

Much ado about nothing?

School curriculum reforms and students' educational trajectories

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32nd EALE conference
Padova, September 10, 2022

Motivation

- School curriculum reforms: Primary tool to influence pre-market skills of workforce
 - ▶ Technological change and a more globalized economy call on policy makers to review and adjust school curricula (OECD 2020)
- Literature suggests curriculum reforms can be effective *on average*
(E.G., TAYLOR 2014; AUGHINBAUGH 2012; GÖRLITZ AND GRAVERT 2018; DE PHILIPPIS 2021)
- However, effect of reforms typically varies across groups of students (e.g., gender), potentially amplifying educational inequality
(E.G., HUEBENER ET AL. 2017; DE PHILIPPIS 2021)
- Literature focuses on education reforms that target maths or science classes, whereas other subjects have attracted almost no attention

This paper

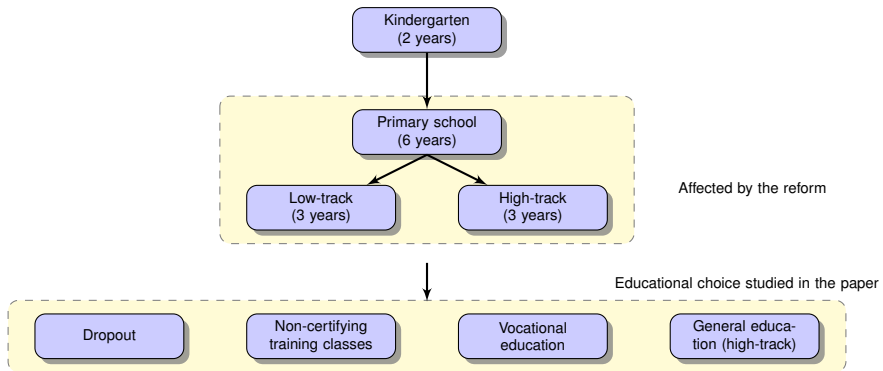
- Effect of increased foreign language (FL) classes in compulsory school (grades 1-9) on subsequent educational choices
- Time and cross-sectional variation in FL classes generated by staggered adoption of substantial curriculum reform in CH (using high-quality student register data)

Preview of findings

- Effect on overall population small; largest effect bound to low-track male students
 - ▶ Reform reduced low-track male students' probability to attend upper secondary school in subsequent year by 3 pp (i.e., increase of non-participation by 10%)
 - ▶ Effect is persistent: Effect reduces only by 15% in a 2-year window
 - ▶ Low-track male students who do not speak at home the language of instruction saw biggest decline
- Low-track female students who start vocational training are more inclined to select into training occupations with higher FL requirement

(SEE RELATED LITERATURE)

Swiss education system



Foreign language (FL) classes and curriculum reform

- Multilingualism and FL proficiency plays essential role in CH (4 official languages)
 - ▶ Government has responsibility to encourage exchange b/w linguistic groups
 - ▶ Reflected in school curriculum: One official language mandatory in primary school
- In the 90s, debates began about prioritizing English language training in curriculum

	Prior reform	After reform
Low track	French (5th)	English (3rd), French (5th)
High track	French (5th), English (7th)	English (3rd), French (5th)

Note: Example for German speaking cantons that introduced English as first foreign language in school curriculum (=cantons studied in this paper).

Compulsory school curriculum before and after the reform

	GER	ENG & FRA	Math	NATSCI & HIS	Arts & Music	Sports	Others	Total
High-track								
Total								
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 (%)	-1.8	43.7	-1.8	-1.0	-4.1	-0.2	-4.4	1.9
Percentage								
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 (%)	-3.6	41.0	-3.6	-2.8	-5.8	-2.0	-6.2	
Low-track								
Total								
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 (%)	-1.7	66.5	-1.8	-1.2	-3.9	-0.2	-4.1	1.8
Percentage								
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 (%)	-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. 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). *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. Numbers reported are unweighted average values over all cantons.

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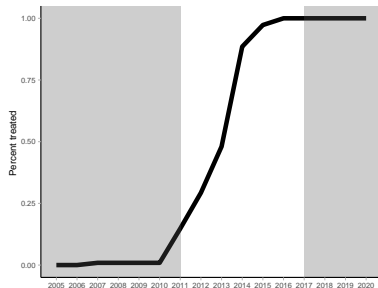
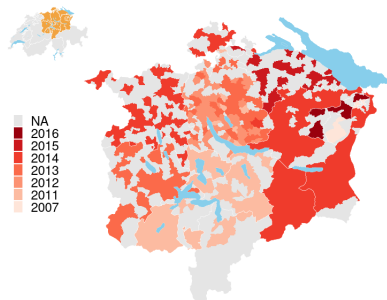
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Data

- 2011-2018 student register data, universe of students enrolled in CH education system
 - ▶ Annual information on students' education status and background characteristics
 - ▶ Individual identifier allows us to identify students across years
- Repeated cross-sectional panel of 9th graders (+ subsequent choices), 2011-2017
- Information on implementation of reform from detailed canton-wide school curricula
- “Treated” students: comparison with first affected hypothetical student in a municipality (regularly passed all grades, no grade skipping or repetition)

(SEE SUMMARY STATISTICS)

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.

(SEE TABLE)

Empirical approach

- Difference-in-differences with variation in treatment timing
- Estimated using two-way FE model (separately for males, females, low- and high-track):

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

$y_{i,c,t+1}$: Education status after 9th grade (binary)
 α_c, α_t : Municipality and year FE
 $Treated_{c,t}$: Binary treatment variable

Assumptions:

- Common trends
- Constant treatment effects (over time and across municipalities)

→ β^{DD} estimates average treatment effect of reform on students' educational choices for municipalities that introduced curriculum reform

Results: Curriculum reform and educational choices (low-track)

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low-track students								
DV: Upper sec. school								
Treated	-0.009 (0.007)	-0.009 (0.006)	0.004 (0.012)	0.007 (0.012)	-0.023*** (0.008)	-0.024*** (0.008)		
Treated x Female							0.030** (0.015)	0.033** (0.015)
Mean outcome	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
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
Mun. x Year FE	No	No	No	No	No	No	Yes	Yes
Mun. 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). 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. Sample includes low-track students in the last year of compulsory school between 2011-2017. Reported standard errors in parentheses are cluster-robust at municipality-level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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Results: Curriculum reform and educational choices (high-track)

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High-track students								
DV: Upper sec. school								
Treated	0.004 (0.005)	0.005 (0.005)	0.007 (0.006)	0.008 (0.006)	0.001 (0.008)	0.001 (0.008)		
Treated x Female							0.006 (0.010)	0.006 (0.009)
Mean outcome	0.82		0.78		0.85		-0.07	
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								
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Robustness and threats to identification

Composition of 9th-grader cohort

- Reform did not have an effect on likelihood to graduate from low- or high-track (TABLE)
- Reform did not have an effect on students' age (grade repetition) (TABLE)

Model specifications

- Check for pre-event trends in event-study design analysis (FIGURE)
- Inference based on S.E. from wild cluster bootstrap-t procedure (TABLE)
(CAMERON ET AL. 2008)
- Estimates with school FE instead of municipality FE (TABLE)
- Add municipality-specific linear time trends to baseline specification (TABLE)
- Weights to adjust for number of students in year-municipality-cells (TABLE)
- Decompose effect from two-way FE model in 2x2-DD model estimates (FIGURE)
(GOODMAN-BACON 2021)

Further results

- Effect is persistent and reduces only by 15 % over a 2-year window (TABLE)
- Low-track male students who do not speak at home the language of instruction saw biggest decline (TABLE)
- Low-track female students who start vocational training are more inclined to select into training occupations with higher FL requirements (TABLE)

Conclusion

- Paper studies the impact of a curriculum reform that increased foreign language classes on educational choices after compulsory school
- Small effect on overall student population, but substantial negative effect for low-track male students in terms of educational progression
 - ▶ In line with linguistic literature showing that females are better language learners and have better language grades in school (E.G., VAN DER SLIK ET AL. 2015; VOYER AND VOYER, 2014)
- Low-track female students who start vocational training are more inclined to select into training occupations with higher FL requirements
 - ▶ Indicates that reform was effective in changing students' skills and educational choices
- No effect on high-track students
 - ▶ In line with literature showing that more comprehensive school curricula worsen educational performance of low-performing students relative to high-performing students (E.G., ANDRIETTI 2016; HUEBENER ET AL. 2017; ANRIETTI AND SU 2019)
 - ▶ However, smaller relative increase in foreign language classes for high-track students

Future research

- If data available, it would be interesting to see if reform also affected students' grades (potential mechanism)

Appendix

Related literature

1. Subject-specific instruction time and student achievement test scores (PISA, TIMSS)
(LAVY 2015, RIVKIN AND SCHIMAN 2015, CATTANEO ET AL. 2017, BINGLEY ET AL. 2018, MANDEL ET AL. 2019, WEDEL 2021)
→ Exploits reported cross-subject variation in instruction time, finds positive association
2. More intensified school curriculum and student achievement test scores
(ANDRIETTI 2016, HUEBENER ET AL. 2017, ANDRIETTI AND SU 2019)
→ Positive effects on average, but not for low-performing students
3. Remedial education for low-performing students and educational attainment
(CORTES AND GOODMAN 2014, TAYLOR 2014, CORTES ET AL 2015)
→ Well-identified positive effects of additional math classes for low-performing students

Context matters:

- Effect of increased subject-specific instruction time depends on the source of that time
- Does the peer group change? (as in the remedial education literature)
- Some groups of students are likely more affected than others

[go back](#)

Summary statistics

	Low track students		High track students	
	Females	Males	Females	Males
<i>Student characteristics</i>				
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
<i>School characteristics</i>				
Located in urban area	67.5	66.4	60.9	61.0
Private school	2.1	2.9	4.7	4.4
<i>Educational choice</i>				
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
<i>Observations</i>	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.

(SEE TABLE BY YEAR)

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Number of observations by canton and treatment status

Canton	Number of observations	Percentage of observations treated	Year first treated
Zürich	85,198	81	2011-2014
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. [go back](#)

Descriptive statistics by year: Male low track students

	2011	2012	2013	2014	2015	2016	2017
<i>Student characteristics</i>							
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
<i>School characteristics</i>							
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
<i>Educational choice</i>							
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
<i>Observations</i>	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. [go back](#)

Descriptive statistics by year: Female low track students

	2011	2012	2013	2014	2015	2016	2017
<i>Student characteristics</i>							
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
<i>School characteristics</i>							
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
<i>Educational choice</i>							
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
<i>Observations</i>	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. [go back](#)

Descriptive statistics by year: Male high track students

	2011	2012	2013	2014	2015	2016	2017
<i>Student characteristics</i>							
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
<i>School characteristics</i>							
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
<i>Educational choice</i>							
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
<i>Observations</i>	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. [go back](#)

Descriptive statistics by year: Female high track students

	2011	2012	2013	2014	2015	2016	2017
<i>Student characteristics</i>							
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
<i>School characteristics</i>							
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
<i>Educational choice</i>							
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
<i>Observations</i>	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. [go back](#)

Reform did not have an effect on likelihood to graduate from low- or high-track

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DV: In high-track								
Treated	-0.006 (0.004)	-0.006 (0.004)	-0.003 (0.005)	-0.005 (0.005)	-0.008 (0.005)	-0.007 (0.005)		
Treated x Female							0.005 (0.007)	0.004 (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
Mun x Year FE	No	No	No	No	No	No	Yes	Yes
Mun x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

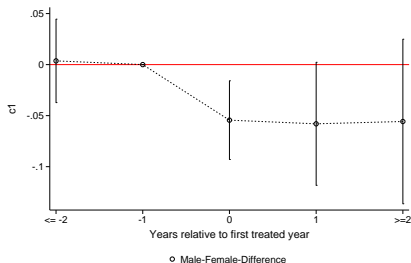
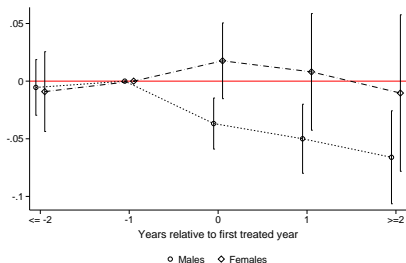
Note: Least squares regressions of binary variables measuring if students' are enrolled in high-track (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Sample includes students in the last year of compulsory school between 2011-2017. Control variables: 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. [go back](#)

Reform did not have an effect on students' age in 9th grade

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low-track students								
DV: Age								
Treated	0.006 (0.011)	0.004 (0.011)	0.009 (0.014)	0.005 (0.014)	0.004 (0.015)	0.003 (0.014)		
Treated x Female							0.001 (0.018)	-0.003 (0.018)
Mean outcome	15.12		15.08		15.15		-0.07	
High-track students								
DV: Age								
Treated	-0.001 (0.012)	-0.003 (0.011)	-0.004 (0.012)	-0.006 (0.013)	0.003 (0.018)	0.000 (0.014)		
Treated x Female							-0.008 (0.019)	-0.009 (0.019)
Mean outcome	14.84		14.81		14.88		-0.07	
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
Mun x Year FE	No	No	No	No	No	No	Yes	Yes
Mun x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

Note: Reported standard errors in parentheses are cluster-robust at municipality-level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. [go back](#)

Event-study design estimates



Note: Plot on the left shows coefficient estimates of β_{-2} , β_0 , β_1 , and β_2 based on equation

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

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 the equation above 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. [go back](#)

Wild cluster bootstrap-t procedure

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low-track students								
DV: Upper sec. school								
Treated	-0.009* (0.005) [0.258]	-0.009* (0.005) [0.293]	0.004 (0.007) [0.628]	0.007 (0.007) [0.331]	-0.023*** (0.005) [0.019]	-0.024*** (0.005) [0.009]		
Treated x Female							0.030*** (0.008) [0.071]	0.033*** (0.008) [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
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
Mun x Year FE	No	No	No	No	No	No	Yes	Yes
Mun 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). Reported standard errors in parentheses are cluster-robust at canton-level. Corresponding p-values: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. P-values of wild cluster bootstrap-t procedure in squared brackets.

[go back](#)

School FE model

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low-track students								
DV: Upper sec school								
Treated	-0.010 (0.007)	-0.011 (0.007)	0.004 (0.013)	0.005 (0.012)	-0.026*** (0.009)	-0.027*** (0.009)		
Treated x Female							0.033** (0.017)	0.036** (0.016)
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	69,712	69,712
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:								
School 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
School x Year FE	No	No	No	No	No	No	Yes	Yes
School 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). Number of school: 472. Reported standard errors in parentheses are cluster-robust at municipality-level. * p < 0.1, ** p < 0.05, *** p < 0.01. [go back](#)

Municipality-specific linear time trends

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low-track students								
DV: Upper sec school								
Treated	-0.011 (0.008)	-0.013* (0.008)	0.008 (0.015)	0.009 (0.015)	-0.031*** (0.010)	-0.033*** (0.010)		
Treated x Female							0.043* (0.024)	0.045* (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
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
Mun-specific trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	Yes	No	Yes	No	Yes	No	Yes
Mun x Year FE	No	No	No	No	No	No	Yes	Yes
Mun x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes
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). Reported standard errors in parentheses are cluster-robust at municipality-level. * p < 0.1, ** p < 0.05, *** p < 0.01. [go back](#)

Weighted regressions (1 divided by number of students), low-track students

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low-track students								
DV: Upper sec school								
Treated	-0.014 (0.009)	-0.011 (0.009)	0.000 (0.016)	0.004 (0.015)	-0.030*** (0.011)	-0.028*** (0.010)		
Treated x Female							0.031* (0.017)	0.033* (0.017)
Mean outcome	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
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
Mun x Year FE	No	No	No	No	No	No	Yes	Yes
Mun x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

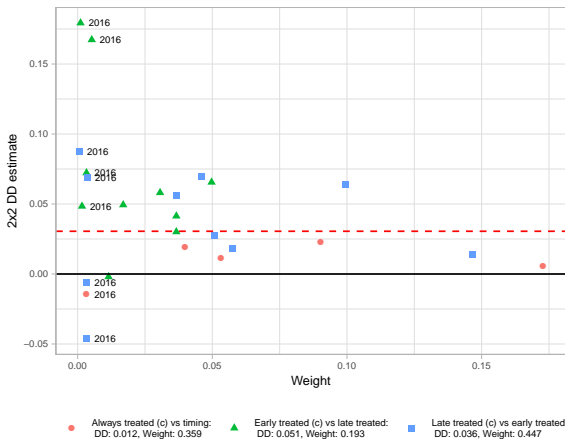
Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Reported standard errors in parentheses are cluster-robust at municipality-level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. [go back](#)

Weighted regressions (1 divided by number of students), high-track students

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High-track students								
DV: Bacalaureate school								
Treated	-0.003 (0.003)	-0.003 (0.003)	-0.002 (0.004)	-0.002 (0.004)	-0.008** (0.004)	-0.007* (0.004)		
Treated x Female							0.006 (0.005)	0.006 (0.006)
Mean outcome	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
Mun x Year FE	No	No	No	No	No	No	Yes	Yes
Mun x Female FE	No	No	No	No	No	No	Yes	Yes
Year x Female FE	No	No	No	No	No	No	Yes	Yes

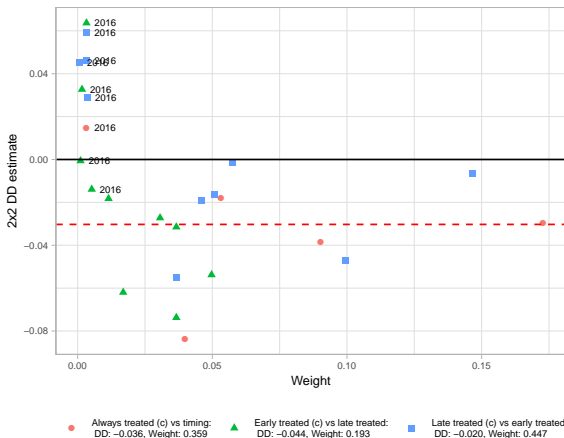
Note: Least squares regressions of binary variables measuring educational choices one year after students enter the last year of compulsory school (DV) on a binary variable indicating if a student was exposed to the curriculum reform (Treated). Reported standard errors in parentheses are cluster-robust at municipality-level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. [go back](#)

Goodman-Bacon decomposition, low-track male-female difference



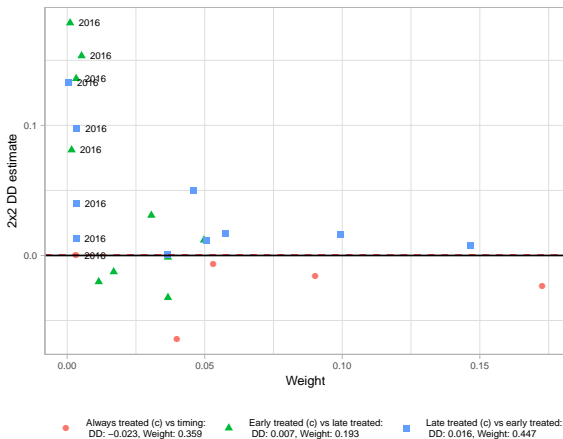
Note: The figure plots each 2x2 DD estimate against their weight given in the baseline specification model. The (red) dotted line indicates the DD estimate of the baseline model, which is equal to the average of all plotted 2x2 DD estimates weighted by the value of the x-axis. [go back](#)

Goodman-Bacon decomposition, low-track male students



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. [go back](#)

Goodman-Bacon decomposition, low-track female students



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. [go back](#)

Effect on educational choices of low-track male students is persistent

	All		By gender				2-DD	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low-track students								
Upper sec school (2y)								
Treated	-0.004 (0.006)	-0.003 (0.006)	0.012 (0.010)	0.015 (0.010)	-0.017** (0.007)	-0.017** (0.007)		
Treated x Female							0.030** (0.012)	0.033*** (0.012)
Mean outcome	0.84		0.80		0.87		-0.06	
Upper sec school								
Treated	-0.009 (0.007)	-0.009 (0.007)	0.006 (0.013)	0.008 (0.013)	-0.025*** (0.008)	-0.026*** (0.008)		
Treated x Female							0.035** (0.016)	0.037** (0.016)
Mean outcome	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
Control variables	No	Yes	No	Yes	No	Yes	No	Yes

Note: Reported standard errors in parentheses are cluster-robust at municipality-level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. [go back](#)

Low-track male students who do not speak at home the schools' language of instruction saw biggest decline in upper secondary school enrollment

	Non-German speaking			German speaking		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Low track students						
DV: Upper secondary school						
Treated	-0.001 (0.011)	0.031* (0.016)	-0.036** (0.015)	-0.014 (0.009)	-0.011 (0.017)	-0.018** (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
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: Reported standard errors in parentheses are cluster-robust at municipality-level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. [go back](#)

Reform associated with changes in occupational choices of low-track female students

	Math		School language		Natural Sciences		Foreign language	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low-track students								
Treated	-0.191 (0.190)	0.165 (0.202)	0.220 (0.147)	-0.087 (0.123)	-0.432*** (0.165)	0.118 (0.107)	0.403* (0.205)	-0.197 (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
High-track students								
Treated	0.122 (0.122)	-0.108 (0.139)	-0.109 (0.085)	0.044 (0.081)	-0.190 (0.167)	0.020 (0.141)	0.177 (0.163)	0.044 (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: Dependent variable: math, school language, natural sciences, or foreign language skill requirement relative to sum of all skill requirements (percentage value). Reported standard errors in parentheses are cluster-robust at municipality-level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. [go back](#)