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Early exposure to foreign language training and students' educational trajectories

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Early exposure to foreign language training and students' educational trajectories*

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Abstract

We estimate the impact of a large curriculum reform in Switzerland that substantially increased the share of foreign language classes in compulsory school on students' subsequent educational choices in upper secondary school. Using detailed student register data and exploiting the staggered implementation of the curriculum reform, we find that exposure to more foreign language classes has only minor effects on educational trajectories of the overall student population. However, we find substantial effect heterogeneity: while the reform has no effect on the direct educational progression of low-track female or high-track students, it impedes low-track male students' transition to upper secondary education.

Keywords: Policy Evaluation, Goodman-Bacon Decomposition, Education Reform, Foreign Language Skills, Educational Choices, Occupational Choices

JEL codes: I21, I24, I28

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I. INTRODUCTION

School curriculum reforms are often considered the primary tool for educational policy makers to influence the skill mix of the future workforce (OECD, 2020). Changes in skill demands resulting from, e.g., skill-biased technological progress (Katz and Murphy, 1992; Autor et al., 2003; Acemoglu and Autor, 2011) or increased competition in globalized markets (David et al., 2013; Dauth et al., 2014, 2017) call on policy makers to regularly review and adjust school curricula.

Prior research suggests that school curriculum reforms that change course requirements or the quantity of course-specific instruction times are effective to address these new demands for the workforce on average as such policy interventions affect students' set of skills (Taylor, 2014) and postsecondary educational choices (Aughinbaugh, 2012; Görlitz and Gravert, 2018; De Philippis, 2021). However, recent studies find that the effect of curriculum changes varies considerably across groups of students (e.g., across gender, academic ability) and, as a result, these educational reforms have the potential to amplify educational inequality (Huebener et al., 2017; De Philippis, 2021). Moreover, despite the large uncertainties about the specific skill set that today's students need to succeed in the future labor market (OECD, 2018), the main focus of the existing literature is on education reforms that target maths or science classes, whereas other subjects have attracted much less attention.

In this paper, we address both the overall impact of curriculum reforms and their implications for educational inequalities by examining a recent reform in Switzerland's compulsory school system. The reform substantially increased the number of English language classes in the school curriculum with the intended goal of providing students with the necessary skills to compete in a globally interconnected economy.[1] As the overall number of classes did not increase proportionally, the main consequence of the reform was that the fraction of foreign language classes in compulsory school (grade 1-9) increased significantly. The effect of the reform on the school

[1]The important role of foreign language proficiency in an interconnected economy—today, in particular, English language proficiency—has been extensively studied in the economics literature (see, e.g., Grenier and Vaillancourt, 1983; Ginsburgh and Prieto-Rodriguez, 2011; Melitz, 2016). A related strain of literature focuses on language proficiency of immigrants (see, e.g., Chiswick and Miller, 2007). For a recent literature review on the economics of language, see Ginsburgh and Weber (2020).

curriculum was particularly strong for low-track compulsory school students, who compared to the situation before were now required to study two instead of one foreign language and were exposed to a substantial increase in the fraction of foreign language classes by 63.5 % on average (high-track students: 41.0 %).[2] Considering the evidence provided by linguistic research showing that females are better language learners than males in terms of second languages (Van der Slik et al., 2015) and the strikingly large female advantage in language grades in school (Voyer and Voyer, 2014), we expect male and female students to be differently affected by this compulsory school curriculum reform.

In our empirical analysis, we test this hypothesis, after documenting the average effects of the reform, and provide clear evidence that a higher share of foreign language classes in school curricula can have a negative effect on male students' school career. Drawing on administrative data covering the entire student population in Switzerland, we construct a repeated cross-sectional panel data set of students in the last year of compulsory school matched with information about their educational choices in the subsequent year. We then exploit the differential timing of canton or municipality adoptions of the curriculum reform as exogenous source of variation in the share of foreign language classes in school curriculum.

Two-way fixed effect models with municipality and cohort fixed effects show that the reform had on average only minor effects on educational trajectories. However, the reform reduced the likelihood of low-track male students to proceed their education in upper secondary school programs one year after compulsory school by 2.3 percentage points. The small group of compulsory school graduates who do not immediately proceed their education in upper secondary school programs typically consists of students who temporarily or permanently drop out of the educational system or enter other non-certifying educational programs. Considering that only

[2]Starting in 7th grade, students in Switzerland are assigned to two educational tracks based on their academic ability. For a more detailed discussion of the Swiss education system, see Section I. The fraction of foreign language classes (i.e., the number of foreign language classes divided by the number of all classes during compulsory school) increased on average from 5.8 % to 9.5 % for this group of students. For high-track compulsory school students, the fraction of foreign language classes increased from 8.8 % to 12.4 % (or 41.0 %). Calculations are based on publicly available school curricula before and after the introduction of the reform. For a detailed description of the implementation of the reform, see Section II.

around one-fourth of low-track male students fall into this group (ca. 27 %), our estimation results reveal a substantial impact of the curriculum reform on the immediate transition to upper secondary school for male low-track compulsory school graduates.

Our estimates are consistent with the hypothesis that male students exposed to a higher share of foreign language classes have more difficulties in school than their female counterparts. Interestingly, low-track male students who do not speak at home the schools' language of instruction saw the biggest decline in immediate transfers to upper secondary school. This result suggests that students who already have to invest in other language skills might be particularly overwhelmed by the foreign language demands of the newly introduced school curriculum. Contrary to the results for low-track students, we do not find robust evidence for a link between the curriculum reform and educational choices of high-track students. In almost all specifications, we obtain very precise null effects of the reform to enter upper secondary school or to choose different tracks within upper secondary school (e.g., vocational education vs general education) for both male and female students.

We examine whether the main results of our paper are robust to various model specifications and show that the interpretation of our results is not affected by adding municipality-specific linear time trends to our baseline model, applying a weighting procedure that accounts for the number of observations per municipality-year cell, and using an event-study design model. Moreover, following Goodman-Bacon (2021), we decompose our estimate of the two-way fixed effect model into separate two-groups-two-periods difference-in-differences (2x2 DD) estimators. The results support our conclusions.

As a final analysis, we study if the curriculum reform had an effect on the occupational track of students who enter a VET program after compulsory school. If the curriculum reform had an impact on students' set of skills, we would expect affected students to be trained for occupations that match their newly acquired skill set.[3] To test this hypothesis, we match information on four dimensions of skill requirements (maths, natural science, German language, foreign language) for

[3] Speer (2017) finds that workers' pre-market skills are correlated with the task content of their occupation.

each occupational track of the Swiss VET program to our data set.Using separately the relative importance of each of the four dimensions of skill requirements as an outcome variable in our two-way fixed effect model, we find a striking effect of the curriculum reform on the occupational track of low-track female students who enter a VET program. This effect is in line with our hypothesis: our estimation results indicate that the curriculum reform increased the share of foreign language skill requirements among all skill requirements of an occupation by around 0.4 percentage points (mean: 15.3 %), whereas the share of natural sciences skill requirements of the occupation decreased by an equal amount. Again, we do not find a detectable impact of the reform for high-track students.

Our study has three key implications. First, reforms that increase the share of foreign language instruction in school curricula may negatively affect male students' academic outcomes—especially those with lower academic ability who are already challenged by the language of instruction. Second, as these reforms impose disproportionate demands on male students, they may influence educational gender equality. However, since only a subset of male students is adversely affected—at least in the reform studied—the overall impact on gender equality appears limited. This suggests that targeted interventions, such as remedial support, may suffice to address potential side effects. Finally, our finding that curriculum content influences the occupational tracks of students entering vocational education and training (VET) highlights the broader potential of curriculum reforms as a policy tool to align education with evolving labor market demands.

In addition to the literature mentioned in the beginning of the paper, our study relates to two strands of research. First, a considerable part of the economics of education literature is dedicated to the study of factors in the education production function and an increasing body of literature suggest that classroom instruction time plays a role in explaining students' educational success. Prior research studies the effect of the number of days students go to school on student achievement and the majority of these studies finds positive effects (Marcotte, 2007; Marcotte and Hemelt, 2008; Sims, 2008; Fitzpatrick et al., 2011; Herrmann and Rockoff, 2012; Carlsson et al., 2015; Aucejo and Romano, 2016). Other studies have shown that academic performance

is positively affected by the length of the school day or the weekly number of lectures (Bellei, 2009; Huebener et al., 2017; Lavy, 2020). Most closely related to this study, Lavy (2015), Rivkin and Schiman (2015), Cattaneo et al. (2017), Bingley et al. (2018), Mandel et al. (2019) and Wedel (2021) show that subject-specific instruction time is positively associated with grades or student performance in international student achievement tests. However, it has been noted that the effect of increased subject-specific instruction time depends on the source of that time (Rivkin and Schiman, 2015). An increase in subject-specific instruction time might be compensated for by a reduction of other subjects' instruction time or an increase in overall instruction time; and the magnitude of the link between subject-specific instruction time and student performance will likely depend on the compensation mechanism. As prior research relies on reported cross-subject variation in instruction time from international student achievement tests, they usually do not have information on instruction times of non-tested subjects. Our paper contributes to this literature and provides evidence from a policy-induced change in instruction time that gives a clear picture of the compensation mechanisms (reallocation of instruction time from non-core subjects to foreign language classes).

Second, our study relates to the literature on schooling intensity—i.e., the amount of learning material per instruction time—and student performance, as in our setting the increase in the share of foreign language classes likely reflects an increase in learning material in compulsory school curriculum. Prior research that studies a German curriculum reform in the academic track of secondary school suggests that a more compromised school curriculum increases student performance in assessment tests on average (Andrietti, 2016; Huebener et al., 2017; Andrietti and Su, 2019). Interestingly, comparable to our findings regarding low- and high-track students, these studies find a differential effect by student ability, where high-performing students benefit more from the reform than low-performing students potentially due to differences in students' capability to cope with higher schooling intensity. Our paper contributes to this literature by examining a curriculum reform that affected all tracks of compulsory school and investigating a different set of outcome variables (educational choices instead of test scores).

The remainder of this paper is organized as follows. Section II describes the Swiss education system and the implementation of the curriculum reform. Section III introduces the data and Section IV explains the empirical approach. Section V reports the main findings, robustness tests, the event-study design model, and the decomposition of the two-way fixed effect model. Section VI reports the findings on occupational choices in the VET program. Section VII concludes.

II. BACKGROUND

II.I THE SWISS EDUCATION SYSTEM

Switzerland is a federal state comprising 26 cantons, with authority over education largely delegated to the cantonal governments.[4] Education is generally compulsory and free for children aged 4 to 15. Compulsory schooling includes two years of kindergarten (ages 4–6), six years of primary school (ages 6–12), and three years of lower secondary school (ages 12–15). Starting at the lower secondary level, students are placed into one of two educational tracks based on academic ability, determined either by their performance in the final year of primary school or by a separate entrance assessment. Roughly one-third of students enter a track with basic requirements (low track), while the remaining two-thirds follow a track with extended requirements (high track).[5] Tracking in the Swiss system is relatively rigid, with few students switching tracks during lower secondary school.

After completing compulsory schooling, the vast majority of Swiss students continue to upper secondary education. This level is typically divided into two main pathways: general education programs and vocational education and training (VET) programs. General education programs, which are mostly free of charge, are school-based and offered by baccalaureate schools or specialized middle schools. Admission is regulated by legal or institutional criteria and is generally

[4]The autonomy of Swiss cantons in educational matters is comparable to that of U.S. states, Canadian provinces, or German Bundesländer.

[5]In some cantons, students are assigned to three tracks, with the high track further subdivided by academic performance. In our analysis, we do not distinguish between these subdivisions and treat all students in extended-requirement tracks as high-track. A small number of students attend integrated schools without ability tracking; due to their heterogeneity, these schools are excluded from our analysis.

reserved for high-track students from lower secondary school who either meet academic performance thresholds or pass an entrance exam. Graduates of these programs earn university entrance qualifications and typically pursue academic degrees at higher education institutions, including universities and universities of applied sciences. The majority of students in upper secondary school are in VET programs. VET programs are selected by both low-track students and high-track students who do not enter a general education program. VET programs prepare students for non-academic careers in the labor market by teaching profession-specific practical and theoretical skills.[6]

A notable number of students do not immediately enroll in upper secondary education, even though they intend to continue their studies. Most of these students are from the low track and either fail to meet the entry requirements for school-based VET programs or are unable to secure an apprenticeship position with a training company. However, a smaller share consists of high-track students who, for instance, aspire to enter general education programs but do not meet the admission criteria of baccalaureate or specialized middle schools. To support these students and prevent disengagement from the education system, various intermediate, non-certifying programs are available. These programs typically last 6 to 12 months and offer tailored support such as additional coursework and guidance on navigating the VET system. Their primary goal is to facilitate a smooth transition to upper secondary education in the following academic year. In general, students who attend these programs have a high likelihood of enrolling in upper secondary education within one year.

II.II FOREIGN LANGUAGE CLASSES IN COMPULSORY SCHOOL

Starting in the 1990s, cantonal education authorities began developing new guidelines to harmonize and elevate the role of foreign language instruction in the school curriculum. During these discussions, stakeholders agreed that English should receive greater emphasis. This shift was driven by the growing demands on the Swiss labor force in an increasingly globalized econ-

[6]VET programs exist today for more than 250 occupations in Switzerland (State Secretariat for Education, Research, and Innovation, 2022).

omy. Previously, English was only compulsory for high-track students and typically introduced in lower secondary school. To maintain the prominent role of national languages while also recognizing the benefits of early language acquisition, education authorities ultimately decided to introduce both English and a national language at the primary level.

In June 2007, the guidelines of the education authorities became part of a legally binding agreement among canton governments. This agreement specifies that students should attend training classes in the first foreign language in 3rd grade and training classes in the second foreign language in 5th grade of primary school. Canton governments were given some flexibility for the implementation of the reform as they were able to freely decide whether the first or the second foreign language is an official language of Switzerland, while the other foreign language has to be English.

The reform has been adopted in the course of the following years at canton- or municipality level. When implementing the reform, the higher number of foreign language classes during compulsory school was not entirely compensated for by an increase in the overall number of classes per academic year. Rather, education authorities reduced the number of non-core subjects in the overall school curriculum. As a result, the percentage of foreign language training classes in the school curriculum increased tremendously.

III. DATA

For the empirical analysis, we use student register data that include the universe of students enrolled in a Swiss educational institution between 2011 and 2018.[7] The data set provides annual information on students' current education status (e.g., type and location of educational institution, school track, grade) and a limited set of student background characteristics (age, gender, first language, migration status). Individual identifiers included in the data set allow us to identify students across years.

We link information on the educational choice in the subsequent year to each student obser-

[7]The data is provided by the Swiss Federal Statistical Office (Office fédéral de la statistique, Division population et formation) under the name "Le Long File longitudinal de l'éducation" (accessed August 2020).

vation, which leaves us with a repeated cross-sectional panel data set of first-time 9th graders' educational choices, from 2011 to 2017, with schools as the lowest identifiable level of the panel data. We observe the following educational choices of students: non-enrollment in a Swiss educational institution (drop out of Swiss education system), repetition of 9th grade of compulsory school, and enrollment in a (a) non-certifying preparation program, (b) vocational training program, (c) specialized middle school, or (d) baccalaureate school.[8]

III.I REFORM

We received information on the implementation of the curriculum reform from official sources. Specifically, we have access to detailed canton-wide school curricula, covering the years 2003–2020, which canton-level officials are required to report annually to national education authorities (data available upon request). By comparing year-by-year changes in school curricula over time, we are able to identify the year of adoption of the curriculum reform for all cantons in our sample. For the canton of Zurich, which adopted the curriculum reform at the municipality-level, we approached canton-level officials and received a list of all schools located in the canton of Zurich with information on the year in which they implemented the reform.[9]

To identify students who were exposed to the curriculum reform, we calculate the time span between first-time enrollment in 9th grade and the implementation of the reform in the municipality of their current educational institution. We define students as exposed to the curriculum reform if this time span is equal or larger than that of a hypothetical student in the first cohort affected by the reform who regularly passed all grades in compulsory school without grade skipping or grade repetition.[10]

[8] Around 0.7 % (0.5 %) of low-track (high-track) students' educational choices cannot be categorized in one of the aforementioned categories. We exclude these observations from our sample.

[9] Table A1 (Table A2) in the Appendix lists all cantons (municipalities of canton Zurich) included in our study, the number of student observations, and corresponding treatment year.

[10] In case of grade repetition during compulsory school, our approach misclassfies some 9th grade students as being exposed to the curriculum reform even though they were not in the first treated cohort from the beginning. This might slightly bias our results towards zero.

III.II SAMPLE

For our empirical analysis we conduct three sample restrictions. First, as our empirical strategy, which is outlined in Section IV, relies on variation in mean students' educational choices in a municipality over time, we reduce noise in mean outcomes by restricting our sample to municipality-year cells with more than 10 student observation, and restrict our sample to a balanced panel at municipality-level.[11]

Second, we restrict the data to students who enrolled for the first time in the last year of compulsory school (9th grade) and are either in low or high-track of lower secondary school. We mainly do this to ensure the most accurate matching of treatment status and outcomes to student observations we can achieve. This avoid for example that the same student is twice in our sample in two consecutive cohorts of 9th graders.[12,13]

Third, we restrict our sample to cantons which have a German-speaking majority and introduced English as the first foreign language in compulsory school. Our motivation for these restrictions is twofold. i) as noted in Section II, each canton's education system has distinct features and, often, main differences across cantons overlap with linguistic boarders in Switzerland. This is true for various economic indicators, which might influence students' educational choices, but also for the education system (e.g., percentage of students entering VET, regulations for entering general education).[14] Restricting our analysis to German-speaking Swiss cantons enhances comparability across regions and allows us to examine, for example, VET choices under similar institutional conditions. ii) by focusing on cantons that implemented English instead of French as first foreign language, as done by the large majority of cantons with a German-speaking majority, we are able to estimate the effect of a homogeneous policy change.[15] Our final data set

[11] In Appendix B Table B3 and Table B4, we show that our estimation results are hardly affected by these restrictions.

[12] We address concerns regarding grade repetition before grade 9 in our robustness checks.

[13] Around 3 % of students in our final sample are in school programs without tracks. These school programs are very diverse in terms of student ability level and are excluded from our analysis.

[14] For recent studies on the economic consequences of the Swiss language border, see Eugster et al. (2017); Aepli et al. (2021); Herz et al. (2021).

[15] There are also several institutional reasons that warrant us from using a larger sample. First, multilingual cantons have either not introduced the policy or the effect of a language reform is very difficult to classify in these

includes 14 cantons which cover roughly half of the the Swiss population and contributed 47 % to the country-wide gross domestic product in 2018.

Figure 1 illustrates the time and cross-sectional variation used in our analysis. The left-hand side sub-figure of Figure 1 illustrates the Swiss-German cantons included in the data (upper left corner) as well as the year when the first treated cohort entered 9th grade for each municipality (main map). Gray areas reflect municipalities for which we do not have data.[16] The sub-figure on the right shows the percentage of municipalities whose 9th grader cohort were exposed to the curriculum reform by year as well as the years covered by our final data set (white area).

As shown in the right-hand plot of Figure 1, at the beginning of our panel data set, around 15 % of students were located in municipalities were 9th graders were already exposed to the curriculum reform. For these municipalities, we do not observe both 9th grader cohorts affected by the curriculum reform and 9th grader cohorts not affected by the reform, so that these municipalities can only act as control units in our empirical analysis. By 2017, the last observation period in our data, 9th graders of all other municipalities were affected by the curriculum reform. The variation in exposure to the curriculum reform across cohorts in these municipalities is used as identifying variation for the effect of the curriculum reform on educational choices in the empirical analysis.

III.III DESCRIPTIVE STATISTICS

Table 1 illustrates the consequences of the reform for the content of the school curriculum in Swiss cantons which have a German-speaking majority and chose English as the first foreign language in school curricula. Using information from official canton-level school curricula, Table

cantons. Second, for one cantons we are not able to obtain information on a precise starting date at the canton level (Bern). Third, French speaking cantons have introduced the reform relatively late, such that the first 9th grade cohort would be observed after 2017, which warrants us from estimating an effect for these cantons. We would therefore be able to enlarge our sample by two (German speaking) cantons Basel-Stadt and Solothurn, who opted for French instead of English as first foreign language. However, Basel-Stadt had another structural policy implemented at the same time, which affected the length of primary and secondary schooling and therefore may have an impact on the outcomes as well and is therefore problematic for interpretation. However, adding the two cantons does not change our results. Results are available upon request.

[16] The main reason for this is that not all municipalities have schools with 9th graders. Another reason could be that these municipalities were excluded from the data set because of the panel restriction explained above. However, in Figure B1 Appendix B we show that only very few municipalities were excluded because of this restriction.

1 reports separately for low and high-track students the total number of classes in compulsory school by subject (or groups of subjects) and the percentage of each subject (or group of subjects) from all classes in compulsory school before and after the implementation of the reform. Prior to the adoption of the reform, both low-track and high-track students started to attend French classes in 5th grade while high-track students additionally began attending English classes in 7th grade. After the adoption of the curriculum reform, all students receive English learning classes starting in 3rd grade and French learning classes starting in 5th grade.

Table 1 shows a substantial increase in foreign language classes for both types of students. Prior to the reform, only 5.8 percent of total classes in compulsory school were dedicated to foreign language training of low-track students and 8.8 percent of total classes of high-track students. After the implementation of the reform, this number increased for low-track students to 9.5 (12.4 for high-track students), which implies an increase of 63.5 percent (41.0 percent for high-track students). The increase in the share of foreign language classes was compensated for by both a reduction in other subjects—most pronounced for non-core subjects such as Arts, Music, or elective classes (Others)—and an increase in the total number of classes. For both types of students, the increase in the total number of classes compensated for roughly 50 % of the increase in the number of foreign language classes.[17]

Summary statistics of the background variables by school track and gender are shown in the upper part of Table 2. Low-track students are slightly older than high-track students, which suggest that grade repetition is more common for students in the lower track. Table 2 also shows that the percentage of foreigners and students who do not speak at home either German or another official language is noticeably larger in the group of low-track students than in the group of high-track students. Overall, background characteristics of male and female students are rather similar within school type.

The lower part of Table 2 reports educational choices of students one year after compulsory school. Low-track students proceeding their education in upper secondary school almost ex-

[17]Increase in total number of classes: 7,539.4-7,402.7=136.7 (low-track) and 7,661.2-7,520.1=141.1 (high-track). Increase in foreign language classes: 716.5-430.3=286.2 (low-track) and 947.6-659.5=288.1 (high-track).

clusively enter a vocational training program.[18] While vocational training programs are also an important education path for high-track students, a large share of high-track students enters specialized middle or baccalaureate schools. For both low and high-track students, Table 2 reveals a large gender discrepancy with respect to enrollment in upper secondary school, with low-track female students being 20 percentage points less likely than low-track male students to proceed their education immediately after compulsory school (gender gap in high-track: 7 percentage points). Instead, female students are more likely to drop out of the Swiss education system—at least temporary—or enroll in a non-certifying preparation class.[19]

IV. EMPIRICAL APPROACH

To assess the impact of increased foreign language classes in compulsory school on educational choices of students after compulsory school, we estimate the following two-way fixed effects (FE) model on students in the last year of compulsory school for all students (and separately for low and high-track students):

$$y_{i,c,t+1} = \alpha_c + \alpha_t + \beta^{DD} Treated_{c,t} + \epsilon_{i,c,t} \tag{1}$$

where $y_{i,c,t+1}$ is a variable measuring the observed educational choice in year $t+1$ of student i enrolled in the last year of compulsory school in municipality c in year t, and $Treated_{c,t}$ is a binary variable indicating whether students in the last year of compulsory school in municipality c were affected by the curriculum reform that increased foreign language classes through introducing English language training in primary school. Equation 1 includes dummies for each municipality (α_c) and graduation year (α_t). We include cross-sectional FE (α_c) to control for un-

[18] In general, only high-track students can enter a specialized middle school or baccalaureate school. However, we cannot exclude the possibility that exemption are made for a small number of high ability students in low-track of compulsory school. Another explanation could be measurement error in the administrative data.

[19] To assess if there are any noticeable trends in our data, we report separately for low-track male and female students in Table A3 and A4 in Appendix A background characteristics and educational choices by year (for high-track students: Table A5 and A6). For all four groups, we find a remarkably decrease in the percentage of students that speak at home German or any other Swiss official language, but educational choices appear to be stable over time.

observed heterogeneity in educational choices specific to a municipality that might be caused by, e.g., persistent differences in local labor markets, student population compositions, or school environments across municipalities. Time FE (α_t) are intended to capture unobserved heterogeneity in educational choices across years that might be driven by, e.g., time-varying shocks or trends in labor demand or students' preferences that affect educational choices of the entire student population in our sample in a specific graduation year.

Our coefficient of interest in equation 1, β^{DD}, measures the effect the implementation of the curriculum reform on educational choices of students. In our setting of a staggered adoption of the curriculum reform, β^{DD} is the weighted average of all possible 2x2 difference-in-differences (DD) estimates that compare groups of municipalities treated at different points in time with each other (Goodman-Bacon, 2021).[20] If the effect of the curriculum reform on educational choices is constant over time and across municipalities (constant treatment effects), β^{DD} estimates the average treatment effect of the curriculum reform on students' educational choices for those municipalities that introduced the curriculum reform during the years studied in this paper. The identifying assumption is that, for all possible 2x2 DD models, in the absence of the implementation of the curriculum reform students' educational choices in a municipality that implemented the curriculum reform in a given year would have evolved similarly to students' educational choices in municipalities of the control group (common trends). We assess the assumption of common trends and potential implications of violations of the constant treatment effect assumption in Section III and IV.

$Treated_{c,t}$ varies at municipality-year level. Ordinary least squares estimates of equation 1 are equivalent to weighted estimates of the same equation based on data collapsed at municipality-year level using mean values of the outcome variable as dependent variable and weights proportional to the student population in each municipality-year cell. In Section II, we discuss to what extent our results are affected by these weights and adjust our estimates for the number

[20] Our research designs provides 25 2x2 DD estimates: 5 comparisons between always-treated municipalities (2011 and before) and groups of municipalities that introduced the reform at different points in time (2012, 2013, 2014, 2015, 2016), 10 comparisons between early adopters of the reform and late adopters of the reform, and 10 comparisons between late adopters of the reform and early adopters of the reform.

of students in each municipality-year cell by inverse population weighting, i.e., the sum of all weights within a municipality-year cell is equal to 1.

We estimate equation 1 on the full sample of students, for low and high-track students and on sub-samples by gender to assess potential effect heterogeneity. We additionally assess effect heterogeneity of the curriculum reform by gender in a double DD (2-DD) model. Formally, we estimate separately for low and high-track students the equation:

$$y_{i,c,t+1} = \alpha_{c,t} + \alpha_c Female_{i,c,t} + \alpha_t Female_{i,c,t} + \beta^{2-DD} Treated_{c,t} \times Female_{i,c,t} + \xi_{i,c,t}, \quad (2)$$

where $a_{c,t}$ is a municipality-by-year FE and $Female_{i,c,t}$ a binary variable indicating female students. Municipality-by-year FE control for unobserved heterogeneity in educational choices across municipality-year-cells that affect students of both genders simultaneously. $\alpha_c Female_{i,c,t}$ ($\alpha_t Female_{i,c,t}$) are municipality-specific (time-specific) FE for female students that take out any unobserved heterogeneity in educational choices of females specific to a municipality (year). Using appropriate weights, estimates of equation 2 are equivalent to estimates of equation 1 on collapsed data at municipality-year level and using the difference in the mean outcome variables of females and males for each municipality-year cell as dependent variable. Thus our coefficient of interest in equation 2, β^{2-DD}, measures the average treatment effect of the curriculum reform on the female-male difference in educational choices of students.

V. RESULTS

V.I BASELINE MODELS

Table 3 summarizes our estimation results for the full sample. In column 1 we report results of the baseline two-way FE model. Columns 2-6 present extensions of the model in which we add control variables (columns 2,4 and 6), municipality-specific linear time trends (columns 3-4), and change the weighting procedure of observations to give each municipality-year cell the same weight instead of weighting each cell by the number of student observations per cell (columns

5-6). To take into account serial correlation of error terms, Table 3 reports cluster-robust standard errors at municipality-level in parentheses (Bertrand et al., 2004).

Table 3 shows that the curriculum reform did not affect the likelihood to enter upper secondary school one year after compulsory school. The estimated coefficients are small in comparison to the sample mean of 0.76 in all specifications and we cannot reject the hypothesis that our estimated coefficient is equal to 0. In the remainder of the paper we therefore focus on a second policy relevant question, which is whether the reform had a heterogeneous impact on specific groups and may therefore exacerbate educational inequalities by favoring certain groups of students, such as those who already perform better in these subjects or who are predisposed to them due to stereotypes. We first present results for male and female students. We present these results by track, as treatment intensity differs across tracks (see Table 1).[21]

Table 4 summarizes our estimation results for low-track (Panel A) and high-track (Panel B) students. Columns 1-2 report results of the two-way FE model estimated on the entire sample, columns 3-4 (columns 5-6) report estimation results of the same model for the subsample of females (males), and columns 7-8 report estimation results of the 2-DD model. In columns 2, 4, and 8, we add a set of control variables to the baseline models. Standard errors are clustered at the municipality level.[22]

In general, low-track students who immediately proceed their education in upper secondary school enter VET programs. Students in low-track who do not proceed their education in upper secondary school after compulsory school either enroll in non-certifying preparation classes, repeat the last year of compulsory school or drop out of the educational system for at least one year. Panel A of Table 4 reports estimates of a binary variable equal to one if a student proceeded its education one year after compulsory school and zero otherwise on a binary variable indicating if a student was imposed to the curriculum reform for the sample of low-track students in the last year of compulsory school or not.

[21] We address potential selection concerns due to the endogenous track choice in Section II.

[22] In the Section II, we show that the interpretation of our results is not affected if we cluster standard errors at canton-level and apply a wild cluster bootstrap-t procedure as suggested in Cameron et al. (2008) in case of small number of clusters.

The first two column of Table 4 suggest that the curriculum reform did not affect the likelihood to enter upper secondary school one year after compulsory school for the combined sample of males and females. The estimated coefficient of -0.009 is small in comparison to the sample mean of 0.64 and we cannot reject the hypothesis that our estimated coefficient is equal to 0. However, we find a striking difference between male and female students. While our estimates based on the sample of females are again close to 0, we estimate a significant negative effect of the curriculum reform for male students. Our estimates in columns 5-6 indicate that the curriculum reform reduced the probability of male students to attend upper secondary school one year after compulsory school by around 2.3 percentage points or 3.2 % (0.023/0.73) relative to the sample mean.

The effect heterogeneity of the curriculum reform by gender is confirmed by the estimates of the 2-DD model in columns 7-8. We estimate that the curriculum reform decreased the probability of male students to enter upper secondary school one year after compulsory school by 3 percentage points relative to the probability of female students. As low-track male students have a higher participation rate in upper secondary school one year after compulsory school, our results suggest that the introduction of the reform reduced the gender gap in immediate transfer to upper secondary school by around 15 % (0.03/0.20).

Panel B of Table 4 reports estimation results for the sub-sample of high-track students. High-track students have a broader set of educational choices after compulsory school. Most students either enter a baccalaureate school, a specialized middle school, or VET. High-track students who do not select one of these 3 educational tracks enter a preparation year, repeat the last year of compulsory school or drop out of the educational system—equivalent to low track students who do not enter upper secondary school.

The upper part of Panel B in Table 4 presents estimation results for a binary outcome variable indicating if a student entered upper secondary school one year after compulsory school. Contrary to the results based on the sample of low-track students, the estimated coefficients are small and not significantly different from 0 for the entire sample as well as for the sub-samples of

male and female students. We also check if the curriculum reform changed high-track students' educational choices within upper secondary school. Using a binary variable indicating if a student entered baccalaureate school and zero otherwise as outcome variable (lower part of Panel B), we, again, do not find any evidence that the curriculum reform affected educational choices of high-track students.[23]

To sum up, we find substantial heterogeneity by gender for low-track students, while there no such evidence for high-track students. Potential reasons for this difference could be the larger *treatment-dose*, which low-track students receive compared to high-track students or ability difference, which make lower ability students more vulnerable to the shift in the curriculum (Huebener et al., 2017). We therefore add a second indicator for students that may potentially have higher difficulties with the new curriculum, which is whether students speak at home the language of instruction. We hypothesize that these students have more difficulties with the new curriculum as they already have to invest in other language skills (i.e., the language of instruction) to be successful in school.

In Table 5, we report split-sample estimates for students who speak at home the language of instruction, i.e., German, (columns 4-6) and those who do not (columns 1-3). Again, we show estimates for the overall sample (columns 1, 4), for female students (columns 2, 5), and for male students (column 3, 5) separately for low-track (Panel A) and high-track (Panel B) students.

The estimation results reported in Table 5 do not provide evidence for an effect of the curriculum reform for any subgroup of high-track students, and the negative effect of the curriculum reform is centered among low-track male students. While both male students from German and non-German speaking households in low-track are negatively affected by the curriculum reform, the effect is more than twice as large for students from non-German speaking households. The gender difference among non-German speaking students is also substantially larger.

In contrast to our previous results, which showed very little impact on female students, we

[23]We also do not find an effect of the curriculum reform on high-track students' educational choices if we use a binary variable indicating enrollment in baccalaureate school or specialized middle school as outcome variable or if we restrict the sample to students who enter upper secondary school. Results are available upon request.

also find that low-track female students from non-German speaking household are weakly positively affected by the reform. In general, a positive effect of female students is in line with previous results by De Philippis (2021), showing that an increase in STEM education had a positive impact on male students. We show related findings in Section VI, when studying occupational choices. It is also worth noting that a potentially harmful impact of a decrease in German classes as a side effect of this reform for this group is unlikely as the reduction in German classes was marginal (see Table 1).

V.II ROBUSTNESS TESTS

We provide various robustness tests to evaluate the strength of our findings. In Table A7 in the Appendix we report estimation results based on standard errors clustered at canton-level. As the curriculum reform was introduced at the same time for all municipalities in a canton in 13 out of 14 cantons in our sample, a potential concern is that standard errors clustered at municipality-level do not account for potential within canton correlation of the error term. As shown in Table A7 in the Appendix, standard errors clustered at canton-level are similar and in some specifications even smaller than standard errors clustered at municipality-level, which suggest that within canton correlation of the error term is rather small. However, we only have a small number of cantons in our sample in which case cluster-robust standard errors are more likely to over-reject the null-hypothesis (Cameron et al., 2008). Hence, we also report p-values resulting from a wild cluster bootstrap-t procedure in squared brackets in Table A7 in the Appendix. It is comforting to see that inference based on standard errors from the bootstrap-t procedure does not change the interpretation of our baseline results.[24]

We add municipality-specific linear time trends to our baseline specifications. Intuitively, including municipality-specific linear time trends resembles a regression discontinuity design

[24]We also conduct a separate analysis for the canton of Zurich, which is the only canton for which we have municipality level information of the implementation of the reform and can therefore rely on within canton variation. In addition, we conduct a leave-one-out analysis to show that our results are robust to the choice of the sample. Our result can be found in Appendix B Table B6, Table B7, Table B8 and Table B9. The negative effect on low-track male students is insensitive to these tests.

with years as the running variable. In these modified versions of the two-way FE and 2-DD model, the identifying variation of β^{DD} and β^{2-DD} relies more strongly on the discontinuity of the outcome variable at the time of the policy change which potentially relaxes the common trend assumption by allowing treatment and control cantons to be on different trends (Angrist and Pischke, 2008; Lee and Solon, 2011).[25] Results for these modified versions of our baseline models are reported in Table A8 in the Appendix. Overall, we find that our estimation results are remarkably robust to the inclusion of municipality-specific time trends. We interpret this finding as supporting evidence for the gendered effect of the curriculum reform on low-track students' educational choices.

In our baseline specification, we give each municipality-year observation weight equal to the number of student observations in each municipality-year cell. In case that the effect of the curriculum reform on students' educational choices is homogeneous for municipalities, we would expect our results to not differ if we run our analysis when giving each municipality-year cell equal weights (Solon et al., 2015). In Table A9 in the Appendix, we show estimation results of our baseline regressions using weights to adjust for the number of students in each year-municipality-cell. Our point estimates become smaller for low-track male students (form -0.023 to -0.030) and the significant negative effects of entering upper secondary school after compulsory school remains significant for male students and we do not find a corresponding effect for female students. The results of the 2-DD model is not affected by the inclusion of the inverse population weights, which suggests that the effect of the curriculum reform on educational choices is similar among students in smaller and larger municipalities. However, Table A9 shows a noticeable difference of the effect of the curriculum reform on educational choices of high-track students if we weight our regressions. Specifically, we find that the curriculum reform significantly reduced the probability to enter a baccalaureate school for male students in high-track in the unweighted regressions. While the point estimate of the 2-DD estimate is less affected by the population weights, this result still suggests that our baseline estimates for high-track students are mainly

[25]For a more detailed discussion, see Goodman-Bacon (2018).

driven by larger municipalities that receive relatively more weight in our baseline regressions.

In Table A10 in the Appendix, we show that the effect of the reform for low-track male students is persistent and remains visible also two years after graduation. We re-run our estimation equations 1 and 2 using the educational status two years after graduation as outcome variable.[26] To obtain the information on the educational status two years after graduation, we have to shorten our panel by one year. As shown in Table A10, the estimated coefficient shrinks by around 32% for the estimates by gender and by around 14 % for the 2-DD estimates. Overall, we interpret these estimates as supportive evidence that the curriculum reform has a persistent effect on the school career of low-track male students.

A potential concern regarding the validity of our estimation strategy based on repeated cross-sectional data of 9th grader is that the reform might have induced a compositional change in 9th grader cohorts in treated municipalities by affecting the likelihood to graduate from low- or high-track. To address this concern, in Table A15 in the Appendix, we report results of regressions of equation 1 and 2 using a binary variable measuring whether a student is enrolled in high-track in the last year of compulsory school as outcome variable. The estimated coefficients for β^{DD} (and β^{-2DD}) are not significantly different from zero and suggest that the likelihood to graduate from either low- or high-track is not affected by the reform. It is worth noting here that we do not find any evidence for sorting in the full sample as well as in the sample of male and female students due to the reform.

Another concern is that the reform increased the likelihood to repeat a certain grade in compulsory school, again leading to a compositional change in the 9th grader cohort in treated municipalities. Unfortunately, we do not have information on the number of times a student has repeated a certain grade. However, we can address this concern indirectly by using students' age as outcome variable in our estimation equation. Table A16 in the Appendix reports results of such

[26]Tables A11-A14 in the Appendix show frequency tables of educational outcomes one and two years after enrollment in 9th grade. There is a high persistence of educational choices over this period. However, as expected, a large share (between 60-80 %) of students who entered preparation classes immediately after graduation start a vocational education in the next year. We also find that a substantial part (around 50 %) of students who drop out of the education system immediately after graduation find their way back to the education system.

an estimation equation. As the estimated coefficients are insignificant and close to zero, we do not find any evidence that grade repetition might be a concern in our setup.[27] As we also present results based on the language spoken at home, we conduct a similar robustness check and show that the share of students who do not speak the language of instruction at home is not affected by the reform. The results can also be found in Table A16.

A final concern relates to the specific nature of the reform. As standard in curriculum reforms, the relative increase in foreign language courses has to be compensated. These simultaneous changes might all affect the outcome jointly and therefore it not ex-ante clear whether the observed effect is a result of the increase in foreign language classes or the compensation mechanism (Rivkin and Schiman, 2015). In our case part of the compensation is a decrease in instruction time in other subjects and part of the compensation is also an increase in instruction time overall. We acknowledge, in line with the related literature, that we cannot empirically distinguish them. However, it is worth noting here that all other changes are remarkably small and therefore unlikely to have a major impact on student outcomes. This is illustrated in Table 1.[28]

V.III EVENT-STUDY DESIGN MODEL

As noted in Section IV, the credibility of our preferred empirical model relies on the common trend and the constant treatment effect assumption. In order to examine a potential violation of one of the two assumptions, we follow standard practice in DiD literature and estimate an event-study design model. In the event-study design model, we replace $Treated_{c,t}$ in equation 1 with a set of dummy variables indicating the distance between the treatment year, i.e., the year in which the first student cohort in municipality c was affected by the curriculum reform, and t.[29]

[27] Table 2 provides further intuition for this by showing that the share of grade repeaters is rather low, especially in the low-track (below 2%).

[28] E.g. The decrease in German classes of 1.7% in the low-track captures a decrease by 23 units over the course of 9 years of compulsory schooling (less than 3 units per year).

[29] Due to the leads and lags of the treatment variable, we estimate the event-study design model only on a subsample of the municipalities in our sample (Schmidheiny and Siegloch, 2019). Specifically, we focus on municipalities which implemented the curriculum reform between 2013 and 2015. Given the observation window of students' educational choices for the years 2011 to 2017, we can construct two pre-treatment dummy variables (two or more years before treatment, one year before treatment), two post-treatment dummy variables (one year after treatment, two or more years after treatment), and one event dummy variable (treatment year).

Formally, we estimate on sub-samples of male and female students the following model:

$$y_{i,c,t+1} = \beta_{-2}\mathbb{1}[-2 \leq t - T_c] + \sum_{j \in \{0,1\}} \{\beta_j \mathbb{1}[j = t - T_c]\} + \beta_2 \mathbb{1}[2 \geq t - T_c] + \alpha_c + \alpha_t + \epsilon_{i,c,t} \quad (3)$$

where T_c is the year the first student cohort exposed to the language reform entered the last year of compulsory school (treatment year), and $\mathbb{1}[\bullet]$ is an indicator variable equal to 1 if the condition in the squared brackets if fulfilled. To avoid collinearity, we exclude the dummy variable for the year prior to the treatment year from the estimation equation. Thus, the coefficients of interest in equation 3 (β_{-2}, β_0, β_1, and β_2) measure the time-varying effect of the exposure to the curriculum reform on students' subsequent educational choices relative to one year before the the first student cohort entered the last year of compulsory school.

The coefficients of interest of equation 3, estimated on the sample of low-track students and using enrollment in upper secondary school as outcome variable, are illustrated in the left plot of Figure 2.[30] The right plot of Figure 2 illustrates coefficient estimates that measure the time-varying effect of the reform on the female-male difference in educational choices that come from an estimate of a modified version of equation 3 where all predictors are additionally interacted with a binary variable indicating male students.

The estimation results shown in the left plot of Figure 2 do not indicate pre-treatment trends in educational choices for the sub-sample of males (dotted line) nor for the sub-sample of females (dashed line), which supports the common trend assumption of our empirical approach. While we see a significant drop in immediate enrollment in upper secondary school programs for male students in the treatment year and the years after, we do not find a corresponding effect for female students. The effect for male students appears to increase over time, which suggests the presences of time-varying treatment effect. Such time-varying treatment effect might be caused by the fact that over time the percentage of wrongly defined treated students due to grade repetition in grade

[30] For brevity, we focus on educational choices of low-track students. Event-study design estimates for high-track students are available upon request.

3 to 9 decreases.[31] However, we see a similar negative trend for female students, which suggest that instead of time-varying treatment effects, treatment-independent factors correlated with the timing of the introduction of the curriculum reform could explain these trends. This is confirmed in the right plot of Figure 2, which shows that the male-female differential effect of the curriculum reform remains remarkably constant over time.

V.IV GOODMAN-BACON DECOMPOSITION

A growing literature has shown that estimations of two-way FE models in a staggered treatment adoption design can lead to misleading results. Particularly, if the treatment effect varies over time, two-way fixed effect models are biased and the estimated effect might even have the opposite sign of the true effect. The reason for this is that when already treated units act as a control group in one of the 2x2 DD estimates, changes in the outcome variable over time due to the dynamic treatment effect affect the DD estimate.

While the results of our event-study design model do not provide clear evidence in favor of dynamic treatment effects, we evaluate the influence of potential biases of our two-way FE model using the decomposition proposed by Goodman-Bacon (2021). This decomposition estimates all 2x2 DD models and their corresponding weights that they receive in the two-way FE model. These weights increase with (a) the number of observations in a particular 2x2 DD model and (b) the treatment variance, which is highest for 2x2 DD models in which the treatment year is in the middle of the panel and lowest for treatment years at the beginning or the end of the panel.

Our research designs provides 25 2x2 DD estimates that can be categorized in three groups: (a) 5 comparisons between always-treated municipalities (2011 and before), which act as control, and groups of municipalities that introduced the reform at different points in time (2012, 2013, 2014, 2015, 2016), which act as treatment group, (b) 10 comparisons between early adopters of the reform, which act as control group, and late adopters of the reform, which act as treatment group, and (c) 10 comparisons between late adopters of the reform, which act as control group,

[31] See discussion on potential mis-measurement of the treatment variable in Section III.

and early adopters of the reform, which act as treatment group. The first two cases (a and b) are problematic in case of dynamic treatment effects as they involve treated municipalities as control groups. Our main motivation for applying the Goodman-Bacon decomposition is to separately estimate the treatment effect for all three categories, using information on the 2x2 DD estimates and their corresponding weights, and to evaluate to what extent our baseline estimate is driven by the potentially two problematic categories.

In Figure 3 we plot for low-track students each 2x2 DD estimate (dependent variable: Attends upper secondary school) and their corresponding weights for the the 2-DD model as well as the baseline estimate from the 2-DD model (red dotted line).[32] In Figure 3, (red) dots represent 2x2 DD models of always-treated municipalities, which act as control group, and groups of municipalities that introduced the reform at different points in time, (green) triangles represent 2x2 DD models of early adopters of the reform, which act as control group, and late adopters of the reform, and blue squares represent 2x2 DD models of late adopters of the reform, which act as control group, and early adopters of the reform. The Goodman-Bacon decomposition for the 2-DD model shows a very homogeneous effect of the reform on the female-male difference in our outcome variable and almost all of the 2x2 DD estimates correspond in sign to our baseline estimates.[33] The estimate for the group of 2x2 DD models that is not affected by potential dynamic treatment effects (blue squares in Figure 3) is 0.036 and very close to our baseline estimate for the 2-DD model (0.03).[34]

In sum, we interpret the results of the Goodman-Bacon decomposition as supporting evidence that potential dynamic treatment effects are not driving our baseline estimates. However, we also

[32]In Figure A1 in the Appendix we plot for low-track students each 2x2 DD estimate and their corresponding weights for the two-way FE models (separately for males and females) as well as the baseline estimate from the two-way FE model (red dotted lines) respectively. To ease comparability between the models, the decomposition is based on models weighted by the inverse number of students in each municipality-year-cell as discussed in Section II (results reported in Table A9 in the Appendix). By doing so, the weights resulting from the Goodman-Bacon decomposition for each 2x2 DD estimate are the same for the two two-way FE models (male and female) as well as for the 2-DD model.

[33]We find an anomaly only for 2x2 DD estimates generated with observations from the treatment year 2016. However, as the treatment year 2016 is at the end of our observation period and includes only observations from a small canton with only 25 municipality (see Table A1 in Appendix A), those 2x2 DD estimates receive only little weight in our baseline estimates and have only little effect on our overall estimate.

[34]For completeness, we also conduct a Goodman-Bacon decomposition to test the concern of track choices being affected by the reform. The results can be found in Appendix B Table B5. Our conclusion regarding compositional changes are unchanged.

present an additional robustness check based on a novel estimator suggested by Gardner et al. (2024) for settings with treatment effect heterogeneity and variation in treatment timing.[35] The results can be found in Appendix A Table A17 for the main sample and separately for female and male students and in Figure A2 for the gender difference across low-track students.

VI. EFFECT ON OCCUPATIONAL CHOICES

In this section, we investigate whether the curriculum reform was effective in changing students' set of skills. Unfortunately, we do not have access to repeated large-scale achievement tests that would allow us to directly estimate the consequences of increased foreign language classes on students' skills in a setting of a staggered implementation of the curriculum reform. However, the Swiss education system, which includes a large vocational education and training (VET) component in upper secondary school, gives us the opportunity to approach this question indirectly. VET programs prepare students for non-academic careers in specific occupations. These training occupations differ from each other by their task content and the skills that they require to successfully graduate from the VET program. As previous literature suggests that workers' premarket skills covary with their occupation's task content (Speer, 2017), we would expect to see changes in the selected training occupations of students starting a VET program after compulsory school. More specifically, if exposure to increased foreign language classes affects students' set of skills, we would expect students affected by the reform to be more likely to select into training occupations with a higher share of tasks that require foreign languages than not affected students.

To test this claim, we restrict our sample to students who start a VET program immediately after compulsory school and match our data with information on the skill requirements of training occupations. We obtain this unique information on skill requirements of training occupations from https://www.anforderungsprofile.ch, a website that is administrated by the Swiss trade association and the Swiss Conference of Cantonal Ministers of Education and is partially financed

[35]For a detailed discussion of the estimator see Gardner et al. (2024). To summarize, the approach consists of two stages. In the first stage the outcome is regressed on group and period fixed effects using the subsample of untreated observations. Stage two subtracts the estimated group and period effects from the observed outcomes. The residualized outcome is regressed on the treatment status.

by the Swiss Secretariat for Education, Research, and Innovation.[36] Overall, the data includes information on a comprehensive set of 20 different skill measures that can be linked to four main categories: maths, natural science, native language, foreign language.

Based on the skill requirement measures of the four main categories, which are calibrated to a scale of 0-100, we construct a training occupation-specific variable that represents the *relative* importance of each skill dimension by dividing each skill requirement measure by the sum of the skill requirement measures of all four categories. These relative measures of skill requirements are used as outcome variables in our baseline model outlined in equation 1. If (pre-market) skills and the skill requirements of a training occupation are correlated and the exposure to the curriculum reform changed students foreign language skills, we expect to see a positive effect of the curriculum reform on the relative importance of foreign language requirements of training occupations.[37]

Table 6 reports estimation results separately for low-track (Panel A) and high-track students (Panel B) based on the sample of students who start a VET program one year after compulsory school (the dependent variable is measured in percent, i.e., multiplied by 100). Columns 1-2 summarize estimation results for the outcome variable math skill requirements; columns 3-4 for the outcome variable school language requirements; columns 5-6 for the outcome variable natural science requirements; columns 7-8 for the outcome variable foreign language requirements. We run all estimations separately for female (columns 1, 3, 5, 7) and male students (columns 2, 4, 6, 8).

Panel A suggest that the curriculum reform changed the skill requirement content of training occupations for low-track female students, while we do not find a corresponding effect for low-

[36]The information available on this website is intended to help students—or persons who advise students such as parents, teachers, etc.—to choose a training occupation that fits a students' profile by providing information on the skills that are required to successfully graduate from the VET program. The skill requirement measures were constructed from a systematic comparative rating procedure that relates each occupation to a reference group of selected occupations. The rating procedure was conducted by experts and practitioners in the field such as teachers at vocational schools and human resource managers of training companies.

[37]In Table A18 in the Appendix, we replicate the findings of Speer (2017) and show that students' pre-market skills (measured by achievement test scores) are correlated with our relative skill requirement measure using data from the Swiss subsample of 2012 PISA survey.

track male students. As expected, we find a significant positive effect of the reform on the relative skill requirement measure for foreign language skills. Relative to the sample mean of 15.3 %, the curriculum reform increased the relative foreign language skill requirement measure by around 2.6 %. It is also worth noting that the increase in relative foreign language requirements was mainly compensated for by a reduction in natural science skills, rather than the more closely linked category of native language requirements.[38]

The estimates for high-track students, as reported in Panel B, do not show an effect of the curriculum reform on the skill requirement of the training occupation. While the estimated coefficients are larger for female than for male students, we cannot reject the hypothesis that the coefficients are equal to zero based on conventional significance levels.

A potential concern of this estimation approach is that the curriculum reform induced a compositional change in the sample of students who start a VET program immediately after compulsory school and this compositional change might confound our estimates. However, the estimation results reported in Section V suggest that the curriculum reform does not affect the transition to upper secondary school for the majority of students (i.e., low-track female and high-track students), rendering the assumption of compositional changes unlikely.

VII. CONCLUSION

In this paper, we analyze the effects of a large curriculum reform in Switzerland on educational choices and trajectories at the end of compulsory schooling using administrative data on all students in the German speaking part of the country. The curriculum reform substantially increased the share of foreign language instruction in compulsory school. The increase in foreign language teaching was mainly compensated for by a reduction of instruction time in non-core subjects and partly by increasing the overall instruction time. Exploiting the staggered introduction of the reform, we are able to estimate the average treatment effect of the curriculum reform on stu-

[38]For completeness and comparability, we also conduct a Goodman-Bacon decomposition for this outcome variable. The results can be found in Appendix B Table B10. Our conclusion regarding the impact of the reform on relative skill requirements of occupations are unchanged.

dent outcomes. We analyze the transfers to post-compulsory education at upper secondary level, namely whether the transfer is immediate or delayed, to which type of education the transfer is made, and for students starting a VET program, which is the majority of Swiss students, which skill requirement profile the found training occupation has. Overall, we find that the vast majority of students, i.e., low-track female and high-track students, which represent together around 83 % of the student population, were not affected by the reform in terms of the immediate transfer to upper secondary school or the type of education (general education or VET) they select in upper secondary school.

Our estimates, however, show significant effects for two groups of students. First, low-track male students, in particular those not speaking the school language at home, are more likely to delay the entrance in upper secondary school. We find that the likelihood of low-track male students to delay the immediate entrance in upper secondary school increases by 2.3 percentage points or 8.5 % relative to the sample mean. We do not find a corresponding effect for female students in low-track nor for high-track students. Second, we find that low-track female students who start a VET program immediately after compulsory school are significantly more likely to opt for a training occupation with higher demands in foreign language skills but at the expense of cognitive demands in the field of natural science. We estimate for this group of students that the share of foreign language skill requirements of training occupations increases by around 2.6 % relative to the sample mean. This would be a result consistent with the expectation that the reform increased students' foreign language skills. However, our data do not allow us to examine the effect of the reform on students' foreign language proficiency, since standardized proficiency tests for foreign languages are not regularly administered in Switzerland. Therefore, we cannot know to what extent and for which groups of students the reform has achieved the primary intended goal, namely that of improving foreign language proficiency.

What we can say, however, is that even if the reform has not had any disadvantages for the vast majority of students in terms of further educational progress, negative side effects have occurred for a small group of students. The reform would therefore need to be accompanied by

targeted interventions for this group of students without compromising the potential benefits of the reform for the majority of students.

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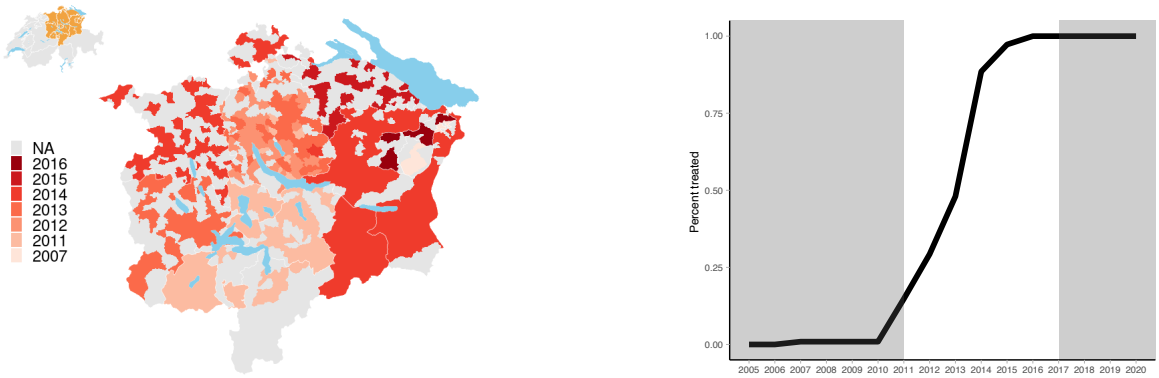
Table 1:
Compulsory school (Grade 1-9) curriculum before and after the reform

	German	English & French	Maths	NATSCI & HIS	Arts & Music	Sports	Others	Total
High-track students								
Total number of classes								
Before reform	1,307.4	659.5	1,409.1	1,326.6	1,438.2	808.0	571.2	7,520.1
After reform	1,284.4	947.6	1,383.4	1,313.4	1,379.7	806.7	546.1	7,661.2
Relative change in %	-1.8	43.7	-1.8	-1.0	-4.1	-0.2	-4.4	1.9
Percentage of total classes								
Before reform	17.4	8.8	18.7	17.6	19.1	10.7	7.6	
After reform	16.8	12.4	18.1	17.1	18.0	10.5	7.1	
Relative change in %	-3.6	41.0	-3.6	-2.8	-5.8	-2.0	-6.2	
Low-track students								
Total number of classes								
Before reform	1,331.4	430.3	1,430.8	1,317.3	1,484.5	808.0	600.5	7,402.7
After reform	1,308.3	716.5	1,404.8	1,301.2	1,426.1	806.7	575.8	7,539.4
Relative change in %	-1.7	66.5	-1.8	-1.2	-3.9	-0.2	-4.1	1.8
Percentage of total classes								
Before reform	18.0	5.8	19.3	17.8	20.1	10.9	8.1	
After reform	17.4	9.5	18.6	17.3	18.9	10.7	7.6	
Relative change in %	-3.5	63.5	-3.6	-3.0	-5.7	-2.0	-5.9	

Note: Table illustrates the effect of the implementation of the curriculum reform in Swiss cantons with a German-speaking majority that selected English as first foreign language in the new school curriculum on (a) the total number of subject-specific classes in compulsory school and (b) the percentage of subject-specific classes from total classes in compulsory school. Each column refers to a specific class or groups of classes (except of the last column, which refers to the total number of all classes). *NATSCI & HIS* includes natural science and history classes. *Others* includes other elective non-core subjects that vary across cantons. Numbers are calculated based on information from canton-level compulsory school curricula before and after the introduction of the reform (see Section III). Numbers reported are unweighted average values over all cantons.

Figure 1:
Time variation in the implementation of the curriculum reform



Note: Figure on the left shows in the upper left corner a map of Switzerland where the colored area marks cantons included in the final data set. The larger map of the left figure shows a magnified map of the cantons included in the data. Colors of municipalities indicate years when the first 9th grader cohort was exposed to the curriculum reform (see small legend next to the map, blue areas are lakes). Figure on the right illustrates the percentage of municipalities whose 9th grader cohort were exposed to the curriculum reform by year. White area (shaded area) shows years included (not included) in the final data set.

Table 2:
Summary statistics

	Low track students		High track students	
	Females	Males	Females	Males
Student characterisitcs				
Age	15.1	15.1	14.8	14.9
Migration status				
Swiss born in CH	63.8	66.6	83.7	84.4
Non-Swiss born in CH	20.2	18.7	7.3	7.0
Swiss not born in CH	3.2	3.0	3.1	3.1
Non-Swiss not born in CH	12.6	11.4	5.6	5.3
First language				
German	53.3	56.4	81.4	82.8
Official language of CH	58.3	61.3	84.2	85.5
School characteristics				
Located in urban area	67.5	66.4	60.9	61.0
Private school	2.1	2.9	4.7	4.4
Educational choice				
Drop-out of Swiss education system	21.1	9.6	8.5	3.5
Grade repetition	1.7	1.2	6.1	4.9
Non-certifying preparation class	23.9	16.0	7.3	6.2
Vocational training program	53.2	73.1	43.2	60.5
Specialized middle school	0.0	0.0	5.8	1.3
Baccalaureate school	0.1	0.1	29.1	23.6
Observations	30,682	39,088	84,866	77,354

Note: Mean values of student and school characteristics and students' educational choices in the next year. Sample includes students in the last year of compulsory school (9th grade). Binary variables: Migration status, first language, school characteristics and educational choices.

Table 3:
Effect of curriculum reform on educational choices

	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.001	0.001	-0.002	-0.002	-0.005	-0.003
	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes
Municipality-specific trend	No	No	Yes	Yes	No	No
Population weights	No	No	No	No	Yes	Yes
Student observations	231,990	231,990	231,990	231,990	231,990	231,990
Municipalities	331	331	331	331	331	331

Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if student is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2017. Control variables: Age, first language (German, non-German), migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

Table 4:
Effect of curriculum reform on educational choices

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Low-track students								
DV: Upper secondary school								
Treated	-0.009	-0.009	0.004	0.007	-0.023***	-0.024***		
	(0.007)	(0.006)	(0.012)	(0.011)	(0.008)	(0.008)		
Treated x Female							0.030**	0.033**
							(0.015)	(0.015)
Mean outcome[a]	0.64		0.53		0.73		-0.20	
Student observations	69,770	69,770	30,682	30,682	39,088	39,088	69,770	69,770
Municipalities	253	253	253	253	253	253	253	253
Panel B: High-track students								
DV: Upper secondary school								
Treated	0.004	0.005	0.007	0.008	0.001	0.001		
	(0.005)	(0.005)	(0.006)	(0.006)	(0.008)	(0.008)		
Treated x Female							0.006	0.006
							(0.010)	(0.009)
Mean outcome[a]	0.82		0.78		0.85		-0.07	
DV: Baccalaureate school								
Treated	0.000	-0.000	0.002	0.001	-0.003	-0.003		
	(0.005)	(0.005)	(0.006)	(0.007)	(0.006)	(0.006)		
Treated x Female							0.007	0.006
							(0.008)	(0.008)
Mean outcome[a]	0.26		0.29		0.24		0.05	
Student observations	162,220	162,220	84,866	84,866	77,354	77,354	162,220	162,220
Municipalities	326	326	326	326	326	326	326	326
Model specifications								
Restricted to:								
Females	No	No	Yes	Yes	No	No	No	No
Males	No	No	No	No	Yes	Yes	No	No
Variables added:								
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
Municipality x Year FE	No	No	No	No	No	No	Yes	Yes
Municipality x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if student is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2017. Control variables: Age, first language (German, non-German), migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

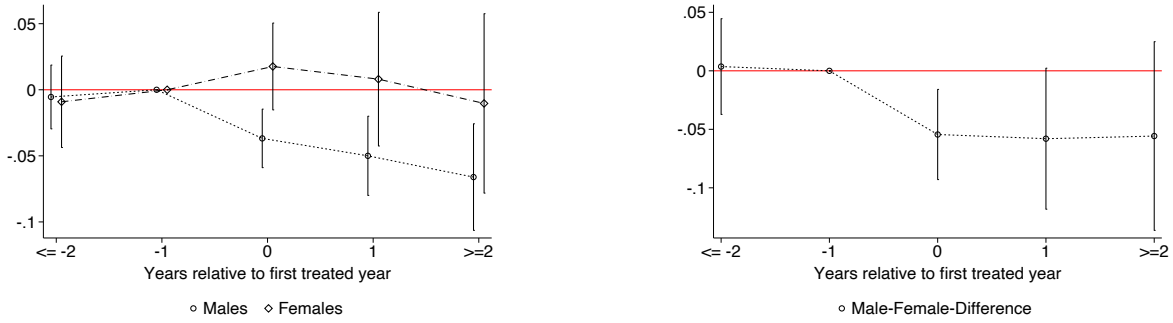
[a] Column (7) reports the mean value of the female-male difference of the corresponding outcome variable.

Table 5:
Effect heterogeneity, students who do not speak at home the language of instruction

	Non-German speaking			German speaking		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Low-track students						
DV: Upper secondary school						
Treated	-0.001	0.031*	-0.036**	-0.014	-0.011	-0.018**
	(0.011)	(0.016)	(0.015)	(0.009)	(0.017)	(0.009)
Mean outcome	0.55	0.47	0.63	0.72	0.59	0.81
Observations	31,379	14,324	17,055	38,391	16,358	22,033
Cluster	252	252	252	253	253	253
Panel B: High-track students						
DV: Upper secondary school						
Treated	0.009	0.025	-0.012	0.005	0.006	0.003
	(0.014)	(0.016)	(0.021)	(0.004)	(0.006)	(0.006)
Mean outcome	0.73	0.71	0.74	0.84	0.80	0.88
DV: Baccalaureate school						
Treated	-0.008	-0.012	-0.002	0.003	0.005	-0.002
	(0.012)	(0.011)	(0.015)	(0.005)	(0.007)	(0.006)
Mean outcome	0.18	0.19	0.17	0.28	0.31	0.25
Observations	29,053	15,777	13,276	133,167	69,089	64,078
Cluster	325	321	323	326	326	326
Model specifications						
Restricted to:						
Females	No	Yes	No	No	Yes	No
Males	No	No	Yes	No	No	Yes
Non-German speaker	Yes	Yes	Yes	No	No	No
German speaker	No	No	No	Yes	Yes	Yes
Variables added:						
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes

Note: Least squares regressions of binary variables measuring educational choices one year after the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to English language training in primary school (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if student is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2017. Control variables: Age, migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

Figure 2:
Event-study design, effect on direct transfer to upper secondary school, low-track students

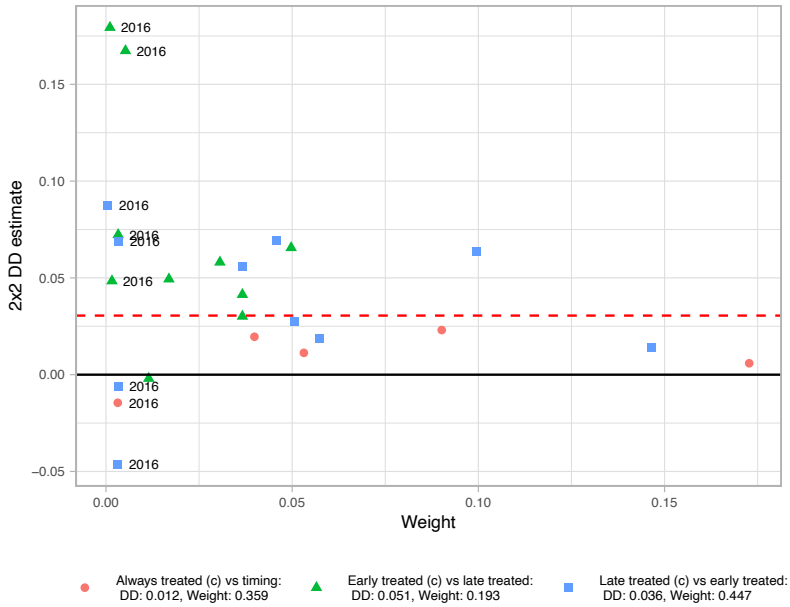


(a) Split sample estimate

(b) Full sample estimate

Note: Plot on the left shows coefficient estimates of β_{-2}, β_0, β_1, and β_2 based on equation 3, estimated separately for male and female low-track students. Plot on the right shows estimates of the coefficients interacted with a binary variable indicating male students, estimated on the entire sample of low-track students, based on a modified version of equation 3 with interaction terms for all predictors. Data restricted to municipalities in which students in the last year of compulsory school were affected by the policy change between 2013 and 2015. Number of municipalities: 176. 90 % confidence intervals are calculated based on robust standard errors clustered at municipality-level.

Figure 3:
Goodman-Bacon (2021) decomposition, low-track students, 2-DD model



Note: The figure plots each 2x2 DD estimate against their weight given in the baseline 2-DD model for low-track students (dependent variable: Attends upper secondary school). The (red) dotted line indicates the DD estimate of the baseline model, which is equal to the average of all plotted 2x2 DD estimates weighted by the value of the x-axis. The decomposition is based on models weighted by the inverse number of students in each municipality-year-cell as discussed in Section II.

Table 6:
Effect of the reform on the relative skill requirements of training occupations

	Math		School language		Natural Sciences		Foreign language	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Low-track students								
Treated	-0.191	0.165	0.220	-0.087	-0.432***	0.118	0.403*	-0.197
	(0.190)	(0.202)	(0.147)	(0.123)	(0.165)	(0.107)	(0.205)	(0.181)
Mean outcome	18.47	31.82	36.94	29.78	29.28	31.96	15.32	6.44
Student observations	15,963	26,637	15,963	26,637	15,963	26,637	15,963	26,637
Municipalities	253	253	253	253	253	253	253	253
Panel B: High-track students								
Treated	0.122	-0.108	-0.109	0.044	-0.190	0.020	0.177	0.044
	(0.122)	(0.139)	(0.085)	(0.081)	(0.167)	(0.141)	(0.163)	(0.196)
Mean outcome	20.86	30.37	34.40	28.48	25.38	28.16	19.36	12.98
Student observations	34,627	42,488	34,627	42,488	34,627	42,488	34,627	42,488
Municipalities	326	326	326	326	326	326	326	326
Model specifications								
Restricted to:								
Females	Yes	No	Yes	No	Yes	No	Yes	No
Males	No	Yes	No	Yes	No	Yes	No	Yes
Variables added:								
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Least squares regressions of a variable measuring the relative skill requirement (in percent) of training occupations on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Sample includes 9th grade students who selected into a VET program in the subsequent year. Control variables: Age, migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

ONLINE APPENDIX A

DESCRIPTIVES, ROBUSTNESS, ADDITIONAL RESULTS

Table A1:
Number of observations by canton and treatment status

Canton	Number of observations	Percentage of observations treated	Year first treated
Zürich	85,198	81	
Luzern	24,735	68	2013
Uri	1,716	100	2011
Schwyz	10,845	100	2011
Obwalden	2,635	100	2011
Nidwalden	996	100	2011
Glarus	2,789	55	2014
Zug	7,169	100	2011
Schaffhausen	3,818	58	2014
Appenzell Ausserrhoden	3,003	25	2016
Appenzell Innerrhoden	1,396	100	2007
St. Gallen	33,847	55	2014
Aargau	38,620	57	2014
Thurgau	15,223	41	2015

Note: Repeated cross-section of students in the last year of compulsory school (9th grader) between 2011-2017. *Year first treated* indicates the year when the first 9th grader cohort was exposed to the curriculum reform. *Year first treated* varies within the canton of Zurich (see Table A2).

Table A2:
Number of observations by municipality and treatment status in canton Zurich

Municipality	Number of observations	Percentage of observations treated	Year first treated
Affoltern am Albis	710	71	2013
Bonstetten	618	87	2012
Hausen am Albis	328	86	2012
Mettmenstetten	467	85	2012
Obfelden	467	86	2012
Flaach	151	70	2013
Andelfingen	550	86	2012
Laufen-Uhwiesen	333	100	2011
Marthalen	278	65	2013
Ossingen	224	70	2013
Bassersdorf	695	72	2013
Bülach	2,979	84	2012
Dietlikon	387	87	2012
Eglisau	242	85	2012
Embrach	684	88	2012
Glattfelden	270	73	2013
Kloten	1,013	87	2012
Nürensdorf	355	100	2011
Opfikon	832	74	2013
Rafz	286	81	2012
Wallisellen	799	75	2013
Buchs (ZH)	666	73	2013
Dielsdorf	528	85	2012
Niederglatt	551	84	2012
Niederhasli	538	84	2012
Niederweningen	442	86	2012
Otelfingen	354	88	2012
Regensdorf	940	74	2013
Rümlang	748	84	2012
Stadel	375	86	2012
Bäretswil	310	56	2014
Bubikon	425	74	2013
Dürnten	467	72	2013
Gossau (ZH)	570	87	2012
Grüningen	128	87	2012
Hinwil	641	86	2012
Rüti (ZH)	707	86	2012
Wald (ZH)	588	72	2013
Wetzikon (ZH)	3,068	69	2013
Adliswil	700	72	2013
Langnau am Albis	342	86	2012
Richterswil	624	84	2012
Rüschlikon	183	91	2012
Thalwil	577	86	2012
Erlenbach (ZH)	285	85	2012
Hombrechtikon	481	85	2012
Küsnacht (ZH)	821	81	2012
Männedorf	457	86	2012
Meilen	473	86	2012
Oetwil am See	283	71	2013
Stäfa	627	100	2011
Uetikon am See	184	100	2011
Zollikon	388	100	2011
Fehraltorf	322	73	2013
Hittnau	253	69	2013
Lindau	327	70	2013
Pfäffikon	530	68	2013
Russikon	116	100	2011
Weisslingen	132	87	2012
Dübendorf	1,455	73	2013
Egg	398	68	2013
Fällanden	327	87	2012
Greifensee	116	87	2012
Maur	348	86	2012
Mönchaltorf	125	100	2011
Uster	2,675	85	2012
Volketswil	1,093	72	2013
Wangen-Brüttisellen	484	100	2011
Elsau	269	87	2012
Neftenbach	222	73	2013
Pfungen	230	76	2013
Rickenbach (ZH)	351	85	2012
Seuzach	626	82	2012
Turbenthal	323	69	2013
Winterthur	7,953	71	2013
Zell (ZH)	333	74	2013
Birmensdorf (ZH)	375	86	2012
Dietikon	1,440	73	2013
Oberengstringen	281	85	2012
Schlieren	943	74	2013
Urdorf	1,383	85	2012
Weiningen (ZH)	695	86	2012
Zürich	25,727	84	2012
Stammheim	126	87	2012
Wädenswil	1,249	85	2012
Elgg	334	69	2013
Horgen	1,044	83	2012
Illnau-Effretikon	796	73	2013
Bauma	314	67	2013
Wiesendangen	344	84	2012

Note: Repeated cross-section of students in the last year of compulsory school (9th grader) between 2011-2017. *Year first treated* indicates the year when the first 9th grader cohort was exposed to the curriculum reform.

Table A3:
Descriptive statistics by year: Male low-track students

	2011	2012	2013	2014	2015	2016	2017
Student characterisitcs							
Age	15.2	15.2	15.2	15.1	15.1	15.1	15.0
Migration status							
Swiss born in CH	67.4	68.2	67.7	66.6	65.5	65.3	65.1
Non-Swiss born in CH	18.7	18.1	18.5	18.4	19.5	18.6	19.4
Swiss not born in CH	3.9	3.3	3.4	2.8	2.9	2.6	2.2
Non-Swiss not born in CH	9.6	10.1	10.2	11.8	11.8	13.1	13.1
First language							
German	62.4	61.6	58.8	56.3	53.5	51.3	50.4
Official language of CH	67.4	66.1	63.4	61.1	58.5	56.6	56.0
School characteristics							
Located in urban area	66.2	64.5	67.0	66.0	67.8	66.8	66.7
Private school	3.8	2.9	3.1	2.6	2.7	2.9	2.3
Educational choice							
Drop-out of Swiss education system	9.8	8.0	8.9	10.4	10.1	11.1	9.1
Grade repetition	1.6	1.2	1.0	1.2	1.2	1.2	1.3
Non-certifying preparation class	14.6	15.2	16.4	15.9	16.3	16.1	17.3
Vocational training program	74.0	75.6	73.7	72.5	72.4	71.7	72.4
Specialized middle school	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Baccalaureate school	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Observations	5,727	5,565	5,474	5,671	5,582	5,615	5,454

Note: Mean values of student and school characteristics and students' educational choices in the next year. Sample includes male low-track students in the last year of compulsory school (9th grade). Binary variables: Migration status, first language, school characteristics and educational choices.

Table A4:
Descriptive statistics by year: Female low-track students

	2011	2012	2013	2014	2015	2016	2017
Student characterisitcs							
Age	15.2	15.1	15.1	15.1	15.1	15.0	15.0
Migration status							
Swiss born in CH	65.0	64.7	64.9	63.0	64.0	62.2	62.4
Non-Swiss born in CH	19.3	19.5	20.3	20.8	20.0	20.7	20.9
Swiss not born in CH	4.1	3.6	3.1	3.2	2.7	2.8	2.9
Non-Swiss not born in CH	11.4	11.9	11.5	12.8	13.0	14.1	13.5
First language							
German	59.0	57.0	56.5	51.9	52.1	49.2	46.8
Official language of CH	63.5	61.8	61.4	57.2	56.9	54.5	52.2
School characteristics							
Located in urban area	66.3	66.5	66.6	68.6	67.2	68.8	68.4
Private school	2.5	2.2	2.6	1.9	2.2	1.7	1.7
Educational choice							
Drop-out of Swiss education system	21.4	20.6	19.8	22.0	22.1	22.7	19.1
Grade repetition	2.0	1.5	1.4	1.8	1.6	1.7	1.6
Non-certifying preparation class	26.6	25.4	25.1	22.5	23.0	21.7	22.6
Vocational training program	50.0	52.5	53.8	53.6	53.3	53.8	56.7
Specialized middle school	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Baccalaureate school	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Observations	4,518	4,489	4,386	4,384	4,391	4,269	4,245

Note: Mean values of student and school characteristics and students' educational choices in the next year. Sample includes female low-track students in the last year of compulsory school (9th grade). Binary variables: Migration status, first language, school characteristics and educational choices.

Table A5:
Descriptive statistics by year: Male high-track students

	2011	2012	2013	2014	2015	2016	2017
Student characterisitcs							
Age	15.0	14.9	14.9	14.9	14.9	14.8	14.8
Migration status							
Swiss born in CH	85.0	85.2	84.6	84.5	83.7	83.5	83.8
Non-Swiss born in CH	6.6	6.8	6.8	7.3	7.0	7.3	6.9
Swiss not born in CH	3.0	3.1	2.9	3.2	3.4	2.9	2.8
Non-Swiss not born in CH	4.5	4.6	5.4	4.9	5.7	6.0	6.3
First language							
German	85.9	85.3	84.3	83.3	82.4	79.5	78.5
Official language of CH	88.3	87.6	86.7	85.7	84.9	82.8	81.9
School characteristics							
Located in urban area	60.6	60.7	60.4	60.8	61.4	60.6	62.8
Private school	5.1	4.5	4.1	4.2	4.4	4.2	4.5
Educational choice							
Drop-out of Swiss education system	4.0	3.5	3.4	3.2	3.9	3.6	3.2
Grade repetition	5.0	5.0	5.0	5.1	4.7	4.7	4.9
Non-certifying preparation class	5.9	6.4	6.9	6.3	6.2	6.0	5.4
Vocational training program	58.3	60.3	61.1	61.4	60.1	61.2	61.2
Specialized middle school	1.2	1.1	1.3	1.3	1.2	1.3	1.5
Baccalaureate school	25.6	23.7	22.3	22.8	23.8	23.1	23.8
Observations	11,799	11,223	11,071	11,009	11,096	10,620	10,536

Note: Mean values of student and school characteristics and students' educational choices in the next year. Sample includes male high-track students in the last year of compulsory school (9th grade). Binary variables: Migration status, first language, school characteristics and educational choices.

Table A6:
Descriptive statistics by year: Female high-track students

	2011	2012	2013	2014	2015	2016	2017
Student characterisitcs							
Age	14.9	14.8	14.8	14.8	14.8	14.8	14.7
Migration status							
Swiss born in CH	84.5	84.7	84.2	83.9	83.4	82.7	82.4
Non-Swiss born in CH	6.8	7.1	6.9	7.6	7.3	7.8	8.0
Swiss not born in CH	3.4	2.8	3.3	3.0	3.3	3.0	3.0
Non-Swiss not born in CH	4.6	5.1	5.4	5.4	5.8	6.2	6.4
First language							
German	84.6	84.3	82.7	81.4	80.9	77.9	77.5
Official language of CH	87.0	86.4	85.2	84.1	83.6	81.3	81.0
School characteristics							
Located in urban area	60.6	60.1	60.7	60.6	60.9	61.4	61.8
Private school	5.7	4.7	4.6	4.4	4.6	4.4	4.4
Educational choice							
Drop-out of Swiss education system	8.5	8.9	8.5	9.0	8.8	7.9	7.9
Grade repetition	6.5	6.4	5.3	6.1	6.0	6.0	6.3
Non-certifying preparation class	7.9	8.1	8.0	7.2	6.9	6.5	6.5
Vocational training program	41.3	43.1	44.1	43.5	43.2	44.3	43.0
Specialized middle school	5.1	5.8	5.5	5.7	6.4	6.1	6.2
Baccalaureate school	30.7	27.8	28.6	28.6	28.7	29.2	29.9
Observations	13,209	12,327	11,999	12,042	11,751	11,728	11,810

Note: Mean values of student and school characteristics and students' educational choices in the next year. Sample includes female high-track students in the last year of compulsory school (9th grade). Binary variables: Migration status, first language, school characteristics and educational choices.

Table A7:
Robustness, effect of reform on educational choices, clustering

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Low-track students								
DV: Upper secondary school								
Treated	-0.009*	-0.009*	0.004	0.007	-0.023***	-0.024***		
	(0.005)	(0.005)	(0.007)	(0.007)	(0.005)	(0.005)		
	[0.258]	[0.294]	[0.628]	[0.352]	[0.019]	[0.005]		
Treated x Female							0.030***	0.033***
							(0.008)	(0.008)
							[0.071]	[0.053]
Student observations	69,770	69,770	30,682	30,682	39,088	39,088	69,770	69,770
Cantons	14	14	14	14	14	14	14	14
Panel B: High-track students								
DV: Upper secondary school								
Treated	0.004	0.005	0.007	0.008	0.001	0.001		
	(0.004)	(0.004)	(0.005)	(0.006)	(0.007)	(0.007)		
	[0.236]	[0.198]	[0.334]	[0.265]	[0.894]	[0.852]		
Treated x Female							0.006	0.006
							(0.010)	(0.010)
							[0.549]	[0.545]
DV: Baccalaureate school								
Treated	0.000	-0.000	0.002	0.001	-0.003	-0.003		
	(0.004)	(0.004)	(0.007)	(0.007)	(0.003)	(0.004)		
	[0.163]	[0.945]	[0.819]	[0.896]	[0.418]	[0.467]		
Treated x Female							0.007	0.006
							(0.009)	(0.009)
							[0.605]	[0.589]
Student observations	162,220	162,220	84,866	84,866	77,354	77,354	162,220	162,220
Cantons	14	14	14	14	14	14	14	14
Model specifications								
Restricted to:								
Females	No	No	Yes	Yes	No	No	No	No
Males	No	No	No	No	Yes	Yes	No	No
Variables added:								
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
Municipality x Year FE	No	No	No	No	No	No	Yes	Yes
Municipality x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if stdent is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2017. Control variables: as listed in note of Table 4. Reported standard errors in parentheses are cluster-robust at canton-level. P-values of wild cluster bootstrap-t procedure in squared brackets.

Table A8:
Robustness, effect of reform on educational choices, trends

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Low-track students								
DV: Upper secondary school								
Treated	-0.011	-0.013*	0.008	0.009	-0.031***	-0.033***		
	(0.008)	(0.008)	(0.015)	(0.014)	(0.010)	(0.010)		
Treated x Female							0.043*	0.045*
							(0.024)	(0.024)
Student observations	69,770	69,770	30,682	30,682	39,088	39,088	1,771	1,771
Municipalities	253	253	253	253	253	253	253	253
Panel B: High-track students								
DV: Upper secondary school								
Treated	0.001	0.002	0.004	0.004	-0.003	-0.002		
	(0.007)	(0.006)	(0.007)	(0.007)	(0.010)	(0.009)		
Treated x Female							-0.012	-0.014
							(0.015)	(0.015)
DV: Baccalaureate school								
Treated	-0.003	-0.003	-0.001	-0.002	-0.005	-0.006		
	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)	(0.007)		
Treated x Female							0.005	0.006
							(0.007)	(0.007)
Student observations	162,220	162,220	84,866	84,866	77,354	77,354	2,282	2,282
Municipalities	326	326	326	326	326	326	326	326
Model specifications								
Restricted to:								
Females	No	No	Yes	Yes	No	No	No	No
Males	No	No	No	No	Yes	Yes	No	No
Variables added:								
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality-specific trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
Municipality x Year FE	No	No	No	No	No	No	Yes	Yes
Municipality x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes
Municipality-specific trend x Female FE	No	No	No	No	No	No	Yes	Yes

Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if stdent is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2017. Control variables: as listed in note of Table 4. Reported standard errors in parentheses are cluster-robust at municipality-level.

Table A9:
Robustness, effect of reform on educational choices, weighted

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Low-track students								
DV: Upper secondary school								
Treated	-0.014	-0.011	0.000	0.004	-0.030***	-0.028***		
	(0.009)	(0.009)	(0.016)	(0.015)	(0.011)	(0.010)		
Treated x Female							0.031*	0.033*
							(0.017)	(0.017)
Mean outcome[a]	0.69		0.56		0.78		-0.21	
Student observations	69,770	69,770	30,682	30,682	39,088	39,088	69,770	69,770
Municipalities	253	253	253	253	253	253	253	253
Panel B: High-track students								
DV: Upper secondary school								
Treated	0.001	0.002	-0.002	-0.001	0.004	0.005		
	(0.006)	(0.006)	(0.009)	(0.009)	(0.008)	(0.007)		
Treated x Female							-0.006	-0.006
							(0.011)	(0.011)
Mean outcome[a]	0.82		0.77		0.87		-0.11	
DV: Baccalaureate school								
Treated	-0.003	-0.003	-0.002	-0.002	-0.008**	-0.008*		
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)		
Treated x Female							0.006	0.006
							(0.005)	(0.006)
Mean outcome[a]	0.10		0.12		0.09		0.03	
Student observations	162,220	162,220	84,866	84,866	77,354	77,354	162,220	162,220
Municipalities	326	326	326	326	326	326	326	326
Model specifications								
Restricted to:								
Females	No	No	Yes	Yes	No	No	No	No
Males	No	No	No	No	Yes	Yes	No	No
Variables added:								
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
Municipality x Year FE	No	No	No	No	No	No	Yes	Yes
Municipality x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if student is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2017. Control variables: as listed in note of Table 4.

[a] Column (7) reports the mean value of the female-male difference of the corresponding outcome variable.

Table A10:
Effect of reform on educational outcomes two years after graduation

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Low-track students								
DV: Upper secondary school (2y)								
Treated	-0.004	-0.003	0.012	0.015	-0.017**	-0.017**		
	(0.006)	(0.006)	(0.010)	(0.009)	(0.007)	(0.007)		
Treated x Female							0.030**	0.032***
							(0.012)	(0.012)
Mean outcome[a]	0.84		0.80		0.87		-0.06	
DV: Upper secondary school (1y)								
Treated	-0.009	-0.009	0.006	0.008	-0.025***	-0.026***		
	(0.007)	(0.007)	(0.013)	(0.013)	(0.008)	(0.008)		
Treated x Female							0.035**	0.037**
							(0.016)	(0.016)
Mean outcome[a]	0.64		0.53		0.74		-0.20	
Student observations	59,726	59,726	26,259	26,259	33,467	33,467	59,726	59,726
Municipalities	253	253	253	253	253	253	253	253
Model specifications								
Restricted to:								
Females	No	No	Yes	Yes	No	No	No	No
Males	No	No	No	No	Yes	Yes	No	No
Variables added:								
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
Municipality x Year FE	No	No	No	No	No	No	Yes	Yes
Municipality x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

Note: Least squares regressions of binary variables measuring educational choices two years (2y) or one year (1y) after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school two years (2y) or one year (1y) after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2016. Control variables: Age, first language (German, non-German), migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

[a] Column (7) reports the mean value of the female-male difference of the corresponding outcome variable.

Table A11:
Descriptive: Educational status two years after graduation, male low-track students

	One year later							
	Not classifiable	Dropout educ system	Grade repetition	Preparation class	Vocational education	Spec middle school	Baccalaureate school	Total
Immediate outcome								
Dropout educ system	46	1,526	7	119	1,563	1	3	3,265
	(1.41)	(46.74)	(0.21)	(3.64)	(47.87)	(0.03)	(0.09)	(100.00)
	[27.54]	[38.73]	[17.50]	[24.59]	[5.40]	[6.25]	[7.89]	[9.71]
Grade repetition	10	67	18	57	244	4	12	412
	(2.43)	(16.26)	(4.37)	(13.83)	(59.22)	(0.97)	(2.91)	(100.00)
	[5.99]	[1.70]	[45.00]	[11.78]	[0.84]	[25.00]	[31.58]	[1.22]
Preparation class	58	1,117	8	144	3,962	2	6	5,297
	(1.09)	(21.09)	(0.15)	(2.72)	(74.80)	(0.04)	(0.11)	(100.00)
	[34.73]	[28.35]	[20.00]	[29.75]	[13.69]	[12.50]	[15.79]	[15.75]
Vocational educ	53	1,228	7	164	23,179	0	3	24,634
	(0.22)	(4.98)	(0.03)	(0.67)	(94.09)	(0.00)	(0.01)	(100.00)
	[31.74]	[31.17]	[17.50]	[33.88]	[80.07]	[0.00]	[7.89]	[73.24]
Spec middle school	0	0	0	0	1	9	0	10
	(0.00)	(0.00)	(0.00)	(0.00)	(10.00)	(90.00)	(0.00)	(100.00)
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[56.25]	[0.00]	[0.03]
Baccalaureate school	0	2	0	0	0	0	14	16
	(0.00)	(12.50)	(0.00)	(0.00)	(0.00)	(0.00)	(87.50)	(100.00)
	[0.00]	[0.05]	[0.00]	[0.00]	[0.00]	[0.00]	[36.84]	[0.05]
Total	167	3,940	40	484	28,949	16	38	33,634
	(0.50)	(11.71)	(0.12)	(1.44)	(86.07)	(0.05)	(0.11)	(100.00)
	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]

Note: Frequency table (absolute number) of education status one (immediate) and two years (one year later) after first-time enrollment in 9th grade. Relative frequency within row reported in parentheses. Relative frequency within column reported in squared brackets.

Table A12:
Descriptive: Educational status two years after graduation, female low-track students

	One year later							
	Not classifiable	Dropout educ system	Grade repetition	Preparation class	Vocational education	Spec middle school	Baccalaureate school	Total
Immediate outcome								
Dropout educ system	71	2,174	5	271	3,136	3	7	5,667
	(1.25)	(38.36)	(0.09)	(4.78)	(55.34)	(0.05)	(0.12)	(100.00)
	[39.89]	[48.00]	[13.89]	[43.15]	[14.93]	[13.04]	[21.21]	[21.44]
Grade repetition	6	82	23	72	244	7	9	443
	(1.35)	(18.51)	(5.19)	(16.25)	(55.08)	(1.58)	(2.03)	(100.00)
	[3.37]	[1.81]	[63.89]	[11.46]	[1.16]	[30.43]	[27.27]	[1.68]
Preparation class	70	1,614	6	203	4,463	5	3	6,364
	(1.10)	(25.36)	(0.09)	(3.19)	(70.13)	(0.08)	(0.05)	(100.00)
	[39.33]	[35.64]	[16.67]	[32.32]	[21.24]	[21.74]	[9.09]	[24.07]
Vocational educ	30	657	1	81	13,164	1	1	13,935
	(0.22)	(4.71)	(0.01)	(0.58)	(94.47)	(0.01)	(0.01)	(100.00)
	[16.85]	[14.51]	[2.78]	[12.90]	[62.66]	[4.35]	[3.03]	[52.71]
Spec middle school	0	1	1	0	1	7	0	10
	(0.00)	(10.00)	(10.00)	(0.00)	(10.00)	(70.00)	(0.00)	(100.00)
	[0.00]	[0.02]	[2.78]	[0.00]	[0.00]	[30.43]	[0.00]	[0.04]
Baccalaureate school	1	1	0	1	2	0	13	18
	(5.56)	(5.56)	(0.00)	(5.56)	(11.11)	(0.00)	(72.22)	(100.00)
	[0.56]	[0.02]	[0.00]	[0.16]	[0.01]	[0.00]	[39.39]	[0.07]
Total	178	4,529	36	628	21,010	23	33	26,437
	(0.67)	(17.13)	(0.14)	(2.38)	(79.47)	(0.09)	(0.12)	(100.00)
	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]

Note: Frequency table (absolute number) of education status one (immediate) and two years (one year later) after first-time enrollment in 9th grade. Relative frequency within row reported in parentheses. Relative frequency within column reported in squared brackets.

Table A13:
Descriptive: Educational status two years after graduation, male high-track students

	One year later							
	Not classifiable	Dropout educ system	Grade repetition	Preparation class	Vocational education	Spec middle school	Baccalaureate school	Total
Immediate outcome								
Dropout educ system	44	905	29	55	1,055	29	293	2,410
	(1.83)	(37.55)	(1.20)	(2.28)	(43.78)	(1.20)	(12.16)	(100.00)
	[20.95]	[35.49]	[9.67]	[15.94]	[2.36]	[3.08]	[1.65]	[3.61]
Grade repetition	11	120	174	34	516	66	2,365	3,286
	(0.33)	(3.65)	(5.30)	(1.03)	(15.70)	(2.01)	(71.97)	(100.00)
	[5.24]	[4.71]	[58.00]	[9.86]	[1.15]	[7.00]	[13.34]	[4.92]
Preparation class	64	417	53	64	3,474	71	61	4,204
	(1.52)	(9.92)	(1.26)	(1.52)	(82.64)	(1.69)	(1.45)	(100.00)
	[30.48]	[16.35]	[17.67]	[18.55]	[7.76]	[7.53]	[0.34]	[6.29]
Vocational educ	80	631	29	176	39,314	37	63	40,330
	(0.20)	(1.56)	(0.07)	(0.44)	(97.48)	(0.09)	(0.16)	(100.00)
	[38.10]	[24.75]	[9.67]	[51.01]	[87.87]	[3.92]	[0.36]	[60.36]
Spec middle school	0	34	8	5	69	685	30	831
	(0.00)	(4.09)	(0.96)	(0.60)	(8.30)	(82.43)	(3.61)	(100.00)
	[0.00]	[1.33]	[2.67]	[1.45]	[0.15]	[72.64]	[0.17]	[1.24]
Baccalaureate school	11	443	7	11	314	55	14,916	15,757
	(0.07)	(2.81)	(0.04)	(0.07)	(1.99)	(0.35)	(94.66)	(100.00)
	[5.24]	[17.37]	[2.33]	[3.19]	[0.70]	[5.83]	[84.14]	[23.58]
Total	210	2,550	300	345	44,742	943	17,728	66,818
	(0.31)	(3.82)	(0.45)	(0.52)	(66.96)	(1.41)	(26.53)	(100.00)
	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]

Note: Frequency table (absolute number) of education status one (immediate) and two years (one year later) after first-time enrollment in 9th grade. Relative frequency within row reported in parentheses. Relative frequency within column reported in squared brackets.

Table A14:
Descriptive: Educational status two years after graduation, female high-track students

	One year later							
	Not classifiable	Dropout educ system	Grade repetition	Preparation class	Vocational education	Spec middle school	Baccalaureate school	Total
Immediate outcome								
Dropout educ system	102	1,603	46	132	3,625	177	601	6,286
	(1.62)	(25.50)	(0.73)	(2.10)	(57.67)	(2.82)	(9.56)	(100.00)
	[37.09]	[39.87]	[12.47]	[27.85]	[9.18]	[3.92]	[2.51]	[8.60]
Grade repetition	19	171	198	63	413	189	3,371	4,424
	(0.43)	(3.87)	(4.48)	(1.42)	(9.34)	(4.27)	(76.20)	(100.00)
	[6.91]	[4.25]	[53.66]	[13.29]	[1.05]	[4.19]	[14.10]	[6.06]
Preparation class	66	652	80	113	4,263	211	55	5,440
	(1.21)	(11.99)	(1.47)	(2.08)	(78.36)	(3.88)	(1.01)	(100.00)
	[24.00]	[16.21]	[21.68]	[23.84]	[10.79]	[4.67]	[0.23]	[7.45]
Vocational educ	73	525	19	133	30,723	69	32	31,574
	(0.23)	(1.66)	(0.06)	(0.42)	(97.30)	(0.22)	(0.10)	(100.00)
	[26.55]	[13.06]	[5.15]	[28.06]	[77.79]	[1.53]	[0.13]	[43.22]
Spec middle school	3	153	21	25	216	3,673	98	4,189
	(0.07)	(3.65)	(0.50)	(0.60)	(5.16)	(87.68)	(2.34)	(100.00)
	[1.09]	[3.81]	[5.69]	[5.27]	[0.55]	[81.35]	[0.41]	[5.73]
Baccalaureate school	12	917	5	8	257	196	19,748	21,143
	(0.06)	(4.34)	(0.02)	(0.04)	(1.22)	(0.93)	(93.40)	(100.00)
	[4.36]	[22.81]	[1.36]	[1.69]	[0.65]	[4.34]	[82.61]	[28.94]
Total	275	4,021	369	474	39,497	4,515	23,905	73,056
	(0.38)	(5.50)	(0.51)	(0.65)	(54.06)	(6.18)	(32.72)	(100.00)
	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]	[100.00]

Note: Frequency table (absolute number) of education status one (immediate) and two years (one year later) after first-time enrollment in 9th grade. Relative frequency within row reported in parentheses. Relative frequency within column reported in squared brackets.

Table A15:
Effect of reform on likelihood to be in enrolled in high-track

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DV: Enrolled in high-track								
Treated	-0.006	-0.006	-0.003	-0.003	-0.008	-0.008		
	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)		
Treated x Female							0.005	0.004
							(0.007)	(0.006)
Mean outcome[a]	0.70		0.73		0.66		0.07	
Student observations	231,990	231,990	115,548	115,548	116,442	116,442	231,990	231,990
Municipalities	331	331	331	331	331	331	331	331
Model specifications								
Restricted to:								
Females	No	No	Yes	Yes	No	No	No	No
Males	No	No	No	No	Yes	Yes	No	No
Variables added:								
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
Municipality x Year FE	No	No	No	No	No	No	Yes	Yes
Municipality x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

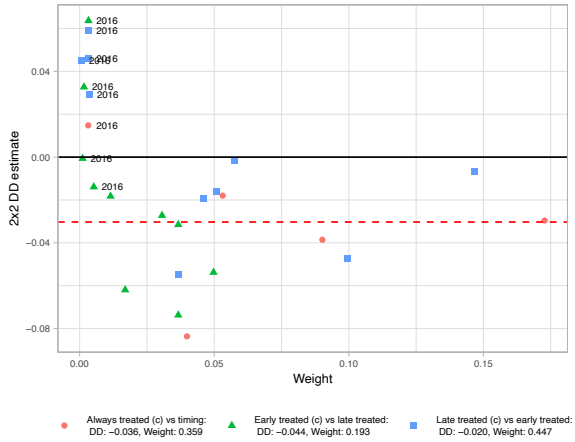
Note: Least squares regressions of binary variables measuring if a student is enrolled in high-track in the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Sample includes students in the last year of compulsory school between 2011-2017. Control variables: as listed in note of Table 4.
[a] Column (7) reports the mean value of the female-male difference of the corresponding outcome variable.

Table A16:
Compositional changes of 9th grade cohorts

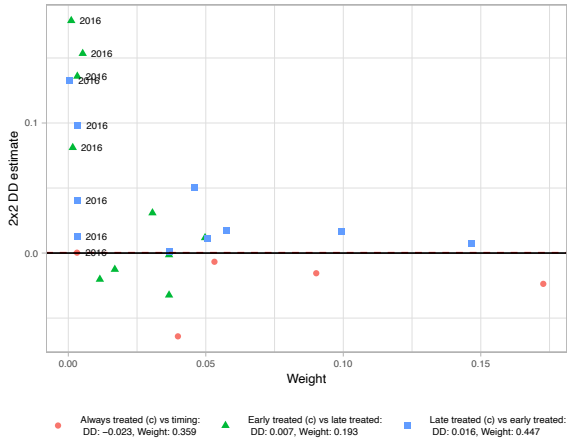
	All students		Low-track students						High-track students					
			All		Male		Female		All		Male		Female	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
DV: Age														
Treated	0.004	0.003	0.006	0.004	0.004	0.002	0.009	0.007	-0.001	-0.001	0.003	0.001	-0.004	-0.003
	(0.009)	(0.009)	(0.011)	(0.011)	(0.015)	(0.014)	(0.014)	(0.014)	(0.012)	(0.012)	(0.018)	(0.018)	(0.012)	(0.012)
Mean outcome	14.92		15.12		15.15		15.08		14.84		14.88		14.81	
DV: First language (not German)														
Treated	-0.006	-0.009	-0.010	-0.010	-0.017	-0.016	-0.004	-0.002	-0.007	-0.010	-0.006	-0.009	-0.008	-0.011
	(0.006)	(0.006)	(0.010)	(0.010)	(0.011)	(0.011)	(0.013)	(0.012)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)	(0.008)
Mean outcome	0.26		0.45		0.44		0.47		0.18		0.17		0.19	
DV: Gender (female)														
Treated	-0.001	-0.000	-0.007	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
	(0.004)	(.)	(0.007)	(0.000)	(.)	(.)	(.)	(.)	(0.005)	(0.000)	(.)	(.)	(.)	(.)
Mean outcome	0.50		0.44		0.00		1.00		0.52		0.00		1.00	
Student observations	231,990	231,990	69,770	69,770	39,088	39,088	30,682	30,682	162,220	162,220	77,354	77,354	84,866	84,866
Municipalities	331	331	253	253	253	253	253	253	326	326	326	326	326	326
Model specifications														
Restricted to:														
Track	No	No	Low	Low	Low	Low	Low	Low	High	High	High	High	High	High
Males	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No	No
Females	No	No	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
Variables added:														
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Note: Least squares regressions of Age (Panel A) and First language (not German) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Sample includes students in the last year of compulsory school between 2011-2017. Control variables: Age, first language (German, non-German), migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

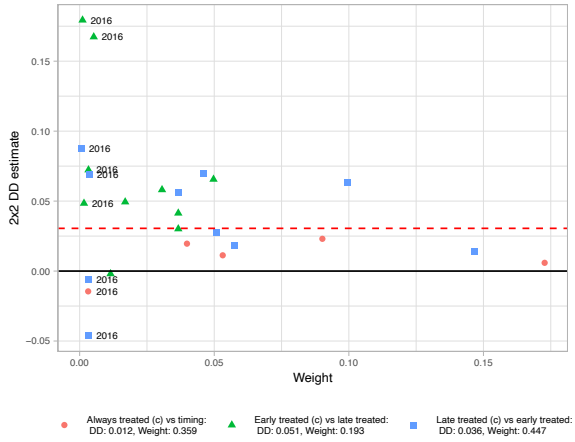
Figure A1:
Goodman-Bacon (2021) decomposition: Low-track students, DV: Upper secondary school



(a) Male students (Two-way FE model)



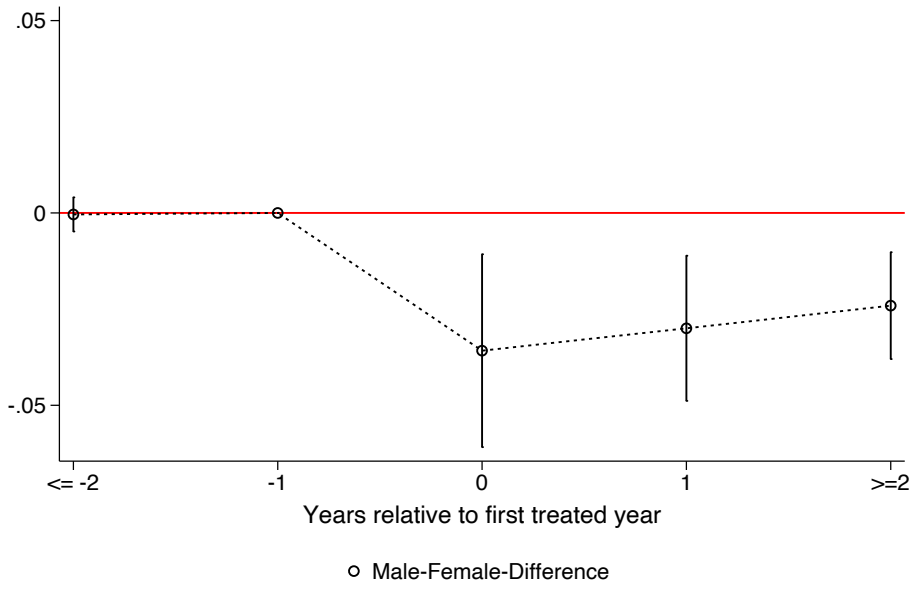
(b) Female students (Two-way FE model)



(c) Female vs male (2-DD model)

Note: The figure plots each 2x2 DD estimate against their weight given in the baseline specification model. The (red) dotted line indicates the DD estimate of the baseline model, which is equal to the average of all plotted 2x2 DD estimates weighted by the value of the x-axis.

Figure A2:
Effect on direct transfer to upper secondary school, low-track students (Gardner et al., 2024)



Note: Reported estimates come from a two-step estimation procedure following Gardner et al. (2024). Left-hand plot: In the first stage, the outcome variable—an indicator for direct transfer to upper secondary school—is regressed on year and municipality fixed effects, using the subsample of untreated observations. In the second second stage, the residuals from the first stage regression (predicted for the entire sample) are used as the dependent variable in a regression on the treatment indicators (lagged treatment indicators included: two year before treatment, treatment year, one year after treatment, and two or more years after treatment). This second-stage regression is estimated without an intercept. The coefficients on the treatment indicators are shown in the figure. Right-hand plot: In the first stage, the outcome variable—an indicator for direct transfer to upper secondary school—is regressed on year fixed effects, municipality fixed effects, year-specific indicator variables for males, using the subsample of untreated observations. In the second second stage, the residuals from the first stage regression (predicted for the entire sample) are used as the dependent variable in a regression on the treatment indicators (lagged treatment indicators included: two year before treatment, treatment year, one year after treatment, and two or more years after treatment. Treatment indicators are interacted with an indicator variable for males.) This second-stage regression is estimated without an intercept. The coefficients on the interacted treatment indicators are shown in the figure. Number of observations: see Figure 2. 90 % confidence intervals are calculated based on robust standard errors clustered at municipality level.

Table A17:
Effect of curriculum reform on educational choices, alternative estimator

		Low-track students		
	Low- and high-track students	All	Male	Female
	(1)	(2)	(3)	(4)
DV: Upper secondary school				
Treated	0.003	-0.015	-0.034***	0.012
	(0.007)	(0.011)	(0.009)	(0.018)
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes
Only low-track students	No	Yes	Yes	Yes
Only male students	No	No	Yes	No
Only female students	No	No	No	Yes
Student observations	231,990	69,770	39,088	30,682
Municipalities	331	253	253	253

Note: Reported estimates come from a two-step estimation procedure following Gardner et al. (2024). In the first stage, the outcome variable—an indicator for direct transfer to upper secondary school—is regressed on the full set of control variables, including year and municipality fixed effects, using the subsample of untreated observations. In the second second stage, the residuals from the first stage regression (predicted for the entire sample) are used as the dependent variable in a regression on the treatment indicator. This second-stage regression is estimated without an intercept. The coefficient on the treatment indicator is reported in the table. Standard errors, clustered at the municipality level, are reported in parentheses.

Table A18:
Association between relative skill requirement of training occupation and pre-market skills

	Maths requirements			Science			Language			Foreign language		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Test score (std)												
Maths	0.052***	0.018***	0.019***	0.009***	-0.001	0.002	-0.034***	-0.014***	-0.013***	-0.027***	-0.004	-0.008**
	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.003)	(0.003)	(0.003)
Science	0.023***	0.003	0.003	0.018***	0.012***	0.009***	-0.014***	-0.002	-0.003*	-0.027***	-0.013***	-0.009***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.002)	(0.003)	(0.003)	(0.003)
Reading	-0.074***	-0.020***	-0.019***	-0.037***	-0.021***	-0.016***	0.040***	0.007***	0.008***	0.071***	0.034***	0.026***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.003)	(0.003)
Controls included												
Gender	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Other	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Mean outcome	0.27			0.28			0.31			0.14		
Observations	5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663	5,663

Note: Least square regressions of four relative skill requirement of a students' training occupation on standardized PISA test scores (mean: 0, SD: 1) one-year before the training started. Sample consists of Swiss 2012 PISA survey participants. The sample consists of students in the last year of compulsory school who entered a VET program in the subsequent year. Information on training occupation is obtained by linking the PISA data to the administrative student register data discussed in Section III the paper. Information on four dimensions of training occupation-specific skill requirements (maths, natural science, schools' language of instruction, foreign languages) is obtained from http://anforderungsprofile.ch (see Section VI). The relative skill requirement of a training occupation (outcome variable) is constructed by dividing each of the for skill requirements by the sum of all four skill requirements. *Other* control variables (all binary) include: age in years, track in last year of compulsory school (high, middle, low), migration status (Swiss born in Switzerland, Swiss born abroad, foreigner born in Switzerland, foreigner born abroad), school located in urban area, language region (German, French, Italian, Rhaeto-Romance). Heteroskedasticity-robust standard errors in parentheses.

ONLINE APPENDIX B

Table B1:
Number of observations by canton and treatment status

Canton	Number of observations	Percentage of observations treated	Year first treated
Zürich	87,320	81	
Luzern	26,755	67	2013
Uri	2,575	100	2011
Schwyz	10,876	100	2011
Obwalden	2,872	100	2011
Nidwalden	1,367	100	2011
Glarus	2,789	55	2014
Zug	7,757	100	2011
Schaffhausen	4,718	58	2014
Appenzell Ausserrhoden	4,005	25	2016
Appenzell Innerrhoden	1,396	100	2007
St. Gallen	34,754	55	2014
Aargau	43,996	56	2014
Thurgau	16,469	41	2015

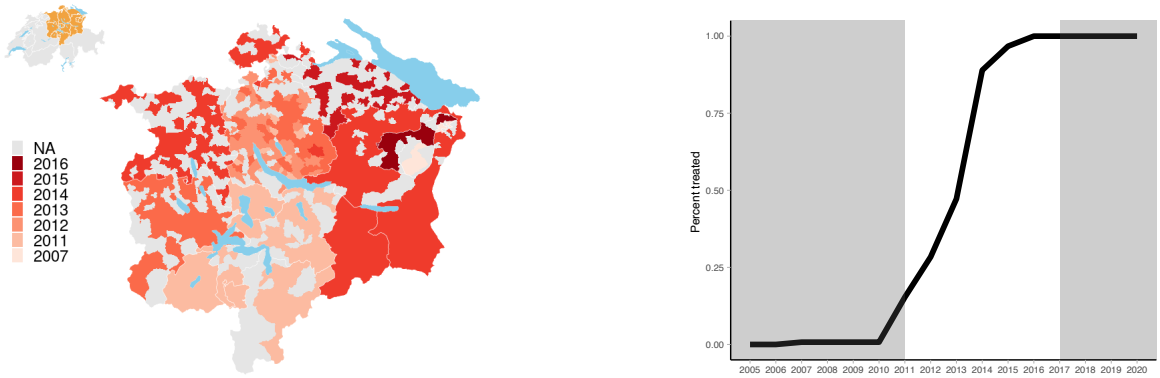
Note: Repeated cross-section of students in the last year of compulsory school (9th grader) between 2011-2017. *Year first treated* indicates the year when the first 9th grader cohort was exposed to the curriculum reform. *Year first treated* varies within the canton of Zurich (see Table B2).

Table B2:
Number of observations by municipality and treatment status in canton Zurich

Municipality	Number of observations	Percentage of observations treated	Year first treated
Affoltern am Albis	710	71	2013
Bonstetten	618	87	2012
Hausen am Albis	328	86	2012
Mettmenstetten	467	85	2012
Obfelden	467	86	2012
Flaach	151	70	2013
Andelfingen	550	86	2012
Laufen-Uhwiesen	333	100	2011
Marthalen	278	65	2013
Ossingen	224	70	2013
Bassersdorf	695	72	2013
Bülach	2,979	84	2012
Dietlikon	387	87	2012
Eglisau	242	85	2012
Embrach	684	88	2012
Glattfelden	270	73	2013
Kloten	1,013	87	2012
Nürensdorf	355	100	2011
Opfikon	832	74	2013
Rafz	286	81	2012
Wallisellen	799	75	2013
Buchs (ZH)	666	73	2013
Dielsdorf	528	85	2012
Niederglatt	551	84	2012
Niederhasli	538	84	2012
Niederweningen	442	86	2012
Otelfingen	354	88	2012
Regensdorf	940	74	2013
Rümlang	748	84	2012
Stadel	375	86	2012
Bäretswil	310	56	2014
Bubikon	425	74	2013
Dürnten	467	72	2013
Gossau (ZH)	570	87	2012
Grüningen	128	87	2012
Hinwil	641	86	2012
Rüti (ZH)	707	86	2012
Wald (ZH)	588	72	2013
Wetzikon (ZH)	3,068	69	2013
Adliswil	700	72	2013
Langnau am Albis	342	86	2012
Richterswil	624	84	2012
Rüschlikon	183	91	2012
Thalwil	577	86	2012
Erlenbach (ZH)	285	85	2012
Hombrechtikon	481	85	2012
Küsnacht (ZH)	821	81	2012
Männedorf	457	86	2012
Meilen	473	86	2012
Oetwil am See	283	71	2013
Stäfa	627	100	2011
Uetikon am See	184	100	2011
Zollikon	388	100	2011
Fehraltorf	322	73	2013
Hittnau	253	69	2013
Lindau	327	70	2013
Pfäffikon	530	68	2013
Russikon	116	100	2011
Weisslingen	132	87	2012
Dübendorf	1,455	73	2013
Egg	398	68	2013
Fällanden	327	87	2012
Greifensee	116	87	2012
Maur	348	86	2012
Mönchaltorf	125	100	2011
Uster	2,675	85	2012
Volketswil	1,093	72	2013
Wangen-Brüttisellen	484	100	2011
Elsau	269	87	2012
Neftenbach	222	73	2013
Pfungen	230	76	2013
Rickenbach (ZH)	351	85	2012
Seuzach	626	82	2012
Turbenthal	323	69	2013
Winterthur	7,953	71	2013
Zell (ZH)	333	74	2013
Birmensdorf (ZH)	375	86	2012
Dietikon	1,440	73	2013
Oberengstringen	281	85	2012
Schlieren	943	74	2013
Urdorf	1,383	85	2012
Weiningen (ZH)	695	86	2012
Zürich	25,727	84	2012
Stammheim	126	87	2012
Wädenswil	1,249	85	2012
Elgg	334	69	2013
Horgen	1,044	83	2012
Illnau-Effretikon	796	73	2013
Bauma	314	67	2013
Wiesendangen	344	84	2012

Note: Repeated cross-section of students in the last year of compulsory school (9th grader) between 2011-2017. *Year first treated* indicates the year when the first 9th grader cohort was exposed to the curriculum reform.

Figure B1:
Time variation in the implementation of the curriculum reform



Note: Figure on the left shows in the upper left corner a map of Switzerland where the colored area marks cantons included in the final data set. The larger map of the left figure shows a magnified map of the cantons included in the data. Colors of municipalities indicate years when the first 9th grader cohort was exposed to the curriculum reform (see small legend next to the map, blue areas are lakes). Figure on the right illustrates the percentage of municipalities whose 9th grader cohort were exposed to the curriculum reform by year. White area (shaded area) shows years included (not included) in the final data set.

Table B3:
Effect of curriculum reform on educational choices

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Low-track students								
DV: Upper secondary school								
Treated	-0.006	-0.008	0.006	0.008	-0.022***	-0.023***		
	(0.007)	(0.006)	(0.011)	(0.011)	(0.008)	(0.008)		
Treated x Female							0.029**	0.032**
							(0.014)	(0.014)
Mean outcome[a]	0.65		0.54		0.74		-0.20	
Student observations	78,897	78,897	34,478	34,478	44,419	44,419	78,888	78,888
Municipalities	391	391	390	390	391	391	390	390
Panel B: High-track students								
DV: Upper secondary school								
Treated	0.003	0.004	0.007	0.007	0.000	0.001		
	(0.005)	(0.004)	(0.006)	(0.005)	(0.008)	(0.007)		
Treated x Female							0.006	0.006
							(0.009)	(0.009)
Mean outcome[a]	0.81		0.78		0.85		-0.08	
DV: Baccalaureate school								
Treated	-0.000	-0.000	0.002	0.001	-0.003	-0.003		
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)		
Treated x Female							0.007	0.006
							(0.008)	(0.008)
Mean outcome[a]	0.25		0.28		0.23		0.05	
Student observations	168,752	168,752	88,159	88,159	80,593	80,593	168,749	168,749
Municipalities	404	404	403	403	404	404	404	404
Model specifications								
Restricted to:								
Females	No	No	Yes	Yes	No	No	No	No
Males	No	No	No	No	Yes	Yes	No	No
Variables added:								
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
Municipality x Year FE	No	No	No	No	No	No	Yes	Yes
Municipality x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if student is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2017. Control variables: Age, first language (German, non-German), migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

[a] Column (7) reports the mean value of the female-male difference of the corresponding outcome variable.

Table B4:
Effect heterogeneity, students who do not speak at home the language of instruction

	Non-German speaking			German speaking		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Low-track students						
DV: Upper secondary school						
Treated	-0.001	0.039**	-0.041***	-0.011	-0.011	-0.014*
	(0.011)	(0.016)	(0.015)	(0.008)	(0.014)	(0.008)
Mean outcome	0.55	0.47	0.62	0.71	0.58	0.81
Observations	30,159	13,786	16,373	48,738	20,692	28,046
Cluster	384	376	381	391	390	391
Panel B: High-track students						
DV: Upper secondary school						
Treated	0.011	0.013	0.001	0.004	0.007	0.001
	(0.014)	(0.016)	(0.021)	(0.004)	(0.006)	(0.006)
Mean outcome	0.72	0.70	0.73	0.83	0.79	0.87
DV: Baccalaureate school						
Treated	-0.004	-0.017	0.012	0.001	0.004	-0.004
	(0.012)	(0.012)	(0.016)	(0.005)	(0.006)	(0.006)
Mean outcome	0.17	0.19	0.16	0.27	0.30	0.24
Observations	25,334	13,805	11,529	143,418	74,354	69,064
Cluster	394	382	387	404	403	404
Model specifications						
Restricted to:						
Females	No	Yes	No	No	Yes	No
Males	No	No	Yes	No	No	Yes
Non-German speaker	Yes	Yes	Yes	No	No	No
German speaker	No	No	No	Yes	Yes	Yes
Variables added:						
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes

Note: Least squares regressions of binary variables measuring educational choices one year after the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to English language training in primary school (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if student is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2017. Control variables: Age, migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

Table B5:
Effect of reform on likelihood to be in enrolled in high-track (Goodman-Bacon, 2021)

	Students		
	All	Male	Female
	(1)	(2)	(3)
DV: High-track			
Always treated (c) vs timing	0.001	0.005	-0.003
	(0.402)	(0.402)	(0.402)
Early treated (c) vs late treated	-0.004	-0.003	-0.006
	(0.407)	(0.407)	(0.407)
Late treated (c) vs early treated	0.001	-0.001	0.006
	(0.191)	(0.191)	(0.191)

Note: The table presents each 2x2 DD block and their weight (in parentheses) given in the baseline model. The depended variable is whether a student is in the high-track. The decomposition is based on models weighted by the inverse number of students in each municipality-year-cell as discussed in Section II.

Table B6:
Effect of curriculum reform on educational choices (only Zurich)

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low-track students								
Only Canton Zurich								
DV: Upper secondary school								
Treated	-0.016	-0.017	-0.001	0.004	-0.029	-0.036*		
	(0.017)	(0.017)	(0.026)	(0.025)	(0.020)	(0.020)		
Treated x Female							0.030	0.040
							(0.029)	(0.029)
Mean outcome	0.58		0.48		0.65		-0.18	
Student observations	30,491	30,491	13,381	13,381	17,110	17,110	30,491	30,491
Municipalities	79	79	79	79	79	79	79	79
Model specifications								
Restricted to:								
Females	No	No	Yes	Yes	No	No	No	No
Males	No	No	No	No	Yes	Yes	No	No
Variables added:								
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
Municipality x Year FE	No	No	No	No	No	No	Yes	Yes
Municipality x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if student is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the canton of Zurich. Control variables: Age, first language (German, non-German), migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

[a] Column (7) reports the mean value of the female-male difference of the corresponding outcome variable.

Table B7:
Leave-one-out analysis

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DV: Upper secondary school (w/o Aargau)								
Treated	-0.007	-0.009	0.004	0.005	-0.021***	-0.023***		
	(0.005)	(0.005)	(0.008)	(0.008)	(0.005)	(0.006)		
	[0.360]	[0.377]	[0.653]	[0.537]	[0.036]	[0.029]		
Treated x Female							0.029***	0.031***
							(0.009)	(0.009)
							[0.074]	[0.088]
Student observations	63,832	63,832	28,039	28,039	35,793	35,793	63,832	63,832
Cantons	13	13	13	13	13	13	13	13
DV: Upper secondary school (w/o Schwyz)								
Treated	-0.006	-0.007	0.009	0.012*	-0.024***	-0.025***		
	(0.005)	(0.005)	(0.006)	(0.007)	(0.005)	(0.005)		
	[0.444]	[0.466]	[0.096]	[0.061]	[0.050]	[0.047]		
Treated x Female							0.036***	0.039***
							(0.006)	(0.006)
							[0.082]	[0.047]
Student observations	66,512	66,512	29,242	29,242	37,270	37,270	66,512	66,512
Cantons	13	13	13	13	13	13	13	13
DV: Upper secondary school (w/o Luzern)								
Treated	-0.012***	-0.012***	-0.001	0.001	-0.025***	-0.025***		
	(0.003)	(0.002)	(0.007)	(0.006)	(0.004)	(0.005)		
	[0.008]	[0.015]	[0.923]	[0.840]	[0.017]	[0.019]		
Treated x Female							0.028**	0.030***
							(0.009)	(0.009)
							[0.195]	[0.225]
Student observations	63,542	63,542	27,922	27,922	35,620	35,620	63,542	63,542
Cantons	13	13	13	13	13	13	13	13
DV: Upper secondary school (w/o Uri)								
Treated	-0.009*	-0.009*	0.005	0.007	-0.023***	-0.025***		
	(0.005)	(0.005)	(0.007)	(0.007)	(0.005)	(0.005)		
	[0.250]	[0.309]	[0.552]	[0.317]	[0.008]	[0.003]		
Treated x Female							0.031***	0.035***
							(0.008)	(0.008)
							[0.036]	[0.027]
Student observations	69,469	69,469	30,558	30,558	38,911	38,911	69,469	69,469
Cantons	13	13	13	13	13	13	13	13
DV: Upper secondary school (w/o Obwalden)								
Treated	-0.008	-0.009*	0.005	0.007	-0.023***	-0.025***		
	(0.005)	(0.005)	(0.007)	(0.008)	(0.005)	(0.005)		
	[0.311]	[0.310]	[0.556]	[0.322]	[0.022]	[0.006]		
Treated x Female							0.031***	0.035***
							(0.008)	(0.008)
							[0.030]	[0.021]
Student observations	69,200	69,200	30,465	30,465	38,735	38,735	69,200	69,200
Cantons	13	13	13	13	13	13	13	13

Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if student is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2017. Control variables: Age, first language (German, non-German), migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

[a] Column (7) reports the mean value of the female-male difference of the corresponding outcome variable.

Table B8:
Leave-one-out analysis, cont

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DV: Upper secondary school (w/o Nidwalden)								
Treated	-0.008	-0.009*	0.004	0.007	-0.023***	-0.024***		
	(0.005)	(0.005)	(0.007)	(0.007)	(0.005)	(0.005)		
	[0.241]	[0.333]	[0.598]	[0.332]	[0.016]	[0.010]		
Treated x Female							0.030***	0.033***
							(0.008)	(0.008)
							[0.057]	[0.034]
Student observations	69,645	69,645	30,630	30,630	39,015	39,015	69,645	69,645
Cantons	13	13	13	13	13	13	13	13
DV: Upper secondary school (w/o Glarus)								
Treated	-0.009*	-0.009*	0.004	0.007	-0.024***	-0.025***		
	(0.005)	(0.005)	(0.007)	(0.007)	(0.005)	(0.006)		
	[0.203]	[0.316]	[0.616]	[0.399]	[0.020]	[0.010]		
Treated x Female							0.031***	0.034***
							(0.008)	(0.008)
							[0.071]	[0.048]
Student observations	68,560	68,560	30,186	30,186	38,374	38,374	68,560	68,560
Cantons	13	13	13	13	13	13	13	13
DV: Upper secondary school (w/o Zug)								
Treated	-0.008	-0.010**	0.004	0.006	-0.023***	-0.025***		
	(0.005)	(0.004)	(0.008)	(0.008)	(0.005)	(0.005)		
	[0.245]	[0.219]	[0.638]	[0.428]	[0.034]	[0.017]		
Treated x Female							0.029***	0.033***
							(0.009)	(0.009)
							[0.104]	[0.078]
Student observations	68,107	68,107	29,984	29,984	38,123	38,123	68,107	68,107
Cantons	13	13	13	13	13	13	13	13
DV: Upper secondary school (w/o Schaffhausen)								
Treated	-0.009*	-0.010*	0.003	0.006	-0.023***	-0.024***		
	(0.005)	(0.005)	(0.007)	(0.007)	(0.005)	(0.005)		
	[0.241]	[0.276]	[0.749]	[0.478]	[0.018]	[0.010]		
Treated x Female							0.030***	0.033***
							(0.008)	(0.008)
							[0.072]	[0.059]
Student observations	68,418	68,418	30,088	30,088	38,330	38,330	68,418	68,418
Cantons	13	13	13	13	13	13	13	13
DV: Upper secondary school (w/o Appenzell A)								
Treated	-0.009	-0.009*	0.005	0.008	-0.024***	-0.025***		
	(0.005)	(0.005)	(0.007)	(0.007)	(0.004)	(0.005)		
	[0.237]	[0.304]	[0.510]	[0.258]	[0.005]	[0.004]		
Treated x Female							0.032***	0.035***
							(0.008)	(0.008)
							[0.078]	[0.081]
Student observations	69,149	69,149	30,414	30,414	38,735	38,735	69,149	69,149
Cantons	13	13	13	13	13	13	13	13

Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if student is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2017. Control variables: Age, first language (German, non-German), migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

[a] Column (7) reports the mean value of the female-male difference of the corresponding outcome variable.

Table B9:
Leave-one-out analysis, cont

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DV: Upper secondary school (w/o Thurgau)								
Treated	-0.011**	-0.010*	0.001	0.005	-0.024***	-0.025***		
	(0.005)	(0.005)	(0.008)	(0.008)	(0.005)	(0.006)		
	[0.179]	[0.359]	[0.934]	[0.622]	[0.032]	[0.030]		
Treated x Female							0.028**	0.032***
							(0.010)	(0.010)
							[0.127]	[0.127]
Student observations	63,838	63,838	28,156	28,156	35,682	35,682	63,838	63,838
Cantons	13	13	13	13	13	13	13	13
DV: Upper secondary school (w/o Appenzell I)								
Treated	-0.008	-0.008	0.004	0.007	-0.022***	-0.023***		
	(0.005)	(0.005)	(0.007)	(0.007)	(0.005)	(0.006)		
	[0.273]	[0.343]	[0.607]	[0.366]	[0.020]	[0.025]		
Treated x Female							0.030***	0.033***
							(0.008)	(0.008)
							[0.071]	[0.067]
Student observations	69,415	69,415	30,542	30,542	38,873	38,873	69,415	69,415
Cantons	13	13	13	13	13	13	13	13
DV: Upper secondary school (w/o Zurich)								
Treated	-0.006	-0.002	0.003	0.009	-0.015***	-0.013***		
	(0.008)	(0.007)	(0.016)	(0.016)	(0.004)	(0.004)		
	[0.539]	[0.803]	[0.858]	[0.709]	[0.014]	[0.017]		
Treated x Female							0.020	0.025
							(0.016)	(0.017)
							[0.281]	[0.294]
Student observations	39,279	39,279	17,301	17,301	21,978	21,978	39,279	39,279
Cantons	13	13	13	13	13	13	13	13
DV: Upper secondary school (w/o St.Gallen)								
Treated	-0.008	-0.008	0.003	0.006	-0.020***	-0.022***		
	(0.006)	(0.006)	(0.008)	(0.008)	(0.005)	(0.006)		
	[0.401]	[0.413]	[0.785]	[0.464]	[0.058]	[0.036]		
Treated x Female							0.025***	0.030***
							(0.008)	(0.008)
							[0.044]	[0.027]
Student observations	58,044	58,044	25,339	25,339	32,705	32,705	58,044	58,044
Cantons	13	13	13	13	13	13	13	13
Model specifications								
Restricted to:								
Females	No	No	Yes	Yes	No	No	No	No
Males	No	No	No	No	Yes	Yes	No	No
Variables added:								
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
Municipality x Year FE	No	No	No	No	No	No	Yes	Yes
Municipality x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Observed educational choices: not enrolled in any Swiss educational institution, grade repetition or enrolled in non-certifying preparatory class, vocational training program, specialized middle school (only high-track students), baccalaureate school (only high-track students). DV: Upper secondary school is equal to 1 if student is either enrolled in vocational training program, specialized middle school, or baccalaureate school one year after compulsory school and 0 otherwise. DV: Baccalaureate school is equal to 1 if student is enrolled in baccalaureate school one year after compulsory school and 0 otherwise. Sample includes students in the last year of compulsory school between 2011-2017. Control variables: Age, first language (German, non-German), migration status (Swiss-born national, Swiss-born foreigner, non-Swiss-born national, non-Swiss-born foreigner), school location (urban, rural, intermediary), type of school (public, private). Reported standard errors in parentheses are cluster-robust at municipality-level.

[a] Column (7) reports the mean value of the female-male difference of the corresponding outcome variable.

Table B10:
Effect of the reform on the relative skill requirements of training occupations (Goodman-Bacon, 2021)

	Math		School language		Natural Sciences		Foreign language	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Low-track students								
Always treated (c) vs timing	-0.268	0.521	0.362	-0.108	-0.703	0.278	0.608	-0.691
	(0.388)	(0.386)	(0.388)	(0.386)	(0.388)	(0.386)	(0.388)	(0.386)
Early treated (c) vs late treated	-0.411	0.280	0.353	-0.145	-0.776	0.241	0.834	-0.377
	(0.432)	(0.433)	(0.432)	(0.433)	(0.432)	(0.433)	(0.432)	(0.433)
Late treated (c) vs early treated	-0.378	0.492	0.310	-0.184	-0.409	-0.032	0.477	-0.275
	(0.179)	(0.181)	(0.179)	(0.181)	(0.179)	(0.181)	(0.179)	(0.181)
Model specifications								
Restricted to:								
Females	Yes	No	Yes	No	Yes	No	Yes	No
Males	No	Yes	No	Yes	No	Yes	No	Yes

Note: The table presents each 2x2 DD block and their weight (in parentheses) given in the baseline model. The depended variable is whether a student is in the high-track. The decomposition is based on models weighted by the inverse number of students in each municipality-year-cell as discussed in Section II.