**	0.132***
	(0.030)	(0.035)	(0.043)	(0.050)
Dummy = 1 if woman	-0.046*	-0.041	-0.047*	-0.041
	(0.026)	(0.027)	(0.027)	(0.027)
Upper-secondary GPA	-0.047***	-0.056***	-0.047***	-0.056***
	(0.016)	(0.017)	(0.017)	(0.018)
Age			-0.043	0.107
			(0.249)	(0.258)
Age^2			0.001	-0.003
			(0.006)	(0.006)
Constant	0.513***	0.278	0.941	-0.579
	(0.118)	(0.375)	(2.724)	(2.859)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.025	0.075	0.025	0.075
Age*			20.28	**21.40**

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=762 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age minimizing expected probability of dropout is denoted by Age* and if estimations yield an achievement minimizing age, it is shown in bold.

Table A15. Average grade as the dependent variable, The School of Health Sciences.

Average grade	(1)	(2)	(3)	(4)
Reform	-0.319***	-0.327***	-0.222**	-0.097
	(0.064)	(0.073)	(0.092)	(0.106)
Dummy = 1 if woman	0.055	0.047	0.063	0.065
	(0.073)	(0.075)	(0.074)	(0.075)
Upper-secondary GPA	0.398***	0.378***	0.417***	0.417***
	(0.034)	(0.036)	(0.036)	(0.038)
Age			0.355	0.516
			(0.545)	(0.558)
Age^2			-0.007	-0.009
			(0.013)	(0.013)
Constant	-2.962***	-2.304**	-7.372	-9.269
	(0.254)	(0.927)	(5.948)	(6.180)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.141	0.186	0.144	0.197
Age*			24.55	27.33

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=961 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected average grade is denoted by Age* and if estimations yield an achievement minimizing age.

Table A16. Number of completed credits as the dependent variable, The School of Health Sciences.

Number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.305***	-0.339***	-0.110	-0.016
	(0.066)	(0.077)	(0.096)	(0.111)
Dummy = 1 if woman	-0.088	-0.103	-0.076	-0.084
	(0.076)	(0.078)	(0.077)	(0.078)
Upper-secondary GPA	0.366***	0.326***	0.400***	0.378***
	(0.035)	(0.038)	(0.037)	(0.039)
Age			0.933	1.015*
			(0.566)	(0.581)
Age^2			-0.020	-0.020
			(0.013)	(0.013)
Constant	-2.772***	-1.894*	-13.850**	-14.630**
	(0.265)	(0.969)	(6.187)	(6.439)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.127	0.169	0.135	0.185
Age*			23.56	25.00

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=961 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected number of completed credits is denoted by Age*.

Table A17. The product of average grade and number of completed credits as the dependent variable, The School of Health Sciences.

The product of average grade and the number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.356***	-0.368***	-0.170*	-0.005
	(0.062)	(0.071)	(0.089)	(0.102)
Dummy = 1 if woman	-0.117	-0.136*	-0.108	-0.117
	(0.071)	(0.072)	(0.076)	(0.072)
Upper-secondary GPA	0.443***	0.407***	0.474***	0.464***
	(0.033)	(0.035)	(0.035)	(0.036)
Age			1.007*	1.282**
			(0.528)	(0.535)
Age^2			-0.022*	-0.026**
			(0.012)	(0.012)
Constant	-3.336***	-2.525***	-15.100***	-18.280***
	(0.247)	(0.897)	(5.770)	(5.934)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.178	0.229	0.185	0.251
Age*			23.20	24.37

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=961 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing the expected product of the number of completed credits and average grade is denoted by Age*.

Table A18. Dropout as the dependent variable, The School of Health Sciences.

Dropout	(1)	(2)	(3)	(4)
Reform	0.079***	0.087***	0.0583	0.0460
	(0.026)	(0.031)	(0.038)	(0.045)
Dummy = 1 if woman	-0.047	-0.047	-0.050	-0.052*
	(0.030)	(0.031)	(0.031)	(0.031)
Upper-secondary GPA	-0.095***	-0.088***	-0.100***	-0.097***
	(0.014)	(0.015)	(0.015)	(0.016)
Age			-0.011	0.0136
			(0.226)	(0.234)
Age^2			-3.38e-05	-0.001
			(0.005)	(0.005)
Constant	0.882***	0.660*	1.166	0.828
	(0.105)	(0.387)	(2.468)	(2.593)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.058	0.093	0.059	0.097
Age*				**7.67**

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=961 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age minimizing expected probability of dropout is denoted by Age* and if estimations yield an achievement minimizing age, it is shown in bold.

Table A19. Average grade as the dependent variable, The School of Humanities.

Average grade	(1)	(2)	(3)	(4)
Reform	-0.294**	-0.283	-0.185	-0.013
	(0.149)	(0.195)	(0.204)	(0.255)
Dummy = 1 if woman	0.158	0.164	0.160	0.152
	(0.139)	(0.148)	(0.139)	(0.148)
Upper-secondary GPA	0.327***	0.335***	0.333***	0.371***
	(0.075)	(0.083)	(0.079)	(0.087)
Age			1.470	1.546
			(1.276)	(1.397)
Age^2			-0.034	-0.034
			(0.030)	(0.033)
Constant	-2.526***	-1.971	-18.350	-19.690
	(0.565)	(1.266)	(13.790)	(14.950)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.084	0.164	0.089	0.173
Age*			21.55	22.80

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=275 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected average grade is denoted by Age*.

Table A20. Number of completed credits as the dependent variable, The School of Humanities.

Number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.164	-0.107	-0.121	0.020
	(0.149)	(0.196)	(0.204)	(0.258)
Dummy = 1 if woman	0.260*	0.262*	0.265*	0.263*
	(0.139)	(0.149)	(0.139)	(0.150)
Upper secondary GPA	0.222***	0.210**	0.213***	0.220**
	(0.075)	(0.084)	(0.079)	(0.088)
Age			1.404	1.347
			(1.277)	(1.411)
Age^2			-0.034	-0.031
			(0.030)	(0.033)
Constant	-1.809***	-1.897	-16.410	-15.400
	(0.566)	(1.275)	(13.800)	(15.110)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.060	0.132	0.066	0.136
Age*			20.96	21.73

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=275 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected number of completed credits is denoted by Age*.

Table A21. The product of average grade and number of completed credits as the dependent variable, The School of Humanities.

The product of average grade and the number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.254*	-0.208	-0.221	-0.055
	(0.150)	(0.197)	(0.205)	(0.259)
Dummy = 1 if woman	0.244*	0.245	0.249*	0.243
	(0.140)	(0.150)	(0.140)	(0.151)
Upper-secondary GPA	0.322***	0.314***	0.314***	0.330***
	(0.076)	(0.084)	(0.080)	(0.088)
Age			1.139	1.231
			(1.286)	(1.421)
Age^2			-0.027	-0.028
			(0.030)	(0.033)
Constant	-2.498***	-2.625**	-14.330	-15.270
	(0.570)	(1.284)	(13.910)	(15.210)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.095	0.163	0.098	0.167
Age*			20.94	22.06

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=275 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing the expected product of the number of completed credits and average grade is denoted by Age*.

Table A22. Dropout as the dependent variable, The School of Humanities.

Dropout	(1)	(2)	(3)	(4)
Reform	0.061	0.049	0.018	-0.034
	(0.057)	(0.075)	(0.078)	(0.098)
Dummy = 1 if woman	-0.057	-0.060	-0.059	-0.059
	(0.053)	(0.057)	(0.053)	(0.057)
Upper-secondary GPA	-0.060**	-0.059*	-0.061**	-0.068**
	(0.029)	(0.032)	(0.030)	(0.033)
Age			-0.694	-0.664
			(0.489)	(0.539)
Age^2			0.016	0.015
			(0.011)	(0.013)
Constant	0.691***	0.452	8.092	7.779
	(0.217)	(0.488)	(5.286)	(5.767)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.028	0.106	0.035	0.113
Age*			21.42	22.13

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=275 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age minimizing expected probability of dropout is denoted by Age* and if estimations yield an achievement minimizing age.

Table A23. Average grade as the dependent variable, The School of Education.

Average grade	(1)	(2)	(3)	(4)
Reform	-0.044	-0.240	0.278*	0.245
	(0.126)	(0.165)	(0.157)	(0.201)
Dummy = 1 if woman	0.495***	0.524***	0.490***	0.537***
	(0.118)	(0.127)	(0.116)	(0.124)
Upper-secondary GPA	0.202***	0.222***	0.281***	0.318***
	(0.069)	(0.078)	(0.072)	(0.080)
Age			2.514***	3.042***
			(0.924)	(0.983)
Age^2			-0.055***	-0.066***
			(0.021)	(0.022)
Constant	-2.526***	-1.971	-18.350	-19.690
	(0.565)	(1.266)	(13.790)	(14.950)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.111	0.196	0.143	0.240
Age*			22.81	22.98

Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. Notes: N=324 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected average grade is denoted by Age*.

Table A24. Number of completed credits as the dependent variable, The School of Education.

Number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.060	-0.268*	0.250*	0.185
	(0.119)	(0.154)	(0.148)	(0.188)
Dummy = 1 if woman	0.452***	0.484***	0.447***	0.497***
	(0.112)	(0.119)	(0.110)	(0.116)
Upper-secondary GPA	0.170***	0.179**	0.245***	0.267***
	(0.066)	(0.073)	(0.068)	(0.075)
Age			2.579***	2.914***
			(0.871)	(0.920)
Age^2			-0.057***	-0.064***
			(0.020)	(0.021)
Constant	-1.589***	-0.718	-31.250***	-35.710***
	(0.463)	(1.015)	(9.698)	(10.290)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.147	0.241	0.179	0.283
Age*			22.74	22.91

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=324 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected number of completed credits is denoted by Age*.

Table A25. The product of average grade and number of completed credits as the dependent variable, The School of Education.

The product of average grade and the number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.083	-0.315**	0.283*	0.207
	(0.118)	(0.152)	(0.145)	(0.183)
Dummy = 1 if woman	0.497***	0.517***	0.492***	0.531***
	(0.110)	(0.117)	(0.108)	(0.113)
Upper-secondary GPA	0.239***	0.260***	0.328***	0.363***
	(0.065)	(0.072)	(0.067)	(0.073)
Age			2.925***	3.238***
			(0.854)	(0.897)
Age^2			-0.064***	-0.070***
			(0.019)	(0.020)
Constant	-2.059***	-1.408	-35.830***	-39.940***
	(0.458)	(0.999)	(9.512)	(10.030)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.184	0.280	0.228	0.334
Age*			22.78	23.00

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=324 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing the expected product of the number of completed credits and average grade is denoted by Age*.

Table A26. Dropout as the dependent variable, The School of Education.

Dropout	(1)	(2)	(3)	(4)
Reform	0.008	0.066	-0.089	-0.088
	(0.048)	(0.063)	(0.060)	(0.077)
Dummy = 1 if woman	-0.162***	-0.175***	-0.160***	-0.179***
	(0.045)	(0.048)	(0.044)	(0.048)
Upper-secondary GPA	-0.036	-0.040	-0.060**	-0.070**
	(0.026)	(0.030)	(0.028)	(0.031)
Age			-0.757**	-0.975**
			(0.351)	(0.377)
Age^2			0.017**	0.021**
			(0.008)	(0.009)
Constant	0.544***	0.315	9.294**	11.610***
	(0.185)	(0.412)	(3.912)	(4.217)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.063	0.141	0.084	0.174
Age*			22.80	23.00

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=324 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age minimizing expected probability of dropout is denoted by Age*.

Table A27. Average grade as the dependent variable, The School of Engineering and Natural Sciences

Average grade	(1)	(2)	(3)	(4)
Reform	-0.204***	-0.126	-0.341***	-0.009
	(0.072)	(0.077)	(0.104)	(0.115)
Dummy = 1 if woman	-0.077	-0.125*	-0.078	-0.132**
	(0.067)	(0.066)	(0.067)	(0.066)
Upper-secondary GPA	0.513***	0.427***	0.468***	0.428***
	(0.037)	(0.038)	(0.039)	(0.040)
Age			0.442	1.674**
			(0.660)	(0.689)
Age^2			-0.013	-0.039**
			(0.015)	(0.016)
Constant	-3.830***	-2.359**	-7.083	-20.170***
	(0.281)	(0.936)	(7.18)	(7.568)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.197	0.304	0.211	0.309
Age*			17.27	21.30

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=825 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected average grade is denoted by Age*.

Table A28. Number of completed credits as the dependent variable, The School of Engineering and Natural Sciences.

Number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.216***	-0.160**	-0.488***	-0.162
	(0.069)	(0.072)	(0.100)	(0.108)
Dummy = 1 if woman	-0.159**	-0.214***	-0.150**	-0.214***
	(0.065)	(0.062)	(0.064)	(0.062)
Upper-secondary GPA	0.541***	0.458***	0.481***	0.453***
	(0.035)	(0.035)	(0.037)	(0.038)
Age			-0.892	0.291
			(0.633)	(0.649)
Age^2			0.0176	-0.007
			(0.015)	(0.015)
Constant	-4.259***	-4.270***	7.113	-7.170
	(0.270)	(0.878)	(6.885)	(7.127)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.238	0.372	0.256	0.373
Age*			**25.34**	20.32

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=825 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected number of completed credits is denoted by Age* and if estimations yield an achievement minimizing age, it is shown in bold.

Table A29. The product of average grade and number of completed credits as the dependent variable, The School of Engineering and Natural Sciences.

The product of average grade and the number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.256***	-0.191***	-0.528***	-0.136
	(0.068)	(0.070)	(0.100)	(0.105)
Dummy = 1 if woman	-0.218***	-0.282***	-0.208***	-0.285***
	(0.064)	(0.060)	(0.064)	(0.060)
Upper-secondary GPA	0.635***	0.553***	0.578***	0.561***
	(0.035)	(0.034)	(0.037)	(0.037)
Age			-1.090*	0.340
			(0.628)	(0.631)
Age^2			0.023	-0.008
			(0.015)	(0.015)
Constant	-4.893***	-4.775***	8.469	-8.671
	(0.268)	(0.854)	(6.831)	(6.928)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.297	0.443	0.312	0.443
Age*			**24.22**	22.64

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=825 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing the expected product of the number of completed credits and average grade is denoted by Age* and if estimations yield an achievement minimizing age, it is shown in bold.

Table A30. Dropout as the dependent variable, The School of Engineering and Natural Sciences.

Dropout	(1)	(2)	(3)	(4)
Reform	0.049*	0.020	0.096**	0.007
	(0.029)	(0.031)	(0.041)	(0.047)
Dummy = 1 if woman	0.012	0.022	0.013	0.0234
	(0.027)	(0.027)	(0.027)	(0.027)
Upper-secondary GPA	-0.140***	-0.110***	-0.122***	-0.104***
	(0.015)	(0.015)	(0.016)	(0.016)
Age			-0.279	-0.580**
			(0.263)	(0.281)
Age^2			0.008	0.014**
			(0.006)	(0.006)
Constant	1.241***	0.734*	3.646	6.658**
	(0.112)	(0.381)	(2.859)	(3.079)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.105	0.189	0.121	0.198
Age*			18.53	20.71

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=825 in every model. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age minimizing expected probability of dropout is denoted by Age*.

Table A31. Average university grade as the dependent variable, non-compliance filtered out.

Average university grade	(1)	(2)	(3)	(4)
Reform	-0.294***	-0.266***	-0.259***	-0.050
	(0.041)	(0.047)	(0.061)	(0.072)
Dummy = 1 if woman	0.072*	0.068*	0.070*	0.062
	(0.038)	(0.039)	(0.039)	(0.039)
Upper-secondary GPA	0.364***	0.333***	0.365***	0.356***
	(0.022)	(0.023)	(0.023)	(0.024)
Age			0.497	0.979***
			(0.344)	(0.355)
Age^2			-0.012	-0.021***
			(0.003)	(0.003)
Constant	-2.651***	-1.906**	-7.989**	-13.380***
	(0.160)	(0.957)	(3.764)	(4.023)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.101	0.129	0.102	0.134
Age*			21.61	23.20

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=2,645 in every model. Those who were exposed to the reform but did not complete upper secondary school in three years and those who were not exposed to the reform but completed upper secondary school in three years have been filtered out. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected average grade is denoted by Age*.

Table A32. Number of completed credits as the dependent variable, non-compliance filtered out.

Number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.285***	-0.256***	-0.225***	-0.014
	(0.041)	(0.046)	(0.061)	(0.071)
Dummy = 1 if woman	0.039	0.031	0.037	0.025
	(0.038)	(0.038)	(0.038)	(0.038)
Upper-secondary GPA	0.362***	0.327***	0.369***	0.354***
	(0.022)	(0.023)	(0.023)	(0.023)
Age			0.499	1.031***
			(0.341)	(0.350)
Age^2			-0.011	-0.022***
			(0.008)	(0.008)
Constant	-2.844***	-3.616***	-8.386**	-15.800***
	(0.159)	(0.946)	(3.732)	(3.975)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.126	0.158	0.127	0.164
Age*			22.08	23.33

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=2,645 in every model. Those who were exposed to the reform but did not complete upper secondary school in three years and those who were not exposed to the reform but completed upper secondary school in three years have been filtered out. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected number of completed credits is denoted by Age*.

Table A33. The product of average grade and number of completed credits as the dependent variable, non-compliance filtered out.

The product of average grade and the number of completed credits	(1)	(2)	(3)	(4)
Reform	-0.348***	-0.303***	-0.291***	-0.010
	(0.040)	(0.045)	(0.059)	(0.069)
Dummy = 1 if woman	0.0002	-0.006	-0.002	-0.014
	(0.037)	(0.037)	(0.037)	(0.037)
Upper-secondary GPA	0.447***	0.407***	0.454***	0.440***
	(0.021)	(0.022)	(0.022)	(0.022)
Age			0.419	1.110***
			(0.332)	(0.339)
Age^2			-0.009	-0.023***
			(0.007)	(0.008)
Constant	-3.414***	-4.046***	-8.107**	-17.380***
	(0.155)	(0.917)	(3.642)	(3.843)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.168	0.209	0.168	0.218
Age*			22.36	23.72

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=2,645 in every model. Those who were exposed to the reform but did not complete upper secondary school in three years and those who were not exposed to the reform but completed upper secondary school in three years have been filtered out. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing the expected product of the number of completed credits and average grade is denoted by Age*.

Table A34. Dropout as the dependent variable, non-compliance filtered out.

Dropout	(1)	(2)	(3)	(4)
Reform	0.066***	0.061***	0.062**	0.021
	(0.016)	(0.019)	(0.024)	(0.029)
Dummy = 1 if woman	-0.044***	-0.043***	-0.044***	-0.042***
	(0.015)	(0.015)	(0.015)	(0.015)
Upper-secondary GPA	-0.084***	-0.077***	-0.083***	-0.080***
	(0.009)	(0.009)	(0.009)	(0.009)
Age			-0.169	-0.257*
			(0.136)	(0.142)
Age^2			0.004	0.006*
			(0.003)	(0.003)
Constant	0.807***	0.569	2.566*	3.469**
	(0.064)	(0.382)	(1.493)	(1.610)
Secondary-school dummies included	No	Yes	No	Yes
R^2	0.040	0.058	0.041	0.059
Age*			21.02	22.35

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=2,645 in every model. Those who were exposed to the reform but did not complete upper secondary school in three years and those who were not exposed to the reform but completed upper secondary school in three years have been filtered out. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age minimizing expected probability of dropout is denoted by Age*.

Table A35. Age and reform exposure, average grade and completed credits

	(1)	(2)	(3)	(4)
Dependent variable	Average grade	Average grade	Completed credits	Completed credits
D = 1 if woman	0.0702**	0.0639*	0.0515	0.0417
	(0.0353)	(0.0352)	(0.0348)	(0.0346)
Upper-secondary GPA	0.360***	0.360***	0.365***	0.357***
	(0.0206)	(0.0213)	(0.0203)	(0.0209)
D= 1 if 19yo	0.695**	0.709**	0.615*	0.624*
	(0.325)	(0.325)	(0.321)	(0.320)
D= 1 if 20yo	0.482*	0.473*	0.463*	0.470*
	(0.265)	(0.264)	(0.262)	(0.259)
D= 1 if 21yo	0.578**	0.641**	0.522**	0.601**
	(0.265)	(0.263)	(0.262)	(0.259)
D= 1 if 22yo	0.577**	0.725***	0.521**	0.696***
	(0.268)	(0.267)	(0.265)	(0.263)
D= 1 if 23yo	0.602**	0.771***	0.630**	0.815***
	(0.273)	(0.272)	(0.269)	(0.267)
D= 1 if 24yo	0.347	0.559**	0.347	0.578**
	(0.277)	(0.277)	(0.273)	(0.272)
D= 1 if 25yo	0.625**	0.815***	0.596**	0.781***
	(0.294)	(0.294)	(0.290)	(0.289)
D= 1 if 17yo X D= 1 if exposed to reform	0.247	0.348	0.158	0.214
	(0.980)	(0.972)	(0.967)	(0.955)
D= 1 if 18yo X D= 1 if exposed to reform	Comparison group	Comparison group	Comparison group	Comparison group
D= 1 if 19yo X D= 1 if exposed to reform	-0.437**	-0.409**	-0.410**	-0.362*
	(0.196)	(0.198)	(0.194)	(0.195)
D= 1 if 20yo X D= 1 if exposed to reform	-0.290***	-0.119*	-0.305***	-0.141**
	(0.0661)	(0.0719)	(0.0652)	(0.0707)
D= 1 if 21yo X D= 1 if exposed to reform	0.0699	0.160	0.179	0.232
	(0.168)	(0.176)	(0.166)	(0.173)
D= 1 if 22yo X D=1 if exposed to reform	0.195	0.192	0.101	0.0316
	(0.235)	(0.240)	(0.232)	(0.236)
D= 1 if 23yo X D=1 if exposed to reform	0.0429	0.0329	-0.184	-0.259
	(0.307)	(0.310)	(0.303)	(0.304)
D= 1 if 24yo X D=1 if exposed to reform	0.628*	0.634*	0.676**	0.629*
	(0.326)	(0.327)	(0.322)	(0.321)
D= 1 if 25yo X D=1 if exposed to reform	-1.236***	-1.197***	-0.985**	-0.914**
	(0.442)	(0.446)	(0.436)	(0.439)
Constant	-3.183***	-2.809***	-3.388***	-4.522***
	(0.313)	(0.986)	(0.308)	(0.969)
Secondary-school dummies included	No	Yes	No	Yes
R-squared	0.113	0.144	0.137	0.174

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=3,147 in every model. "D= 1 if …" indicates a dummy variable equal to one if the condition that follows is holds for the observation, zero otherwise. "D= 1 if … X D= 1 if …" indicates an interaction between two such dummies. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported.

Table A36. Age and reform exposure, the product of grade and credits, and dropout likelihood

Dependent variable	(1) Product of grade and credits	(2) Product of grade and credits	(3) Dropout	(4) Dropout
D = 1 if woman	0.0169	0.00775	-0.0417***	-0.0392***
	(0.0339)	(0.0334)	(0.0140)	(0.0140)
Upper secondary GPA	0.449***	0.445***	-0.0820***	-0.0803***
	(0.0198)	(0.0202)	(0.00815)	(0.00850)
D= 1 if 19yo	0.639**	0.646**	-0.228*	-0.235*
	(0.313)	(0.309)	(0.129)	(0.130)
D= 1 if 20yo	0.527**	0.518**	-0.130	-0.131
	(0.255)	(0.251)	(0.105)	(0.105)
D= 1 if 21yo	0.565**	0.653***	-0.179*	-0.193*
	(0.255)	(0.250)	(0.105)	(0.105)
D= 1 if 22yo	0.606**	0.805***	-0.152	-0.188*
	(0.258)	(0.254)	(0.106)	(0.107)
D= 1 if 23yo	0.696***	0.924***	-0.168	-0.201*
	(0.262)	(0.258)	(0.108)	(0.109)
D= 1 if 24yo	0.447*	0.716***	-0.0611	-0.115
	(0.267)	(0.263)	(0.110)	(0.111)
D= 1 if 25yo	0.667**	0.897***	-0.172	-0.214*
	(0.283)	(0.279)	(0.116)	(0.117)
D= 1 if 17yo X D= 1 if exposed to reform	-0.0512	0.0470	-0.217	-0.240
	(0.944)	(0.923)	(0.388)	(0.388)
D= 1 if 18yo X D= 1 if exposed to reform	Comparison group	Comparison group	Comparison group	Comparison group
D= 1 if 19yo X D= 1 if exposed to reform	-0.425**	-0.372**	0.136*	0.132*
	(0.189)	(0.188)	(0.0777)	(0.0792)
D= 1 if 20yo X D= 1 if exposed to reform	-0.355***	-0.131*	0.0795***	0.0477*
	(0.0636)	(0.0683)	(0.0262)	(0.0287)
D= 1 if 21yo X D= 1 if exposed to reform	0.160	0.251	-0.0212	-0.0405
	(0.162)	(0.167)	(0.0666)	(0.0701)
D= 1 if 22yo X D=1 if exposed to reform	0.0770	0.0356	-0.0706	-0.0649
	(0.226)	(0.228)	(0.0929)	(0.0959)
D= 1 if 23yo X D=1 if exposed to reform	-0.234	-0.299	-0.0316	-0.0333
	(0.295)	(0.294)	(0.121)	(0.124)
D= 1 if 24yo X D=1 if exposed to reform	0.726**	0.690**	-0.203	-0.206
	(0.314)	(0.310)	(0.129)	(0.130)
D= 1 if 25yo X D=1 if exposed to reform	-0.824*	-0.756*	0.548***	0.529***
	(0.425)	(0.424)	(0.175)	(0.178)
Constant	-4.027***	-5.124***	0.945***	0.779**
	(0.301)	(0.936)	(0.124)	(0.393)
Secondary-school dummies included	No	Yes	No	Yes
R-squared	0.178	0.228	0.054	0.071

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=3,147 in every model. "D= 1 if …" indicates a dummy variable equal to one if the condition that follows is holds for the observation, zero otherwise. "D= 1 if … X D= 1 if …" indicates an interaction between two such dummies. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported.

Table A37. Average university grade as the dependent variable, age < 23

Average university grade	(1)	(2)	(3)	(4)	(5)
Reform	-0.288***	-0.288***	-0.221***	-0.099	-0.534
	(0.039)	(0.044)	(0.056)	(0.064)	(0.325)
Dummy = 1 if woman	0.011	0.012	0.007	0.006	0.006
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Upper-secondary GPA	0.354***	0.339***	0.366***	0.366***	0.344***
	(0.020)	(0.021)	(0.021)	(0.022)	(0.027)
Age			-0.415	-0.245	-0.023
			(0.757)	(0.758)	(0.775)
Age^2			0.011	0.009	0.004
			(0.018)	(0.018)	(0.019)
Reform * Upper-second. GPA					0.057
					(0.042)
Constant	-2.557***	-1.885**	1.017	-1.112	-3.218
	(0.153)	(0.934)	(7.785)	(7.832)	(7.981)
Secondary-school dummies included	No	Yes	No	Yes	Yes
R^2	0.108	0.140	0.109	0.147	0.148
Age*			**18.86**	**13.61**	**2.88**

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=2,761 in every model. Those who receive an average grade of zero are included. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected the average grade is denoted by Age* and if estimations yield an achievement minimizing age, it is shown in bold.

Table A38. Number of completed credits as the dependent variable, age < 23

Average university grade	(1)	(2)	(3)	(4)	(5)
Reform	-0.289***	-0.286***	-0.228***	-0.109*	-0.567*
	(0.039)	(0.043)	(0.056)	(0.063)	(0.321)
Dummy = 1 if woman	0.027	0.020	0.024	0.014	0.015
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Upper-secondary GPA	0.358***	0.330***	0.369***	0.356***	0.333***
	(0.020)	(0.021)	(0.021)	(0.022)	(0.027)
Age			-0.082	-0.001	0.233
			(0.753)	(0.750)	(0.767)
Age^2			0.003	0.003	-0.003
			(0.018)	(0.018)	(0.019)
Reform * Upper-secondary GPA					0.060
					(0.041)
Constant	-2.817***	-3.626***	-2.537	-5.195	-7.413
	(0.152)	(0.924)	(7.744)	(7.751)	(7.898)
Secondary-school dummies included	No	Yes	No	Yes	Yes
R^2	0.130	0.170	0.131	0.176	0.177
Age*			**13.67**	**0.17**	38.83

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=2,761 in every model. Those who receive an average grade of zero are included. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing expected number of completed credits is denoted by Age* and if estimations yield an achievement minimizing age, it is shown in bold.

Table A39. The product of average grade and number of completed credits as the dependent variable, age < 23

Average university grade	(1)	(2)	(3)	(4)	(5)
Reform	-0.336***	-0.322***	-0.265***	-0.095	-0.417
	(0.038)	(0.042)	(0.055)	(0.061)	(0.311)
Dummy = 1 if woman	-0.016	-0.019	-0.020	-0.027	-0.026
	(0.036)	(0.036)	(0.036)	(0.035)	(0.035)
Upper-secondary GPA	0.442***	0.414***	0.454***	0.446***	0.430***
	(0.020)	(0.020)	(0.021)	(0.021)	(0.026)
Age			-0.221	0.025	0.189
			(0.737)	(0.726)	(0.743)
Age^2			0.007	0.003	-0.001
			(0.018)	(0.018)	(0.018)
Reform * Upper-second. GPA					0.042
					(0.040)
Constant	-3.389***	-4.083***	-1.795	-6.336	-7.892
	(0.149)	(0.896)	(7.572)	(7.503)	(7.647)
Secondary-school dummies included	No	Yes	No	Yes	Yes
R^2	0.174	0.225	0.176	0.234	0.235
Age*			**15.79**		94.5

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=2,761 in every model. Those who receive an average grade of zero are included. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age maximizing the expected product of average grade and number of completed credits is denoted by Age* and if estimations yield an achievement minimizing age, it is shown in bold.

Table A40. Dropout as the dependent variable, age < 23

Average university grade	(1)	(2)	(3)	(4)	(5)
Reform	0.074***	0.077***	0.063***	0.043*	0.303**
	(0.015)	(0.017)	(0.022)	(0.026)	(0.130)
Dummy = 1 if woman	-0.022	-0.021	-0.022	-0.020	-0.020
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Upper-secondary GPA	-0.080***	-0.076***	-0.083***	-0.081***	-0.068***
	(0.008)	(0.008)	(0.008)	(0.009)	(0.011)
Age			0.192	0.201	0.068
			(0.300)	(0.304)	(0.310)
Age^2			-0.005	-0.006	-0.002
			(0.007)	(0.007)	(0.008)
Reform * Upper-second. GPA					-0.034**
					(0.017)
Constant	0.766***	0.540	-1.062	-1.164	0.096
	(0.061)	(0.373)	(3.084)	(3.136)	(3.194)
Secondary-school dummies included	No	Yes	No	Yes	Yes
R^2	0.041	0.061	0.042	0.063	0.064
Age*			**19.2**	**16.75**	**17**

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=2,761 in every model. Those who receive an average grade of zero are included. An entry-year cohort dummy (2018-2019 versus 2019-2020) is included but not reported. The age minimizing probability of dropout is denoted by Age* and if estimations yield an dropout likelihood maximizing age, it is shown in bold.

Table A41. Average grade as the dependent variable, first-year student cohort of 2018-2019.

Average grade	(1)	(2)	(3)	(4)	(5)
Reform	-0.274***	-0.297***	-0.332***	-0.300***	-0.333***
	(0.061)	(0.077)	(0.069)	(0.085)	(0.091)
Dummy = 1 if woman	0.045	0.039	0.050	0.041	0.042
	(0.051)	(0.051)	(0.051)	(0.051)	(0.051)
Standardized Upper-secondary GPA	0.291***	0.275***	0.279***	0.275***	0.263***
	(0.025)	(0.026)	(0.025)	(0.027)	(0.029)
Age			-0.042	0.011	0.008
			(0.041)	(0.043)	(0.044)
Age^2			0.0004	-0.0003	-0.0003
			(0.0007)	(0.0007)	(0.0007)
Reform * Standardized Upper-secondary GPA					0.063
					(0.063)
Constant	-0.013	-0.215	0.723	-0.283	-0.230
	(0.040)	(0.473)	(0.588)	(0.851)	(0.853)
Secondary-school dummies included	No	Yes	No	Yes	Yes
R^2	0.092	0.132	0.095	0.132	0.133
Age*			**58.67**	18.32	15.31

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,514 in every model. The sample consists of only those who we had information on standardized upper secondary GPAs from the first-year students cohort of 2018-2019. The age maximizing expected average grade is denoted by Age* and if estimations yield an achievement minimizing age, it is shown in bold.

Table A42. Number of completed credits as the dependent variable, first-year students cohort of 2018-2019.

Number of completed credits	(1)	(2)	(3)	(4)	(5)
Reform	-0.283***	-0.281***	-0.273***	-0.222***	-0.266***
	(0.061)	(0.077)	(0.068)	(0.084)	(0.090)
Dummy = 1 if woman	0.003	-0.009	0.008	-0.006	-0.004
	(0.050)	(0.051)	(0.050)	(0.051)	(0.051)
Standardized Upper-secondary GPA	0.315***	0.292***	0.318***	0.301***	0.285***
	(0.024)	(0.026)	(0.025)	(0.026)	(0.029)
Age			0.055	0.101**	0.097**
			(0.041)	(0.044)	(0.044)
Age^2			-0.0011*	-0.0017**	-0.0016**
			(0.0007)	(0.0007)	(0.0007)
Reform * Standardized Upper-secondary GPA					0.085
					(0.062)
Constant	0.011	-0.814*	-0.646	-2.265***	-2.193**
	(0.040)	(0.471)	(0.584)	(0.844)	(0.846)
Secondary-school dummies included	No	Yes	No	Yes	Yes
R^2	0.105	0.142	0.108	0.146	0.147
Age*			29.59	22.91	29.36

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,514 in every model. The sample consists of only those who we had information on standardized upper secondary GPAs from the first-year students cohort of 2018-2019. The age maximizing expected number of completed credits is denoted by Age*.

Table A43. The product of average grade and number of completed credits as the dependent variable, first-year students cohort of 2018-2019.

The product of average grade and the number of completed credits	(1)	(2)	(3)	(4)	(5)
Reform	-0.315***	-0.322***	-0.292***	-0.233***	-0.266***
	(0.059)	(0.074)	(0.067)	(0.081)	(0.087)
Dummy = 1 if woman	-0.036	-0.049	-0.032	-0.047	-0.046
	(0.049)	(0.049)	(0.049)	(0.049)	(0.049)
Standardized Upper-secondary GPA	0.384***	0.362***	0.389***	0.377***	-0.266***
	(0.024)	(0.025)	(0.025)	(0.025)	(0.087)
Age			0.071*	0.132***	0.129***
			(0.040)	(0.042)	(0.042)
Age^2			-0.0014**	-0.0021***	-0.002***
			(0.0006)	(0.0007)	(0.0007)
Reform * Standardized Upper-secondary GPA					0.062
					(0.060)
Constant	0.031	-0.714	-0.862	-2.726***	-2.673***
	(0.039)	(0.455)	(0.568)	(0.816)	(0.818)
Secondary-school dummies included	No	Yes	No	Yes	Yes
R^2	0.153	0.196	0.156	0.202	0.203
Age*			26.27	31.44	31.34

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,514 in every model. The sample consists of only those who we had information on standardized upper secondary GPAs from the first-year students cohort of 2018-2019. The age maximizing expected product of the number of completed credits and average grade is denoted by Age*.

Table A44. Dropout as the dependent variable, first-year students cohort of 2018-2019.

Dropout	(1)	(2)	(3)	(4)	(5)
Reform	0.063***	0.057*	0.095***	0.076**	0.087**
	(0.024)	(0.030)	(0.027)	(0.033)	(0.036)
Dummy = 1 if woman	-0.035*	-0.035*	-0.036*	-0.036*	-0.037*
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Standardized Upper-secondary GPA	-0.059***	-0.052***	-0.053***	-0.049***	-0.045***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)
Age			0.030*	0.018	0.019
			(0.016)	(0.017)	(0.017)
Age^2			-0.0004	-0.0002	-0.0002
			(0.0003)	(0.0003)	(0.0003)
Reform * Standardized Upper-secondary GPA					-0.022
					(0.025)
Constant	0.188***	0.287	-0.295	-0.051	-0.070
	(0.016)	(0.186)	(0.229)	(0.334)	(0.334)
Secondary-school dummies included	No	Yes	No	Yes	Yes
R^2	0.031	0.061	0.035	0.062	0.063
Age*			**42.03**	**43.10**	**42.66**

Notes: Standard errors in parentheses below coefficient. *** p<0.01, ** p<0.05, * p<0.1. N=1,514 in every model. The sample consists of only those who we had information on standardized upper secondary GPAs from the first-year students cohort of 2018-2019. The age minimizing expected probability of dropout is denoted by Age* and if estimations yield an achievement minimizing age, it is shown in bold.