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THE SOCIAL-ORIGIN GAP IN UNIVERSITY COMPLETION AMONG YOUTH WITH COMPARABLE SCHOOL ABILITIES IN SWITZERLAND

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The social origin gap in university completion among youth with comparable school abilities in Switzerland

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Abstract

A large body of literature shows that families with extended socio-economic resources are able to provide better learning environments and make more ambitious educational choices for their children. At the end of compulsory education, the result is a social-origin gap in school-track attendance and learning outcomes. Our paper analyses whether this gap, when controlling for students' school abilities, further widens throughout post-compulsory education, and whether the gap varies by gender and migrant status. We examine graduation rates from higher education by combining a cohort study from Switzerland with a reweighting method to match students on their school track, grades, reading literacy and place of residence at the end of compulsory school. The one observed feature that sets them apart is their parents' socio-economic status. When analysing their graduation rates 14 years later at the age of 30, we find a large social-origin gap. The rate of university completion at age 30 is 26 percentage points higher among students from the highest socio-economic status quartile than among students from the lowest quartile, even though their school abilities were comparable at age 16. This gap appears to be somewhat smaller among women than men, and among natives than migrants, but differences are not statistically significant. For men and women, migrants and natives alike, abundant parental resources strongly increase the likelihood of university completion in Switzerland.

Keywords: Social origin; tertiary education; university; cohort study; gender; migrants

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1 Introduction

Access to a privileged position in the labour market - in management or the professions - increasingly depends on higher education. Across Europe, a tertiary level degree has become the entry ticket to the upper-middle class and having higher-status parents greatly helps to obtain one (e.g., Breen and Jonsson 2005, Bernardi and Ballarino 2016).

Parents with more resources are able to provide more material support and create more favourable learning environments, thus enabling their children to acquire more skills at home (Heckman 2006) and perform better in school (Barone 2006). In addition, children from higher-status families tend to make more ambitious educational choices at the various transition points of the school system (Breen and Jonsson 2000). At the end of compulsory education, these differences in educational performance and choice lead to a social-origin gap in school tracks attended and learning outcomes. The crucial question is whether this gap widens further in post-compulsory education. Our paper uses a longitudinal cohort study for Switzerland to analyse whether graduation rates from higher education at the age of 30 vary for students who showed the same level of reading literacy and academic achievement at the end of compulsory education - that is, at age 16 - but were from different class backgrounds.

Two views challenge each other in responding to this question (Triventi 2011). The first expects the effect of social origin to dissipate over the life course because, in systems with early tracking, social selection has already occurred in previous transitions and, with growing maturity, young people's educational trajectories become increasingly independent of their parents' social background (Müller and Karle 1993). By contrast, the second view expects social origin to have an enduring effect. When families strive to maintain their status, they will have different educational aspirations for their children depending on their social class (Breen and Goldthorpe 1997). Higher-status families are likely to choose long and prestigious educational options, whereas lower-status families may settle for shorter and less costly alternatives that are sufficient to maintain their status.

This social-origin gap may be particularly large if an attractive offer of vocational training "diverts" working-class students from the path to university (Müller and Pollak 2007, Becker and Hecken 2008). At the same time, the recent expansion of universities of applied sciences may have contributed to closing the social-origin gap for younger cohorts. This is the case if universities of applied sciences provide an alternative path to higher education for "diverted" students who had initially enrolled in vocational training.

The effect of social origin on graduating from higher education may not be homogenous across population groups but vary by gender and migrant status (Hadjar and Hupka-Brunner 2013). Parental resources may be more decisive for boys than girls. While girls' peer culture more readily encourages attachment to school across social classes, boys from working-class origins are more likely to endorse values that are at odds with what is expected of them in

school (Legewie and DiPrete 2012, Hadjar et al. 2014). The result would be a larger social-origin gap in higher education among boys than girls.

Parental resources may also be more consequential for natives than migrants. The idea of migrant optimism suggests that, academic performance being equal, migrant children exhibit higher educational aspirations than natives of similar social origin (Brinbaum and Cebolla-Boado 2007, Jonsson and Rudolphi 2010). Accordingly, a lower-status class background may be a smaller handicap for the educational trajectories of migrants than natives.

We test these hypotheses of enduring – and heterogeneous – effects of social origin on higher education for Switzerland. Besides having one of the largest proportions of students with migrant backgrounds in Europe (OECD 2017: 318), three additional features make Switzerland attractive for our analysis. Similar to Austria and Germany, it has a highly stratified educational system in which selection takes place early, as students are allocated to different tracks around the age of 12. In such systems, there should be less room for social origin to make a difference later on. Moreover, vocational education provides an attractive alternative, as 60 per cent of a youth cohort begin an apprenticeship after the age of 16 (Wolter et al. 2014: 107). If the diversion thesis applies anywhere, it should be in Switzerland. Moreover, as supply of higher-education graduates is low (with only 27 per cent among ages 25 to 65) in Switzerland, higher-education degrees promise good labour-market prospects across the board and thus come close to providing guaranteed entry tickets to the professions and management (BFS 2017).

Our analysis draws on a nationally representative panel dataset called “Transitions from Education to Employment” (TREE), which follows a cohort of young people from the age of 16 up to 30. We combined the longitudinal data with a reweighting method that matches students in their last year of compulsory schooling on the basis of the school track they attended, their grades, reading literacy and place of residence (canton). The only observed factor that varies – the treatment variable – is the students’ social origin (parents’ socio-economic status). This allows us to compare the graduation rates from higher education for individuals who, at the age of 16, showed a similar level of academic achievement but different class backgrounds.

This article first discusses the arguments why social origin should – or should not – affect educational outcomes beyond the end of compulsory schooling. It then develops the hypotheses of heterogeneous social-origin effects by gender and migrant status. After discussing the country context, data and method, our results section shows the gap in university graduation between the top and bottom quartile of the social-status distribution. The conclusion discusses the policy implications of our findings.

2 Theory on social origin and higher education

2.1 An enduring effect of social origin on higher education

There is little doubt that children's school performance and choice are affected by their parents' economic, cultural and social capital, notably in the early educational trajectory. Less straightforward is the question to what extent the influence of parental resources extends beyond the end of compulsory schooling, notably in educational systems where early selection has already filtered students from different class origins into different school tracks.

One argument expects that the dice are already cast at the end of compulsory schooling. In psychology and economics, the idea has become influential that human abilities develop in a few formative periods, the most crucial one being early childhood (Heckman 2006: 1900). Educational advantage and disadvantage should thus crystallize early in life and be a powerful predictor of later advantage and disadvantage. A less extreme version of the same argument is made by the life-course approach, which expects youth to gradually emancipate from their families as they move towards adulthood, becoming more autonomous from their social origin in their educational decisions (Müller and Karle 1993). Relatedly, the effect of social origin may also disappear because, at higher educational levels, students have already been selected into different tracks and levels (Mare 1981). In countries with early tracking, entry into a given type of lower-secondary school may thus be expected to largely predict one's chances of graduating from higher education. Being in the lowest track at the age of 15 makes a university degree unlikely, whereas being in the highest track makes it probable - in Switzerland (Falter 2012) as well as in Germany (Dustmann 2004, Hillmert and Jacob 2010).¹

A second argument expects the effect of social origin to extend beyond the end of compulsory schooling. In order to graduate from higher education, individuals need to navigate several educational transitions—and these transitions come with different relative costs and benefits for different social origins. According to the status-maintenance thesis, parents aspire for their children to have at least the same level of education as their own in order to avoid downward social mobility (Breen and Goldthorpe 1997). As a result, even when accounting for children's cognitive ability and lower-secondary-school track, more affluent families will make more ambitious choices at the various transition points of post-compulsory education.

¹ On this point, see Dustmann (2004: 216) for Germany: "Having attended a secondary general school [*Hauptschule*] is strongly and significantly correlated with subsequent blue-collar apprenticeship training. Intermediate school graduates [*Realschule*] tend to obtain further education by attending technical schools, or joining white-collar apprenticeship schemes. Being a high school graduate [*Gymnasium*] is strongly correlated with attending university." However, note that even in Germany, the transition into a given lower-secondary track has become less consequential for educational attainment over time (Schindler 2017). A growing proportion of youth use second-chance options to revise earlier track choices. Students from higher-class origins are more likely to exploit these options (Biehn and Martin 2017).

For families with more resources, not only are the relative costs of longer educational options lower but the success probabilities and expected gains from additional education are also higher.

Empirical findings support the argument of an enduring effect of social origin on higher education. Even when children's early-life cognitive ability is taken into account, parental background remains a powerful predictor of educational attainment, which has been shown for Britain (Schoon 2010), France (Ichou and Vallet 2013), Italy (Barone et al. 2018), the Netherlands (Need and De Jong 2001), Sweden (Bukodi et al. 2014) and Switzerland (Becker 2011, Combet 2013, Sacchi et al. 2011). Less clear is whether this finding holds true for youth who faced the same educational options - based on their school track, school grades, reading literacy and place of residence - in their last year of compulsory schooling. Our hypothesis is that it does:

Hypothesis 1: Even when we account for school track, school grades and reading literacy at the age of 16, youth from higher social origins will be more likely to have obtained a higher-education degree by the age of 30 than youth from lower social origins.

2.2 The diversion thesis and universities of applied sciences

The effect of social origin on higher education may be particularly strong in those European countries where vocational training provides an attractive alternative to university and diverts talented working-class children from higher education - typically in Austria, Denmark, Germany, the Netherlands and Switzerland. While vocational training may offer lower financial returns than a university degree, it is also less costly and less risky and may thus be favoured as a safer choice by families with fewer resources (Müller and Pollak 2004, Becker and Hecken 2008). Combined with early tracking, this diversion explains why educational inequalities - the degree to which parental education affects their children's education - are particularly large in Germany and Switzerland (e.g., Pfeffer 2008, Grätz and Pollak 2016, Laganá 2016). Moreover, in Switzerland over the 20th century, these inequalities seem surprisingly persistent (Buchmann et al. 2007, Jann and Combet 2012), with a weak downwards trend at best (Hadjar and Berger 2010).

However, in the 21st century, universities of applied sciences have opened the path from vocational training to higher education. While the development of universities of applied sciences had already begun in the 1970s and 1980s in Germany and the Netherlands, their expansion began in earnest in Austria and Switzerland only after the year 2000 (Müller et al. 2017: 313).² By

² Note that the Swiss system of universities of applied sciences was not built *ex novo*. At the end of the 1990s, it integrated about half of the former 120 institutions of higher vocational learning (Buchmann et al. 2007: 323, Denzler 2011). However, the extent of expansion and, probably, educational advancement is undisputed. Between 2000 and 2017, the number of students in Switzerland's universities of applied sciences increased almost fourfold (BFS 2018).

2010, Switzerland had caught up with Germany when one third of all higher-education students in both countries went to a university of applied sciences (Lörz 2013: 119; BFS 2019: 24). One policy goal of this expansion was to reduce the impact of upper-secondary school transitions on educational attainment and thus to attenuate the effect of social origin (Falter 2012, Murdoch et al. 2016).

Recent research indeed suggests that the parental class bias is much smaller in universities of applied sciences than in traditional universities in Germany (Lörz 2013: 127; Blossfeld et al. 2015: 144) or Switzerland (Denzler 2011: 80, Schmid and Gonon 2011: 11, Schumann 2011: 261). If universities of applied sciences provide more equality than traditional universities, their massive growth over the last few decades may have closed the social-origin gap in higher education. This leads us to a second hypothesis:

Hypothesis 2: When we account for school track, school grades and reading literacy at the age of 16, there should be no social-origin gap in graduation from universities of applied sciences.

Of course, the diversion thesis may still apply if vertical differentiation (between upper-secondary and tertiary education) has shifted to more fine-grained horizontal differentiation between universities of applied sciences and traditional universities (Becker and Zangger 2013: 444). Thus, the key question is whether a degree from a university of applied sciences offers inferior labour-market prospects to a university degree. For Switzerland's comparatively small - and therefore exclusive - higher-education sector, this does not seem to be the case. The Swiss Graduate Survey 2015 shows that one year after graduation, holders of a master's degree from a traditional university and holders of a bachelor's degree from a university of applied sciences received almost the same median earning within the same fields of study. University graduates experienced somewhat stronger earnings growth in the following four years. Still, a mere five years after graduation, the median earnings of both groups exceeded the national median wage by more than 12 per cent (BFS 2017: 5-6). Both types of higher education lead to privileged positions in the labour market.

2.3 Heterogeneous social-origin effects by gender and migrant status

The effect of social origin on higher education may not be uniform for subgroups but vary by gender and migrant status. Breen et al. (2010: 46) found that the declining trends in class-based educational inequality over the 20th century looked similar for men and women in seven European countries. However, the youngest cohort in their analysis was born between 1955 and 1964, and in ensuing cohorts women have gradually surpassed men in educational attainment. Buchmann and DiPrete (2006: 515) explain this growing gender gap in college completion by the increasing vulnerability of boys from families with low-educated or absent fathers. In their school trajectories, boys seem less resilient to an unfavourable social origin than girls, and in the U.S.A. this gender-specific effect of family background on educational transitions holds when school performance is accounted for (Buchmann and DiPrete, 2006: 533). A similar

result is reported for Germany where boys are found to be more sensitive than girls to the social-origin composition of their classrooms—and hence depend more on the resources available in their local environment (Legewie and DiPrete 2012: 468).

Why should social origin be of greater relevance to boys' access to higher education than girls'? One argument points to differences in how adolescent peer groups view masculine and feminine identity. Showing diligence and working for academic achievement tends to be stigmatized by boys' peer groups, who label it as feminine. By contrast, girls typically view schoolwork as acceptable and do not consider disengagement from school as a core aspect of feminine identity (Hadjar et al. 2014: 119, Legewie and DiPrete 2012: 466). The negative stance towards schools may be less prevalent among middle-class boys, whose parents counteract it by promoting a competitive school attitude that focuses on high educational performance (Legewie and DiPrete 2012: 464). The “problem with boys” may thus primarily refer to boys from a lower-class origin. While boys' lower engagement in school should be reflected in academic performance at the age of 16, the performance gap with respect to girls is likely to widen further in the following teenage years. This is what our third hypothesis anticipates:

Hypothesis 3: When we account for school track, school grades and reading literacy at the age of 16, the effect of social origin on graduating from higher education should be larger for men than women.

We expect a second heterogeneous effect of social origin on higher education for migrants. While children with a migrant background tend to leave school earlier than natives, once differences in parental resources and school performance are taken into account, they are more likely to obtain higher levels of education than natives. This has been documented for England (Jackson 2010), Finland (Kilpi-Jakonen 2011), Sweden (Jonsson and Rudolphi 2010) and possibly Switzerland (Bauer and Riphahn 2006a, Griga 2014).

Several reasons may explain why migrants are less constrained by their class origin than natives when making their educational choices. Higher educational aspirations may be explained by a selection effect. This is the case if individuals who migrate have more drive and ability- or simply more optimism and a stronger strive for upward mobility (Salikutluk 2016). Alternatively, higher aspirations could be due to the quest for status maintenance as migrant families may have belonged to an educational elite in their country of origin - a fact that is hidden by the overall higher levels of education in the host society (Engzell and Ichou 2019). Migrant families may also be less likely to be “diverted” to vocational training if they expect greater benefits- and usefulness in their country of origin - from academic education (Jonsson and Rodolphi 2011: 503) or, alternatively, if they anticipate discrimination in the apprenticeship market (Hupka-Brunner et al. 2010, Imdorf 2017). These elements lead us to expect a weaker effect of parental background on the educational trajectories of migrants in our fourth hypothesis:

Hypothesis 4: When we account for school track, school grades and reading literacy at the age of 16, the effect of social origin on graduating from higher education should be smaller for youth with a migrant background than for youth from the majority population.

3 Institutional context, data and method

3.1 Institutional context

Similar to Austria and Germany, Switzerland has a strongly stratified educational system where selection takes place early as students are separated into two to four performance tracks around the age of 12 in most cantons. Early tracking shapes schooling inequality in Switzerland, as the type of school attended in lower-secondary school strongly conditions the choice of upper-secondary education (Bauer and Riphahn 2006b, Samuel et al. 2014).

After eleven years of compulsory schooling, the Swiss educational system offers the choice between two main options: vocational education or baccalaureate school. Two thirds of a given age cohort choose vocational education, mostly in the form of company-based apprenticeships. These apprenticeships train for both blue-collar and white-collar occupations, lead to nationally standardized skill certificates and enjoy broad support from employers (Fazekas and Field 2013). The other third of an age cohort remains in general education, mostly entering baccalaureate schools (Wolter et al. 2014).

Both tracks continue at the tertiary level. While a general baccalaureate gives access to traditional universities, the vocational baccalaureate - introduced in the 1990s and obtained by a fifth of all apprentices - entitles students to enter a university of applied sciences. The difficulty of obtaining these entry degrees explains why Switzerland's system of higher education remains small and internally less differentiated than in other countries (Buchmann et al. 2007). Students who earn a degree from a baccalaureate school are then free to choose any university and subject at the bachelor level (with the exception of medicine in German-speaking cantons and physical education at some universities). The same applies to vocational baccalaureates, which enable students to transfer to any university of applied sciences. Both types of universities follow the Bologna system of higher education.

The difficult access to universities is mirrored in the comparatively low proportion of residents in Switzerland with higher education. In 2016, only 28 per cent of men and 26 per cent of women aged 25 to 64 held either a university degree or a degree from a university of applied sciences. This proportion has grown over the past two decades and risen in the age group 25–34 to 35 per cent among men and 39 per cent among women (Federal Statistical Office Database). The low share of graduates—and hence their low supply in the labour market—leads to earnings and job prospects that are substantially better for those who hold higher-education degrees than for those who hold only upper-secondary ones (Weber 2014: 612, Korber and Oesch 2019).

3.2 Data and measures

Our analysis used the nationally representative panel dataset TREE (Gomensoro and Meyer 2017). TREE follows a youth cohort that participated in the Programme for International Student Assessment (PISA) in 2000 when students were in their last year of compulsory schooling and thus around 16 years old. This cohort was followed up until 2014, when respondents were around 30 years old. Our analysis examined the educational outcome of this youth cohort 14 years after the end of compulsory schooling, when respondents were 30 years old. We have complete information for 2,821 individuals: 1,665 women and 1,156 men.

Our dependent variable is the highest educational attainment and distinguishes five categories: traditional university (obtained by 38 per cent in our sample), university of applied sciences (6.5 per cent), post-secondary vocational training (15 per cent), upper-secondary education (38 per cent) and no more than compulsory schooling (2.6 per cent). Since the category of post-secondary vocational training corresponds more to further education than initial higher education, with the average age at enrolment being 30 years (Schmid and Gonon 2011: 14), we will not discuss the results for this outcome.

Our key independent variable is students' social origin, which we measured with parents' social status. For each respondent, TREE provides parents' occupational status as measured by the ISEI, which reflects the mean earnings and education in a given occupation (Ganzeboom and Treiman 1996). We took the average of both parents' ISEI scores to allocate students into four equally large and hierarchically ordered quartiles of social status. In terms of social origin, these four quartiles roughly correspond to the semi-skilled working class (quartile 1), skilled working class (quartile 2), lower-middle class (quartile 3) and upper-middle class (quartile 4) (Lipps and Oesch 2018). As a robustness test, we redid our analysis with a categorical class variable that distinguishes the upper-middle class, lower-middle class and working class (Erikson and Goldthorpe 1992).

We analysed the gap in higher-education completion between youth from the bottom and top quartile with a reweighting method called entropy balancing (Hainmueller 2012). The logic behind this method is to balance the covariates on the different moments in order to achieve comparability between the treatment and the control group.

In our case, we balanced youth from different social origins on the following five variables. *Age in months* accounts for age-related differences in educational pathways and human development. *Canton of residence* allows us to control for regional, institutional and cultural differences across Switzerland's cantons in the availability and attractiveness of higher-education opportunities (Glaser and Becker 2016).³ *Educational track* controls for the channelling of

³ Note that in Switzerland's federal system, education is a political prerogative of the cantons; 24 out of 26 cantons are represented in our data.

pupils into different ability tracks in lower-secondary schools, the selection taking place between the ages of 11 to 14. The number of tracks varies by canton and we distinguished four tracks: the advanced track of lower-secondary education (*Progymnasium*), the track with extended academic requirements, the track with basic academic requirements, and no formal tracking. *School grades* provide a proxy for students' academic achievement, which consists of an index based on mathematics and the regionally predominant language. Measured as an ordinal scale, this index tells us whether students are above, at or below the necessary mark to pass the school year. Finally, we used *reading literacy test scores*. In their last year of compulsory school, students in our sample took the standardized PISA reading literacy test. To the extent that this test requires students to seek, extract, interpret and assess information, it gives us a proxy for their intellectual ability (Duckworth et al. 2012).⁴

We expected heterogeneous effects for two socio-demographic characteristics: gender (male versus female) and migrant background (native versus migrant). The latter dimension was measured with parents' country of birth. We consider students to have a migrant background if both of their parents were born somewhere other than in Switzerland. This is the case for 15 per cent of the students in our sample. Table A.1 in the appendix provides the descriptive statistics for the variables used in the analysis.

3.3 Analytical design

We combined our longitudinal data with a reweighting method called entropy balancing (Hainmueller 2012). This method balances the covariates (age, canton, school track, grades and reading literacy, all measured at age 16) between our different social-background groups on the third moment of covariate distributions by assigning scalar weights. The treatment variable that systematically varies is students' social origin divided into four quartiles. Table A.2 in the web appendix shows that our matched quartiles look very much alike.

We balanced our students at the beginning of our study in the year 2000 on the covariates outlined above and then compared graduation rates from higher education 14 years later, in the year 2014 when they were 30. More precisely, we estimated a multinomial logit model on educational attainment for each matched pair of status quartiles (Q1 to Q4, Q2 to Q4, etc.). Our results are shown as discrete-change effects for the two outcomes we are interested in, namely, graduation from either university or from university of applied sciences relative to the reference category of having no more and no less than an upper-secondary school degree.

⁴ Since the mathematics test was only administered to a part of the sample in the PISA 2000 study, reading literacy scores are the only skills measure that is available for all students in our data.

4 Results

4.1 The overall social origin gap

We first present a descriptive analysis of how educational attainment varies within our sample by social origin. Table 1 shows that 14 years after the end of compulsory schooling, 56 per cent of respondents from quartile 4 - the most advantageous social-origin category - had obtained a university degree as compared to only 17 per cent of the least advantageous quartile 1. Social-origin differences are substantially smaller for graduation from universities of applied sciences, but the hierarchical pattern is still visible: 8 per cent of respondents in the top quartile had earned such a degree versus 4 per cent among those in the bottom quartile.

Table 1: *Distribution of educational attainment by social-origin quartile (in %)*

	No post-compulsory education	Upper-secondary (vocational or general)	Post-secondary vocational	University of applied sciences	University	Total
Q1 (bottom)	4	57	17	4	17	100%
Q2	3	46	18	6	26	100%
Q3	2	35	16	6	41	100%
Q4 (top)	2	24	10	8	56	100%
Total	3	38	15	7	38	100%

$N(\text{observations}) = 1,949$

However, this descriptive finding does not answer our question about an enduring social-origin effect after the end of compulsory schooling. The higher graduation rates among children from advantageous social origins at the age of 30 may be explained by varying cognitive skills and school achievement at the age of 16. This argument is suggested by the fact that PISA reading literacy scores are, on average, higher in the top quartile 4 (561) than in quartile 3 (543), quartile 2 (530) or quartile 1 (492).

In order to identify a persistent social-origin effect, we matched respondents in a first model with respect to their age and canton and, in a second model, with respect to the lower-secondary school track attended, grades and reading literacy.⁵ We then estimated multinomial logistic regressions on educational attainment for each matched pair of social-origin quartiles. The results of these models are summarized in Table 2 for graduating from either a traditional

⁵ Note that the selection into different tracks at the lower-secondary level is influenced both by school achievement and social origin (Bauer and Riphahn 2006b, Felouzis and Charmillot 2013). Therefore, as our analysis considers school track as a measure of school ability, we underestimate the total effect that social origin has on university completion under-estimate.

university or a university of applied sciences. Coefficients are displayed as discrete-change effects, which can be interpreted as percentage-point differences.

When solely matching by age and canton, we observe the same gaps as in the descriptive analysis: among youth from the top status quartile, university graduation rates are 38 percentage points higher than among youth from the bottom status quartile. While differences in academic achievement explain some of this gap, they by no means do so completely. After additionally matching for school track, grades and reading literacy scores, there remains a substantial social-origin gap in university graduation: 26 percentage points between the top and bottom quartiles. Interestingly, the difference in university graduation is not much lower between quartiles 4 and 2 (20 points) and still sizeable between quartiles 4 and 3 (7 points). As expected in our first hypothesis, social origin appears to have a powerful effect on attaining a university degree for students who had lived in the same canton and shown comparable academic achievement at the end of their compulsory schooling.

Table 2: The social-origin gap in graduation from higher education at the age of 30

	University		University of applied sciences	
	Matching on ascriptives	Matching on grades, literacy and lower sec. track attended	Matching on ascriptives	Matching on grades, literacy and lower sec. track attended
$\Delta Q4 - Q1$	0.38*** (0.03)	0.26*** (0.04)	0.04** (0.01)	0.01 (0.02)
$\Delta Q4 - Q2$	0.29*** (0.03)	0.20*** (0.03)	0.02 (0.01)	0.00 (0.02)
$\Delta Q4 - Q3$	0.13*** (0.03)	0.07** (0.03)	0.02 (0.01)	0.01 (0.01)

Coefficients are based on multinomial regressions on educational attainment for matched pairs of status quartiles and shown as discrete-change effects, which can be interpreted as percentage point differences: 0.38 means that the rate of university graduation is 38 percentage points higher among youth in quartile 4 than quartile 1.

Variables used for matching at the age of 16 are for ascriptive characteristics: age in months and canton of residence; additionally for school ability: lower-secondary school track, school grades and reading literacy test score.

** $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$,*

N: 1330 (pair Q4-Q1), 1556 (pair Q4-Q2), 1647 (pair Q4-Q3)

With regard to graduating from universities of applied sciences, the social-origin gap disappears once we match students on the basis of their academic achievement and literacy. If students from a more advantageous social origin are somewhat more likely to earn such a degree, it is to a large extent due to their higher school grades, better reading literacy and more demanding lower-secondary school track (but then note that social origin has an influence on the selection into lower-secondary tracks that our analysis starting at age 16 does not account for).

4.2 Results for a heterogeneous social-origin gap

In our next step, we examine whether the effect of social origin varies by gender and migrant status. Since the social-origin gap with respect to graduating from universities of applied sciences is negligible, the focus of these analyses is on obtaining a degree from a traditional university (as compared to the modal category of an upper-secondary degree).

Table 3 shows the social-origin gap in university completion separately for men and women, migrants and natives. As expected, differences are larger for men than women. Among men, the graduation rate in the top quartile exceeds that of the bottom quartile by 31 percentage points, compared to only 23 points among women (after matching for school achievement and reading literacy).

Table 3: *The social-origin gap in having a university degree at the age of 30 (after matching for academic achievement at the age of 16)*

	Gender		Migrant status	
	Men	Women	Migrants	Swiss
$\Delta Q_4 - Q_1$	0.31*** (0.06)	0.23*** (0.05)	0.26** (0.08)	0.28*** (0.05)
$\Delta Q_4 - Q_2$	0.23*** (0.04)	0.19*** (0.04)	0.36*** (0.08)	0.18*** (0.03)
$\Delta Q_4 - Q_3$	0.09* (0.04)	0.06 † (0.03)	0.14 † (0.08)	0.06* (0.03)

Variables used for matching: age in months, canton of residence, lower-secondary school track, school grades and reading literacy test scores.

$p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

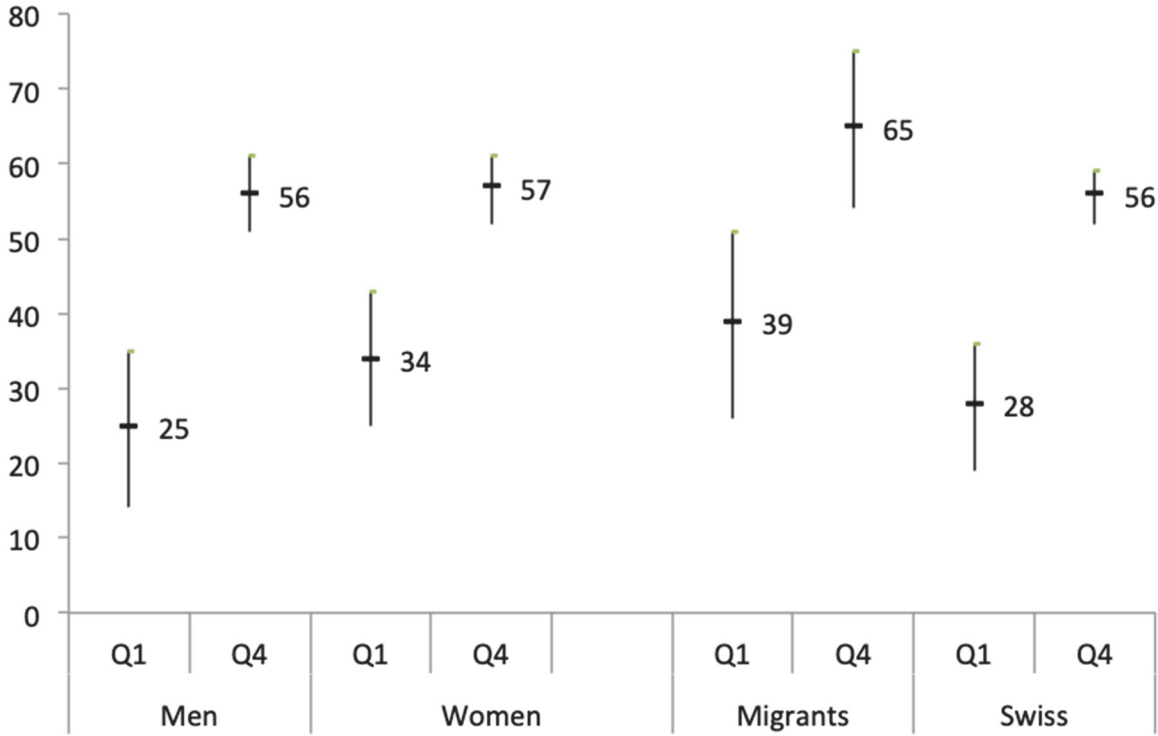
N: 1,156 (men), 1,665 (women); 413 (migrants), 2,408 (Swiss)

Unlike for gender, the results for migrant status do not confirm our expectations. The social-origin gap among migrants is not significantly smaller than among natives. When controlling for canton and school track attended at the lower-secondary level, we find comparable university graduation between the top and bottom quartile among migrants and natives. However, the social-origin gap is much larger among migrants than natives when comparing the top quartile to quartiles 2 or 3.

Large social-origin gaps among men and migrants may either stem from particularly high graduation rates in quartile 4 or very low rates in quartile 1. Figure 1 addresses this question by plotting the predicted probabilities of having a university degree for men and women, Swiss and migrants, whose families either come from the highest- or lowest-status quartile (after matching for achievement and literacy).

This figure shows that among youth from higher-status families (quartile 4), graduation rates do not differ much by gender. Among both men and women, more than half of the children will have obtained a university degree at the age of 30 if the parents are in the top quartile. Differences are larger among lower-status families (quartile 1) whose children showed the same level of academic achievement at age 16 as those from the top quartile. Children from parents of quartile 1 have graduation rates of 34 per cent if they are women, but only 25 per cent if they are men.

Figure 1: Predicted probability of having a university degree at age 30 (in %) (among youth matched on academic achievement)



We also observe that migrants have systematically higher graduation rates than natives for a given level of academic achievement at the age of 16 - both in the top and the bottom quartile.

However, Figure 1 draws attention to the large confidence intervals of our estimates, notably for migrants. We thus tested whether the observed differences in social-origin gaps between the subpopulations are statistically significant by bootstrapping these differences on the basis of performing 1,000 repetitions (see Table 4). The resulting coefficients and standard errors suggest that men's wider social-origin gaps are not significantly different from women's. Consequently, the evidence for our third hypothesis is not conclusive. Table 4 also indicates that while the social-origin gaps are systematically larger among migrants than natives, they are not statistically significant. However, this finding does not change the conclusion that our fourth hypothesis, which expects a smaller social-origin gap among migrants, needs to be rejected.

Table 4: Difference in the social-origin gap of university completion by gender and migrant status

	Difference between men and women	Difference between migrants and Swiss
Q4 - Q1	0.08 (0.08)	-0.02 (0.10)
Q4 - Q2	0.05 (0.06)	0.18 † (0.09)
Q4 - Q3	0.03 (0.05)	0.08 (0.09)

Note: coefficients show the bootstrapped difference between the social-origin gaps (discrete change effects) in Table 3 above, in parentheses are the standard errors. 0.08 means that the social-origin gap in university completion between quartile 4 and quartile 1 is 8 percentage points larger among men than women.

4.3 Robustness tests

As a first robustness test, we checked our results by estimating a simple linear probability model on educational attainment (university degree vs. no university degree). Instead of using entropy balancing, we entered the same variables as controls in a multivariate regression (see Table A.3 in the appendix). Model 1 only includes social origin, model 2 further controls for academic achievement and models 3 and 4 additionally account for gender and migrant status with interactions. The conclusions are similar: university graduation rates among youth from higher-status families are 36 percentage points higher than those among youth from lower-status families when we do not control for academic achievement. This social-origin gap falls to 18 percentage points after differences in school track, grades and reading literacy are ac-

counted for. We find again that the effect of social origin on university completion does not vary significantly by either gender or migrant status.

Our results could be affected by selective attrition from the TREE panel. As a second robustness test, we thus redid our analysis for the preceding wave 8 when respondents were aged 26. When replicating our model for this slightly larger sample, we found that the social-origin gap in university completion is smaller at the age of 26 but sizable nonetheless. While there is no difference in graduation from universities of applied sciences, the disparity in university completion between quartiles 1 and 4 stands at 31 per cent before matching and at 18 per cent after matching for academic achievement (see Tables A.4 to A.7 in the appendix). These results suggest that, rather than closing over time, the social-origin gap widens further in the late twenties when children from more privileged class origins continue to be more likely to obtain a university degree than children from the lowest-status quartile.

Table 5: The class-origin gap in graduation from higher education at the age of 30

	University		University of applied science	
	Matching on ascriptives	Matching on grades, literacy & lower sec. track attended	Matching on ascriptives	Matching on grades, literacy & lower sec. track attended
Δ Upper-middle class – working class	0.32*** (0.02)	0.19*** (0.03)	0.03* (0.01)	0.02 (0.01)
Δ Upper middle class – lower-middle class	0.14*** (0.02)	0.10*** (0.03)	0.01 (0.01)	0.00 (0.01)
Δ Lower-middle class – working class	0.17*** (0.02)	0.08** (0.03)	0.02 † (0.01)	0.01 (0.01)

Coefficients are based on multinomial regressions on educational attainment for matched pairs of status quartiles and shown as discrete-change effects, which can be interpreted as percentage point differences: 0.38 means that the rate of university graduation is 38 percentage points higher among youth in quartile 4 than quartile 1.

Variables used for matching at the age of 16 are for ascriptive characteristics: age in months and canton of residence; additionally for school ability: lower-secondary school track, school grades and reading literacy test score.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$,

Some readers might be sceptical about the substantive meaning of status quartile. In a final robustness test, we therefore examined whether our conclusions would hold if we used another measure of social stratification. Instead of social-status quartiles (based on the ISEI), we used a collapsed version of the Erikson–Goldthorpe scheme and distinguished three classes based on

parents' occupation: upper-middle class, lower-middle class and working class.⁶ As this variable only distinguishes between three levels of advantage rather than four, it leads to slightly smaller estimates of the social-origin gap. Nonetheless, Table 5 shows that the contrast in graduation rates between children from the upper-middle class and children from the working class is very large: 32 percentage points before and 19 points after matching for academic achievement. When comparing the class-origin gap between men and women as well as between migrants and natives, we observe a consistently larger class gap in graduation rates among men than women and among migrants than natives. But again, these differences are not statistically significant and lead to the same substantive conclusion as our analysis based on the four ISEI quartiles (see Tables A.8 and A.9 in the appendix). This similarity in results is not surprising given the strong correlation between different measures of social stratification (Bihagen and Lambert 2018).

5 Conclusion

In 21st century Europe, a degree in higher education is gradually becoming a prerequisite for access to the upper-middle class. This implies that key decisions about a society's distribution of future class positions are taken when individuals are still in their teens and make their educational choices. Our paper compares the likelihood that youth from different social origins finish their educational trajectory with a higher-education degree.

By using a cohort study that spans over a decade, we were able to match students in their last year of compulsory schooling on the basis of their school track, school grades, reading literacy and canton of residence. The one feature that sets them apart is their parents' social status. This design allowed us to compare the graduation rates of young adults 14 years later and thus to estimate the social-origin effect. Three findings are noteworthy.

First, the influence of parents' social status on educational attainment does not dissipate over the teenage years. Although educational advantage and disadvantage may develop early in life, the dice are by no means cast at the end of compulsory schooling. When keeping academic achievement constant, we see that socially privileged families choose more ambitious educational options and their children are substantially more likely to graduate from university than children from lower-status families. In Switzerland, this persistent effect of social origin is sizable: university completion among the highest-status quartile exceeds that of the lowest-status quartile by over twenty percentage points for students with comparable grades, literacy and school track attended at the end of compulsory schooling.

⁶ The key information to build the class measure comes from occupations (measured with ISCO 1988 4-digit). We used the so-called dominance method and attributed to children the higher class position of either parent. For more details on the concept and measurement of the class variable, see Oesch (2006). The script used for the construction of this class schema can be downloaded from one of the authors' website:

<http://people.unil.ch/danieloesch/scripts/>.

The social-origin gap may be particularly large in Switzerland's school system, which combines early and pronounced tracking in lower-secondary education with an attractive offer of vocational education and training in upper-secondary education. The same logic prevails in Germany's educational system where the large social-origin gap in university completion has been explained by the "diversion" of working-class children away from the academic towards the vocational track (Müller and Pollack 2007, Becker and Hecken 2008). However, recent results from an Italian panel suggest that the social-origin gap in access to university for a given level of school achievement is at least as large in Italy as in Switzerland (Barone et al. 2018: 561).

Second, there is no social-origin gap in graduation from universities of applied sciences if one accounts for differences in grades, literacy and lower-secondary track attended. This means that, as a growing proportion of youth move on to study at the tertiary level after completing an apprenticeship, the diversion mechanism should have a lesser impact. Universities of applied sciences provide an alternative path to higher education that offers comparably favourable labour-market prospects in Switzerland. They are also the educational institution that has most strongly expanded over the last decade. The increasing numbers of adults graduating from a university of applied sciences should therefore reduce the social-origin gap.

A third and final finding leads us to reject our hypothesis of a heterogeneous effect of social origin on higher education. The social-origin gap is not substantially larger for men than for women. Although our data suggest that women from lower-status families do somewhat better than their male counterparts, the differences are small and not statistically significant. Likewise, the social-origin gap is not smaller for migrants than natives. If anything, the opposite is true and disparity in university completion seems larger between higher- and lower-status migrant families than higher- and lower-status native families. One explanation could be that migrants are a socially more heterogeneous group who tend to be overrepresented at both ends of Switzerland's wealth and income distribution. They include both European expats in management and the professions who cluster in the upper classes as well as guest workers and refugees from outside Europe who are relegated to the lowest-class positions.

Over the past few decades, a degree in higher education has increasingly become a precondition for access to positions of power in private companies or public organizations in Switzerland. Our study suggests that among youth with the same school abilities at the age of 16, social origin crucially defines who will obtain higher education - and thus who will eventually join the country's economic and political elite.

6 References

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Appendix

Table A.1: descriptive statistics of the variables used

	min	max	mean	sd
Gender is female	0	1	0.59	
Age (wave 1)	13.8	18.8	15.5	0.6
Has no migrant background	0	1	0.85	
School grades	0	2	1.66	0.5
PISA reading literacy (wave 1)	272	884	541	78.3
Type of school track (wave 1)				
No (formal) tracking	0	1	0.06	
Basic academic requirements	0	1	0.17	
Extended requirements	0	1	0.32	
Pre-gymnasial track	0	1	0.44	
Educational degree (wave 9)				
No upper-secondary	0	1	0.03	
Upper-secondary	0	1	0.38	
Post-secondary VET	0	1	0.15	
University of applied sciences	0	1	0.06	
University	0	1	0.38	
Social status quartile				
Quartile 1	0	1	0.17	
Quartile 2	0	1	0.25	
Quartile 3	0	1	0.28	
Quartile 4	0	1	0.30	
Social class				
Working Class	0	1	0.39	
Lower-middle class	0	1	0.28	
Upper-middle class	0	1	0.32	

N (observations): 2821; 1665 women, 1156 men. Control variables are also used for cantons

Table A.2: Results of the entropy balancing for the matching weight, Wave 9 – ISEI class scheme

	Before reweighting						After reweighting		
	mean	var.	skewn.	mean	var.	skewn.	mean	var.	skewn.
	Quartile 4			Quartile 1			Quartile 1		
PISA test score	563.96	5062.92	-0.05	497.48	7270.87	-0.19	563.98	5063.26	-0.05
Grades extended	1.70	0.19	-1.40	1.59	0.24	-1.02	1.70	0.19	-1.40
basic	0.27	0.20	1.05	0.31	0.22	0.81	0.27	0.20	1.05
no tracking	0.08	0.07	3.15	0.35	0.23	0.62	0.08	0.07	3.15
age in months	0.05	0.05	4.07	0.08	0.07	3.10	0.05	0.05	4.07
	184.83	54.01	0.82	187.49	57.57	0.47	184.84	54.01	0.82
	Quartile 4			Quartile 2			Quartile 2		
PISA test score	563.96	5062.92	-0.05	533.50	5878.25	-0.03	563.96	5063.46	-0.05
Grades extended	1.70	0.19	-1.40	1.64	0.22	-1.27	1.70	0.19	-1.40
basic	0.27	0.20	1.05	0.36	0.23	0.56	0.27	0.20	1.05
no tracking	0.08	0.07	3.15	0.19	0.16	1.56	0.08	0.07	3.15
age in months	0.05	0.05	4.07	0.06	0.06	3.55	0.05	0.05	4.07
	184.83	54.01	0.82	186.09	52.45	0.58	184.83	54.01	0.82
	Quartile 4			Quartile 3			Quartile 3		
PISA test score	563.96	5062.92	-0.05	548.26	5045.15	-0.02	563.96	5063.02	-0.05
Grades extended	1.70	0.190	-1.40	1.66	0.20	-1.17	1.70	0.19	-1.40
basic	0.27	0.20	1.05	0.33	0.22	0.73	0.27	0.20	1.05
no tracking	0.08	0.07	3.15	0.14	0.12	2.12	0.08	0.07	3.15
age in months	0.05	0.05	4.07	0.06	0.05	3.83	0.05	0.05	4.07
	184.83	54.01	0.82	185.58	47.60	0.58	184.83	54.01	0.82

The matching variables also include 24 cantons (not shown). Descriptive statistics of the matching weights:
Q4 to Q1: mean = 1.287, std = 1.492, min = 0.004, max = 14.60

Q4 to Q2: mean = 1.102, std = 0.568, min = 0.014, max = 6.277

Q4 to Q3: mean = 1.041, std = 0.390, min = 0.168, max = 5.540

Table A.3: linear probability model on university graduation by social origin and population subgroup

	Model with social origin	Model with social origin and ability	Model with social origin, ability and gender	Model with social origin, ability and migrant status
Social origin:				
Lowest quartile 1 (ref.)				
Quartile 2	0.071** (0.024)	-0.015 (0.023)	-0.008 (0.034)	-0.099* (0.049)
Quartile 3	0.219*** (0.025)	0.093*** (0.024)	0.104** (0.036)	0.087 (0.061)
Quartile 4	0.355*** (0.024)	0.177*** (0.025)	0.188*** (0.035)	0.216*** (0.051)
PISA reading score		0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Grades		0.127*** (0.018)	0.128*** (0.018)	0.127*** (0.018)
Tracking: Pregymasial (ref.)				
Extended requirements		-0.261*** (0.024)	-0.260*** (0.024)	-0.259*** (0.024)
Basic requirements		-0.366*** (0.029)	-0.364*** (0.029)	-0.369*** (0.029)
No (formal) tracking		-0.402*** (0.054)	-0.401*** (0.054)	-0.402*** (0.052)
Gender: Female (Ref: Male)			-0.011 (0.033)	
Quartile 2 * female			-0.011 (0.045)	
Quartile 3 * female			-0.019 (0.046)	
Quartile 4 * female			-0.023 (0.045)	
Migrant status: Swiss (Ref: migrant)				-0.099** (0.035)
Quartile 2 * Swiss				0.121* (0.055)
Quartile 3 * Swiss				0.034 (0.066)
Quartile 4 * Swiss				-0.017 (0.056)
Constant	1.634*** (0.254)	0.597* (0.261)	0.617* (0.262)	0.725** (0.263)
N	2821	2821	2821	2821
R ²	0.132	0.268	0.269	0.272

Dependent variable: highest educational attainment (university versus no university)

Standard errors in parentheses. Controls for age (in months) and canton of residence are not shown.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.4: the social-origin gap in graduation from higher education at age 26

	University		University of applied science	
	Matching on ascriptives	Matching on ability	Matching on ascriptives	Matching on ability
$\Delta Q_4 - Q_1$	0.31*** (0.02)	0.18*** (0.04)	0.03* (0.01)	-0.01 (0.02)
$\Delta Q_4 - Q_2$	0.23*** (0.02)	0.16*** (0.03)	0.02 (0.01)	0.01 (0.01)
$\Delta Q_4 - Q_3$	0.11*** (0.02)	0.06 (0.03)	0.02 (0.01)	0.02 (0.01)

Coefficients are based on multinomial regressions on educational attainment for matched pairs of status quartiles and shown as discrete-change effects, which can be interpreted as percentage point differences: 0.38 means that the rate of university graduation is 38 percentage points higher among youth in quartile 4 than quartile 1.

Variables used for matching at the age of 16 are for ascriptive characteristics: age in months and canton of residence; additionally for school ability: lower-secondary school track, school grades and reading test score.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

N: 1443 (pair Q4-Q1), 1676 (pair Q4-Q2), 1758 (pair Q4-Q3)

Table A.5: the social-origin gap in having a university degree at age 26 (after matching for school ability at the age of 16)

	Gender		Migrant status	
	Men	Women	Migrants	Swiss
$\Delta Q_4 - Q_1$	0.21** (0.06)	0.17** (0.05)	0.26** (0.08)	0.18*** (0.05)
$\Delta Q_4 - Q_2$	0.13** (0.04)	0.18*** (0.03)	0.29*** (0.08)	0.15*** (0.03)
$\Delta Q_4 - Q_3$	0.09* (0.04)	0.04 (0.03)	0.20* (0.08)	0.04 (0.03)

Variables used for matching at the age of 16 are age in months, canton of residence, lower-secondary school track, school grades and reading test score.

$p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

N: 1273 (men), 1788 (women), 475 (migrants), 2586 (Swiss)

Table A.6: difference in the social-origin gap of university completion by gender and migrant status at age 26

	Difference between men and women	Difference between migrants and Swiss
Q4 - Q1	0.04 (0.08)	0.08 (0.09)
Q4 - Q2	-0.05 (0.05)	0.14 (0.08)
Q4 - Q3	0.05 (0.05)	0.15 (0.11)

Note: coefficients show the bootstrapped difference between the social-origin gaps (discrete change effects) in Table 3 above (1000 replications). In parentheses are the standard errors. 0.05 means that the social-origin gap in university completion between quartile 4 and quartile 1 is 5 percentage points larger among men than women

Table A.7 linear probability model on university graduation *at age 26*

	Model with social origin	Model with social origin and ability	Model with social origin, ability and gender	Model with social origin, ability and migrant status
Social origin:				
Lowest quartile 1 (ref.)				
Quartile 2	0.054** (0.020)	-0.019 (0.019)	0.015 (0.029)	-0.020 (0.043)
Quartile 3	0.167*** (0.021)	0.065** (0.021)	0.052+ (0.030)	0.061 (0.051)
Quartile 4	0.284*** (0.022)	0.134*** (0.022)	0.136*** (0.030)	0.220*** (0.055)
PISA reading score		0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Grades		0.113*** (0.017)	0.114*** (0.017)	0.114*** (0.017)
Tracking: Pregymasial (ref.)				
Extended requirements		-0.258*** (0.021)	-0.258*** (0.021)	-0.258*** (0.021)
Basic requirements		-0.321*** (0.026)	-0.320*** (0.026)	-0.323*** (0.026)
No (formal) tracking		-0.344*** (0.039)	-0.347*** (0.039)	-0.346*** (0.039)
Gender: Female (Ref: Male)				
Quartile 2 * female			-0.002 (0.027)	
Quartile 3 * female			-0.055 (0.038)	
Quartile 4 * female			0.021 (0.040)	
Migrant status: Swiss (Ref: migrant)				
Quartile 2 * Swiss				-0.041 (0.028)
Quartile 3 * Swiss				0.011 (0.049)
Quartile 4 * Swiss				0.016 (0.056)
Constant	1.065*** (0.224)	0.232 (0.235)	0.226 (0.236)	0.303 (0.239)
N	3061	3061	3061	3061
R ²	0.097	0.215	0.216	0.217

Dependent variable: highest educational attainment (university versus no university)

Standard errors in parentheses; additional controls for age (in months) and canton of residence

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.8: the class-origin gap in having a university degree at the age of 30 (after matching for school ability at the age of 16)

	Gender		Migrant status	
	Men	Women	Migrants	Swiss
Δ Upper-middle class – working class	0.22*** (0.04)	0.17*** (0.04)	0.25*** (0.07)	0.18*** (0.03)
Δ Upper middle class – lower-middle class	0.12** (0.04)	0.08* (0.03)	0.21* (0.08)	0.09** (0.03)
Δ Lower-middle class – working class	0.10** (0.04)	0.07* (0.03)	0.06 (0.07)	0.08** (0.03)

Variables used for matching at the age of 16 are age in months, canton of residence, lower-secondary school track, school grades and reading test score.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

N: 1156 (men), 1665 (women), 413 (migrants), 2408 (Swiss)

Table A.9: difference in the class-origin gap of university completion by gender and migrant status at age 30

	Difference between men and women	Difference between migrants and Swiss
Δ Upper-middle class – working class	0.06 (0.06)	0.07 (0.08)
Δ Upper middle class – lower-middle class	0.03 (0.05)	0.12 (0.09)
Δ Lower-middle class – working class	0.03 (0.05)	-0.02 (0.07)

Note: coefficients show the bootstrapped difference between the social-origin gaps (discrete change effects) in Table A.4 above (1000 replications). In parentheses are the standard errors. 0.06 means that the social-origin gap in university completion between quartile 4 and quartile 1 is 6 percentage points larger among men than women.