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Measuring the Social Status of Education Programmes: Applying a New Measurement to Dual Vocational Education and Training in Switzerland

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This paper proposes a new approach to measuring changes in the social status of education programmes, a type of social status that the literature has greatly neglected so far. We focus on the dual Vocational Education and Training (dual VET) system in Switzerland, which has recently received substantial attention across Europe. We argue that, holding everything else constant, a change in the relative ability of students in an education programme, in relation to the cohort, reflects a change in the social status of that programme. Using PISA scores as a proxy for cognitive ability, we apply this approach to test whether growing knowledge of the education system increases the social status of dual VET in Switzerland. Our results, which focus on immigrant students, confirm that the social status of dual VET increases with these students length of stay in Switzerland, thus reflecting their learning process about the Swiss education system.

Keywords:
Social Status, Vocational Education and Training, Dual VET, Apprenticeship

Introduction

Following the financial crisis of 2008, youth unemployment rates reached unprecedented high values in various European countries. Due to the comparably low unemployment rates in Austria, Germany, and Switzerland, this challenge has sparked increasing political interest in dual Vocational Education and Training (dual VET[1]; Chatzichristou et al. 2014). By combining practical training in the workplace with learning of occupation-specific theory and some share of general education (OECD 2004, Wolter and Ryan 2011), dual VET programmes improve labour market integration.

However, a successful functioning of a dual VET system[2] depends on the social status of this education programme (Lasonen and Manning 2001; Cedefop 2014), whereat social status refers to the relative position or rank of that programme compared to other education programmes on the same educational level (Devers et al. 2009). Several authors suggest that a stigma against VET exists (Koulaidis et al. 2006; Bilboe 2011; Billett 2014; Cedefop 2014; Mourshed et al. 2014). Accordingly, educational reform leaders from around the world were worried about the low social status of their VET programmes (Caves and Renold 2016). Hence, politicians and researchers search for ways to improve the social status of VET (see e.g. Lasonen and Manning 2001; Cedefop 2014).

However, while a broad literature exists about the social status of individuals and occupations, little is known about the social status of education programmes. Exceptions include studies by Cattaneo and Wolter (2013), Cedefop (2014), and Mourshed et al. (2014), which survey individuals regarding the social status of education programmes based on very specific questions, e.g. regarding expected employment opportunities and career perspectives of individuals with a particular

education programme. However, these measurement approaches have three disadvantages. First, the particularity of the questions restricts data availability. Second, social desirability bias, the tendency to respond in a manner that is viewed favourably by others, might cause measurement errors (e.g., Diekmann 2004). Third, it remains unclear how to aggregate the variety of questions in a single measure of social status.

Hence, we expand the existing literature in two main directions. First, we present a novel approach to measure changes in the social status of education programmes that relies on objective information about educational choices. From an economic perspective, educational choices result from objective cost and benefit considerations, based on institutional context and individual ability (Becker 1964). However, educational choices also reflect adolescent's subjective perception, which depends on the social status of education programmes as well as cultural and social origin (cf. Boudon 1974; Breen and Goldthorpe 1997; Becker and Hecken 2009). Hence, an increase in the social status of an education programme leads to an increase in the relative ability of adolescents choosing that particular education programme. Observing educational choices therefore allows to measure changes in the social status of an education programme. Specifically, an increase in the relative ability of adolescents choosing an education programme compared to the cohort reflects an increase in the social status of that programme, holding everything else constant. Likewise, a change in the probability of choosing a particular education programme conditional on ability reflects a change in the social status of that programme.

Second, we are the first to investigate whether the knowledge of the education system increases the social status of dual VET as hypothesized by Depner and Atze (2000), OPET (2011), Mourshed et al. (2014), and Cedefop (2014). We thereby refer to dual VET as an education programme defined and regulated on the national level, rather

than to individual school programmes or programmes for particular occupations. To answer our question, we investigate the educational choices of immigrant adolescents in Switzerland at the end of compulsory education, i.e. shortly before their transition to post-compulsory education. Using PISA scores as a proxy for ability and the length of stay in Switzerland as a proxy for the knowledge of the Swiss education system, e analyse the impact of knowledge on the social status of dual VET.

The results suggest that the social status of dual VET increases as immigrant adolescents live longer in Switzerland. Assuming that the length of stay approximates the increased knowledge about the Swiss education system, this finding highlights the relevance of providing such information to immigrants early. Dual VET in Switzerland represents an ideal case study thanks to the particularity of that education programme. This particularity suggests that immigrants are not familiar with the education programme at the time of immigration because most other countries have no comparable education programme to serve as a benchmark. Hence, their knowledge differs substantially from individuals born in Switzerland. As this low initial knowledge level of immigrants is comparable to situation when introducing new education programmes, the results suggest that such reforms need to come with dissemination of information from the outset. Hence, this analysis provides important information to all policy makers who aim to introduce an education programme.

Building on the existing literature regarding the social status of education programmes and on theoretical concepts explaining educational choices, section 2 introduces our approach to measure changes in the social status of education programmes and develops our hypothesis regarding the social status of dual VET in Switzerland. Section 3 describes the data and section 4 explains the empirical methodology applied in our results section 5. Finally, section 6 concludes.

Measuring the Social Status of Education Programmes

In sociology, social status describes a social rank or a position in a hierarchical order and thus refers to the relative standing of an individual or organisation in the society (Devers et al. 2009). In accordance with this concept, a number of studies analyse the social status of individuals with a specific occupation. Particularly in the economic literature, the prevalent way of measuring the social status of occupations is by the relative income or educational attainment (objective approach, e.g., Duncan 1961). Recent studies try to operationalise the perceived social status with the help of occupation rankings, which is called the subjective approach (e.g., Van Praag 2009). In this micro-perspective, the image of an occupation or educational attainment is closely related to the relative (hierarchical) standing of an individual in society. Transferring this concept of social status of individuals and occupations to the education system of a country defines the social status of an education programme as the relative position of that programme in comparison to other education programmes on the same level.

However, scholars have so far paid little attention to the social status of education programmes. The scant existing literature suggests three approaches to measure the social status of VET discussed in the following paragraphs. The first approach asks respondents about their expectation regarding various labour market indicators of individuals with a particular education, e.g. probability to find work, income prospects, and career perspectives (Cattaneo and Wolter 2013, Mourshed et al. 2014). This approach has three disadvantages: First, these questions are very particular, substantially limiting data availability. Second, social desirability, namely the tendency of survey respondents to answer questions in a manner that will be viewed favourably by others instead of saying what they really think, might bias the responses (e.g., Diekmann 2004). Third, it remains unclear how the variety of outcomes, e.g. questions

about expected employment opportunities, career perspectives, and social prestige, can be aggregated into a single measurement of social status.

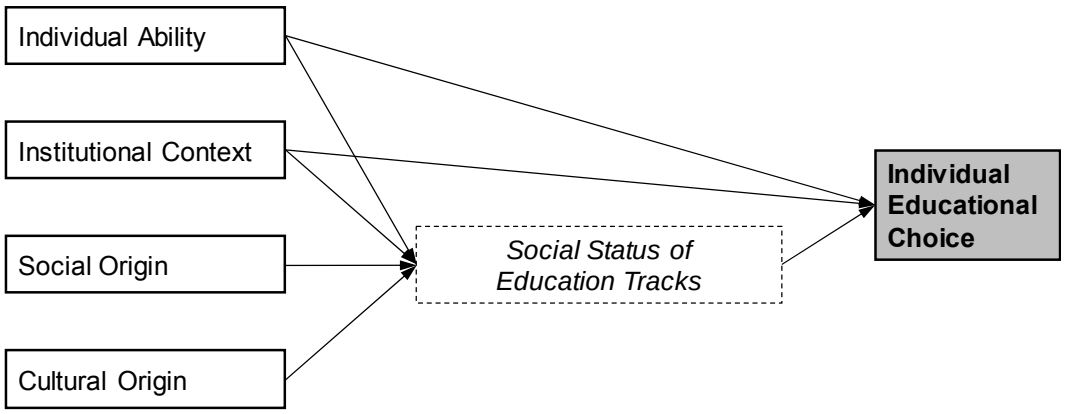
The second approach used in the literature consists of asking respondents directly about the social status of education programmes. This approach avoids the aggregation drawback, whilst the data availability and social desirability drawbacks remain. Cedefop (2014) uses two questions in the Special Eurobarometer Survey 369 in 2011 (European Commission 2011) that ask directly for the social status of VET, namely 'Do you think that VET has a very positive, fairly positive, fairly negative or very negative image in this country?' and 'Nowadays, which of the following would you recommend to a young person who is finishing compulsory education?' Similarly, Mourshed et al. (2014) measure the social status of VET by asking respondents whether they believed that society values academic education more than VET. For Switzerland, Cattaneo and Wolter (2013) ask a related question about the desired education programme for the respondents' children. However, which education programme someone prefers for his child not only depends on the social valuation of that programme but also on the abilities and interest of the child.

The third measurement approach, suggested by Cedefop (2014), measures social status by the share of students enrolled in different education programmes. This measurement does not suffer from the previously mentioned disadvantages. However, the measurement has the drawback that it depends on the supply of VET, thereby failing to disentangle supply and demand for VET.

We build on this third approach that exploits the information about observed education programme choices to constitute our novel measurement approach. The basic idea of our approach captures a change of the social status of an education programme by a change in the ability of adolescents in that programme relative to the ability of

adolescents in the corresponding cohort, holding everything else constant. Figure 1 sketches the theoretical framework underlying this approach.

Figure 1. Theoretical framework



Broadly speaking, economists consider educational choices as a result of a cost-benefit consideration based on expected objective earnings (Becker 1964). These expected objective earnings mainly depend on individual ability, namely cognitive and non-cognitive ability (e.g., Dole 1964) and institutional context (e.g. differences in the selection into educational programmes, in the quality of these programmes, or in the situation on the labour market). Though, the subjective perception of own abilities and expected earnings might deviate from expected objective earnings because of cultural and social origin (e.g. social norms, socio-economic status of parents; e.g. Boudon 1974; Breen and Goldthorpe 1997; Becker and Hecken 2009).

Several authors suggest that the subjective perception of VET is lower than the objective expectation, i.e. that a stigma against VET exists (Koulaidis et al. 2006; Bilboe 2011; Billett 2014; Cedefop 2014; Mourshed et al. 2014). Moreover, the stigma against VET even appears to dissuade young people from following pathways that can lead to jobs they want (Mourshed et al. 2014). Hence, social status of an education programme affects educational choices. Therefore, the theoretical framework depicted

in figure 1 suggests that holding individual ability and institutional context constant, an increase in the social status of an education programme increases the probability of selecting a particular education programme. Hence, the change in the social status of the education programme can be captured by a change in the probability of selecting a particular programme conditional on ability and institutional context:

$$\Delta\text{Social Status} = \Delta p(Educational\ Choice \mid Ability, Context) \quad (1)$$

Conversely, holding institutional context constant, an increase in the social status of an education programme results in a change in the composition of adolescents in a certain education programme with regard to their ability, expressed by the average relative ability of adolescents choosing an education programme compared to the whole cohort. For the change in the social status of dual VET, this can be expressed as follows:

$$\Delta\text{Social Status} = \Delta \frac{Ability\ Dual\ VET\ Students}{Ability\ Cohort} \quad \text{cet. par.} \quad (2)$$

While this approach allows to analyse differences in the perceived social status of education programmes across time and groups, it provides no interpretation of the level of the social status of education programmes. As we do not dispose of any reference for interpreting a certain level of the social status of education programmes, we can only build upon differences over e.g. time or geographical regions.

Hypotheses

The theoretical framework in figure 1 shows that social status might deviate from objective expectations because of stigma. Since this stigma depends on the level of knowledge on the education system (cf. Depner and Atze 2000; OPET 2011; Mourshed et al. 2014; Cedefop 2014), we hypothesise that *growing knowledge about the education system leads to an increase in the perceived social status of dual VET*.

Cattaneo and Wolter (2013) show that the social status of dual VET is lower among immigrants living in Switzerland than among Swiss individuals. This might suggest that immigrants coming from a country without a dual VET system do not know this system at all and will never have experienced this kind of education themselves. As even Swiss show a higher preference for VET if they have completed a VET programme themselves (Busemeyer et al. 2011; Cattaneo and Wolter 2013), their own experience might also have an impact on their valuation. Hence, we can assume that with the time that immigrants spend in Switzerland, their knowledge of the education system and career prospects increases, and that this increase leads them to a less biased assessment of dual VET. In addition, with the time spent in a country, adolescents are socialised to the local norms and values, e.g. the valuation of dual VET. From this, we can reformulate our hypothesis as follows: *The social status of dual VET increases as immigrants live longer in Switzerland thanks to their growing knowledge about the education system.*

However, as the robustness section on emigration probability discusses in detail, an alternative interpretation of an increase in the social status of dual VET as a result of living in Switzerland longer exists. If immigrants intend to leave Switzerland, the valuation of an education programme in Switzerland does not matter. Assuming that the probability of leaving Switzerland decreases with time spent in Switzerland suggests that the increase in the social status reflects a higher probability of staying in Switzerland rather than a knowledge gain about the education system.

Methodology

Data and Measures

The empirical analysis operationalises ability by the cognitive ability measured by the

plausible reading and mathematics test scores (OECD 2009, von Davier et al. 2009) of the Swiss Programme for International Student Assessment (PISA). Hence, the measure of ability neglects differences in other ability dimensions, e.g. non-cognitive skills. Due to missing values in key variables in the wave of 2006, we analyse the PISA waves 2000, 2003 and 2009, pooled across time (see PISA.ch 2004, 2011, 2012). The sample of PISA is representative of the 9th grade student cohort, thus adolescents at the end of compulsory schooling and just selecting their further education programme. This sample is representative in both the country as a whole and in its three main language regions (Nationale Programmleitung PISA.ch 2008). We restrict our sample to German-speaking regions to ensure cultural homogeneity and to account for different patterns of educational choices for upper secondary education in these regions, e.g. the share of dual VET students being much lower in French- and Italian-speaking Switzerland than in the German-speaking part (BFS 2015). As our focus is on immigrants, we additionally restrict our sample to adolescents born outside Switzerland.

In addition to the test scores, the Swiss PISA data contain information on the upper secondary education programme that adolescents plan to pursue after compulsory education. The possible activities after compulsory education are grouped into six categories: Grade 8-9/ gap year (22.8%), dual VET (42.4%), school-based vocational education (4.1%), general education (21.0%), other education or paid job (3.8%) and do not know yet (5.9%). TREE[2] data, a longitudinal follow-up study to PISA 2000, shows that the information on the prospective education programme in the PISA data has a correlation of more than 0.8 with the actually chosen education.

In our analysis, we only include adolescents choosing an education programme after compulsory education, thus including solely adolescents who plan to attend dual VET, school-based vocational education or general education. While these adolescents

account for 67% of the population, we exclude a sizeable group of students planning to attend a 8-9/ gap year. From the TREE data, we know that these students will mostly choose dual VET after the bypass. Our preliminary analysis shows that the relative ability increases for the of 8-9/ gap year students with their time spent in Switzerland. This suggests that omitting these students from our sample biases the effect of time spent in Switzerland downwards. Hence, including the full cohort in our estimations yields qualitatively the same results, which can be obtained from the authors upon request.

Based on background questionnaires, PISA further offers detailed information on the adolescents and their families. In the multivariate analysis, we control for age, gender and the following observable factors that have been proven to influence educational choices (see, e.g., Becker and Hecken 2009, Kupfer 2009). We measure the social origin of the adolescents by the socio-economic status of the father (ISEI) and the educational background of the mother (ISCED), the number of books at home, and the family structure. Fixed effects for the birth country of adolescent and parents capture the cultural origin. For the institutional context, we use residence canton, which is a territorial district of the Swiss confederation, and living area as indicator for urbanisation (including the categories village, small town, town, and city). Table 7 in appendix A-1 provides descriptive statistics for all variables.

Estimation Methods

In a first step, we implement the new approach to measure the social status of dual VET as an education programme by calculating the ability ratio of dual VET students and the whole upper secondary education cohort based on formula (2). This allows to analyse differences in the social status of dual VET descriptively. To analyse the statistical

significance of observed differences in these ability ratios, we complement the descriptive approach by a multivariate analysis that further allows to account for potential endogeneity of the estimates due to unobserved heterogeneity.

Based on formula (1), we estimate the probability that adolescent i selects dual VET over the alternative upper secondary education programmes conditional on observed cognitive abilities measured by PISA reading and mathematics scores with the following probit model with robust standard errors:

$$App_i = \beta_1 lnPISA_i + \beta_2 lnLength_i + \gamma_1 X_i + \varepsilon_i \quad (3)$$

where App_i is a dummy variable indicating whether an adolescent chooses dual VET and $PISA_i$ refers to the PISA reading and mathematics scores. We expect a negative sign for β_1 as the relationship between individual ability and participation in dual VET is supposed to be negative (cf. Bertschy et al. 2009). $lnLength_i$ denotes the natural logarithm of the number of years an adolescent has spent in Switzerland, thereby allowing to test the hypothesis suggesting that the longer an adolescent lives in Switzerland, the higher the perceived social status of dual VET, thus the higher the probability of selecting dual VET. Hence, the coefficient of main interest is β_2, for which we hypothesise a positive sign, i.e. the probability of selecting dual VET conditional on ability increases as an adolescent lives longer in Switzerland. X_i is a vector of observable characteristics capturing survey year fixed effects, age, gender, socio-economic status of the father, fixed effects for the educational background of the mother, for the number of books at home, for the family structure, and for the urbanity. The main concern regarding the identification of β_2 is that there is unobserved heterogeneity across migration waves, e.g. in terms of non-cognitive abilities or settlement patterns. Depending on the specification, the estimations thus further control

for unobserved heterogeneity in settlement patterns and characteristics of migration waves by including residence canton fixed effects, fixed effects for the birth country of the child, the father and the mother as well as the interaction of time living in Switzerland with the child's country of birth.

To improve the identification strategy, we further exploit the fact that we observe educational choices of immigrants born in Germany or Austria, where a dual VET system also exists. Hence, we expect that these adolescent are familiar with the dual VET system and the value of dual VET. Therefore, we hypothesise that the social status of dual VET should increase less for immigrants born in Germany or Austria than for immigrants born in other countries that have no dual VET system.

This approach allows us to test our hypothesis in a Difference-in-Difference (DiD) identification strategy (Legewie 2012):

$$App_i = \beta_1 lnPISA_i + \beta_2 lnLength_i + \beta_3 Similar_i + \beta_4 Similar_i * lnLength_i + \gamma_1 X_i + \varepsilon_i \quad (4)$$

This estimation holds the same variables as (3) plus the variable $Similar_i$ that denotes a dummy indicating whether an adolescent is born in Germany or Austria. The DiD coefficient of interest is the interaction $Similar_i * lnLength_i$ that captures whether the increase in the relative ability of dual VET students with time spent in Switzerland is lower for dual VET students born in Germany or Austria than for the ones born in another country.

A second approach exploits the fact that we observe education choices from immigrant adolescents with and without a parent born in Switzerland. Immigrant adolescents with at least one parent born in Switzerland have a better knowledge about the Swiss education system at the time of immigration. Therefore, the social status of

dual VET should increase less with the time spent in Switzerland for these immigrants compared to immigrants without at least one parent born in Switzerland. Hence, we apply a second DiD identification strategy to test our hypothesis:

$$App_i = \beta_1 lnPISA_i + \beta_2 lnLength_i + \beta_3 Swiss_i + \beta_4 Swiss_i * lnLength_i + \gamma_1 X_i + \varepsilon_i \quad (5)$$

This estimation holds the same variables as (3) except for $Swiss_i$ that is a dummy variable that takes the value 1 if at least one of the adolescent's parents is born in Switzerland. Importantly, we look at the interaction $Swiss_i * lnLength_i$ that indicates a variation in probability change of selecting dual VET, given a certain ability, with the time spent in Switzerland between adolescents with and without at least one parent born in Switzerland. Unlike the first DiD approach, this estimation even allows to include country-specific trends to capture differences in migration waves within a country.

Results

Descriptive Analysis

This section illustrates the average ability ratio for different groups of adolescents, thereby providing a descriptive analysis of our hypothesis that the social status of dual VET is lower for immigrant adolescents than for adolescents born in Switzerland but increases with the time spent in Switzerland.

Figure 2 presents average PISA reading and mathematics scores of dual VET students relative to the average PISA scores of the whole upper secondary education cohort, separately for adolescents born in Switzerland (CH/FL), in Germany/ Austria (DE/AT), and in other countries (OTHER).

Figure 2. Ability ratios dual VET vs. cohort; by country of origin

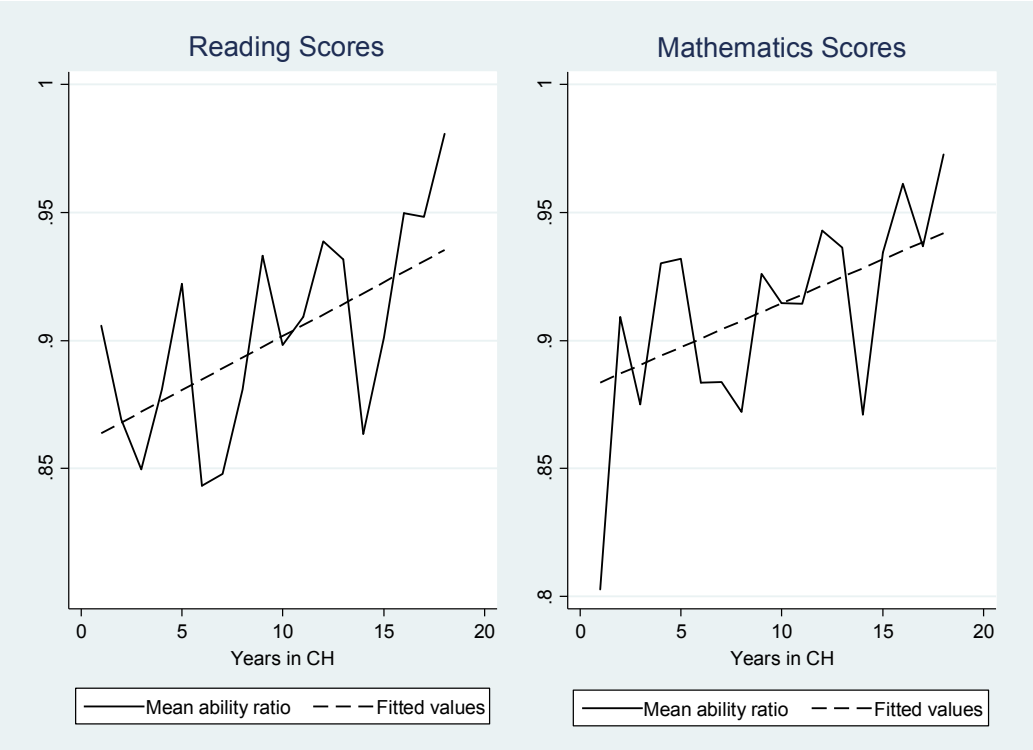
Notes: Own calculations based on Swiss PISA data of waves 2000, 2003, 2009, with sample weighting; N=15'731 for reading scores and N=14'186 for mathematics scores

This figure suggests that the social status of dual VET is perceived higher by adolescents born in Switzerland than by immigrants, supporting the findings of Cattaneo and Wolter (2013). Rather surprisingly, immigrants coming from a country with a similar VET system than Switzerland, i.e. Germany/ Austria, show a lower social status of dual VET than adolescents born in another country. This might reflect the high educational attainment of immigrant parents from these countries. However, the confidence intervals show that the difference between immigrants from Germany/ Austria and from another country is statistically not significant.

To analyse our main hypothesis, figure 3 shows the average ability ratio for reading and mathematics scores as a function of the years an adolescent has lived in

Switzerland. In line with our hypothesis, this figure suggests that the average ability ratio increases with the time spent in Switzerland.

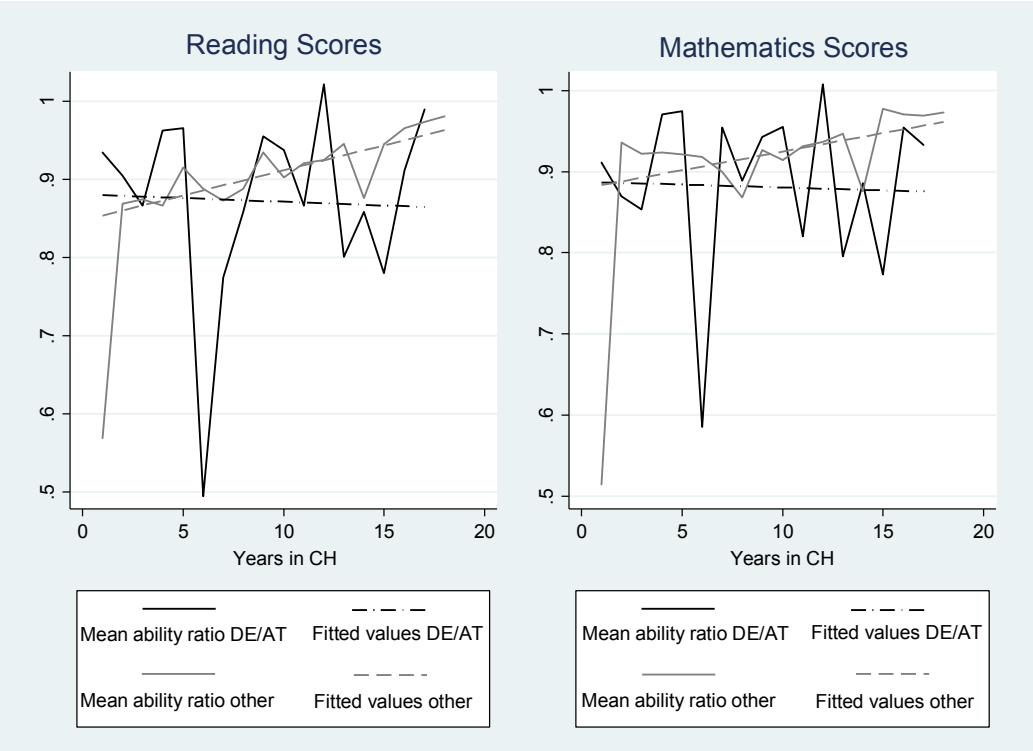
Figure 3. Ability ratios dual VET vs. cohort; by time spent in Switzerland



Notes: Own calculations based on PISA data of waves 2000, 2003, 2009, with sample weighting; N=1'310 for reading scores and N=1'172 for mathematics scores

In addition, figure 4 provides descriptive evidence for our first DiD approach, which exploits the fact that immigrant adolescents come from countries with different education systems, thereby providing variation in the initial knowledge of dual VET. Figure 4 indicates that the average ability ratio increases for immigrants born in a country without dual VET system, but remains roughly constant for immigrants from Germany or Austria. Hence, the first DiD approach supports the hypothesis that the social status of dual VET increases as immigrants live longer in Switzerland.

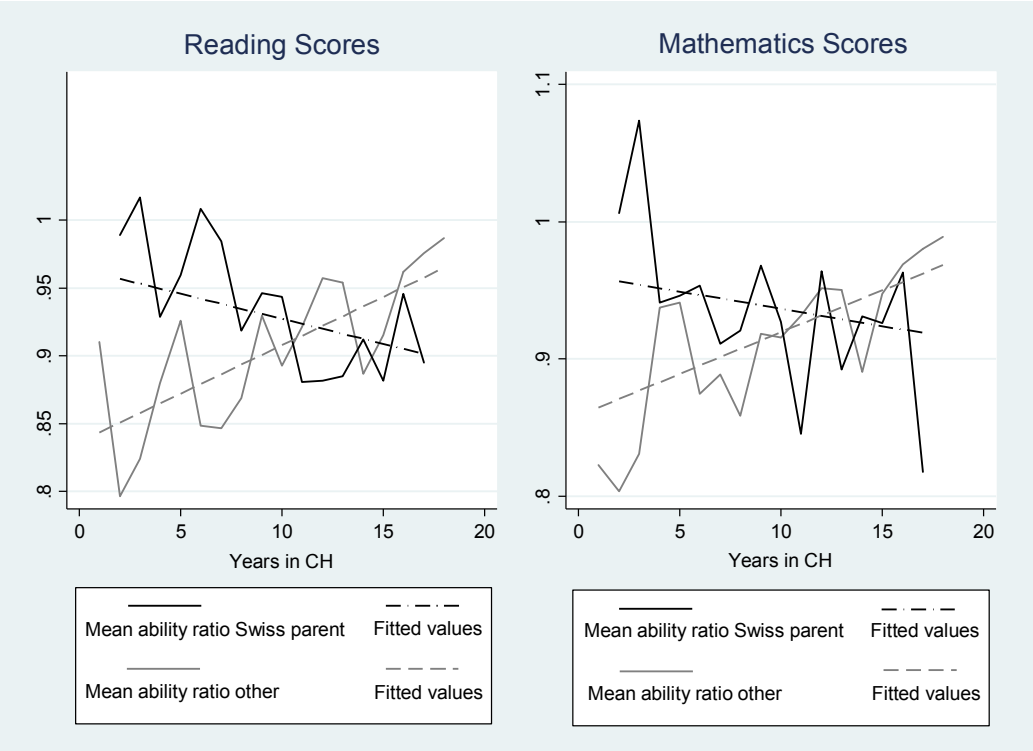
Figure 4. Ability ratios dual VET vs. cohort; by time spent in Switzerland and by birth country



Notes: Own calculations based on PISA data of waves 2000, 2003, 2009, with sample weighting; N=1'308 for reading scores and N=1'170 for mathematics scores

Lastly, figure 5 illustrates our second DiD approach which distinguishes between immigrant adolescents with at least one parent born in Switzerland, and adolescents without a parent born in Switzerland. This figure shows that the average ability ratio only increases for immigrant adolescents without a parent born in Switzerland, while it even decreases for the others.

Figure 5. Ability ratios dual VET vs cohort; by time spent in Switzerland and by parent born in Switzerland



Notes: Own calculations based on PISA data of waves 2000, 2003, 2009, with sample weighting; N=1'292 for reading scores and N=1'157 for mathematics scores

Hence, figures 3, 4, and 5 provide descriptive evidence that the social status of dual VET increases as immigrants live longer in Switzerland, reflecting the learning process regarding the Swiss education system and the true value of dual VET.

Multivariate Regressions

To test whether these results hold after controlling for individual characteristics, this section shows multivariate regressions that analyse whether living in Switzerland longer increases the social status of dual VET. The full estimates of all tables in this section are shown in appendix A-2.

Baseline Approach

Table 1 illustrates the results of the baseline approach whereat the first estimates present the simple correlation of the length of stay in Switzerland on the probability of choosing dual VET conditional on PISA reading and mathematics scores (Model 1). The second model further controls for observable characteristics (Model 2). Models three to six account for unobserved heterogeneity across cantons (Model 3), plus own birth country fixed effects (Model 4), plus birth country of father and mother fixed effects (Model 5), and plus birth country trends (Model 6).

Table 1 shows that the marginal effect for the cognitive ability measures, namely reading and mathematics scores, have the expected sign: Higher test scores result in a lower probability of choosing dual VET. This effect is even higher for mathematics than for reading scores when controlling for observables.

Furthermore, table 1 indicates that living in Switzerland (Years in CH) longer increases the probability of selecting dual VET conditional on cognitive ability measures, thus confirming out hypothesis and the descriptive analysis in the precedent section. This result holds for all specifications of control variables and remains remarkably stable by introducing fixed effects for canton, birth country and birth country trends. In the final model, a 1% increase in the time spent in Switzerland leads to a 0.083% increase in the probability of choosing dual VET instead of school-based vocational education or general education, holding the other variables constant.

Table 1. Baseline approach for the probability of selecting a dual VET

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Reading Scores (ln)	-0.783***	-0.324**	-0.308**	-0.363***	-0.340**	-0.363***
	(0.125)	(0.136)	(0.136)	(0.137)	(0.136)	(0.135)
Mathematics Scores (ln)	-0.747***	-0.895***	-0.831***	-0.822***	-0.857***	-0.830***
	(0.127)	(0.135)	(0.136)	(0.135)	(0.135)	(0.134)
Years in CH (ln)	**0.094*****	**0.077*****	**0.075*****	**0.088*****	**0.090*****	**0.083***
	(0.025)	(0.024)	(0.023)	(0.023)	(0.023)	(0.043)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	No	Yes	Yes	Yes	Yes	Yes
Canton Dummies	No	No	Yes	Yes	Yes	Yes
Birth Country Dummies	No	No	No	Yes	Yes	Yes
Birth Country of Father and Mother Dummies	No	No	No	No	Yes	Yes
Birth Country Trend Dummies	No	No	No	No	No	Yes
N	955	955	952	952	952	952

Notes: The table displays marginal effects of probit estimations and robust standard errors in parentheses. *,** and *** denote significance at the 10%, 5% and 1% level, respectively. Pooled PISA data 2000, 2003, 2009.

DiD Approach: Similar Education System

Table 2 provides the results of the first DiD approach, which exploits the fact that immigrant adolescents come from countries with varying education systems, thereby providing variation in the initial knowledge of dual VET. Due to perfect collinearity, the estimations with birth country trends are not included.

Table 2 shows that the estimated effect of living in Switzerland (Years in CH) longer remains significantly positive in all estimations. The dummy variable indicating that an immigrant comes from a country with a dual VET system (DE/AT) shows the expected positive sign. Hence, immigrants from a country with a similar education system (DE/AT) have a higher conditional probability of 0.25% of selecting dual VET.

This shows that the descriptive evidence is misleading in this respect as it ignores important differences in individual characteristics.

Importantly, we now look at the interaction term of the DE/AT dummy with years spent in Switzerland. The significantly negative estimates of this interaction term additionally support our hypothesis: The effect of time spent in Switzerland is lower for immigrants coming from a country with a similar education system (DE/AT) compared to other immigrant adolescents.

Table 2. DiD approach with birth country for the probability of selecting a dual VET

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Reading Scores (ln)	-0.854***	-0.386***	-0.363***	-0.383***	-0.361***
	(0.126)	(0.135)	(0.135)	(0.136)	(0.135)
Mathematics Scores (ln)	-0.763***	-0.879***	-0.810***	-0.802***	-0.836***
	(0.128)	(0.135)	(0.135)	(0.135)	(0.134)
Years in CH (ln)	0.134***	0.122***	0.117***	0.118***	0.118***
	(0.035)	(0.032)	(0.031)	(0.031)	(0.032)
DE/AT	0.252**	0.314***	0.281***	0.299***	0.250**
	(0.110)	(0.101)	(0.097)	(0.098)	(0.116)
Years in CH (ln) * DE/AT	**-0.068**	**-0.086****	**-0.077***	**-0.080***	**-0.076***
	(0.047)	(0.044)	(0.042)	(0.042)	(0.044)
Year Dummies	Yes	Yes	Yes	Yes	Yes
Control Variables	No	Yes	Yes	Yes	Yes
Canton Dummies	No	No	Yes	Yes	Yes
Birth Country Dummies	No	No	No	Yes	Yes
Birth Country of Father and Mother Dummies	No	No	No	No	Yes
N	955	955	952	952	952

Notes: The table displays marginal effects of probit estimations and robust standard errors in parentheses. *,** and *** denote significance at the 10%, 5% and 1% level, respectively. Pooled PISA data 2000, 2003, 2009.

To test the validity of this DiD approach, a placebo-test can be applied whereat instead of looking at the group of adolescents coming from Germany and Austria compared to immigrants from other countries, we can form other groups of immigrants based on their birth country (table 3). Validity of this DiD approach suggests that the interaction

term of group of birth country with length of stay in Switzerland remains insignificant. Table 3 supports this assumption except for adolescents born in France or Belgium, for which the probability of choosing dual VET with the time spent in Switzerland significantly increases compared to adolescents from other countries. However, since these two countries only account for 14 observations, dropping these observations does not affect our main results.

Table 3. Placebo test for DiD approach with birth country for the probability of selecting a dual VET

	Model FR/BE	**Model IT/ES/PT**	**Model YU/KO/AL/TK**	**Model Other**
Reading Scores (ln)	-0.326**	-0.357**	-0.350**	-0.340**
	(0.136)	(0.138)	(0.134)	(0.136)
Mathematics Scores (ln)	-0.862***	-0.844***	-0.849***	-0.857***
	(0.134)	(0.136)	(0.132)	(0.135)
Years in CH (ln)	0.088***	0.085***	0.074***	0.093***
	(0.023)	(0.024)	(0.025)	(0.028)
Group of Birth Country	-1.822***	-0.621***	0.488***	-0.049
	(0.658)	(0.228)	(0.178)	(0.138)
Years in CH (ln) * Group of Birth Country	**0.719*** ** (0.273)	**0.120** (0.117)	**0.054** (0.056)	**-0.009** (0.052)
N	952	952	952	952

Notes: The table displays marginal effects of probit estimations and robust standard errors in parentheses. *,** and *** denote significance at the 10%, 5% and 1% level, respectively. The regressions include year dummies, canton dummies, birth country dummies, birth country of father and mother dummies, and control variables. Pooled PISA data 2000, 2003, 2009.

DiD Approach: Parent born in Switzerland

Lastly, table 4 presents the results of the second DiD approach, which exploits the fact that adolescents with at least one parent born in Switzerland know the Swiss education system better than other immigrant adolescents. Table 4 shows that the estimated effect of living longer in Switzerland (Years in CH) remains significantly positive in all estimations and that controlling for observable characteristics even increases the

magnitude of the estimates. This increase also applies to the dummy variable showing that adolescents with at least one parent born in Switzerland (Swiss Parent) have a higher probability of selecting dual VET. Moreover, the interaction effect of time spent in Switzerland and Swiss parent has the expected negative sign, suggesting that the effect of living longer in Switzerland is smaller for immigrants with at least one parent born in Switzerland. Hence, the second DiD approach also supports our hypothesis.

Table 4. DiD approach with parent born in Switzerland for the probability of selecting a dual VET

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Reading Scores (ln)	-0.788***	-0.323**	-0.309**	-0.369***	-0.350**	-0.365***
	(0.125)	(0.135)	(0.136)	(0.136)	(0.135)	(0.136)
Mathematics Scores (ln)	-0.753***	-0.893***	-0.825***	-0.818***	-0.851***	-0.824***
	(0.127)	(0.134)	(0.135)	(0.134)	(0.133)	(0.133)
Years in CH (ln)	0.105***	0.092***	0.092***	0.116***	0.119***	0.195***
	(0.029)	(0.029)	(0.027)	(0.027)	(0.027)	(0.063)
Swiss Parent	0.139	0.187	0.211*	0.307**	0.292**	0.430***
	(0.151)	(0.133)	(0.123)	(0.123)	(0.135)	(0.163)
Years in CH (ln) * Swiss Parent	**-0.050**	**-0.063**	**-0.072**	**-0.108****	**-0.118****	**-0.176*****
	(0.063)	(0.056)	(0.052)	(0.053)	(0.054)	(0.066)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	No	Yes	Yes	Yes	Yes	Yes
Canton Dummies	No	No	Yes	Yes	Yes	Yes
Birth Country Dummies	No	No	No	Yes	Yes	Yes
Birth Country of Father and Mother Dummies	No	No	No	No	Yes	Yes
Birth Country Trend Dummies	No	No	No	No	No	Yes
N	955	955	952	952	952	952

Notes: The table displays marginal effects of probit estimations and robust standard errors in parentheses. *,** and *** denote significance at the 10%, 5% and 1% level, respectively. Pooled PISA data 2000, 2003, 2009.

Robustness: Education Preference vs. Education Choice

Exploiting information about education programme choices has the drawback that it might reflect availability of education programmes rather than preferences about them. Though we exploit information before the actual choice takes place, it might be affected by the availability of education programmes. This data feature matters because it means that our results are consistent with alternative explanations that stem from differences in education programme availability, e.g. because of decreasing discrimination of employers or schools.

In the small sample of PISA 2000, the students provided information on how many times they had to apply for their planned education programme after compulsory schooling. We can use this information to account for differences in education programme availability. As only about half of the PISA 2000 sample participated in the mathematics tests, we drop mathematics for these robustness checks to have a large enough sample. Preliminary analysis suggests that dropping mathematics yields qualitatively similar results but biases the estimates downwards. Hence, excluding mathematics as a control yields a lower bound of the true estimates.

Tables 5 and 6 present the results including the number of applications at firms or schools as control variables, respectively. These additional regressions reveal that the baseline estimates remain unaffected by the inclusion of the number of applications at firms or schools. Furthermore, effect magnitude stays the same in the DiD approaches, though the reduced sample renders most DiD estimates insignificant, except for the second DiD approach with the number of applications at firms (table 6).

Table 5. Robustness test to controlling for the number of applications at schools

	Baseline		**DiD1**		**DiD2**	
Reading Scores (ln)	-1.124***	-1.110***	-1.125***	-1.110***	-1.162***	-1.150***
	(0.128)	(0.124)	(0.128)	(0.124)	(0.134)	(0.131)
Years in CH (ln)	**0.138*****	**0.141*****	0.146**	0.148**	0.181***	0.183***
	(0.047)	(0.049)	(0.058)	(0.059)	(0.053)	(0.053)
No. of Applications at Schools	-	**-0.009**	-	-0.009	-	-0.008
		(0.008)		(0.008)		(0.008)
DE/AT	**-**	**-**	**0.194**	**0.190**	**-**	**-**
			(0.248)	(0.258)		
Years in CH (ln) * DE/AT	**-**	**-**	**-0.041**	**-0.039**	**-**	**-**
			(0.103)	(0.106)		
Swiss Parent	**-**	**-**	**-**	**-**	**0.303**	**0.296**
					(0.207)	(0.211)
Years in CH (ln) * Swiss Parent	**-**	**-**	**-**	**-**	**-0.111**	**-0.108**
					(0.082)	(0.084)
N	202	202	202	202	202	202

Notes: The table displays marginal effects of probit estimations and robust standard errors in parentheses. *,** and *** denote significance at the 10%, 5% and 1% level, respectively. The regressions include control variables, canton dummies, birth country dummies. PISA data 2000.

Table 6. Robustness test to controlling for the number of applications at firms

	Baseline		**DiD1**		**DiD2**	
Reading Scores (ln)	-1.087***	-1.087***	-1.089***	-1.090***	-1.115***	-1.115***
	(0.139)	(0.139)	(0.138)	(0.138)	(0.131)	(0.130)
Years in CH (ln)	**0.113****	**0.113****	0.124**	0.126**	0.193***	0.195***
	(0.045)	(0.045)	(0.057)	(0.058)	(0.055)	(0.056)
No. of Applications at Firms	-	**-0.000**	-	0.000	-	0.000
		(0.002)		(0.003)		(0.002)
DE/AT	**-**	**-**	**0.281**	**0.285**	**-**	**-**
			(0.212)	(0.216)		
Years in CH (ln) * DE/AT	**-**	**-**	**-0.045**	**-0.047**	**-**	**-**
			(0.094)	(0.097)		
Swiss Parent	**-**	**-**	**-**	**-**	**0.501*****	**0.503*****
					(0.173)	(0.175)
Years in CH (ln) * Swiss Parent	**-**	**-**	**-**	**-**	**-0.167****	**-0.168****
					(0.070)	(0.071)
N	215	215	215	215	215	215

Notes: The table displays marginal effects of probit estimations and robust standard errors in parentheses. *,** and *** denote significance at the 10%, 5% and 1% level, respectively. The regressions include control variables, canton dummies and birth country dummies. PISA data 2000.

Robustness: Emigration Probability

The estimates presented so far might reflect differences in the probability of leaving Switzerland. Concretely, people intending to leave Switzerland focus on the value of dual VET abroad rather than in Switzerland. Hence, assuming that the probability of leaving Switzerland decreases with the time spent in Switzerland suggests that the objective value of dual VET at the same time increases. Though this would reflect a change in social status of dual VET, it would arise due to differences in the probability of going abroad rather than from a knowledge gain. Furthermore, this argument suggests that our sample might be biased as we only observe individuals that remain in Switzerland.

To test this potential endogeneity bias, figure 6 in appendix A-3 shows the average marginal effects of time spent in Switzerland on the probability of selecting a dual VET for two groups, namely for immigrants who remain in the TREE data from 2000 until 2010 and for immigrants who do not respond in 2010, i.e. who have either emigrated or do not take part in the survey anymore for another reason. The figure shows that the effect size is larger in the non-responding sample. While the difference is not statistically significant, this finding has the opposite sign than the previous argument suggests. Hence, this test provides suggestive evidence that our results are not driven by expected emigration patterns.

Conclusion

The aim of this study was to deepen the understanding of the phenomenon of the social status of education programmes. As existing research does not provide a satisfactory concept for measuring the social status of education programmes, we propose a new approach to measure changes in the social status of education programmes. This approach relies on a theoretical framework suggesting that the probability of choosing a

particular education programme, conditional on ability and institutional context, reflects a change in the social status of that education programme. Equivalently, the change in the social status of an education programme can be expressed by the average relative ability of adolescents choosing that education programme compared to the cohort.

Whereas this novel measurement can be used to analyse the social status of different education programmes in any country, we apply it to the case of Switzerland to test whether growing knowledge about the education system increases the social status of dual VET. As we are not able to directly measure this knowledge gain, we approximate it by investigating immigrant adolescents with different length of stay in Switzerland, arguing that their knowledge of the education system increases with their time spent in this country.

Our results confirm existing evidence that the social status of dual VET is perceived lower by immigrant adolescents than by the ones born in Switzerland (Cattaneo and Wolter 2013). In addition, our results show that the social status of dual VET increases as immigrants live longer in Switzerland. Two alternative DiD settings support these results. The first approach exploits the idea that immigrants from Austria and Germany already know the value of dual VET, suggesting that they gain less knowledge on the Swiss education system by living in Switzerland longer. Similarly, the knowledge of immigrant adolescents with at least one parent born in Switzerland also increases less over time.

The findings suggest that in Switzerland, immigrants should receive information on the Swiss education system at an early stage. With that, adolescents can learn about the true value of dual VET instead of allowing a stigma to distort their educational choices. In addition, the introduction of new education programmes should from the beginning be complemented by provision of information, e.g. through guidance and

counselling systems. The aim is to optimally equip adolescents "to understand and assess their learning and career opportunities to make more informed choices about the pathways to take" (Lasonen and Gordon 2009: 54).

The paper addresses unobserved heterogeneity in terms of migration waves and settlement pattern by controlling for canton and country of birth fixed effects, country of birth trends and two alternative DiD approaches. Nevertheless, some concerns regarding endogeneity due to unobserved heterogeneity, e.g. in terms of non-cognitive skills remain. Hence, future research should exploit quasi-experimental variation to confirm these empirical findings.

As discussed above, the study interprets the effect of living longer in Switzerland as the result of an increase in knowledge about the education system. Alternatively, the measured change could result from socialisation and adaptation to the values held in the Swiss society, which might be transferred through peers or teachers. Future research should establish more precise measures of knowledge to disentangle the mechanisms behind this change in the perceived social status of dual VET with the length of stay in Switzerland. In addition, the reasons behind differences in the valuation of dual VET, even for people from countries with similar dual VET systems, could be of interest for further research. For example, the question of how far this valuation is linked to the range of occupations for which dual VET prepares or to the income and career perspectives associated with these occupations. Another research question could address the development of the social status of education programmes over time, e.g. changes in the perceived social status of newly introduced education programmes or other educational reforms. Similarly, the social status of education programmes could be compared between different groups of adolescents, e.g. geographical regions, gender, social class.

Endnotes

1. VET refers to education and training programmes designed for, and typically directly leading to, a particular profession or occupation (OECD 2004).
2. We speak of VET as a system because in Switzerland, VET is defined as own system ('Berufsbildungssystem') in Art. 3 Abs. a of the Federal Act on Vocational and Professional Education and Training, VPETA, 13 December 2002 (SR 412.10). Consequently, the VET curriculum for each occupation is defined in a national training ordinance and graduates receive a federally recognised degree.
3. The Swiss youth panel study TREE (Transitions from Education to Employment; www.tree-ch.ch) has been running since 2000 and has since been funded by the Swiss National Science Foundation, the University of Basel, the Swiss Federal Office of Statistics, the Federal Office of Professional Education and Technology, and the cantons of Berne, Geneva and Ticino. Distribution: Data service, FORS, Lausanne.

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Appendices

A-1 Summary Statistics

Table 7. Summary statistics

	N	Mean	Std. Dev.	Min	Max
MAIN VARIABLES					
Educational choice: dual VET	955	0.628	0.484	0	1
Reading scores	955	485.230	94.740	175.138	753.549
Mathematics scores	955	523.526	95.171	274.864	784.943
Years in Switzerland	955	10.994	4.081	1.000	18.000
DiD1: Birth country with dual VET system (DE/AT)	955	0.156	0.363	0	1
DiD2: Parent born in CH	955	0.222	0.416	0	1
CONTROL VARIABLES					
Year (PISA wave)					
2000	955	0.173	0.378	0	1
2003	955	0.542	0.498	0	1
2009	955	0.285	0.452	0	1
Canton					
ZH	955	0.208	0.406	0	1
BE	955	0.098	0.298	0	1
SH	955	0.041	0.198	0	1
SG	955	0.230	0.421	0	1
AG	955	0.139	0.346	0	1
D-Rest	955	0.202	0.402	0	1
FR	955	0.003	0.056	0	1
VS	955	0.077	0.268	0	1
Country of birth					
DE/AT	955	0.156	0.363	0	1
FR / BE	955	0.010	0.102	0	1
IT	955	0.035	0.183	0	1
ES	955	0.009	0.097	0	1
PT	955	0.035	0.183	0	1
YU	955	0.352	0.478	0	1
AL / KO	955	0.107	0.309	0	1
TR	955	0.031	0.175	0	1
Other countries	955	0.265	0.442	0	1
Country of birth of father					
CH/FL	955	0.173	0.378	0	1
DE/AT	955	0.102	0.302	0	1
FR / BE	955	0.005	0.072	0	1
IT	955	0.045	0.207	0	1
ES	955	0.009	0.097	0	1
PT	955	0.031	0.175	0	1
YU	955	0.356	0.479	0	1

	N	Mean	Std. Dev.	Min	Max
AL / KO	955	0.106	0.308	0	1
TR	955	0.031	0.175	0	1
Other countries	955	0.141	0.349	0	1
Country of birth of mother					
CH/FL	955	0.128	0.334	0	1
DE/AT	955	0.132	0.339	0	1
FR / BE	955	0.007	0.085	0	1
IT	955	0.026	0.160	0	1
ES	955	0.007	0.085	0	1
PT	955	0.031	0.175	0	1
YU	955	0.356	0.479	0	1
AL / KO	955	0.108	0.310	0	1
TR	955	0.030	0.172	0	1
Other countries	955	0.174	0.379	0	1
Number of books at home					
0-10 books at home	955	0.237	0.425	0	1
11-100 books at home	955	0.460	0.499	0	1
101-500 books at home	955	0.223	0.417	0	1
>500 books at home	955	0.081	0.272	0	1
Age in months	**955**	**193.694**	**8.716**	**169**	**233**
Male	**955**	**0.545**	**0.498**	**0**	**1**
ISEI of father	**955**	**42.889**	**17.766**	**16**	**88**
Highest education of mother					
ISCED 2 and lower	955	0.464	0.499	0	1
ISCED 3B,C	955	0.183	0.387	0	1
ISCED 3A, 4	955	0.089	0.285	0	1
ISCED 5A, B, 6	955	0.264	0.441	0	1
Living area (urbanity)					
Village (<3'000)	955	0.111	0.314	0	1
Small town (3'000-15'000)	955	0.573	0.495	0	1
Town (15'000-100'000)	955	0.194	0.395	0	1
City (100'000-1'000'000)	955	0.123	0.328	0	1
Family structure					
Single	955	0.082	0.274	0	1
Nuclear	955	0.850	0.357	0	1
Mixed	955	0.047	0.212	0	1
Other	955	0.021	0.143	0	1
Swiss parent Mother, father, or both born in CH	955	0.222	0.416	0	1
Number of applications (for 2000 sample)					
Applications at firms	226	4.115	7.212	0	50
Applications at schools	209	1.172	1.593	0	9

Notes: The table shows descriptive statistics for all variables based on pooled PISA data of 2000, 2003, 2009.

A-2 Additional Regression Results

Table 8. Baseline Approach for the probability of selecting a dual VET

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Reading scores (ln)	**-0.783***** (0.125)	**-0.324**** (0.136)	**-0.308**** (0.136)	**-0.363***** (0.137)	**-0.340**** (0.136)	**-0.363***** (0.135)
Mathematics scores (ln)	**-0.747***** (0.127)	**-0.895***** (0.135)	**-0.831***** (0.136)	**-0.822***** (0.135)	**-0.857***** (0.135)	**-0.830***** (0.134)
Years in CH (ln)	**0.094***** (0.025)	**0.077***** (0.024)	**0.075***** (0.023)	**0.088***** (0.023)	**0.090***** (0.023)	**0.083*** (0.043)
0-10 books at home		0.209*** (0.056)	0.196*** (0.053)	0.194*** (0.054)	0.183*** (0.054)	0.181*** (0.053)
11-100 books at home		0.169*** (0.049)	0.165*** (0.044)	0.171*** (0.044)	0.168*** (0.044)	0.166*** (0.043)
101-500 books at home		0.101** (0.050)	0.093** (0.045)	0.104** (0.044)	0.107** (0.044)	0.107** (0.043)
>500 books at home *(Ref.)*		- -	- -	- -	- -	- -
Age (ln)		-0.336 (0.345)	-0.199 (0.349)	-0.139 (0.335)	-0.163 (0.330)	-0.179 (0.336)
Male		1.220 (2.551)	0.578 (2.513)	-0.380 (2.479)	-1.395 (2.394)	-1.381 (2.375)
Age*male (ln)		-0.212 (0.485)	-0.093 (0.478)	0.088 (0.471)	0.280 (0.455)	0.277 (0.451)
ISEI of father (ln)		-0.012 (0.035)	-0.025 (0.033)	-0.022 (0.034)	-0.031 (0.034)	-0.038 (0.034)
ISCED 1 mother		0.064** (0.032)	0.054* (0.030)	0.067** (0.030)	0.071** (0.030)	0.061** (0.031)
ISCED 2 mother		0.095*** (0.035)	0.088*** (0.034)	0.087** (0.034)	0.094*** (0.034)	0.084** (0.034)
ISCED 3 mother		0.011 (0.044)	0.011 (0.042)	0.018 (0.042)	0.023 (0.042)	0.019 (0.042)
ISCED 4 mother *(Ref.)*		- -	- -	- -	- -	- -
Village (<3'000) *(Ref.)*		- -	- -	- -	- -	- -
Small town (3'000-15'000)		-0.026 (0.039)	-0.057 (0.039)	-0.066 (0.039)	-0.078* **(0.039)**	-0.081** (0.039)
Town (15'000-100'000)		-0.098** (0.045)	-0.178*** (0.047)	-0.185*** (0.046)	**-0.204***** (0.046)	-0.205*** (0.047)
City (100'000-1'000'000)		-0.175*** (0.050)	-0.296*** (0.055)	-0.297*** (0.055)	-0.313*** (0.056)	-0.307*** (0.056)
Single family type		0.051 (0.093)	0.046 (0.095)	0.033 (0.090)	0.057 (0.089)	0.052 (0.089)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Nuclear family type		0.073	0.073	0.067	0.086	0.084
		(0.084)	(0.087)	(0.083)	(0.083)	(0.082)
Mixed family type		0.089	0.075	0.056	0.078	0.074
		(0.094)	(0.095)	(0.089)	(0.090)	(0.089)
Other family type		-	-	-	-	
(Ref.)		-	-	-	-	
Swiss parent		0.040	0.044*	0.058*	0.052	0.054
		(0.028)	(0.027)	(0.031)	(0.075)	(0.076)
Years	yes	yes	yes	yes	yes	yes
Canton	no	no	yes	yes	yes	yes
Birth Country	no	no	no	yes	yes	yes
Birth Country Father	no	no	no	no	yes	yes
Birth Country Mother	no	no	no	no	yes	yes
Birth Country Trends	no	no	no	no	no	yes
Observations (N)	955	955	952	952	952	952

Notes: The table displays marginal effects of probit estimations and robust standard errors in parentheses (*,** and *** denote significance at the 10%, 5% and 1% level, respectively). Pooled PISA data 2000, 2003, 2009; differences in sample size stem from perfect collinearity.

Table 9. DiD approach with birth country for the probability of selecting a dual VET

	Model 1	Model 2	Model 3	Model 4	Model 5
Reading scores (ln)	-0.854***	-0.386***	-0.363***	-0.383***	-0.361***
	(0.126)	(0.135)	(0.135)	(0.136)	(0.135)
Mathematics scores (ln)	-0.763***	-0.879***	-0.810***	-0.802***	-0.836***
	(0.128)	(0.135)	(0.135)	(0.135)	(0.134)
Years in CH (ln)	0.134***	0.122***	0.117***	0.118***	0.118***
	(0.035)	(0.032)	(0.031)	(0.031)	(0.032)
Birth country with	0.252**	0.314***	0.281***	0.299***	0.250**
dual VET system (DE/AT)	(0.110)	(0.101)	(0.097)	(0.098)	(0.116)
Birth country DE/AT	-0.068	-0.086**	-0.077*	-0.080*	-0.076*
***Years in CH (ln)**	(0.047)	(0.044)	(0.042)	(0.042)	(0.044)
0-10 books at home		0.235***	0.218***	0.205***	0.190***
		(0.054)	(0.051)	(0.053)	(0.053)
11-100 books at home		0.188***	0.181***	0.178***	0.172***
		(0.046)	(0.042)	(0.044)	(0.044)
101-500 books at home		0.111**	0.101**	0.106**	0.107**
		(0.047)	(0.043)	(0.044)	(0.043)
>500 books at home *(Ref.)*		-	-	-	-
		-	-	-	-
Age (ln)		-0.233	-0.107	-0.101	-0.140
		(0.338)	(0.348)	(0.335)	(0.329)

	Model 1	Model 2	Model 3	Model 4	Model 5
Male		0.598	-0.015	-0.395	-1.339
		(2.495)	(2.465)	(2.470)	(2.398)
Age*male (ln)		-0.096	0.018	0.091	0.269
		(0.474)	(0.469)	(0.469)	(0.456)
ISEI of father (ln)		-0.026	-0.038	-0.022	-0.030
		(0.035)	(0.033)	(0.033)	(0.034)
ISCED 1 mother		0.070**	0.061**	0.067**	0.069**
		(0.032)	(0.029)	(0.030)	(0.030)
ISCED 2 mother		0.086**	0.082**	0.083**	0.091***
		(0.035)	(0.034)	(0.034)	(0.034)
ISCED 3 mother		0.019	0.019	0.019	0.024
		(0.043)	(0.041)	(0.042)	(0.042)
ISCED 4 mother *(Ref.)*		-	-	-	-
		-	-	-	-
Village (<3'000) *(Ref.)*		-	-	-	-
		-	-	-	-
Small town (3'000-15'000)		-0.039	-0.070*	-0.070*	-0.082**
		(0.039)	(0.039)	(0.039)	(0.039)
Town (15'000-100'000)		-0.108**	-0.185***	-0.187***	-0.208***
		(0.044)	(0.046)	(0.046)	(0.046)
City (100'000-1'000'000)		-0.172***	-0.291***	-0.293***	-0.312***
		(0.049)	(0.055)	(0.056)	(0.056)
Single family type		0.046	0.037	0.026	0.051
		(0.091)	(0.095)	(0.091)	(0.090)
Nuclear family type		0.073	0.070	0.059	0.081
		(0.083)	(0.088)	(0.083)	(0.083)
Mixed family type		0.071	0.058	0.050	0.073
		(0.092)	(0.094)	(0.090)	(0.090)
Other family type *(Ref.)*		-	-	-	-
		-	-	-	-
Swiss parent		0.057**	0.060**	0.067**	0.062
		(0.028)	(0.027)	(0.031)	(0.075)
Years	yes	yes	yes	yes	yes
Canton	no	no	yes	yes	yes
Birth Country	no	no	no	yes	yes
Birth Country Father	no	no	no	no	yes
Birth Country Mother	no	no	no	no	yes
Birth Country Trends	no	no	no	no	no
Observations (N)	955	955	952	952	952

Notes: The table displays marginal effects of probit estimations and robust standard errors in parentheses (*,** and *** denote significance at the 10%, 5% and 1% level, respectively). Pooled PISA data 2000, 2003, 2009; differences in sample size stem from perfect collinearity.

Table 10. Placebo test for DiD approach with birth country for the probability of selecting a dual VET

	DE/AT	FR/BE	IT/ES/PT	YU/AL/ KO/TR	OTHER
Reading scores (ln)	**-0.361***** (0.135)	**-0.326**** (0.136)	**-0.357**** (0.138)	**-0.350**** (0.134)	**-0.340**** (0.136)
Mathematics scores (ln)	**-0.836***** (0.134)	**-0.862***** (0.134)	**-0.844***** (0.136)	**-0.849***** (0.132)	**-0.857***** (0.135)
Years in CH (ln)	**0.118***** (0.032)	**0.088***** (0.023)	**0.085***** (0.024)	**0.074***** (0.025)	**0.093***** (0.028)
Birth country group	**0.250**** (0.116)	**-1.822***** (0.658)	**-0.621***** (0.228)	**0.488***** (0.178)	**-0.049** (0.138)
Years in CH (ln) * Birth country group	**-0.076*** (0.044)	**0.719***** (0.273)	**0.120** (0.117)	**0.054** (0.056)	**-0.009** (0.052)
0-10 books at home	0.190*** (0.053)	0.182*** (0.054)	0.182*** (0.053)	0.186*** (0.054)	0.182*** (0.054)
11-100 books at home	0.172*** (0.044)	0.167*** (0.044)	0.169*** (0.044)	0.169*** (0.044)	0.168*** (0.044)
101-500 books at home	0.107** (0.043)	0.107** (0.043)	0.107** (0.043)	0.110** (0.044)	0.108** (0.044)
>500 books at home *(Ref.)*	- -	- -	- -	- -	
Age (ln)	-0.140 (0.329)	-0.166 (0.330)	-0.200 (0.330)	-0.122 (0.338)	-0.162 (0.331)
Male	-1.339 (2.398)	-1.326 (2.390)	-1.654 (2.364)	-1.215 (2.393)	-1.390 (2.392)
Age*male (ln)	0.269 (0.456)	0.267 (0.454)	0.329 (0.449)	0.246 (0.455)	0.279 (0.455)
ISEI of father (ln)	-0.030 (0.034)	-0.034 (0.034)	-0.032 (0.034)	-0.034 (0.034)	-0.032 (0.034)
ISCED 1 mother (ln)	0.069** (0.030)	0.069** (0.031)	0.068** (0.030)	0.071** (0.031)	0.071** (0.030)
ISCED 2 mother (ln)	0.091*** (0.034)	0.092*** (0.034)	0.092*** (0.034)	0.091*** (0.034)	0.094*** (0.034)
ISCED 3 mother (ln)	0.024 (0.042)	0.024 (0.042)	0.021 (0.042)	0.023 (0.042)	0.023 (0.042)
ISCED 4 mother (ln) *(Ref.)*	- -	- -	- -	- -	- -
Village (<3'000) *(Ref.)*	- -	- -	- -	- -	- -
Small town (3'000-15'000)	-0.082** (0.039)	-0.081** (0.039)	-0.077* (0.039)	-0.081* (0.040)	-0.078* (0.039)
Town (15'000-100'000)	-0.208*** (0.046)	-0.206*** (0.046)	-0.202*** (0.047)	-0.206*** (0.046)	-0.204*** (0.046)

	DE/AT	FR/BE	IT/ES/PT	YU/AL/ KO/TR	OTHER
City (100'000-1'000'000)	-0.312***	-0.314***	-0.309***	-0.314***	-0.313***
	(0.056)	(0.056)	(0.057)	(0.056)	(0.056)
Single family type	0.051	0.057	0.058	0.056	0.057
	(0.090)	(0.089)	(0.089)	(0.088)	(0.089)
Nuclear family type	0.081	0.085	0.087	0.084	0.086
	(0.083)	(0.083)	(0.083)	(0.081)	(0.082)
Mixed family type	0.073	0.079	0.078	0.073	0.078
	(0.090)	(0.089)	(0.089)	(0.088)	(0.089)
Other family type *(Ref.)*	-	-	-	-	-
	-	-	-	-	-
Swiss parent	0.062	0.042	0.050	0.049	0.050
	(0.075)	(0.076)	(0.075)	(0.074)	(0.075)
Observations (N)	952	952	952	952	952

Notes: The table displays marginal effects of probit estimations and robust standard errors in parentheses (*,** and *** denote significance at the 10%, 5% and 1% level, respectively). The regressions include year dummies, canton dummies, birth country dummies, birth country of father and mother dummies, and control variables. Pooled PISA data 2000, 2003, 2009.

Table 11. DiD approach with parent born in Switzerland for the probability of selecting a dual VET

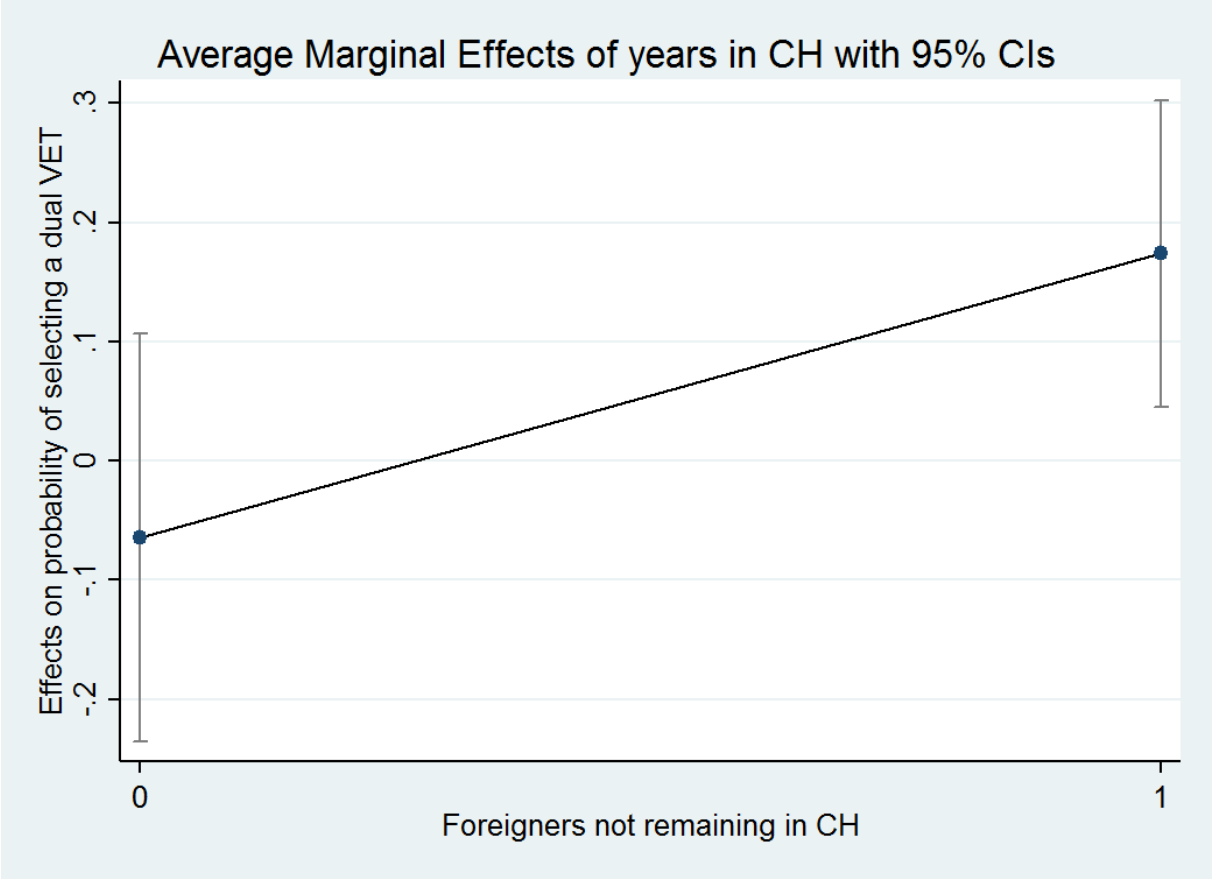
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Reading scores (ln)	-0.788***	-0.323**	-0.309**	-0.369***	-0.350**	-0.365***
	(0.125)	(0.135)	(0.136)	(0.136)	(0.135)	(0.136)
Mathematics scores (ln)	-0.753***	-0.893***	-0.825***	-0.818***	-0.851***	-0.824***
	(0.127)	(0.134)	(0.135)	(0.134)	(0.133)	(0.133)
Years in CH (ln)	0.105***	0.092***	0.092***	0.116***	0.119***	0.195***
	(0.029)	(0.029)	(0.027)	(0.027)	(0.027)	(0.063)
Swiss parent	0.139	0.187	0.211*	0.307**	0.292**	0.430***
	(0.151)	(0.133)	(0.123)	(0.123)	(0.135)	(0.163)
Years in CH (ln) * Swiss parent	-0.050	-0.063	-0.072	-0.108**	-0.118**	-0.176***
	(0.063)	(0.056)	(0.052)	(0.053)	(0.054)	(0.066)
0-10 books at home		0.208***	0.196***	0.197***	0.188***	0.191***
		(0.057)	(0.054)	(0.056)	(0.056)	(0.055)
11-100 books at home		0.168***	0.165***	0.173***	0.174***	0.177***
		(0.050)	(0.046)	(0.046)	(0.046)	(0.045)
101-500 books at home		0.102**	0.095**	0.108**	0.113**	0.110**
		(0.051)	(0.046)	(0.046)	(0.046)	(0.045)
>500 books at home *(Ref.)*		-	-	-	-	-
		-	-	-	-	-
Age (ln)		-0.348	-0.210	-0.159	-0.168	-0.222
		(0.345)	(0.349)	(0.336)	(0.331)	(0.335)
Male		1.189	0.562	-0.487	-1.454	-1.598

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
		(2.542)	(2.500)	(2.460)	(2.393)	(2.388)
Age*male (ln)		-0.207	-0.090	0.108	0.291	0.318
		(0.483)	(0.475)	(0.467)	(0.455)	(0.454)
ISEI of father (ln)		-0.012	-0.026	-0.026	-0.036	-0.038
		(0.035)	(0.033)	(0.033)	(0.033)	(0.033)
ISCED 1 mother		0.062*	0.051*	0.065**	0.069**	0.060*
		(0.032)	(0.030)	(0.030)	(0.030)	(0.030)
ISCED 2 mother		0.094***	0.087***	0.084**	0.090***	0.082**
		(0.035)	(0.033)	(0.033)	(0.033)	(0.033)
ISCED 3 mother		0.007	0.007	0.014	0.020	0.018
		(0.044)	(0.042)	(0.042)	(0.043)	(0.043)
ISCED 4 mother *(Ref.)*		-	-	-	-	-
		-	-	-	-	-
Village (<3'000) *(Ref.)*		-	-	-	-	-
		-	-	-	-	-
Small town (3'000-15'000)		-0.025	-0.057	-0.066	-0.076*	-0.079**
		(0.039)	(0.039)	(0.039)	(0.039)	(0.038)
Town (15'000-100'000)		-0.100**	-0.181***	-0.190***	-0.208***	-0.212***
		(0.045)	(0.047)	(0.046)	(0.046)	(0.046)
City (100'000-1'000'000)		-0.178***	-0.300***	-0.303***	-0.317***	-0.312***
		(0.050)	(0.055)	(0.055)	(0.056)	(0.056)
Single family type		0.052	0.048	0.037	0.056	0.047
		(0.092)	(0.093)	(0.088)	(0.087)	(0.088)
Nuclear family type		0.075	0.076	0.073	0.088	0.085
		(0.083)	(0.085)	(0.080)	(0.080)	(0.081)
Mixed family type		0.078	0.062	0.036	0.054	0.044
		(0.094)	(0.093)	(0.086)	(0.087)	(0.087)
Other family type *(Ref.)*		-	-	-	-	-
		-	-	-	-	-
Years	yes	yes	yes	yes	yes	yes
Canton	no	no	yes	yes	yes	yes
Birth Country	no	no	no	yes	yes	yes
Birth Country Father	no	no	no	no	yes	yes
Birth Country Mother	no	no	no	no	yes	yes
Birth Country Trends	no	no	no	no	no	yes
Observations (N)	955	955	952	952	952	952

Notes: The table displays marginal effects of probit estimations and robust standard errors in parentheses (*,** and *** denote significance at the 10%, 5% and 1% level, respectively). Pooled PISA data 2000, 2003, 2009; differences in sample size stem from perfect collinearity.

A-3 Robustness Checks for the Regression Results

Figure 6. Average marginal effects of time spent in Switzerland on the probability of selecting a dual VET for immigrants remaining and not remaining in Switzerland for a prolonged period



Notes: The marginsplot is based on TREE data (longitudinal follow-up study to PISA 2000); N=76; Immigrants are identified as remaining in Switzerland (baseline) if they still participated in the TREE wave in 2010, hence 10 years later. However, this is just an approximation as there might be other reasons (e.g. refusal, disinterest, event of death) than emigration why immigrants did not take part in the TREE wave in 2010.