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Caroline Chuard, Annatina Aerne, Simone Balestra, Beatrix Eugster and Roland Hodler

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Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

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JEL Classification: I21, J15, J24, J30

Keywords: foreign language speakers, Ethnic concentration, peer effects, Education, early career outcomes

Caroline Chuard - Caroline.chuard@unisg.ch
University of St. Gallen

Annatina Aerne - Annatina.aerne@unil.ch
University of Lausanne

Simone Balestra - simone.balestra@unisg.ch
University of St. Gallen

Beatrix Eugster - beatrix.eugster@unisg.ch
University of St. Gallen and CEPR

Roland Hodler - Roland.hodler@unisg.ch
Universität St Gallen and CEPR

Ethnic Clustering in Schools and Early Career Outcomes*

Caroline Chuard†, Annatina Aerne‡, Simone Balestra§, Beatrix Eugster¶, and Roland Hodler‖

Abstract

We study how ethnic clustering during compulsory schooling affects postcompulsory educational outcomes among ethnic minority students. We evaluate the impacts of students' exposure to foreign language speakers and speakers of their own foreign language on their educational tracks, difficulty of vocational education, and projected labour market outcomes. We find that a higher share of foreign language speakers in the cohort increases a student's probability of entering the vocational (vs. academic) track; this effect is amplified by an increasing share of peers speaking the student's own foreign language. Furthermore, it leads to less difficult vocational education and lower predicted earnings. The drivers of these peer effects are shown to be related to language acquisition, ambition, and networks.

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†University of St. Gallen. Email: caroline.chuard@unisg.ch
‡University of Lausanne. Email: annatina.aerne@unil.ch
§University of St. Gallen and CESifo. Email: simone.balestra@unisg.ch
¶University of St. Gallen, CEPR, and CESifo. Email: beatrix.eugster@unisg.ch
‖University of St. Gallen, CEPR, and CESifo. Email: roland.hodler@unisg.ch

1 Introduction

With the recent waves of refugees from Ukraine and the shores of the Mediterranean Sea, it is becoming more important than ever to understand how the ethnic composition of classrooms affects integration. The simultaneous arrival of many people who speak the same language increases the risk of segregation. Even in the absence of these refugee waves, multicultural societies are becoming the norm in most OECD countries as immigration has increased rapidly over the past four decades. With the risk of clustering of ethnic groups in specific municipalities and neighbourhoods, there is also the risk of ethnic clustering in schools. Schools thus play an important role in hindering or promoting the integration of ethnic minority students and their families (Arenas and Hindriks, 2021; Billings, Deming, and Rockoff, 2014; Derenoncourt, 2022; Laliberté, 2021; Tuttle, 2019). Students learn the local language and relevant skills to lead a successful economic life in the local society. In addition, schools are a place where friendships are made within one's ethnic community and beyond. These friendships play a crucial role in promoting language acquisition and shaping students' career aspirations and professional networks.

Thus far, the economic literature on the effects of ethnic composition in schools has mainly analysed the effects of the share of ethnic minority peers (Ballatore, Fort, and Ichino, 2018; Bossavie, 2020; Brunello and Rocco, 2013; Entorf and Lauk, 2008; Figlio and Özek, 2019; Jensen, 2015; Jensen and Rasmussen, 2011; Ohinata and Van Ours, 2013a,b; Schneeweis, 2015; Tonello, 2016) or the effects of the share of non-English speakers (Cho, 2012; Diette and Uwaifo Oyelere, 2014, 2017; Geay, McNally, and Telhaj, 2013) on short-term outcomes such as test scores for the general population.[1] In addition, Friesen and Krauth (2011) and Åslund et al. (2011) study the additional effect of a greater share of members of a student's *own* ethnic group on short-term educational outcomes, such as test scores and grades. However, we know much less about the effects of ethnic clustering in schools on a broader set of outcomes,

[1] A related strand of literature studies the impact of the racial composition of classes and schools on short-term educational outcomes (Angrist and Lang, 2004; Guryan, 2004; Hanushek, Kain, and Rivkin, 2009; Hoxby and Weingarth, 2005). Additionally, studies have investigated the effect of ethnically mixed schools on the development of soft skills, such as trust, and the effect of targeted interventions on alleviating the burdens faced by ethnically mixed schools (see, e.g., Alan et al., 2021).

particularly postcompulsory schooling outcomes among members of an ethnic minority.[2]

The present paper fills this research gap by studying how ethnic clustering during compulsory schooling affects postcompulsory educational outcomes among students from ethnic minorities, who typically have a migration background. Specifically, we focus on foreign language-speaking students and evaluate the impact of exposure to foreign language-speaking peers and the additional impact of exposure to speakers of the *same* foreign language on their postcompulsory educational tracks, quality of vocational education and training, and projected labour market outcomes. We hypothesize that peer ethnic composition in school is a key factor in shaping students' outcomes after compulsory education.

The empirical literature suggests different reasons why ethnic classroom composition may affect the type of occupation or track that youths eventually undertake. For example, ethnic minorities' language skills develop differently when they join a class with native language-speaking peers and when they join a class with nonnative language-speaking peers. Specifically, ethnic concentration reduces contact with native language speakers and possibilities of interaction (Lazear, 1999) and hampers language proficiency (Danzer and Yaman, 2016). At the same time, Dustmann (1994), Dustmann and van Soest (2002), and Dustmann, Machin, and Schönberg (2010) show that language skills and, in particular, writing proficiency improve the earnings of members of ethnic minorities so that a better command of the local language opens a different set of career options to them.

We investigate the effect of ethnic peer composition using newly released longitudinal data on the universe of students in Switzerland at the transition from compulsory schooling to postcompulsory education. Switzerland is an ideal setting for our analysis for two reasons. First, the Swiss education system is characterized by comparatively early sorting into educational tracks (either academic or vocational), which makes career paths upon finishing compulsory education highly relevant for later career prospects, income, and status in society. Second, Switzerland ranks among the top five OECD countries in terms of its levels of ethnic fractionalization (Alesina et al., 2003) and ethnic segregation (Alesina and Zhuravskaya, 2011; Hodler,

[2] Few studies have looked at longer-term educational outcomes such as passing the high school matriculation exam and STEM major choice (Anelli, Shih, and Williams, 2017; Gould, Lavy, and Paserman, 2009) or other types of outcomes such as peers' mental health (Georgiades, Boyle, and Fife, 2013).

Valsecchi, and Vesperoni, 2021) and its fraction of foreign-born residents. This diversity generates variation in school ethnic composition that we can use for identification. To causally identify the effect of ethnic clustering on postcompulsory educational outcomes, we exploit the natural variation in the ethnic composition of cohorts within school tracks. This strategy rests on the assumption that the variation in cohort ethnic composition is unrelated to other factors affecting occupational choices. We provide evidence for this assumption with several tests, showing that the observed within-school track across-cohort variation in ethnic composition is consistent with variation generated from a random process.

The main result of the paper is the following: the career outcomes of a foreign language-speaking student clearly depend on the share of foreign language-speaking peers. An increase in this share makes the student significantly less likely to proceed to the more prestigious academic track and more likely to start the vocational track while having no significant effect on transitional education and the probability of obtaining no postcompulsory education. We then disentangle the general effect of having peers who speak any foreign language from the specific effect of having peers who speak the same foreign language as the student herself. The effect of the share of (general) foreign language-speaking peers on proceeding to an academic track becomes slightly smaller in absolute value but remains statistically significant. Interestingly, the effect of the share of peers speaking the same foreign language on proceeding to the academic track is also negative and statistically significant and similar in magnitude. Taken together, these results indicate that any increase in foreign language-speaking peers reduces the likelihood that a foreign language-speaking student chooses the academic track but that this effect is amplified and becomes twice as strong when these additional peers speak the same foreign language as the student under consideration.

The main findings are both robust and economically meaningful. Robust because the point estimates remain qualitatively unchanged and quantitatively very similar when we include different sets of control variables. Meaningful because the findings suggest that a one standard deviation increase in the share of foreign language-speaking peers lowers the probability that foreign language-speaking students proceed to the academic track by 0.8 percentage points (or 3.6 percent) while it increases the probability of starting a vocational education and training

(VET) by 1.5 percentage points (or 3.4 percent). As mentioned before, the effects are considerably larger when we consider students who speak the *same* foreign language as the focal student. The unequal distribution of foreign language-speaking students across school tracks and cohorts can therefore explain almost one-tenth of the local-foreign gap in the likelihood of transitioning to the academic track.

The present paper contributes to the growing literature on ethnic peer effects in schools in three ways. First, we focus on the subpopulation of students speaking a foreign language as their mother tongue. The literature primarily examines the general population, often finding very small to insignificant effects. We show that the clustering of ethnic minorities has negative effects on foreign language-speaking students in terms of their (postcompulsory) educational tracks and that this effect is typically amplified by clusters of students speaking the same foreign language as the focal student herself.

Second, we go beyond analysing short-term outcomes such as test scores and focus on tracking postcompulsory education, which is key for paving the way to long-term success in the labour market. In an educational system with early tracking and relatively low mobility across educational pathways, peer effects in education can have long-lasting effects on careers, wages, and socioeconomic status later in life. In this way, we make a first step towards bridging the literature documenting the negative effects of other foreign peers in schools with studies showing improved labour market outcomes in ethnic enclaves (Beaman, 2012; Bertrand, Luttmer, and Mullainathan, 2000; Cutler, Glaeser, and Vigdor, 2008; Damm, 2009; Edin, Fredriksson, and Åslund, 2003).

Third, we provide suggestive evidence that these peer effects are driven by language acquisition, ambitions, and networks. To study the first two of these channels, we build on a large body of literature in sociology on the school outcomes of socially disadvantaged groups (Boudon, 1974; Kristen and Dollmann, 2010; Werfhorst and Tubergen, 2007) and exploit heterogeneity across migrant groups differing in their time of arrival and socioeconomic status. To study the role of networks, we analyse peer effects on the choice of vocational education and training (VET) programmes with disproportionate representation of ethnic groups.

2 Background

In 2021, up to 32.2 percent of the Swiss workforce consisted of foreign workers (Bundesamt für Statistik, 2021). While Switzerland is generally characterized by a high degree of labour immigration, the profile of ethnic minority groups has changed over time. The more recent Swiss migration policy can roughly be distinguished into three phases. Responding to a labour shortage following the second world war, Switzerland had originally pursued a liberal migration policy with a rotation scheme based on bilateral agreements with countries of origin (Becker, Liebig, and Sousa-Poza, 2008). The main entry permit to come to Switzerland was the so-called seasonal permit, allowing foreign workers to work in Switzerland for nine months. In particular, construction sites, hotels and restaurants, agriculture and forestry benefited from seasonal workers. These workers, mainly from Italian and Spanish ethnic minority groups, have since settled and experienced some upwards social mobility. The sharp increase in oil prices in the 1970s leading to a recession reduced the need for foreign workers and brought this first phase of migration to a halt.

From the mid-1980s, migration to Switzerland increased again, following an economic recovery. Swiss employers turned to workers from Portugal, Turkey, and the former Yugoslavia to cover their labour needs (Afonso, 2015, Fibbi et al., 2015). In addition, in 1991, Switzerland introduced a new regime, the 'three-circles' model. This immigration policy facilitated access based on perceived cultural proximity (Griga, 2014, Afonso, 2015, Fibbi et al., 2015). European Union/ European Free Trade Association (EU/EFTA) citizens were treated most favourably, followed by migrants from the US, Canada, Australia, and New Zealand. All other countries, including Yugoslavia and Turkey, were considered the 'third circle'. This new regime favoured migrants from Portugal (an EU member state since 1986) at the expense of labour migration from Yugoslavia and Turkey (Afonso, 2015, p. 124). However, migration from the former Yugoslavia and Turkey also continued based on political asylum and family reunification (Fibbi et al., 2015, p. 37). Unlike earlier migration groups, migrants from the former Yugoslavia, Turkey, and Portugal differ more markedly from the Swiss population in their socioeconomic status (Griga, 2014, p. 129, Afonso, 2015, Fibbi et al., 2015, p. 15).

In 1998, the three-circles model was replaced by the two-circles model, distinguishing only

migrants from EU/EFTA and those from the rest of the world. Consequently, migration from northwestern European countries increased (Griga, 2014). In 2002, Switzerland joined the agreement on the free movement of workers with the EU, which grants EU citizens full access to the Swiss labour market, further facilitating migration from EU countries.

In light of this high level of ethnic diversity, the Swiss school system plays an important role in the extent to which it may promote or hinder integration. Swiss public schools are free of charge and generally considered to be of high quality. A main integrative feature of the Swiss school system is that almost all students—96 percent of primary-school students and 94 percent of students at the lower secondary level—are enrolled in public schools (Nikolai, 2019). Moreover, there is a legal obligation to attend schools in the area where one lives (Diem and Wolter, 2011). While this obligation might promote the integration of ethnic minority students, it could also hinder it given the high level of ethnic residential segregation in Switzerland (Alesina and Zhuravskaya, 2011; Hodler, Valsecchi, and Vesperoni, 2021).

The Swiss school system has become increasingly harmonized in a recent reform, even though education remains a cantonal competence (Fischer, Sciarini, and Traber, 2010). It is characterized by eleven years of compulsory education: after two years of compulsory kindergarten at the ages of four to five years, students continue with their primary education (six years) and lower secondary education (three years). A first selection based on grades takes place after six years of primary school. Students join a more or less demanding track at the lower secondary level, depending on how well they did in primary school (Neuenschwander and Malti, 2009). At age fifteen, after completing compulsory education, students are separated into different career tracks for their upper secondary education. Most start a vocational education or proceed to an academic track. This transition, which we discuss in more detail below, is also affected by the track followed at the lower secondary level (Kost, 2013).[3]

The most common option for noncompulsory upper secondary education is to join a vocational path, typically three to four days per week in a workplace with one to two days of schooling. In these VET tracks, students either choose a more difficult three- to four-year programme leading to a federal certificate of competence (Eidgenössisches Fähigkeitszeugnis,

[3] Figure A.1 provides a graphical overview of the Swiss school system.

EFZ) or obtain a less difficult federal vocational certificate (Eidgenössisches Berufsattest, EBA) after two years. Upon completing either of the two vocational degrees, students are ready to join the labour market as qualified workers or continue with further education.

A second option for noncompulsory upper secondary education is to remain on the academic track (Mittelschule), leading to a specialized (Fachmatura) or general (Matura) baccalaureate. Admittance into these academic tracks requires an entry exam (in most cantons).[4]

Since both the vocational and the academic track are selective, more than 10 percent of students do not find a solution and join a transitional education option, a so-called bridge (rather than gap) year. In these bridge years, students improve their competences and receive tailored support to land an apprenticeship position. While these bridge years may help students further orient themselves regarding career choices, their impact on students' competences is debated (Sacchi and Meyer, 2016).

The permeability between vocational education careers and academic careers has increased in recent years. However, the selection of an educational track at the upper secondary level is still highly significant for youths' career opportunities. Only a few students change tracks. Moreover, permeability seems to facilitate the transition from academic paths to VET (9 percent of students) rather than the other way around (4 percent of students) (Tuor and Backes-Gellner, 2010). Thus, the different educational tracks remain tightly connected with corresponding careers, income, and status in society, as the Swiss school system is a comparatively stratified education system (Allmendinger, 1989, Kerckhoff, 1995).

3 Data

To analyse the effect of peer ethnicity on students' educational and projected long-run labour market outcomes, we link two administrative data sets. First, we draw on the universe of students in Switzerland covered in the LABB data (*Längsschnittanalysen im Bildungsbereich*) provided by the Swiss Federal Statistical Office. Second, we augment this data set with predicted labour market outcomes using the Swiss Labour Force Survey (SLFS) for students who start a

[4] Different schooling options exist. In specialized schools (Fachmittelschule), students focus on a certain area, e.g., business or care work. Alternatively, students continue in general schools (gymnasiale Mittelschule) to obtain a general baccalaureate to enter university.

VET programme.

The LABB data are a comprehensive data set that provides information about all students in compulsory education covering individual characteristics such as month and year of birth, gender, and first language spoken at home; educational pathways including the student's school, cohort, track, and grade; and the specific VET programme chosen (if any). The population of interest is all foreign language speakers in grade eight—the second-to-last year of compulsory schooling—from 2011 to 2016 for whom we observe at least one year of postsecondary education up to 2018. We define a foreign language speaker as a student whose first language spoken at home does not correspond to the dominant local language where the school is located.[5] In the second part of the analysis, in which we study VET choices and predicted labour market outcomes, we further restrict our sample to those foreign language speakers who continue with a VET track in the first stage.

In line with our empirical identification strategy, we define the peer group of students to be a single cohort within a school track (but across classrooms). Accordingly, we define two variables measuring the ethnic composition of the peer group of a student.[6] First, we calculate the leave-one-out share of foreign language speakers in their cohort (i.e., leaving out the student under consideration when computing this share). Second, we calculate the leave-one-out share of students speaking the *same* foreign language as the student in the same peer group.

Our outcomes are the student's track after compulsory education and, conditional on continuing with a VET programme, the difficulty of the VET track. Specifically, we construct individual dummy variables for pursuing an academic track, vocational education, transitional education (i.e., a bridge year), and no postcompulsory education two years after grade eight.[7] For those students who start a VET programme directly after grade nine (roughly 47 percent of the overall student population and 43 percent of the foreign language-speaking students), we can also observe their occupational choice. There are currently 245 distinct VET programmes to choose from (Staatssekretariat für Bildung, 2022) that can be aggregated to broader fields of

[5] Given that there are multiple native languages in Switzerland, a native Swiss citizen can be a foreign language speaker if she resides in another language region.

[6] There are various ways to measure ethnicity. We follow most of the literature by focusing on language (see, e.g., Alesina et al., 2003).

[7] We define transitional education as either another year of secondary education after compulsory schooling or another year of grade 9 education.

interest and levels of difficulty (EBA vs. EFZ; see Section 2).

For predicted labour market outcomes, we map vocational programmes to a broad range of jobs. This mapping is nontrivial since we do not observe students' labour market outcomes, such as jobs, directly following education and wages and because the SLFS, in informing about wages per occupation, does not recover educational profiles. Thus, we link occupational choice to labour market outcomes by relying on a conversion table kindly provided by the Swiss Federal Statistical Office. We map vocational occupational codes with the most likely jobs coded via the International Standard Classification of Occupations (ISCO 08). For each occupation surveyed in the SLFS in 2010–2012, we assign the following two average measures: (1) gross annual income by gender and (2) prestige. For the prestige measure, we rely on the Standard International Occupation Prestige Scale (SIOPS) developed by Ganzeboom and Treiman (1996).[8] To arrive at predicted income and prestige, we average over ISCO occupations based on the conversion table given a certain vocational programme.

Table 1 contains descriptive statistics. The sample is restricted to students aged 11 to 18 in grade eight with nonmissing information in their first language. We further exclude students in implausibly small school track cohorts (less than 15 peers). The remaining sample contains 434,480 students. Columns (1) and (2) present the descriptive statistics for the entire student population. The remaining columns zoom in on the subsamples of interest. Columns (3) and (4) present the descriptive statistics for the population of foreign language-speaking students, who account for 25.6 percent of the entire student population.[9] Finally, columns (5) and (6) restrict the sample to foreign language students who start a VET programme.

The samples of all eighth-grade students and foreign language eighth-grade students are comparable in characteristics such as gender and age but differ in many other aspects. Not surprisingly, the latter are less likely to be Swiss or to be born in Switzerland. More interestingly, they are also much more likely to be exposed to more foreign language-speaking peers

[8] SIOPS relies on a survey conducted in 55 countries where respondents were asked to rate job titles in terms of their social prestige. We also worked with a related measure, the International Socioeconomic Index of Occupational Status (ISEI-08), developed by Ganzeboom, De Graaf, and Treiman (1992). The ISEI scale was developed based on information on the income, education, and occupation of 74,000 full-time employed men and leads to similar results in our estimations. For both measures, there is an online code readily available to assign scale values to ISCO 08 occupations (Ganzeboom and Treiman, 2010).

[9] The most commonly spoken foreign languages are Albanian (18.1 percent of foreign language-speaking students), Portuguese (16.7 percent), Serbian/Croatian (11.0 percent), Italian (8.6 percent), and Turkish (6.6 percent).

Table 1: Descriptive statistics

	(1)	(2)	(3)	(4)	(5)	(6)
	All eighth-grade students		Foreign lang. students		Foreign lang. VET students	
	Mean	SD	Mean	SD	Mean	SD
A. Individual characteristics						
Foreign language	0.256	0.437	1		1	
Swiss nationality	0.800	0.400	0.437	0.496	0.446	0.497
Born in Switzerland	0.886	0.317	0.730	0.444	0.791	0.407
Female	0.496	0.500	0.498	0.500	0.423	0.494
Age in 8th grade	13.485	0.678	13.614	0.725	13.709	0.713
B. School-track cohort characteristics						
Foreign language	0.259	0.211	0.419	0.234	0.430	0.237
Same first language	0.615	0.350	0.085	0.130	0.086	0.119
School-track cohort size	68.534	50.555	64.011	45.088	53.735	36.739
C. Educational track						
Academic track	0.290	0.454	0.213	0.410		
Vocational education	0.465	0.499	0.431	0.495	1	
Transitional education	0.165	0.371	0.256	0.436		
No postsecondary education	0.081	0.272	0.100	0.300		
Observations	434,480		111,313		47,971	
D. VET track						
Difficult VET (EFZ)	0.960	0.197			0.911	0.284
Predicted income (in 1,000 CHF)	76.651	13.706			77.099	13.864
Predicted SIOPS prestige	41.204	6.612			41.183	6.100
Observations	201,822				47,971	

Notes: Columns (1) and (2) show descriptive statistics for the overall student population in grade eight. Columns (3) and (4) restrict the sample to students whose first language spoken at home is not the dominant language in the region where the school is located. Columns (4) and (5) further restrict this sample to those foreign language-speaking students starting a VET programme. Panel B reports leave-one-out shares at the school track cohort level. Panel D has fewer observations because these outcomes are available only for students starting a VET programme.

(41.9 percent compared to 25.9 percent in the overall student population and, thus, only 20.3 percent for native-born local language-speaking students). Additionally, they also differ in their educational pathways. Only 21.3 percent of foreign language-speaking students continue with the academic track, compared to 29.0 percent of the overall student population. Furthermore, foreign language-speaking students are less likely to continue with a VET programme (43.1 percent) but more likely to do a bridge year (25.6 percent) than native language-speaking students. The subsample of foreign language-speaking students attending a VET programme is less likely to be female and tends to be slightly older. The predicted labour market outcomes are, however, comparable to those of the overall population in VET.

4 Empirical Strategy

The aim of this paper is to evaluate the impact of exposure to foreign language speakers and the additional effect of exposure to speakers of the same foreign language as the student's own on students' educational track and projected labour market outcomes if the student continues with a VET programme. Our empirical identification relies on idiosyncratic variation among foreign language speakers across cohorts within the same school track. Empirically, we first estimate the following linear model:

$$y_{is(t+2)} = \alpha + \beta_1 \, SFL_{-ist} + \gamma \, X_{ist} + \delta \, C_{-ist} + \theta_s + \rho_t + \varepsilon_{is(t+2)} \, , \tag{1}$$

where y_{ist} is the outcome of interest for student i in school track s and year t. SFL_{-ist} measures the leave-one-out share of foreign language speakers in grade eight at the *school track cohort level*. This means that we exploit variation in ethnic composition across a certain grade (cohort) within a certain school and performance level (track). With X_{ist}, we include a set of individual controls: own gender, age, and, importantly, dummy variables for the first language spoken at home. With C_{-ist}, we include a set of school track cohort controls: the leave-one-out average age of peers, share of female peers, and size of the school track cohort. Moreover, we include interacted school track fixed effects θ_s and cohort fixed effects ρ_t to account for the level of randomization. ε_{ist} represents the idiosyncratic error term. We cluster the standard errors at the

school track cohort level to account for correlation across subjects within the common environment and estimate equation (1) for foreign language speakers only.

We then add the leave-one-out share of same foreign language speakers $SSFL_{-ist}$:

$$y_{is(t+2)} = \alpha + \beta_1 \, SFL_{-ist} + \beta_2 \, SSFL_{-ist} + \gamma \, X_{ist} + \delta \, C_{-ist} + \theta_s + \rho_t + \varepsilon_{is(t+2)} \, . \qquad (2)$$

The peer effect parameters of interest are β_1 and β_2, which represent the impact of a marginal increase in the share of foreign language peers and the share of same foreign language peers on student i's outcomes. The identification of β_1 and β_2 rests on the assumption that the cohort-to-cohort variation in the composition of foreign language-speaking students and same foreign language-speaking students is random conditional on inclusion of school track fixed effects and cohort fixed effects. We now provide evidence for this assumption.

4.1 Validity of the identification strategy

With the analysis of peer effects at the school track level, the primary threat to identification lies in the potential sorting of students. However, due to the regulatory framework requiring that students attend a given school and cohort depending on their geographic location and age, there is little selection. Furthermore, while there are different educational tracks at the lower secondary level, allocation to a specific track is defined based on prior achievement.[10] In what follows, we formally test the validity of the strategy with three types of balancing checks.

First, we check the feasibility of our research design. Since we compare cohorts within school tracks over time, we need to ensure that there is enough variation in the share of foreign language-speaking peers and the share of same foreign language-speaking peers after netting out the fixed effects at the level of randomization. To do so, we compare the raw variation with the residual variation in both explanatory variables after (i) removing school track and cohort fixed effects and (ii) all controls from the main specification. The results are reported in Table A.1. We find that for the share of foreign language-speaking peers, the standard deviation

[10] A natural choice for the relevant peer group would be the classroom. However, unlike nonobservable characteristics, school principals are most likely informed about their student's first language spoken at home. School principals are likely to balance characteristics such as being a native speaker across classes. Exploiting random variation at the level of the classroom is thus not possible.

drops from 0.234 to 0.069 when we include school track and cohort fixed effects—a reduction to approximately one-third of the raw variation. Additionally, including the controls from the main specification does not reduce the standard deviation any further. The pattern is less extreme for the share of same foreign language-speaking peers. In this case, the standard deviation decreases from 0.130 to 0.100 when we account for school track and cohort fixed effects and to 0.088 when we also include controls. Taken together, there remains sufficient residual variation for the estimation of a marginal increase in the presence of foreign language peers and same foreign language peers.

Second, our strategy relies on the assumption that variation in the share of foreign language-speaking peers and the share of same foreign language-speaking peers within school tracks across cohorts is random conditional on the inclusion of school track and cohort fixed effects. To detect potential selection into school tracks, we follow Balestra, Eugster, and Liebert (2022) and Balestra, Sallin, and Wolter (2021) in examining whether any of the variables on ethnic diversity predict individual baseline characteristics such as gender and age, separately or jointly, as reported in Table A.2. The shares of foreign language-speaking students and same foreign language-speaking students are both individually and jointly insignificant for explaining individual gender. While the coefficients tend to be marginally significant for explaining individual age, the effect size is very small.

Third, in another test to detect nonrandom assignment of children to cohorts within school tracks, following Bifulco, Fletcher, and Ross (2011), we show that the variation in both the share of foreign language speakers and the share of same foreign language speakers is consistent with what we would expect from random assignment. Specifically, we simulate 250 random assignments of students to cohorts (i.e., years) within school tracks. We then calculate for each of the 250 simulations for each student the leave-one-out share of foreign language speakers and same foreign language speakers within a school track and year. Averaging over these 250 simulated shares and comparing the simulated share to the actual share shows that the distributions of the two dependent variables are comparable, as reported in Figure A.2.

Overall, these validity tests indicate that the key identifying assumption of (conditional) random assignment of foreign language-speaking students to school tracks is plausible and that

there is enough variation in the two explanatory variables to estimate precise effects.

5 Results

5.1 Educational pathways

Table 2 presents our estimation results for the foreign language-speaking students' educational tracks. The results in panel A include year fixed effects, interacted school track fixed effects, and the individual-level control variables (which, importantly, include the student's own first language). We see that a foreign language-speaking student's postcompulsory educational track indeed depends on the share of foreign language-speaking peers. An increase in this share significantly reduces the student's chances of proceeding to the academic track and increases her chances of starting a VET programme. The share of foreign language speakers has no significant effect on a student's probability of going into transitional education or forgoing any postcompulsory education. Panel B shows that the results remain qualitatively unchanged and quantitatively very similar when we add cohort-level control variables.

The effects on the academic track and VET are economically meaningful. The point estimates in panel B suggest that a one standard deviation increase in the share of foreign language-speaking peers lowers the probability that a foreign language-speaking student proceeds to the academic track by 0.8 percentage points (or 3.6 percent of the corresponding sample mean). In turn, the share of foreign language speakers raises the probability that this student starts a VET programme by 1.5 percentage points (or 3.4 percent of the corresponding sample mean).[11]

As discussed above, 31.7 percent of local language-speaking students proceed to the academic track, while only 21.3 percent of foreign language-speaking students do so. Hence, there is a local-foreign gap of 10.4 percentage points in the likelihood of proceeding to the academic track. At the same time, an average of 20.3 percent of a local language-speaking student's peers are foreign language speakers, while 41.9 percent of a foreign language-speaking student's peers are also foreign language speakers. In the overall student population, this share is 25.9 percent. Now consider a counterfactual student allocation that ensures that all students—no

[11] Such a one standard deviation increase would correspond to 15 additional foreign language-speaking peers in a school track cohort of 64 students.

Table 2: Peer effects on educational tracks

Dependent variable:	(1) Academic track	(2) VET	(3) Transitional education	(4) No postsec. education
Panel A:				
Share foreign language	-0.032***	0.060***	-0.022	-0.005
	(0.012)	(0.020)	(0.018)	(0.014)
Year fixed effects	✓	✓	✓	✓
School track fixed effects	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓
Cohort controls	–	–	–	–
Panel B:				
Share foreign language	-0.033***	0.062***	-0.025	-0.004
	(0.012)	(0.020)	(0.018)	(0.014)
Year fixed effects	✓	✓	✓	✓
School track fixed effects	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓
Cohort controls	✓	✓	✓	✓
Panel C:				
Share foreign language	-0.028**	0.060***	-0.016	-0.016
	(0.012)	(0.020)	(0.018)	(0.014)
Share same foreign language	-0.035***	0.015	-0.056***	0.076***
	(0.013)	(0.016)	(0.013)	(0.013)
Joint significance (p-value)	0.001	0.006	0.000	0.000
Year fixed effects	✓	✓	✓	✓
School track fixed effects	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓
Cohort controls	✓	✓	✓	✓
Mean of dependent variable	0.213	0.431	0.256	0.100
Observations	111,313	111,313	111,313	111,313

Notes: Fixed effect panel regressions in the sample of all foreign language-speaking students. Dependent variables are indicated in the top row. Explanatory variables are the leave-one-out share of foreign language-speaking students in all panels, plus the leave-one-out share for students speaking the same foreign language in panel C. All regressions include interacted school track fixed effects and year fixed effects as well as the following individual-level control variables: age, gender, and first language. Panels B and C further include the following cohort-level controls: leave-one-out average of school track age, share female, and cohort size. Standard errors are clustered at the school track-year level. ***/**/* indicate statistical significance at the 1%/5%/10% level.

matter what language they speak—have a share of foreign language-speaking peers of exactly 25.9 percent. Our coefficient estimate in column (1) of panel B suggests that foreign language-speaking students would become 0.5 percentage points more likely to proceed to the academic track. Moreover, in Table A.3, we estimate the effect of the share of foreign language-speaking peers on the educational tracks of local language-speaking students. The coefficient estimate in column (1) suggests that local language-speaking students would become 0.2 percentage points less likely to proceed to the academic track if the share of foreign language-speaking peers increased from 20.3 to 25.9 percent. Hence, the clustering of foreign language-speaking students can explain almost one-tenth of the local-foreign gap in the likelihood of proceeding to the academic track.

In panel C, we add as an additional explanatory variable the share of peers speaking the same foreign language as the focal student. We do so to disentangle the general effect of having peers speaking any foreign language from the specific effect of having peers speaking the student's own foreign language. In column (1), we again focus on the likelihood that foreign language-speaking students proceed to the academic track. The estimated coefficient on the share of (general) foreign language-speaking peers becomes slightly smaller in absolute value but remains statistically significant. The estimated coefficient on the share of peers speaking the same foreign language is also negative and statistically significant and even very similar in magnitude. These results suggest that any increase in the share of foreign language-speaking peers reduces the likelihood that a foreign language-speaking student proceeds to the academic track but that this effect is amplified and becomes twice as strong when these additional peers speak the same foreign language as the student under consideration.

When we look at VET in column (2), the pattern is no longer perfectly symmetric. It still holds that foreign language-speaking peers increase the likelihood of starting a VET programme and that this effect tends to be amplified by peers speaking the same language as the student under consideration. This amplification effect, however, is smaller in magnitude and not statistically significant. Furthermore, column (4) shows that a higher share of peers speaking the same foreign language not only diverts students from the academic track to a VET programme but also increases the share of students who drop out: a one standard deviation increase in the

share of peers speaking the same foreign language increases a student's probability of having no postcompulsory education by 1.0 percentage points (or 9.9 percent of the corresponding sample mean). Hence, students clearly proceed to lower-quality postcompulsory educational tracks when they have more peers speaking the same foreign language.

5.2 Labour market outcomes

In the next step, we reduce the sample to all foreign language-speaking students who start a VET programme. We examine how the share of foreign language-speaking peers influences the difficulty of the VET programme that a student joins. Note that these results are based on a selected sample since the share of foreign language-speaking students also increases the likelihood that foreign language-speaking students actually start a VET programme at all. Table 3 presents our results.

In column (1), we show the effect of having more foreign language-speaking peers on a student's likelihood of starting a more difficult VET programme (EFZ rather than EBA; see Section 2). While panels A and B show similar effect sizes, the effect of having more foreign language-speaking peers on EFZ is only marginally significant when we control for cohort characteristics. A one standard deviation increase in the share of foreign language-speaking peers corresponds to a decline of 0.7 percentage points (or 0.8 percent evaluated at the mean). Interestingly, however, the effect is larger and strongly significant for foreign language-speaking peers of the same foreign language as reported in panel C.

We now turn to outcome variables that proxy for the long-term socioeconomic status associated with the different VET tracks. In column (2), we focus on the income that students can expect conditional on their VET choice and gender. We find that foreign language-speaking students start VET programmes that lead to lower expected incomes if they have more foreign language-speaking peers. The point estimates in panel B suggest that a one standard deviation increase in the share of foreign language-speaking peers leads to a reduction in expected annual income by approximately CHF 400 (or 0.5 percent of the sample mean). This effect is rather modest. However, it is worth highlighting that it comes on top of the potential wage discrimination faced by foreign language-speaking students.

Table 3: Peer effects on VET program and predicted labor market outcomes

Dependent variable:	(1) Difficult VET (EFZ)	(2) Predicted income	(3) Predicted prestige
Panel A:			
Share foreign language	-0.028	-1.695***	-0.388
	(0.018)	(0.614)	(0.355)
Year fixed effects	✓	✓	✓
School track fixed effects	✓	✓	✓
Individual controls	✓	✓	✓
Cohort controls	–	–	–
Panel B:			
Share foreign language	-0.031*	-1.736***	-0.417
	(0.018)	(0.620)	(0.357)
Year fixed effects	✓	✓	✓
School track fixed effects	✓	✓	✓
Individual controls	✓	✓	✓
Cohort controls	✓	✓	✓
Panel C:			
Share foreign language	-0.023	-1.695***	-0.495
	(0.018)	(0.631)	(0.362)
Share same foreign language	-0.046***	-0.245	0.472
	(0.015)	(0.662)	(0.347)
Joint significance (p-value)	0.002	0.018	0.200
Year fixed effects	✓	✓	✓
School track fixed effects	✓	✓	✓
Individual controls	✓	✓	✓
Cohort controls	✓	✓	✓
Mean of dependent variable	0.911	77.086	41.180
Observations	47,841	47,718	47,718

Notes: Fixed effect panel regressions in the sample of all foreign language-speaking students who start a VET program. Dependent variables are indicated in the top row. Explanatory variables are the leave-one-out share of foreign language-speaking students on all panels, plus the leave-one-out share for students speaking the same foreign language in panel C. All regressions include interacted school track fixed effects and year fixed effects as well as the following individual-level control variables: age, gender, and first language. Panels B and C further include the following cohort-level controls: leave-one-out average of school track age, share female, and cohort size. Standard errors are clustered at the school track-year level. ***/**/* indicate statistical significance at the 1%/5%/10% level.

In column (3), we document a similar pattern for prestige. Foreign language-speaking students tend to start VET tracks that lead to occupations that are less prestigious if they have more foreign language-speaking peers. This effect, however, is not statistically significant.

5.3 Robustness

In our main specification, we calculate peer effects at the level of the school track to ensure the same educational possibilities given some track dependence. However, one could argue that peer interactions take place at the school cohort level across different tracks. Therefore, in Tables A.4–A.5, we provide estimation results based on measures of ethnic clustering calculated at the level of schools rather than school tracks. Generally, the point estimates become larger in absolute value while the direction and significance of the effects remain the same.[12]

5.4 Channels: Language, ambition, and networks

In the main analysis, we find that ethnic minority students negatively affect their peers' early career outcomes. In this section, we explore various drivers that might account for this result, thereby building on previous literature. First, ethnic minority students' language skills may develop differently when they join a class with local peers than when they join a class with nonlocal peers. Second, some ethnic minority students may have higher ambitions, with their competences controlled for, and having more ethnic minority peers may further raise their ambitions. Finally, different opportunities for jobs and apprenticeships may arise in a predominantly Swiss network than in an ethnic minority network. We next provide suggestive evidence for the importance of these drivers.

Language and ambition. Students with lower socioeconomic status are likely to have lower grades, e.g., because they are less surrounded by books at home and because their parents spend less time doing homework with them (the primary effect according to Boudon, 1974).

[12] For a quantitative interpretation, we need to take the different one standard deviation increase of 0.206 for foreign language speakers and of 0.115 for same foreign language speakers into account. The point estimates in panel B suggest that a one standard deviation increase in the share of foreign language-speaking peers decreases the probability of proceeding to the academic track by 2.1 percentage points instead of 0.8 percentage points in the estimation with school tracks and increases the probability of starting a VET programme by 2.1 percentage points instead of 1.5 percentage points.

In the particular case of socially disadvantaged ethnic minority students, the fact that a foreign language is spoken at home may hinder local language acquisition. Foreign language speakers' command of the local language evolves differently when they join a class with local peers than when they join a class with nonlocal peers. A better command of the local language opens up a different set of career options.

In addition, socioeconomic status affects cost-benefit evaluations of educational investments (the secondary effect according to Boudon, 1974). In contrast to other socially disadvantaged groups, ethnic minority peers are more likely to invest in education and decide more often on an academic education, when their competences are controlled for (Boado, 2011; Kristen and Dollmann, 2010; Lu and Hou, 2020; Werfhorst and Tubergen, 2007). There may be different reasons for this: if migrants experienced downwards social mobility upon arrival, their descendants may be eager to compensate for this experience. Moreover, ethnic minorities may expect to return to their country of origin and invest more in human capital, or they may fear discrimination in the labour market and thus prolong their education (Griga, 2014). By differentiating groups that vary in their time of arrival and socioeconomic status, we provide evidence on the extent to which the main results are driven by either language acquisition or ambition.

On the one hand, students from groups that arrived more recently have a lower command of the local language and may affect peers more negatively. On the other hand, students from groups of lower socioeconomic status may have a more positive peer ambition effect. Given the combinations of time of arrival and socioeconomic status, we distinguish three groups. The first group consists of third-generation ethnic minority youth from Italy and Spain. The majority of these ethnic minority groups arrived in the 1960s. Since their parents grew up in Switzerland, they should experience negligible negative language effects. Moreover, these groups have experienced considerable upwards mobility since migration, and their socioeconomic status is similar to that of their Swiss counterparts (Griga, 2014). Thus, they should exhibit a negligible positive peer ambition effect and a negligible negative peer language effect. The second group includes second-generation ethnic minorities from southern European origins (speaking languages such as Albanian, Portuguese, Serbian, Croatian, and Turkish). They are characterized by lower socioeconomic status than that of Swiss nonmigrants (Griga, 2014). Previous

studies found that these groups are more likely to enter an academic education in Switzerland than Swiss and other European students, when competences are controlled for (Tjaden and Scharenberg, 2017, p. 317, Griga, 2014, p. 390). They are therefore likely to be characterized by a negative peer language effect, outweighed by a positive peer ambition effect. Finally, first-generation ethnic minority students are classified into the third group. These students speak languages such as German, French, English, Greek, Dutch, Swedish, Danish, Norwegian, or Finnish and are rather highly qualified, thus featuring high socioeconomic status. They should display a negative peer language effect without a positive peer ambition effect.

In Table 4, we show the effect of the share of same foreign language peers for each of the three distinct groups on educational pathways. The coefficients in column (1) show that the presence of more same foreign language peers has a strongly positive effect on the probability of starting the academic track if the student belongs to the second-generation migration group. This confirms that these migrants' preference for school-based options increases if they have more peers from the same ethnic background. Interestingly, this increase in the probability of continuing on the academic track does not come at the expense of VET programmes but rather from a strong decrease in the probability of entering transitional education or forgoing any postcompulsory education. For third-generation and first-generation ethnic minorities, having a high share of peers with the same ethnicity reduces the probability of acquiring academic education and increases the probability of not obtaining any postcompulsory education. The negative effect on starting the academic track is stronger for first-generation ethnic minorities with a lower command of the local language but higher socioeconomic status than for third-generation migrants with a higher command of the local language and Swiss-similar socioeconomic status.

Networks. Ethnic enclaves can work as networks that provide members with useful information on norms, job offers, or social welfare programmes (Beaman, 2012; Bertrand, Luttmer, and Mullainathan, 2000; Cutler, Glaeser, and Vigdor, 2008; Damm, 2009; Edin, Fredriksson, and Åslund, 2003). In the Swiss context, connections to employers are particularly relevant for upper secondary education because of the high prevalence of VET programmes, which require a student to find an apprenticeship position upon leaving compulsory school. Peers' parents may help in finding an apprenticeship position or even provide an apprenticeship position themselves

Table 4: Evidence for the role of language and ambition

Dependent variable:	(1) Academic track	(2) VET	(3) Transitional education	(4) No postsec. education
Share foreign language	-0.035***	0.054**	-0.019	-0.000
	(0.013)	(0.023)	(0.020)	(0.016)
(Share SFL)*(Third-generation)	-0.083***	-0.020	-0.113***	0.216***
	0.046	0.056	0.046	0.048
(Share SFL)*(Second-generation)	0.086***	0.018	-0.079***	-0.025***
	(0.015)	(0.029)	(0.027)	(0.020)
(Share SFL)*(First-generation)	-0.129***	0.028	-0.043***	0.143***
	(0.046)	(0.056)	(0.046)	(0.048)
Year fixed effects	✓	✓	✓	✓
School track fixed effects	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓
Cohort controls	✓	✓	✓	✓
Mean of dependent variable	0.204	0.450	0.245	0.102
Observations	88,440	88,440	88,440	88,440

Notes: Fixed effect panel regressions in a restricted sample of all foreign language-speaking students including ethnic minorities speaking Italian or Spanish (third-generation), ethnic minorities speaking Albanian, Portuguese, Serbian, Croatian or Turkish (second-generation), and ethnic minorities speaking Danish, Finnish, French, German, Greek, Dutch, Norwegian, Swedish, or English (first-generation). Dependent variables are indicated in the top row. Explanatory variables are the leave-one-out share of foreign language-speaking students plus the group-specific (first-, second-, and third-generation migrants) leave-one-out share for students speaking the same foreign language (share SFL). All regressions include interacted school track fixed effects and year fixed effects and the following individual-level and cohort-level control variables: age, gender, first language, leave-one-out average of school track age, share female, and cohort size. Standard errors are clustered at the school track-year level. ***/**/* indicate statistical significance at the 1%/5%/10% level.

if they run a business. Thus, different opportunities emerge in predominantly Swiss networks than in ethnic minority networks. Furthermore, peers and peers' parents may serve as role models in terms of their occupational choice (Kofoed et al., 2019; Olivetti, Patacchini, and Zenou, 2020). If their peers and peers' parents are Swiss, ethnic minority youths see different role models than if their peers and peers' parents belong to an ethnic minority, potentially affecting their career choices.

To provide evidence on the importance of ethnic networks, we analyse whether having more foreign language-speaking peers increases a student's probability of choosing an "ethnic-typical VET programme". We define such programmes in two ways. First, they are chosen relatively more often by foreign language speakers than by local language speakers. Second, we refine the measure to reflect the frequency in the programme of a specific ethnic group relative to local language speakers. To this end, we calculate the relative frequency of foreign language-speaking students in comparison to students speaking any of the Swiss national languages in aggregated VET programme fields differentiated by level of difficulty (EFZ vs. EBA). We then generate a binary variable equal to one if the relative frequency is larger than one.

Table 5 presents the results. We find no evidence that a higher share of foreign language-speaking peers induces foreign language-speaking students to start a more ethnic-typical VET—in the sense of VET programmes that are particularly common among either foreign language speakers in general or speakers of a student's own foreign language. Column (1) documents a negative but not statistically significant effect of the share of foreign language-speaking peers on VET programmes typical for foreign language-speaking students. Panel C, however, shows that the share of peers speaking the same foreign language raises the probability of starting an ethnic-typical VET programme. The effect is even more important and significant for VET programmes typical of this particular ethnic group, as reported in column (2) of panel C.

Therefore, our results suggest some impact of ethnic-typical VET choices arising in ethnic clusters in Switzerland. Furthermore, given the relative clustering of individuals from ethnic minorities in lower-paid jobs (see Figure A.3), the increase in the likelihood of starting an ethnic-typical VET explains part of the negative and significant effect on predicted income, as shown in our main results.

Table 5: Evidence for the role of networks

Dependent variable:	(1) Foreign language typical VET	(2) Same foreign language typical VET
Panel A:		
Share foreign language	-0.030	-0.052**
	(0.023)	(0.022)
Year fixed effects	✓	✓
School track fixed effects	✓	✓
Individual controls	✓	✓
Cohort controls	–	–
Panel B:		
Share foreign language	-0.034	-0.055**
	(0.023)	(0.022)
Year fixed effects	✓	✓
School track fixed effects	✓	✓
Individual controls	✓	✓
Cohort controls	✓	✓
Panel C:		
Share foreign language	-0.039*	-0.063***
	(0.023)	(0.022)
Share same foreign language	0.031*	0.043**
	(0.018)	(0.019)
Joint significance (p-value)	0.083	0.003
Year fixed effects	✓	✓
School track fixed effects	✓	✓
Individual controls	✓	✓
Cohort controls	✓	✓
Mean of dependent variable	0.648	0.671
Observations	47,841	47,841

Notes: Fixed effect panel regressions in the sample of all foreign language-speaking students who start a VET program. Dependent variables are indicated in the top row. Relative typical VETs are either defined as typical for all nonnatives (column (1)) or as ethnic-typical for a specific language group (column (2)) vs. native local language speakers. Explanatory variables are the leave-one-out share of foreign language-speaking students in all panels, plus the leave-one-out share for students speaking the same foreign language in panel C. All regressions include interacted school track fixed effects and year fixed effects as well as the following individual-level control variables: age, gender, and first language. Panels B and C further include the following cohort-level controls: leave-one-out average of school track age, share female, and cohort size. Standard errors are clustered at the school track-year level. ***/**/* indicate statistical significance at the 1%/5%/10% level.

Overall, we conclude that the observed peer effects of foreign language-speaking students on both educational pathways and labour market outcomes are driven by ethnic-typical VET programmes and by ethnic minorities' command of the local language and ambitions, which are shared and reinforced within a peer group of the same ethnicity.

6 Conclusion

This paper studies the effect of ethnic peer composition on postcompulsory educational outcomes and occupational choices of foreign language speakers. Empirical identification relies on quasi-random differences in cohort composition within the same school track across years. The findings suggest that a higher share of foreign language speakers in a school cohort reduces a student's probability of pursuing the academic track and increases her probability of starting a VET programme. This effect is stronger if the nonnative language-speaking peers are from the same foreign language group. A higher share of foreign language speakers in a school cohort also reduces predicted wages from VET programmes.

The unequal distribution of ethnic minorities across and within municipalities results in foreign language-speaking students having a much higher share of foreign language-speaking peers (41.9 percent) than the average student (25.9 percent). The peer effects found in this paper suggest that ethnic clustering in Swiss schools is harmful for nonnative language-speaking students and partly responsible for the local-foreign gap in postcompulsory educational outcomes and, consequently, the longer-term local-foreign gap in labour market outcomes. Moreover, our results highlight that the presence of clusters of students of a single foreign ethnicity exacerbate the negative effects on educational outcomes. However, this is not necessarily true for all ethnic minorities. In the case of Switzerland, it does not hold for second-generation migrants from southern Europe, for whom the negative peer effects on language acquisition seem to be outweighed by the positive peer ambition effects.

A straightforward policy implication of these findings is that school principals should aim at balancing ethnic compositions across classes. The potential of this policy, however, is limited if the ethnic composition is vastly different across schools because of high ethnic residential segregation. In this case, policymakers worried about the poor performance of foreign language-

speaking students should consider relaxing the students' obligation to attend schools where they live or even think about broader policies aimed at reducing residential segregation.

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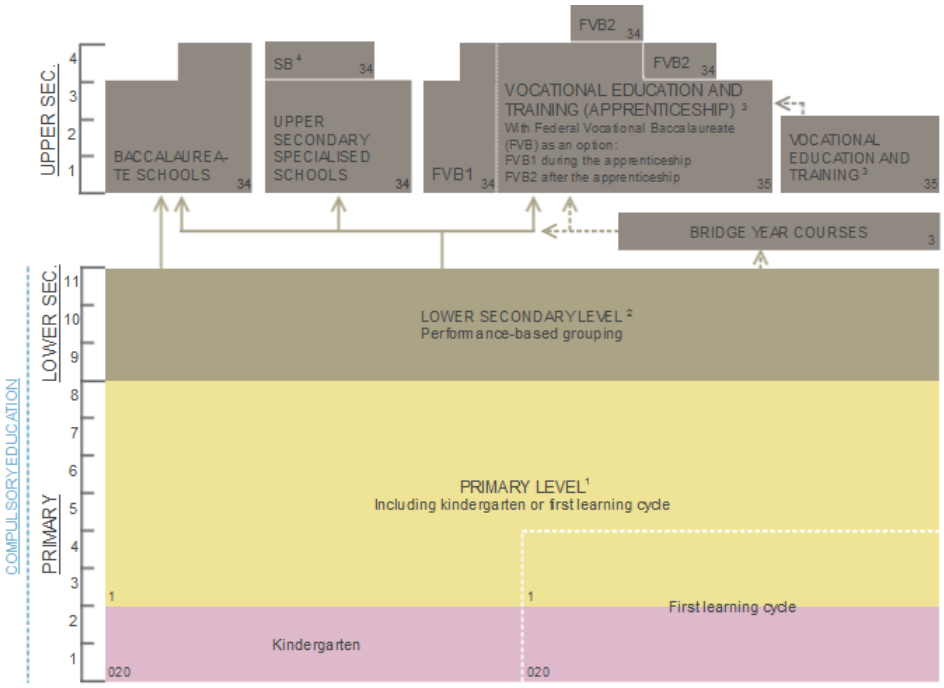
Appendix: Supplementary Material

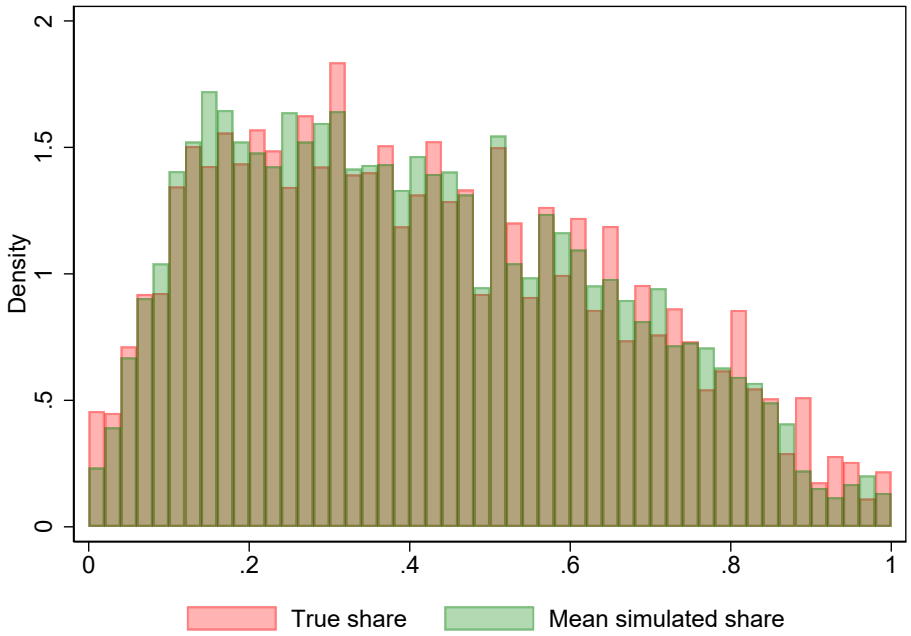
Figure A.1: Schematic overview of the Swiss schooling system



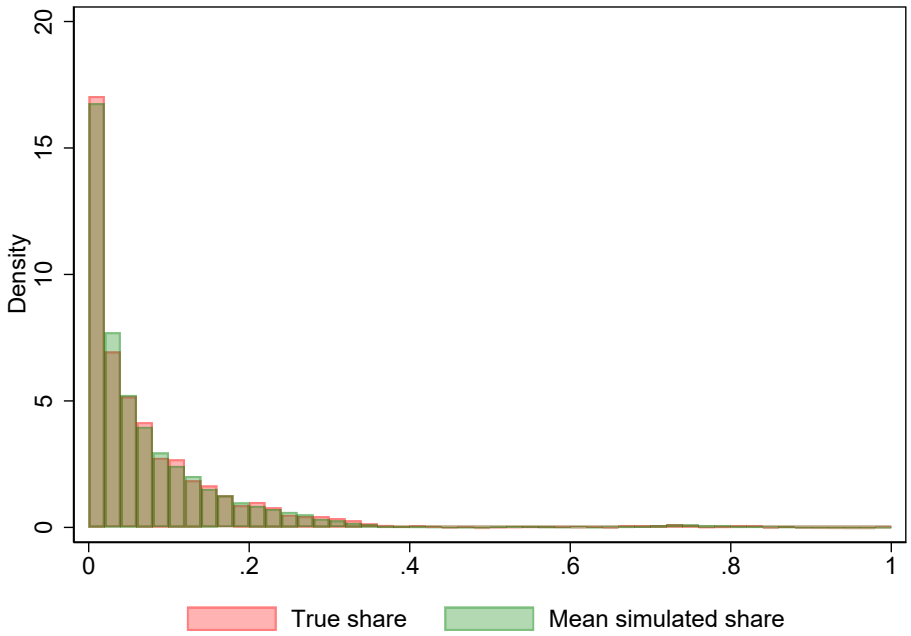
Notes: Infogram of the Swiss Education System prepared by the Swiss Conference of Cantonal Ministers of Education (EDK) (Schweizerische Konferenz der kantonalen Erziehungsdirektoren (EDK), 2022).

Figure A.2

Panel A: Histogram of leave-one-out share of foreign language speakers

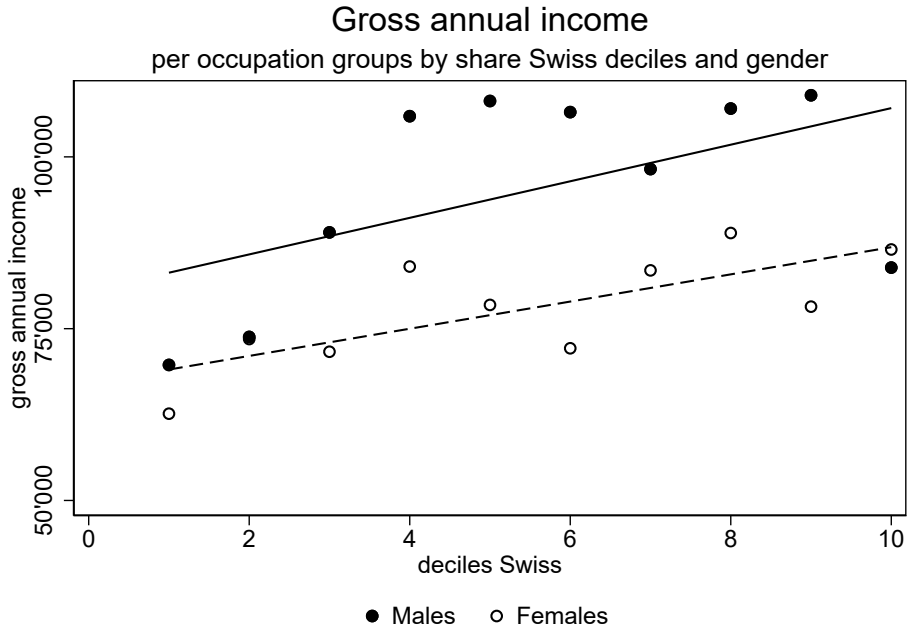


Panel B: Histogram of leave-one-out share of same foreign language speakers



Notes: Panels A and B compare the average simulated histogram with the histogram of the true share of (A) foreign language speakers and (B) same foreign language speakers within a school track and cohort. We run 250 simulations where we randomly assign students within a school track to a cohort (i.e., year).

Figure A.3: Average income by gender and decile of Swiss nonmigrants



Notes: This figure shows the average gross annual income in CHF for occupations that are grouped into deciles by their share of Swiss nonmigrants. Since the labour market survey data do not include information on the individual's language, we can sort only by nationality in this motivational figure. Solid dots refer to the average income for men, and hollow dots refer to the average income for women. Solid and dashed lines represent fitted values.

Table A.1: Variation in foreign language-speaking and same foreign language-speaking shares

	Mean	SD	Min	Max	N
Panel A: Variation in foreign language-speaking leave-one-out share					
Raw	0.419	0.234	0.000	1.000	111,313
Residuals after school track + cohort FE	0.000	0.069	-0.628	0.272	111,313
Residuals after school track + cohort FE + controls	-0.000	0.069	-0.624	0.281	111,313
Panel B: Variation in same foreign language-speaking leave-one-out share					
Raw	0.085	0.130	0.000	1.000	111,313
Residuals after school track + cohort FE	0.000	0.100	-0.854	0.960	111,313
Residuals after school track + cohort FE + controls	-0.000	0.088	-0.805	0.975	111,313

Notes: The sample includes foreign language-speaking students only.

Table A.2: Balancing tests

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Female			Age in eighth grade		
Share foreign language	0.024		0.021	-0.054*		-0.045
	(0.022)		(0.022)	(0.030)		(0.030)
Share same foreign language		0.022	0.020		-0.061***	-0.057**
		(0.017)	(0.017)		(0.023)	(0.023)
Joint significance (p-value)			0.259			0.011
Year fixed effects	✓	✓	✓	✓	✓	✓
School track fixed effects	✓	✓	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓	✓	✓
Cohort controls	✓	✓	✓	✓	✓	✓

Notes: Fixed-effect panel regressions in the sample of all foreign language-speaking students. Dependent variables are indicated in the top row. Explanatory variables are the leave-one-out share of foreign language-speaking students, the leave-one-out share of speakers of the same foreign language or both. All regressions include interacted school track fixed effects and year fixed effects as well as the *remaining* individual-level control variables (age, gender, and first language spoken) and cohort-level controls (leave-one-out average of school track age, share female, and cohort size). Standard errors are clustered at the school track-year level. ***/**/* indicate statistical significance at the 1%/5%/10% level.

Table A.3: Peer effects on educational tracks for local language speakers

Dependent variable:	(1) Academic track	(2) VET	(3) Transitional education	(4) No postsec. education
Share foreign language	-0.040***	0.020	0.001	0.019**
	(0.010)	(0.013)	(0.010)	(0.008)
Year fixed effects	✓	✓	✓	✓
School track fixed effects	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓
Cohort controls	✓	✓	✓	✓
Mean of dependent variable	0.317	0.476	0.133	0.074
Observations	323,088	323,088	323,088	323,088

Notes: Fixed effect panel regressions in the sample of all local language-speaking students. Dependent variables are indicated in the top row. Explanatory variables are the leave-one-out share of foreign language-speaking students. All regressions include interacted school track fixed effects and year fixed effects as well as the following individual-level and cohort-level control variables: age, gender, first language spoken, leave-one-out average of school-track age, share female, and cohort size. Standard errors are clustered at the school track-year level. ***/**/* indicate statistical significance at the 1%/5%/10% level.

Table A.4: Peer effects on educational tracks – identification at the level of school cohorts

Dependent variable:	(1) Academic track	(2) VET	(3) Transitional education	(4) No postsec. education
Panel A:				
Share foreign language	-0.107***	0.096***	-0.006	0.017
	(0.019)	(0.026)	(0.024)	(0.017)
Year fixed effects	✓	✓	✓	✓
School fixed effects	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓
Cohort controls	–	–	–	–
Panel B:				
Share foreign language	-0.101***	0.103***	-0.018	0.016
	(0.019)	(0.026)	(0.024)	(0.017)
Year fixed effects	✓	✓	✓	✓
School fixed effects	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓
Cohort controls	✓	✓	✓	✓
Panel C:				
Share foreign language	-0.084***	0.096***	-0.014	0.002
	(0.019)	(0.026)	(0.024)	(0.018)
Share same foreign language	-0.122***	0.048***	-0.032**	0.106***
	(0.017)	(0.017)	(0.015)	(0.016)
Joint significance (p-value)	0.000	0.000	0.081	0.000
Year fixed effects	✓	✓	✓	✓
School fixed effects	✓	✓	✓	✓
Individual controls	✓	✓	✓	✓
Cohort controls	✓	✓	✓	✓
Mean of dependent variable	0.207	0.434	0.258	0.101
Observations	113,018	113,018	113,018	113,018

Notes: Fixed effect panel regressions in the sample of all foreign language-speaking students. Dependent variables are indicated in the top row. Explanatory variables are the leave-one-out share of foreign language-speaking students on all panels, plus the leave-one-out share for students speaking the same foreign language in panel C. All regressions include school fixed effects and year fixed effects as well as the following individual-level control variables: age, gender, and first language. Panels B and C further include the following cohort-level controls: leave-one-out average of school age, share female, and cohort size. Standard errors are clustered at the school-year level. ***/**/* indicate statistical significance at the 1%/5%/10% level.

Table A.5: Peer effects on VET program and predicted labor market outcomes – identification at the level of school cohorts

Dependent variable:	(1) Demanding VET (EFZ)	(2) Predicted income	(3) Predicted prestige
Panel A:			
Share foreign language	-0.047**	-3.468***	-0.627
	(0.022)	(0.908)	(0.468)
Year fixed effects	✓	✓	✓
School fixed effects	✓	✓	✓
Individual controls	✓	✓	✓
Cohort controls	–	–	–
Panel B:			
Share foreign language	-0.046**	-3.327***	-0.531
	(0.022)	(0.925)	(0.475)
Year fixed effects	✓	✓	✓
School fixed effects	✓	✓	✓
Individual controls	✓	✓	✓
Cohort controls	✓	✓	✓
Panel C:			
Share foreign language	-0.043*	-3.077***	-0.520
	(0.022)	(0.936)	(0.481)
Share same foreign language	-0.019	-1.596*	-0.075
	(0.016)	(0.834)	(0.407)
Joint significance (p-value)	0.057	0.000	0.521
Year fixed effects	✓	✓	✓
School fixed effects	✓	✓	✓
Individual controls	✓	✓	✓
Cohort controls	✓	✓	✓
Mean of dependent variable	0.909	76.959	41.129
Observations	48,983	48,861	48,861

Notes: Fixed effect panel regressions in the sample of all foreign language-speaking students who start a VET program. Dependent variables are indicated in the top row. Explanatory variables are the leave-one-out share of foreign language-speaking students in all panels, plus the leave-one-out share for students speaking the same foreign language in panel C. All regressions include school fixed effects and year fixed effects as well as the following individual-level control variables: age, gender, and first language. Panels B and C further include the following cohort-level controls: leave-one-out average of school age, share female, and cohort size. Standard errors are clustered at the school-year level. ***/**/* indicate statistical significance at the 1%/5%/10% level.