



EDUCATION PATHWAYS FROM COMPULSORY SCHOOL TO YOUNG ADULTHOOD: THE FIRST TEN YEARS

Results of the Swiss panel survey TREE, part I

KATJA SCHARENBERG
MELANIA RUDIN
BARBARA MÜLLER
THOMAS MEYER
SANDRA HUPKA-BRUNNER

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1. INTRODUCTION

This report presents the results of research on young people's education and employment pathways from compulsory school to young adulthood in Switzerland. The data for this research has been provided by the TREE panel study ("Transitions from Education to Employment"). The analyses are based on data from the first eight panel waves from 2001 to 2010.

The report focuses on the educational pathways that the PISA 2000/TREE cohort has pursued until 2010. A second report addressing in-depth the various aspects of their labour market experience (e.g., income, unemployment, precarious employment etc.) is currently in preparation.

This report of results is organised as follows: Section 2 gives a brief overview of the goals, design, methodology and implementation of the TREE study. Section 3 is devoted to the respondents' education and employment pathways since completing compulsory education in 2000. Section 4 focuses on their educational attainment by 2010. In addition to a general description across all respondents, this section gives a more detailed account of how individual and achievement-related characteristics of the respondents and specifics of the Swiss language regions influence educational attainment (Sections 4.1 to 4.5). Section 4.6 takes into consideration that a substantial part of the respondents were still in education even ten years after leaving compulsory education and asks how this can be expected to affect their final level of educational attainment in the future. In Section 4.7, TREE's findings on educational attainment will be compared with those of other studies. The report concludes by giving a brief outlook on the future of TREE.

For more detailed findings drawing on the earlier panel waves, interested readers may consult the numerous in-depth analyses that the project has published in recent years (see references, p. 24). Many of these publications are available for download on the project website (www.tree.unibas.ch). This report continues where the earlier synopses by Meyer (2005), Bertschy, Böni and Meyer (2007) and Keller, Hupka-Brunner & Meyer (2010), based on previous TREE panel data, left off.

2. TREE PROJECT PROFILE AND METHODOLOGICAL DESIGN

TREE is the first longitudinal study at the national level in Switzerland to address the transition of young people from school to work and young adulthood. The survey centres on post-compulsory education and employment pathways. The TREE sample consists of approximately 6,000 young people who participated in the PISA survey (Programme for International Student Assessment; BFS & EDK, 2002) in 2000 and left compulsory schooling in the same year. It is a representative sample of Switzerland as a whole, the Swiss language regions and selected cantons (Berne, Geneva, Ticino, St. Gallen).

As Figure 1 illustrates, the first phase of the project (involving the three follow-up surveys between 2001 and 2003) tracked the respondents' education and employment pathways at the interface of compulsory school and upper secondary general or vocational education (the so-called *first threshold*). During this first phase, the main focus was on reasons for and typical trajectories and consequences of irregular or critical educational careers, with particular attention paid to early dropout (young people who fail to graduate from a post-compulsory education or training programme).

FIGURE 1: TREE SURVEY DESIGN

| Year | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---------------------------------------|--------------------------|---|--------------|--------------|--|--------------|--------------|---|--------------|------|--------------|------|--------------|------|--------------|------|------|
| Ø age of sample | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| Transition progress of sample | End of compulsory school | Transitions from lower sec. to upper sec. | | | Transitions from upper sec. to tertiary level or labour market | | | Transitions from tertiary level to labour market or consolidation of early labour market career | | | | | | | | | |
| Surveys | PISA 2000 | TREE panel 1 | TREE panel 2 | TREE panel 3 | TREE panel 4 | TREE panel 5 | TREE panel 6 | TREE panel 7 | | | TREE panel 8 | | | | TREE panel 9 | | |
| Project organisation | | TREE phase 1 | | | | TREE phase 2 | | | TREE phase 3 | | | | TREE phase 4 | | | | |
| Sample size and response rates | valid sample | 6,343 | 5,944 | 5,605 | 5,344 | 5,048 | 4,852 | 4,665 | | | 4,571 | | | | | | |
| | response absolute | 5,532 | 5,210 | 4,880 | 4,680 | 4,507 | 4,138 | 3,953 | | | 3,424 | | | | | | |
| | % response/panel | 87% | 88% | 87% | 88% | 89% | 85% | 85% | | | 75% | | | | | | |
| | % response total | 87% | 82% | 77% | 74% | 71% | 65% | 62% | | | 54% | | | | | | |

Bold: completed; italics: planned

In the second phase of TREE (involving four more annual follow-up surveys between 2004 and 2007), the survey centred on what we refer to as the *second threshold*, that is, the transition from upper secondary education to working life or tertiary education. The third phase (2008–2012) involved a further survey in 2010, ten years after completion of compulsory schooling. This phase focused on the transition to employment by respondents who completed tertiary education (e.g., at a university) and on the early stages of career consolidation of those cases in which the transition to the labour market occurred after upper secondary education. An additional, ninth follow-up survey of this school-leavers cohort is currently being carried out (in 2014).

As of 2008, TREE has been located at the University of Basel, and the Swiss National Science Foundation (SNSF) has been its major source of funding.

Up until 2004, the data was collected by way of a written questionnaire. From 2005 on, a standardised survey based on a combination of written questionnaire and telephone interview (CATI) has been used. Telephone interviewing is employed to collect key information on education and employment. Following the interview, complementary background information is obtained via a written questionnaire, which is

adapted according to the situation at hand. The PISA 2000/TREE sample is representative of the approximately 80,000 youths in Switzerland who finished the nine years of compulsory education in 2000 and left compulsory school the same year.

The data have been weighted to compensate for biases due to sample attrition, a common effect in any longitudinal research. Hence, the TREE results are not exact values but statistically inferred estimates for the described sample. Within certain margins of error, these estimates can be assumed to be representative of the population under study, that is, the school leavers of the year 2000. The estimates thus involve some degree of uncertainty so that, for instance, the “actual” proportion of individuals with a certain level of education lies within a confidence interval around the respective value indicated.

All calculations were performed on appropriately weighted samples (Sacchi 2011). Parameter estimates and confidence interval calculations were all performed using suitable methods to properly model the complex structure of the PISA 2000/TREE sample.¹ The estimates in this publication, as a rule, are expressed in integer percentages or are rounded to thousands in the case of absolute population estimates. This publication generally reports only results and differences that are statistically significant regardless of estimation and rounding errors. Upon request, the authors will gladly provide more detailed information on weighting and parameter estimation methodology.

¹ For a discussion of variance estimates for complex samples as a result of multi-stage, stratified sampling procedures, see Sacchi, 2007.

3. EDUCATION AND EMPLOYMENT PATHWAYS OF THE PISA 2000/TREE COHORT: SYNOPSIS 2000–2010

What pathways do youths and young adults in Switzerland choose to pursue after completing compulsory education? What patterns can we identify in their post-compulsory education and employment careers? Figure 2 (p. 10) illustrates the education and employment pathways of the PISA 2000/TREE cohort from 2000 to 2010, both cross-sectionally at the time of each of the eight surveys and longitudinally along the three dimensions of education, educational attainment and employment.

3.1 *The first seven years after leaving school (2001–2007)*

One year after completing compulsory education (i.e., the trunk of the tree in the diagram) – hence at the time of the first TREE survey in 2001 – 20 per cent of the respondents participate in some sort of interim solution (e.g., an additional tenth year of schooling, various intermediate or preparatory training programmes, internships, language stays etc.). Another four per cent pursue no educational activity whatsoever. We can therefore conclude that roughly one-quarter of the youths fail to successfully make the transition to some form of certifying upper secondary education² at the so-called *first threshold*. In the second year upon completing compulsory education, however, approximately two-thirds of the youths who participated in an interim solution of some kind a year earlier make the transition to vocational education and training (VET), which still remains, by far, the most frequent post-compulsory education pathway of upper secondary education: In 2002 and 2003, almost two-thirds of the cohort under study is participating in a VET programme, whereas about one-quarter is enrolled in general upper secondary education. In 2003, four per cent is already in employment – however, without having completed upper secondary education.³

The transition from upper secondary education to the labour market or tertiary education (which we have called the *second threshold*) begins in 2004 – although as a rather strongly fragmented process. At this point, the tree diagram branches out into two major pathways: the transition to employment (left side of the treetop) is mostly made by those who have completed VET, whereas graduates of general education programmes tend to enter tertiary education (e.g., universities or universities of applied sciences; right side of the treetop). For a detailed account of these transitions, we refer the reader to Keller et al. (2010). Here, we would like to highlight the following aspects:

1. Whereas the proportion of students enrolled in general upper secondary education drops rapidly and sharply in 2004, as the majority quickly enters tertiary education, the transition among VET graduates proceeds much more sluggishly (middle part of the tree diagram). On the one hand, this owes to the delays mentioned above, particularly in entering VET. Youths who managed to enter post-compulsory education at the upper secondary level only after a period of one or two years upon leaving compulsory school are still in education at this point in time. On the other hand, first exploratory micro-level analyses of the educational careers suggest that a considerable proportion of the cohort has experienced some sort of discontinuity even during basic VET (e.g., switching from one programme to another, interruptions, need to repeat a year etc.; see Stalder 2012). This is reflected in the fact that in 2006, six years after leaving compulsory schooling, more than one in ten of the cohort surveyed is still attending basic VET.

² This refers to educational programmes leading to a recognised certificate of upper secondary education, for instance, VET programmes, advanced-track general education (mostly *gymnasium* for acquiring university entrance qualification) and various business, commerce and trade schools (*Handels-, Diplom- or Fachmittelschule*).

³ Values not adding up to 100 per cent owes to the fact that the diagram, for purposes of clarity, considers only education and employment pathways that have been chosen by at least four per cent of the respondents. The values for smaller subgroups are not shown (see legend of Figure 2).

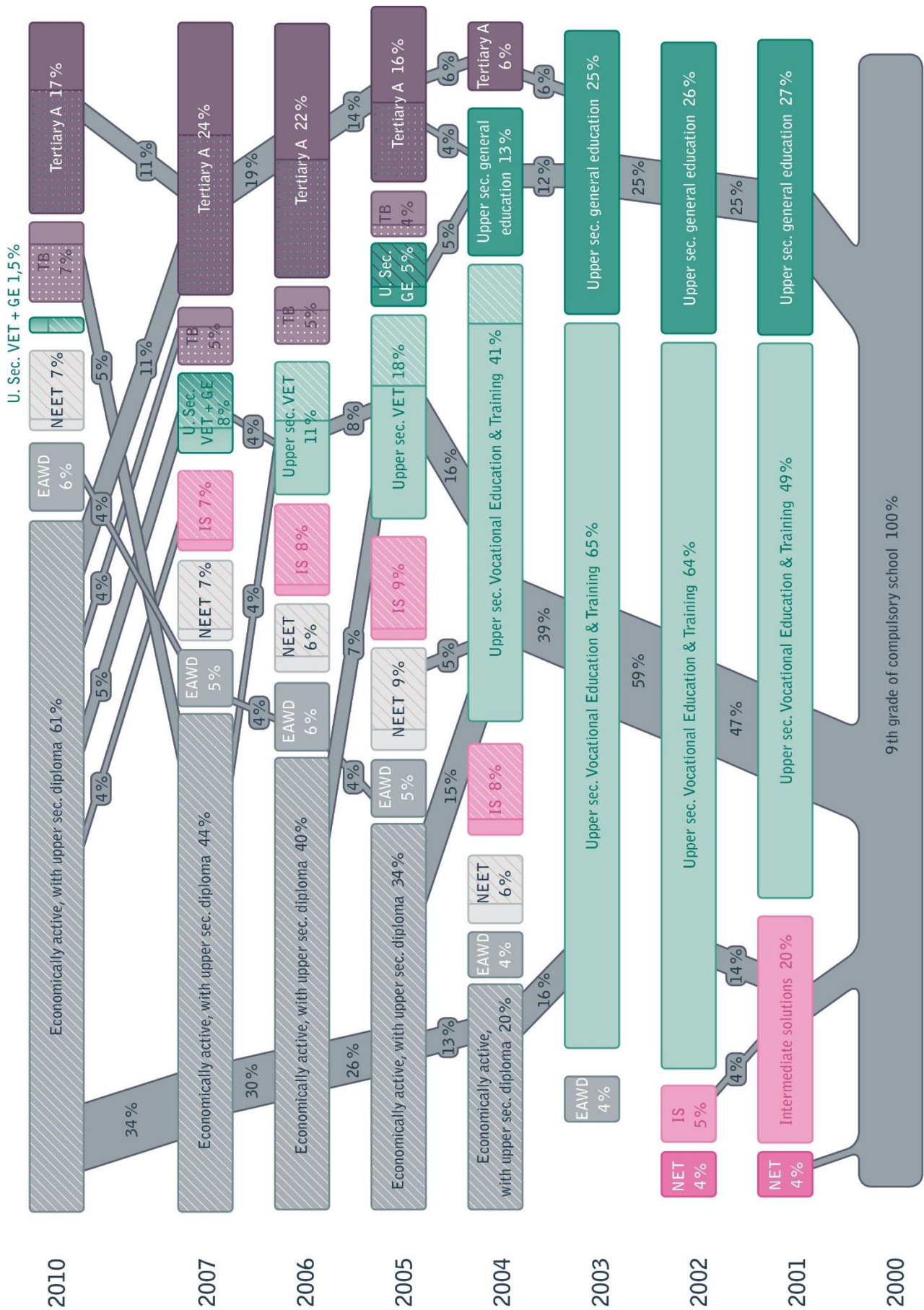
2. The transition from basic VET to employment (top left-hand side of the diagram) takes place gradually over several years. Three years after the end of compulsory education only about a sixth of the cohort has entered the labour market (16%). A year later, after four years, another group of about the same size has made the transition (15%). By 2007, a cumulated 40 per cent of the respondents have completed basic VET and found a job. At this point, another six per cent are employed without having attained a post-compulsory certificate. Thus, seven years after leaving compulsory school, at an average age of 23, half of the cohort has completed the transition from education to employment – either temporarily or permanently.
3. From 2003 to 2004, thus at the earliest possible point in time after completing general upper secondary education, only six per cent of the cohort has moved on to tertiary education (to universities or universities of applied sciences at tertiary-type A; see the upper right-hand corner of the tree diagram). A year later, in 2005, a total of approximately 16 per cent of the respondents are enrolled in tertiary-type A institutions. At this point in time, four per cent of the cohort is attending tertiary-type B education (PET⁴), while five per cent is still in general upper secondary education. In 2007, 24 per cent of the respondents are enrolled in tertiary-type A education and five per cent in tertiary-type B programmes. In a historical perspective, these enrolment rates testify to an impressive increase in the participation in tertiary education in Switzerland, even though Switzerland, by international comparison, still has one of the lowest rates of enrolment in tertiary education of all post-industrial economies (OECD, 2007, p. 69).
4. From 2004 on, we see a substantial number of young adults (14–18%) whose education or employment situation is still up in the air. They are either participating in some sort of interim solution (internships, language stay abroad etc.) or have completely dropped out of any type of education or employment (NEET⁵) – be it temporarily or permanently. The composition of this group shows great diversity: the young mother who performs family work at home full-time falls in this category as do the future students who, for various reasons, decide to take a gap year after graduation before moving on to tertiary education, or the VET graduate who has not yet found a job.⁶ In the latter case, it seems safe to say that this situation is hardly a matter of individual choice but reflects the difficulties of the labour market in absorbing young job seekers, thus denying a certain group of young job entrants the opportunity of direct entry. A look at the tree diagram reveals two aspects that form the “common denominator” among this group. On the one hand, the large majority has successfully completed upper secondary education and holds, for instance, a VET certificate or university entrance qualification (*Matura*). On the other hand, there is a very high degree of fluctuation over time: the absence of vertical “branches” in the tree diagram indicates that only a small part of this group remains in such intermediary situations marked by uncertainty for an extended period of time.

⁴ Professional education and training (PET) colleges, preparatory courses for (advanced) PET diplomas.

⁵ NEET is a common acronym in transition research for “neither in employment nor in education or training”.

⁶ Among those categorized as neither in employment nor in education are those serving mandatory military service.

FIGURE 2: EDUCATION AND EMPLOYMENT PATHWAYS, 2000–2010



POSTCOMPULSORY EDUCATION AND EMPLOYMENT PATHWAYS 2000–2010

NET = Not in education or training
IS = Intermediate solutions
EAWD = Economically active without
upper sec. diploma
NEET = Neither economically active nor
in education or training
VET = Vocational education and training
GE = General education
Tertiary A = Universities and Universities
of Applied Sciences
TB = Tertiary B = other postsecondary
education and training

 upper sec. certificate obtained
 Both enrolled in education/training
and gainfully employed

The sum of the horizontal bars can differ from 100% due to rounding errors and omission of groups smaller than 4 cohort percent.

The vertical bars, symbolising the tree's branches, represent the major pathways from one year of observation to the next. They are (also) proportional to the percentages of the cohort to be found on that pathway, i.e. the thicker the branch, the higher the part of the cohort concerned. Pathways representing groups of less than 4 cohort percent have not been visualised in order to keep the graph readable.

3.2 Education and employment pathways from 2007 to 2010

At the time of the eighth panel wave, in 2010, there are considerable differences in the respondents' education and employment situation compared to 2007 (Keller et al., 2010). If we move along the horizontal bar of the tree diagram for the year 2010, we see that about ten years after leaving compulsory school, the vast majority of the cohort (a total of 67%) is pursuing gainful employment only (without any involvement in educational activities). The large majority of this group (61% of the cohort) graduated from general education or a VET programme at the upper secondary or tertiary level before entering the workforce. Six per cent of the respondents are employed without having attained a post-compulsory certificate. Seven per cent are neither in education nor in employment, the vast majority of which have successfully completed upper secondary education. At an average age of 26, less than 2 per cent of the respondents are still in upper secondary vocational or general education, most of whom hold a first upper secondary degree. All in all, nearly one in four of the cohort under study is enrolled in tertiary education, most of them (17%) at universities, universities of applied sciences or teacher colleges (tertiary-type A). Seven per cent of the cohort is attending tertiary-type B programmes. Most of the individuals enrolled in tertiary programmes are also working.

In a longitudinal perspective, the period from 2007 to 2010 shows a strong transitional dynamic at an average age of 23 to 26 years. Among the 24% of the cohort enrolled in tertiary-type A education in 2007, only approximately one-half (11% of the cohort) is still studying three years later. An equal percentage (11%) of cohort members completed their studies during this period and are exclusively in employment in 2010. Students in other education and training programmes and respondents in intermediary solutions display a similarly strong tendency toward labour market entry in this period. Overall, more than a quarter of the cohort enters the labour market between 2007 and 2010.

However, we can discern a countertrend as well: about five per cent of the cohort that was exclusively in employment in 2007 has commenced a tertiary-type B programme by 2010. This finding corresponds with the results of the Swiss Federal Statistical Office (FSO), which determined an average time span of eight years from the point of acquiring a basic VET certificate (Federal VET Diploma) to the time of graduating from tertiary-type B education and training (BFS, 2011). This confirms the observation that those who choose this pathway typically gain a few years of experience in the labour market before beginning PET. The majority of this group continues working while pursuing advanced training alongside their job.

Lastly, the tree diagram shows that, at this stage, there is little change in the status of the fairly small group of working individuals with no post-compulsory certificate. No other group in the cohort displays greater status continuity. This indicates, on the one hand, that a large part of this group is able to maintain its foothold in the labour market. On the other hand, we may conclude that, at some point, the status of lacking a post-compulsory certificate becomes irreversible. The number of individuals within this group who return to the education system is negligibly small.

The proportion of individuals neither in education nor employment (NEET) fluctuates between six and seven per cent across the last three panel waves. However, for this specific group, there are no “branches” in the tree diagram. This owes to the fact that this status applies to less than four per cent of the respondents for any extended length of time.

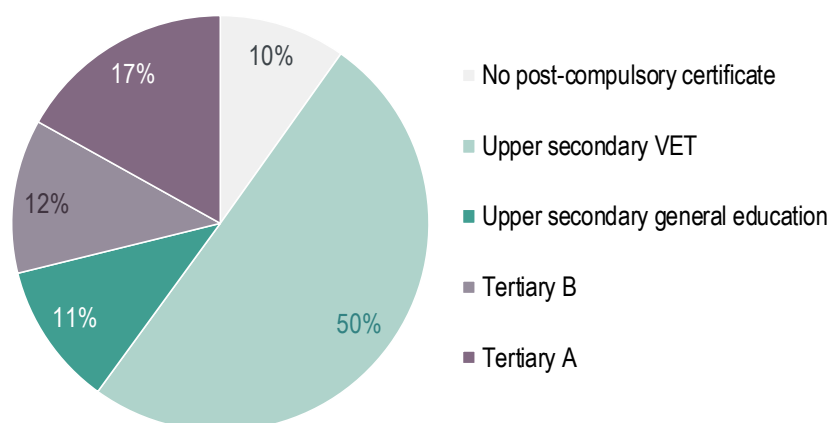
4. EDUCATIONAL ATTAINMENT

Today, completion of an upper secondary education and training programme extending over several years is viewed as an essential requirement for the successful transition from school to work and long-term labour market integration in any modern service and knowledge society (Frey et al., 2012). Post-compulsory education is likewise essential for participating in social and economic resources in adult life later on (BFS, 2004). The reverse holds true as well: a lack of upper secondary graduation clearly limits one's options in the labour market and ability to participate in social life (Keller & Moser, 2013). The graduation rate at the upper secondary level is therefore also an indicator of the effectiveness of the education system in meeting the skills demands of the labour market (BFS & CORECHED, 2004, p. 30).

Below, we first present descriptive findings on educational attainment among the PISA 2000/TREE cohort along various individual and regional characteristics for the period up until 2010. We then use multivariate regression methods to validate the descriptive results.⁷

Figure 3 shows that, by 2010, thus ten years after completing compulsory education, approximately 90 per cent of the members of the TREE cohort have acquired a certificate of general or vocational education at the upper secondary or tertiary level as their highest level of educational attainment. Nearly ten per cent of the TREE respondents, or an estimated total of about 8,000 persons, have not completed a post-compulsory programme at this point.

FIGURE 3: HIGHEST EDUCATIONAL ATTAINMENT OF THE PISA 2000/TREE COHORT BY 2010



Overall, a good 60 per cent of the cohort holds an upper secondary certificate as the highest educational attainment, approximately 50 per cent thereof a VET certificate (Federal VET Diploma or equivalent) and 11 per cent a general university entrance certificate (*Matura* or equivalent).

Twelve per cent of the cohort has acquired a PET diploma by 2010 (tertiary-type B). Roughly 17 per cent of its members have obtained their first degree from a university, university of applied sciences or teacher training college (tertiary-type A; bachelor, master or equivalent). Hence, a total of some 30 per cent of the respondents hold a tertiary certificate ten years after completing compulsory school.

When interpreting the results, we must bear in mind that the level of educational attainment will still change for a considerable part of the cohort after 2010. According to the tree diagram (p. 10), a quarter of the population is still in education (mostly at the tertiary level) in 2010. We can therefore expect the percentage of upper secondary graduates to decrease and that of tertiary graduates to still increase substantially in the future (see also Section 4.6).

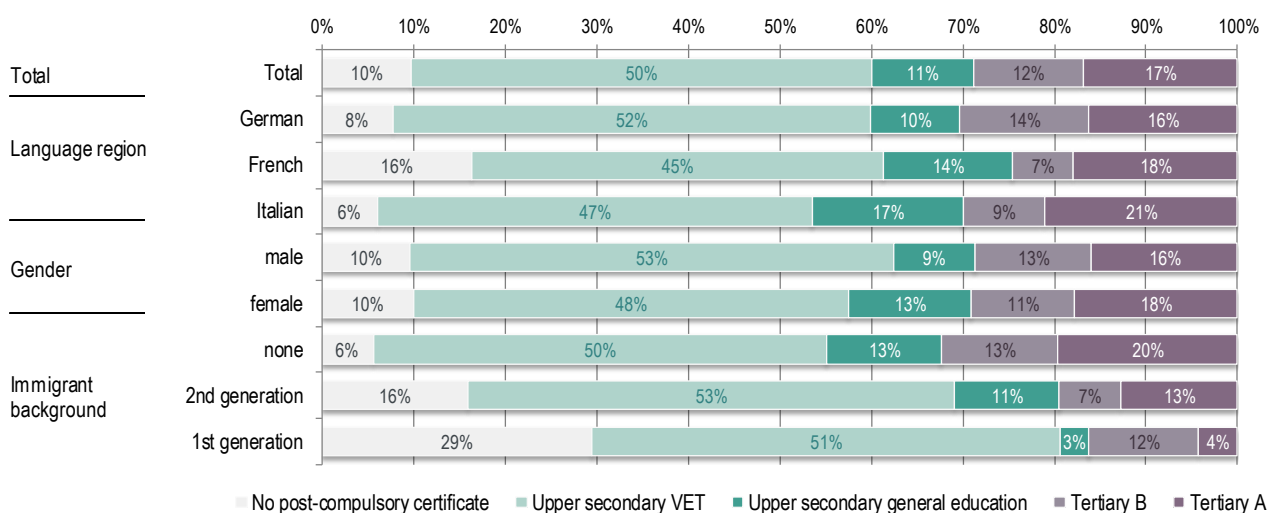
⁷ For the accuracy of the estimates, see Section 2.

The next section describes the respondents' highest educational attainment by language region, gender, immigrant background and PISA reading literacy. Here, we will only address differences that are statistically significant. The complete analyses are documented in the appendix.⁸

4.1 Educational attainment and language region

Figure 4 indicates substantial differences in educational attainment by language region. The percentage of individuals with no post-compulsory upper secondary certificate is markedly lower in German- and Italian-speaking Switzerland (6–8%) than in the French-speaking parts of the country (about 16%). Basic VET as the highest level of educational attainment tends to be more widespread in German- than in French-speaking Switzerland (roughly 52 vs. 45%). PET certificates (tertiary-type B) are twice as frequent in the German-speaking regions (about 14%) than in the French-speaking parts (around 7%). In regard to university certificates (tertiary-type A), however, differences between the language regions cannot be discerned at all.

FIGURE 4: HIGHEST EDUCATIONAL ATTAINMENT IN 2010 BY LANGUAGE REGION, GENDER AND IMMIGRANT BACKGROUND



Percentages within a given bar not adding up to 100% is due to rounding errors.

If we additionally consider the current education status and assume that these young people will indeed complete the education and training programmes started, we can expect the percentage of persons with tertiary certificates to increase in all three language regions. At the same time, the proportion of persons holding only an upper secondary certificate will decline. The percentage of persons without any post-compulsory certificate, however, is not likely to change much in the future. We can thus expect the disparities associated with language region to persist.

How might we explain the fact that roughly twice as many young people remain without a post-compulsory certificate in French-speaking Switzerland (16%) compared to the other language regions (6–8%)? Key factors are likely to be the demand and opportunity structures of the education system in French-speaking Switzerland. On the one hand, the average demands of upper secondary education are substantially higher than, for instance, in German-speaking Switzerland. In 2003, TREE already showed that the enrolment rates in general upper secondary education were twice as high in the French-speaking as in the German-speaking regions (37 vs. 21%). On the other hand, the share of VET programmes with low aca-

⁸ For educational attainment in 2010 by language region, gender and immigrant background, see Table 1 in Appendix 1. For educational attainment in 2010 by PISA reading literacy, see Tables 2 to 4 in Appendix 1.

demographic requirements that are suitable for low-achieving young people is only about half as high in the French-speaking parts than in the German-speaking ones (11 vs. 19%).

Adding to this are differences in educational aspirations and preferences in the language regions. The educational norms in the French-speaking regions closely resemble the situation in France and are strongly oriented toward general academic education, whereas many perceive vocational education as a second-rate option that is clearly less desirable (e.g., Geser 2003).

All of these factors result in a phenomenon at the threshold between lower and upper secondary education that is referred to in French-speaking Switzerland (particularly in the canton of Geneva) as “*(ré-)orientation par l’échec*”. It describes a tendency, encouraged by the organisation of lower and upper secondary education, to opt for educational tracks with the highest possible requirements and switch to less demanding tracks when academic performance fails to meet the requirements. This leads to considerable discontinuities in educational pathways, which, in turn – as the TREE results demonstrate – enhance the risk of ending up without a post-compulsory certificate.⁹

4.2 Educational attainment and gender

Looking at educational attainment from a gender perspective uncovers very few significant differences overall. Roughly 61 per cent of the respondents of either sex have acquired an upper secondary certificate as the highest level of educational attainment by 2010, with a slightly higher share of men than women holding a vocational certificate. Significant differences exist only in regard to certificates of general upper secondary education, which is more often the highest educational attainment for women (approx. 13%) than for men (approx. 9%). However, for the reasons mentioned above, these differences can be expected to disappear with the increasing length of the observation period. Nearly 30% of the women and men have achieved a tertiary certificate as their highest educational attainment.

4.3 Educational attainment and immigrant background

Differentiation according to immigrant background¹⁰ discloses substantial differences in educational attainment. For first-generation immigrants, the percentage of those who remain without a post-compulsory certificate is nearly 30%, which is about five times higher than the percentage for individuals who have no immigrant background. Members of the second generation, the so-called “*secondos*” and “*secondas*”, also end up without a post-compulsory certificate much more frequently than Swiss “natives” do (16 vs. 6%). In regard to basic VET, there are no differences related to immigrant background. However, twice as many individuals with no immigrant background (13%) achieve a PET certificate at the tertiary level (tertiary-type B) compared to those of the second generation (7%). Major migration-related differences emerge when we look at university degrees (tertiary-type A): the university graduation rate is clearly lower for young people of immigrant background, particularly for first-generation immigrants compared to non-immigrants (4 vs. 20%).

In summary, the figures show that first- and second-generation immigrants display a substantially lower level of educational attainment than the native population. If we take into account educational programmes still ongoing in 2010, we can expect a further increase in the educational gap between immigrants born abroad, on the one hand, and second-generation immigrants and natives, on the other – especially in terms of tertiary education.

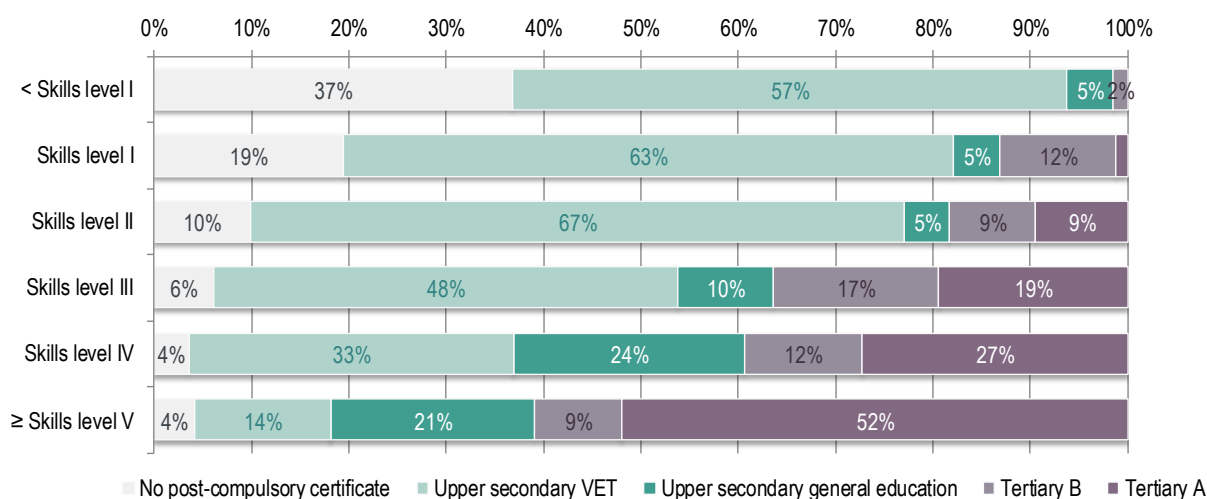
⁹ In the canton of Geneva, this phenomenon led to a referendum in 2009 on the reorganisation of lower secondary education.

¹⁰ Persons born in Switzerland who have at least one Swiss parent are included in the group of Swiss “natives” with no immigrant background. Persons born in Switzerland whose parents were born abroad belong to the group of second-generation immigrants. Persons born abroad who immigrated to Switzerland are classified as first-generation immigrants.

4.4 Educational attainment and PISA reading literacy

Figure 5 illustrates the graduation rates in relation to the reading literacy scores that the youths achieved in the PISA assessment at the end of compulsory education (see BFS & EDK, 2002; OECD/PISA, 2001). The illustration shows that the percentage of those who have not completed an upper secondary programme is much higher among low-achievers (proficiency level I or lower; approx. 19 and 37% respectively) than among those who scored in the middle or higher ranges (proficiency levels II to V; between 4 and 10%).

FIGURE 5: HIGHEST EDUCATIONAL ATTAINMENT OF THE PISA 2000/TREE COHORT BY PISA READING LITERACY IN 2010



By 2010, individuals with low to medium reading literacy scores have completed basic VET at approximately the same rate (around 60%). Among those who scored in the high to very high ranges on reading literacy, this percentage is considerably lower (between 14 and 33%), whereas the percentage of university graduates is substantially higher. As far as graduation from upper secondary general education is concerned, the key dividing line runs between proficiency level II and III (the rate is above 10% for the proficiency levels III to V and about 5% for level II and lower).

Among those with tertiary-type B certificates, the discrepancy among the various proficiency levels is less pronounced. Yet we still observe substantially lower graduation rates for individuals with very low reading skills (below 2% for those lower than proficiency level I) than for all others (between 9 and 17%). The rate of university graduates (tertiary-type A), by contrast, increases with reading proficiency, with significant differences between all proficiency levels.

The *synopsis* in Figure 5 thus demonstrates in impressive fashion how the proportion of individuals without a post-compulsory certificate declines and that of university graduates rises as PISA reading literacy increases. On average, higher reading literacy skills seem to correspond with a lower risk of remaining without post-compulsory education and higher completion rates of tertiary education. As concerns the attainment of an upper secondary certificate, the major dividing line seems to run between those with (very) low reading literacy skills and those with medium to (very) high skills. Achieving proficiency level II appears to be a minimum requirement in this respect (see also Stalder, Meyer & Hupka-Brunner, 2008). According to Artelt et al. (2001, p. 99), young adults with (very) low reading skills represent a group with a potentially high risk of encountering considerable problems in the transition to employment.

4.5 Factors predicting educational attainment

This section is devoted to assessing the extent to which highest educational attainment can be predicted on the basis of characteristics known to have an impact on educational success (e.g., Bertschy et al., 2007; Keller et al., 2010). We consider the following characteristics:

- *Individual characteristics*: gender, immigrant background, parents' highest educational attainment, social background, employment of parents and family structure.
- *Educational characteristics*: type of lower secondary school track, PISA reading literacy, grades in the language of instruction and mathematics at the end of lower secondary education, and educational status in the first and second year of post-compulsory education.
- *Regional characteristics*: language region and degree of urbanisation.

For these analyses, we calculated a multivariate regression model¹¹ (see Appendix 2 for the full regression table and a detailed discussion of the model), which makes it possible to assess the significance of individual factors and characteristics while statistically controlling for all other factors considered. The results of the model calculations can be summarised as follows:

1. The type of school track attended at the lower secondary level as well as the educational status in the first and second post-compulsory year prove to be crucial factors for all levels of educational attainment. Individuals who attended lower secondary tracks with basic requirements have a considerably lower likelihood of graduating from tertiary-type A education than those who attended any other type of school (all other factors being equal).
2. The key risk factors for remaining without a post-compulsory certificate prove to be immigrant background, social background, educational status in 2001 and 2002, and language region. Those bearing a higher risk in this respect are, other factors being equal, individuals who were not born in Switzerland, whose parents have high socio-economic status, who did not attend a certifying education or training programme within the first two post-compulsory years and/or who come from French-speaking Switzerland. Factors that protect against the absence of a post-compulsory certificate are having parents with higher education, having attended a lower secondary school track with extended requirements and having had good grades in the language of instruction.
3. Individuals with medium or high PISA reading literacy scores have a markedly higher chance of achieving a university degree than their peers who scored low in this respect. Furthermore, not having attended a certifying education or training programme within the first two years after leaving compulsory school is a significant risk factor for all types of educational attainment. School grades are the most visible kind of performance assessment and play a key role in the selection processes after compulsory education. Poor grades in the language of instruction increase the risk of ending up without a post-compulsory certificate. The grades achieved in mathematics, by contrast, appear to be more significant for successfully completing a university degree.

In summary, we may hold that, apart from achievement-related and educational characteristics¹², factors related to an individual's social background have a significant influence on the likelihood of acquiring a post-compulsory certificate.

¹¹ Multinomial logistic regression. All in all, the regression model, which was designed to predict highest educational attainment based on the characteristics specified above, proved to be an excellent fit to the data.

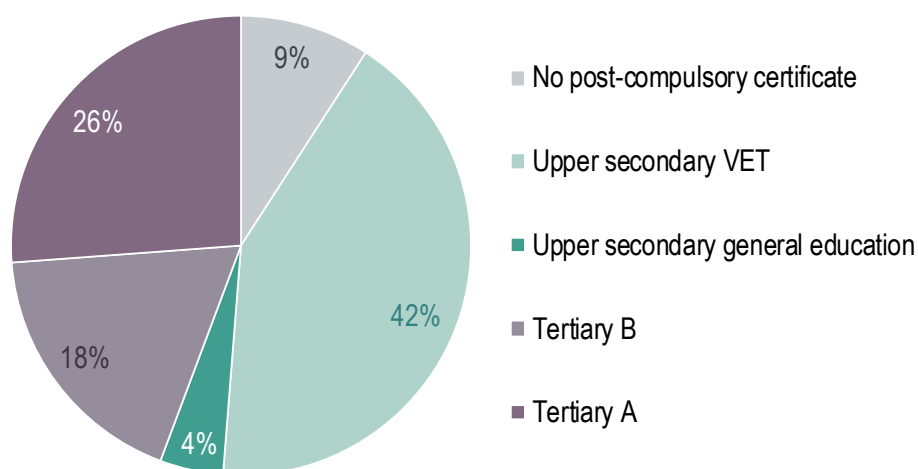
¹² Each factor was assessed while controlling for all other factors considered in the regression model (see Table 6 in Appendix 2).

4.6 Expected development of educational attainment among the TREE cohort

Figure 3 (p. 13) illustrated the respondents' highest educational attainment at the average age of 26 years. It showed that a majority of the school-leaver cohort under study had acquired an upper secondary certificate by that time. A substantial part of the cohort (25%) was still in education in 2010 (see the tree diagram on p. 10 and Table 5 in Appendix 1). In regard to tertiary education in particular, we can expect the completion rate to increase in the future since the majority of educational activities that were still ongoing in 2010 were at the tertiary level. Roughly 15 per cent of the cohort was still in tertiary-type A education and another eight per cent in tertiary-type B programmes. A very small minority (approx. 2 per cent of the respondents) was still in upper secondary education ten years after leaving compulsory schooling.

What changes in educational attainment can we expect among the TREE cohort if we assume, for simplicity, that the ongoing educational activities in 2010 will all be successfully completed (Figure 6)?

FIGURE 6: HIGHEST EDUCATIONAL ATTAINMENT TO BE EXPECTED



The percentage of individuals without a post-compulsory certificate will probably not change by much and remain at about 10 per cent since members of this group only very rarely return to education. In vocational education and training, we can expect a decline in the share of those holding upper secondary certificates as their highest educational attainment to a minimum of around 42 per cent, whereas the share of those holding tertiary-type B certificates could increase to a maximum of about 18 per cent. In the area of general education we can anticipate even greater changes. About half of those who had graduated from upper secondary general education by 2010 were still enrolled in universities at that time. We can therefore expect the tertiary-type A completion rate to increase to a maximum of about 26 per cent. Contrariwise, the proportion of graduates from general upper secondary education may drop to a minimum of approximately five per cent.

4.7 Comparison of TREE results with those based on other data sources

No post-compulsory education

According to TREE, roughly ten per cent of the school leavers of 2000 end up without a post-compulsory certificate (see Figure 3). This non-completion/dropout rate corresponds fairly well with estimates by the Swiss Federal Statistical Office (FSO). For the period from 2004 to 2007, the statistics for students in upper secondary and tertiary education¹³ show that the percentage of the population who were at the age of completing upper secondary education and who had not completed post-compulsory education was about the same or even slightly higher than in the TREE sample. According to FSO figures, the non-completion/dropout rate had dropped to roughly six per cent by 2010.¹⁴ For 25- to 34-year-olds, the OECD education indicators for 2010 (OECD, 2012, p. 36) show the same rate as TREE does, at about ten per cent. This rate lies well below the OECD average of roughly 18%.

Completion rates of tertiary education

For 25- to 34-year-olds in Switzerland, the OECD (2012, p. 38) determined a completion rate of approximately ten per cent for tertiary-type B education and 31 per cent for the tertiary-type A sector. According to the OECD, the total completion rate of tertiary education (tertiary-types A and B) for this age group in Switzerland is hence about 40 per cent. The percentage of individuals who, according to the TREE data, have successfully completed tertiary-type B programmes (12 per cent) is comparable to the OECD's education indicators for Switzerland. The share of the TREE cohort that has graduated from tertiary-type A programmes, however, is substantially lower than the rate determined by the OECD. As discussed in Section 4.6, the TREE rate is likely to increase markedly with the length of the observation period since about one-quarter of the cohort was still in education at the time of the last measurement in 2010. We expect that the TREE rate will have approached the OECD rate by the time of the next measurement in 2014 (at the average cohort age of 29 to 30 years).

For the population aged 25 to 34, the Swiss labour market survey (*Schweizerische Arbeitskräfteerhebung – SAKE*)¹⁵ shows a completion rate for tertiary-type B education of 13 per cent for 2010, which is similar to the TREE results. SAKE estimates the completion rate for the tertiary-type A sector to be slightly lower than the OECD (28 vs. 31%).

Differences by language region

The TREE findings on differences in educational attainment by language region are supported by earlier statistical data (BFS, 2004) indicating that upper secondary graduation rates may vary considerably depending on canton of residence. For instance, the official statistics for 2003 show a substantially higher proportion of individuals with no post-compulsory certificate in some French-speaking cantons (approx. 14% in Vaud and 20% in Geneva compared to the Swiss average of about 10%).

¹³ See Table "Abschlussquote auf der Sekundarstufe II 1990–2012". We chose the years 2004 to 2007 as the period of reference in light of the discontinuities in the patterns of entry into post-compulsory education described in Section 3 (<http://www.bfs.admin.ch/bfs/portal/de/index/themen/15/17/blank/01.indicator.405101.4115.html?open=1#1>; last accessed 30.4.2014).

¹⁴ As possible factors for this development, the FSO mentions VET promotion measures taken by the federal government, the cantons and the training firms, as well as the structural measures introduced to comply with the Swiss VET law of 2004, which requires that a wider range of VET programmes be offered for acquiring the Swiss Federal VET Diploma (*Eidgenössischer Berufsattest*) (ibid.).

¹⁵ See Table "Bildungsstand der Wohnbevölkerung nach Alter und Geschlecht" (<http://www.bfs.admin.ch/bfs/portal/de/index/themen/00/09/blank/ind42.Document.21677.xls> ; last accessed 30.4.2014).

On the basis of data from the Swiss youth survey *ch-x*, Keller and Moser (2013, p. 130f.) likewise found considerable regional variation in the proportion of 19-year-old Swiss men who were neither in education, nor had acquired a post-compulsory certificate: the percentages in Geneva (23%) and Neuchâtel (20%) were about twice as high as in German-speaking Switzerland. Keller and Moser's results suggest a positive correlation between the rate of attainment of upper secondary general education and the post-compulsory non-completion/dropout rate. However, we would be mistaken to interpret such a correlation in terms of causality since it could also reflect structural peculiarities of the labour market in the respective canton that have not been taken into consideration (*ibid.*, p. 132).

5. CONCLUSION AND OUTLOOK

To date, data from the Swiss youth panel study TREE is available from eight panel waves covering a ten-year observation period (2000–2010). This data corpus makes it possible to trace and analyse in detail a large part of the young adults' educational pathways and early stages of employment.

Compared to the seventh TREE panel wave in 2007 (Keller et al., 2010), the results presented here from the eighth follow-up survey of the PISA 2000/TREE cohort, conducted in 2010, show that at this point about two-thirds of the respondents are exclusively working, i.e., they are no longer involved in ongoing educational activities. Ten years after leaving compulsory education, most of the working young adults in our sample have managed to consolidate their position compared to their employment situation after first entering the labour market. Most of them have successfully integrated into the formal labour market. Another TREE results overview scheduled for publication shortly after this report will provide a detailed analysis of the employment situation in 2010. The analyses will address various aspects of their employment experience in depth, such as income, unemployment and precarious employment.

The present results, however, also show that, for a substantial minority, the transition from education to adulthood and working life has not yet been completed but is still well underway at an average young-adult age of 26. In this sense, the results on educational attainment presented here are still of a preliminary nature even ten years after the completion of compulsory education. This is particularly true for the approximately 25% of the cohort who was still in tertiary education in 2010.

Further insight into the education and employment pathways will be provided by the 2014 TREE panel wave. At this point in time, those who were still in education in 2010 can be expected to have made the transition to employment as well. We can further assume a large part of the TREE respondents, who will have reached an average age of nearly 30 years by then, to have started a family. This brings new research questions into focus, for instance how the TREE cohort manages to reconcile family, career and lifelong learning.

SHORT GLOSSARY

Gymnasium: General education programme at the upper secondary level preparing for university studies (comparable to grammar school or senior high school).

Non-completion/dropout: Absence of an upper secondary diploma/certificate.

PET: Professional education and training. Includes all post-secondary tertiary-type B education programmes (see → tertiary education).

PISA: Programme for International Student Assessment.

PISA/TREE cohort: The PISA/TREE cohort consists of a panel of 6,000 youth, representative of Switzerland and its language regions, who participated in the first PISA survey, ended compulsory education in 2000 and have participated in TREE's regular yearly panel surveys since then.

Progymnasium: see → Tracking

Tertiary education: Tertiary-level education (ISCED level >3) refers to any kind of post-secondary education that requires an upper secondary certificate, including the programmes offered at universities, universities of applied sciences as well as technical colleges and other post-secondary programmes. Tertiary-type A includes universities, universities of applied sciences and teacher training colleges. Tertiary-type B comprises all other post-secondary programmes.

Tracking: Lower and upper secondary education in Switzerland is heavily tracked. Between age 12 and 14, students are divided into several lower secondary tracks according to varying levels of academic achievement. Most cantons have at least two tracks, one of them for students meeting "basic" academic requirements and the other for students meeting "extended" requirements. Beyond the "extended" track, some cantons offer a separate "*Progymnasium*" track, which prepares students, as the name suggests, for → *Gymnasium* at the upper secondary level.

Transition: In the TREE context, transition refers to the passage from lower/upper secondary education to employment and from youth to adulthood.

TREE: Acronym for the Swiss youth panel survey "Transitions from Education to Employment".

Upper secondary level: In Switzerland, the upper secondary level (ISCED level 3) of education follows the lower secondary level, which is the last stage in compulsory education. It includes → VET programmes and general education programmes. Today, an upper secondary level certificate is regarded as a minimum requirement for successful entry into the labour market with good prospects of stable employment.

VET: Vocational education and training. In Switzerland, about two thirds of all school leavers enter VET programmes. Most of them last three to four years and are attended in the so-called "dual" mode, i.e. trainees spend three to four days per week working in a training firm and the remaining days at vocational school.

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CONTACT

TREE – Transitions from Education to Employment
University of Basel
Seminar für Soziologie
Petersgraben 27
4051 Basel/Switzerland

phone: +41 (0)61 267 28 28

mail: tree@unibas.ch

web: www.tree.unibas.ch

APPENDICES

Appendix 1: Descriptive analyses

TABLE 1: HIGHEST EDUCATIONAL ATTAINMENT IN 2010 BY LANGUAGE REGION, GENDER AND IMMIGRANT BACKGROUND

| | No post-compulsory certificate | | Upper secondary VET | | Upper secondary general education | | Tertiary-type B | | Tertiary-type A | |
|----------------------|--------------------------------|--------------|---------------------|--------------|-----------------------------------|--------------|-----------------|--------------|-----------------|--------------|
| | % | CI | % | CI | % | CI | % | CI | % | CI |
| Language region | | | | | | | | | | |
| German | 7.8 a | [4.8; 10.7] | 52.1 a | [46.4; 57.9] | 9.8 a | [6.8; 12.8] | 14.0 a | [10.5; 17.5] | 16.3 a | [12.9; 19.7] |
| French | 16.4 b | [11.4; 21.3] | 44.9 a | [39.4; 50.5] | 14.2 a,b | [10.7; 17.7] | 6.6 b | [3.9; 9.3] | 17.9 a | [14.0; 21.8] |
| Italian | 6.1 a | [2.3; 9.9] | 47.5 a | [39.4; 55.5] | 16.5 b | [11.0; 22.1] | 8.9 a,b | [1.0; 16.7] | 21.0 a | [15.5; 26.5] |
| Gender | | | | | | | | | | |
| Male | 9.6 a | [6.1; 13.2] | 52.8 a | [47.2; 58.3] | 8.9 a | [6.5; 11.3] | 12.7 a | [8.9; 16.6] | 15.9 a | [12.2; 19.7] |
| Female | 10.0 a | [6.5; 13.4] | 47.6 a | [41.9; 53.2] | 13.4 b | [9.8; 17.1] | 11.2 a | [8.6; 13.9] | 17.8 a | [14.8; 20.9] |
| Immigrant background | | | | | | | | | | |
| None | 5.6 a | [3.9; 8.0] | 49.6 a | [44.8; 54.4] | 12.5 a | [10.0; 15.6] | 12.7 a | [10.3; 15.6] | 19.6 a | [16.7; 22.9] |
| 2nd generation | 16.0 b | [8.3; 28.5] | 53.2 a | [42.7; 63.4] | 11.4 a | [7.7; 16.5] | 6.8 b | [3.1; 14.0] | 12.7 b | [9.0; 17.6] |
| 1st generation | 29.5 b | [19.8; 41.4] | 51.2 a | [40.3; 62.0] | 3.1 b | [1.9; 4.9] | 12.0 a,b | [6.1; 22.4] | 4.2 c | [2.9; 6.3] |
| Total | 9.8 | [7.4; 12.3] | 50.2 | [45.8; 54.5] | 11.1 | [8.8; 13.5] | 12.0 | [9.4; 14.6] | 16.9 | [14.2; 19.5] |

Figures in per cent

The percentages in each row add up to 100 per cent (minor differences are due to rounding).

Within a given cell of the table, differences between subgroups are statistically significant ($p < .05$) if they are marked by different letters (a, b, c).

The confidence intervals (CI) are indicated in brackets. The upper and lower bounds are indicated for each figure. Each confidence interval gives the range of values that we can expect to contain the true value of a population parameter with a probability of 95%.

Examples of how to read the table:

In the table cell “no post-compulsory certificate” by language region, there are significant differences between French-speaking Switzerland (b) and the German- and Italian-speaking regions (a). By contrast, the difference between German- and Italian-speaking Switzerland is statistically not significant (both a).

In the table cell “upper secondary education VET” by gender, the differences between men and women are statistically not significant.

In the table cell “tertiary-type B” by language region, only the difference between German- and French-speaking Switzerland is statistically significant.

In the table cell “tertiary-type A” by immigrant background, the differences between all three groups are statistically significant.

For the description of Table 1, see the Sections 4.1 to 4.3

TABLE 2: HIGHEST EDUCATIONAL ATTAINMENT IN 2010 = NO POST-COMPULSORY CERTIFICATE
BY PISA READING LITERACY LEVEL

| | (0) | (1) | (2) | (3) | (4) | (5) |
|----------------------|------|------|------|------|------|-----|
| (0) < Skills level I | | | | | | |
| (1) Skills level I | n.s. | | | | | |
| (2) Skills level II | * | n.s. | | | | |
| (3) Skills level III | * | * | n.s. | | | |
| (4) Skills level IV | * | * | * | n.s. | | |
| (5) ≥ Skills level V | * | * | n.s. | n.s. | n.s. | |

*: differences are significant ($p < .05$)

n.s.: differences are not significant ($p \geq .05$)

Example of how to read the table: In terms of the percentage of individuals without a post-compulsory certificate, the difference between skills levels III and IV is not significant, whereas the difference between skills levels II and IV is.

TABLE 3: HIGHEST EDUCATIONAL ATTAINMENT IN 2010 = UPPER SECONDARY LEVEL
BY PISA READING LITERACY LEVEL

| | (0) | (1) | (2) | (3) | (4) | (5) |
|----------------------|------|------|------|------|------|-----|
| (0) < Skills level I | | n.s. | n.s. | n.s. | * | * |
| (1) Skills level I | n.s. | | n.s. | * | * | * |
| (2) Skills level II | n.s. | n.s. | | * | * | * |
| (3) Skills level III | n.s. | n.s. | * | | * | * |
| (4) Skills level IV | * | * | * | * | | * |
| (5) ≥ Skills level V | * | * | * | * | n.s. | |

Below the diagonal: graduation from general upper secondary education

Above the diagonal: certificates of vocational upper secondary education

*: differences are significant ($p < .05$)

n.s.: differences are not significant ($p \geq .05$)

TABLE 4: HIGHEST EDUCATIONAL ATTAINMENT IN 2010 = TERTIARY LEVEL
BY PISA READING LITERACY LEVEL

| | (0) | (1) | (2) | (3) | (4) | (5) |
|----------------------|-----|-----|------|------|------|------|
| (0) < Skills level I | | * | * | * | * | * |
| (1) Skills level I | * | | n.s. | n.s. | n.s. | n.s. |
| (2) Skills level II | * | * | | * | n.s. | n.s. |
| (3) Skills level III | * | * | * | | n.s. | * |
| (4) Skills level IV | * | * | * | * | | n.s. |
| (5) ≥ Skills level V | * | * | * | * | n.s. | |

Below the diagonal: tertiary-type A certificates

Above the diagonal: tertiary-type B certificates

*: differences are significant ($p < .05$)

n.s.: differences are not significant ($p \geq .05$)

For the descriptions of Tables 2 to 4, see Section 4.4.

TABLE 5: EDUCATIONAL ENROLMENT AND ATTAINMENT IN 2010

| | | Status/level of enrolment | | | | | |
|---|-------|---------------------------|---------------------|-----------------------------------|------------|------------|---|
| Highest certificate obtained until 2010 | | No education | Upper secondary VET | Upper secondary general education | Tertiary B | Tertiary A | Highest certificate to be expected in the future ¹ |
| No post-compulsory certificate | 9.8 | 9.1 | 0.7 | 0.0 | 0.0 | 0.0 | 9.1 |
| Upper secondary VET | 50.2 | 41.0 | 0.4 | 0.2 | 5.6 | 2.9 | 42.1 |
| Upper secondary general education | 11.2 | 3.8 | 0.3 | 0.0 | 1.0 | 6.0 | 4.5 |
| Tertiary B | 12.0 | 10.3 | 0.1 | 0.0 | 1.1 | 0.4 | 18.1 |
| Tertiary A | 16.9 | 11.0 | 0.0 | 0.0 | 0.3 | 5.6 | 26.2 |
| Total | 100.0 | 75.3 | 1.5 | 0.3 | 8.0 | 14.9 | 100.0 |

Figures in per cent

Differences in the column totals are due to rounding

¹ Based on the simplifying assumption that all educational activities in 2010 will be successfully completed

For the description of Table 5, see the Sections 4.6.

Appendix 2: Multivariate analyses

In the following, we describe in more detail the multivariate analyses for predicting highest educational attainment by 2010, which we have already outlined briefly in Section 4. For these analyses, we defined a multinomial logistic regression model.

Multinomial logistic regression

The educational attainment of the respondents can be interpreted as a nominally scaled variable that can take on more than two values. For this reason, we opted for a multinomial logistic regression model (Backhaus et al. 2000). The results of the model are presented in Table 6 as average marginal effects, which indicate the differences in percentage points between the value in question and the reference category of a given variable in regard to the probability of having attained a given certificate by 2010. This type of modelling makes it possible to identify beneficial factors (positive algebraic sign) or factors that are more likely to be an impediment (negative algebraic sign) to attaining a certain certificate. The row totals of the marginal effects equal zero (minor differences are due to rounding). The differences in percentage points are valid on condition that the values of all other variables in the model are equal.

The estimate considered the following characteristics:

- *Individual characteristics:* gender, immigrant background, parents' highest educational attainment, social background, employment of parents and family structure
- *Educational characteristics:* type of lower secondary school track attended, PISA reading literacy, grades in the language of instruction and mathematics at the end of lower secondary education and educational status in the first and second post-compulsory year
- *Socio-geographical characteristics:* language region and degree of urbanisation

The full regression model yields a very good fit to the data (McFaddens $R^2 = 0.24$). The results presented in Table 6 below are described separately for each of the levels of educational attainment. All of the findings reported in the text are significant ($p < .05$).

ABSENCE OF A POST-COMPULSORY CERTIFICATE

The first column in Table 6 shows, in regard to individual characteristics, that the first-generation immigrants among the respondents have a four per cent higher risk of failing to attain a post-compulsory certificate within ten years after leaving compulsory education compared to Swiss "natives". However, this difference is only weakly significant ($p < .10$). Young adults of the second generation, by contrast, show no significant differences to their peers with no immigrant background. In line with what was expected, parents' high educational status lowers their children's risk of having no post-compulsory education: compared to respondents whose parents have no post-compulsory education, respondents with well-educated parents (i.e., parents with a tertiary certificate) have an about eight per cent lower risk of not attaining a post-compulsory certificate. All other factors being equal, individuals of above-average socio-economic status have a higher likelihood, by approximately eight percentage points, of not holding a post-compulsory certificate than those of lower socio-economic status.¹⁶

Educational characteristics also have a clear impact. Compared to individuals who attended a lower secondary school track with basic requirements (basic track), *Progymnasium* track students have an eight percentage points lower risk of not attaining a post-compulsory certificate. For respondents who attended a track with extended requirements or a type of school with no formal tracking system, there are no significant differences in this respect. Those who earned good or very good grades in the language of instruction have a lower risk of not acquiring a post-compulsory certificate, by eight and 11 percentage points respectively, compared to those with poor grades in this subject. In regard to mathematics, however, good grades could not be observed to entail such an advantage. Educational discontinuity, on the other hand,

¹⁶ The difference between individuals of medium and high socio-economic status is also significant.

clearly results in disadvantages: individuals who failed to enter a certifying educational programme within two years after leaving compulsory education bear an about 9 to 12 per cent higher risk of remaining without a post-compulsory certificate. This leads us to conclude that, apart from achievement-related characteristics and institutional effects of the tracked school system, characteristics of the educational pathway pursued after completing compulsory education are an additional risk factor for being without a post-compulsory certificate in adulthood.

There are also differences between the cantons or language regions. Other factors being equal, individuals from French-speaking Switzerland have a six per cent higher risk of not attaining a post-compulsory certificate compared to their counterparts from the German-speaking parts of the country. This confirms the descriptive bivariate findings illustrated in Figure 4 (p. 14). The respective differences are not fully explained by the factors considered in the model even when applying multivariate techniques, but persist after statistically controlling for these factors. They are probably a product of, among other things, differences in educational aspirations, preferences and norms in the language regions (see Section 4.1).

TABLE 1: MULTINOMIAL LOGISTIC REGRESSION PREDICTING THE HIGHEST LEVEL OF EDUCATIONAL ATTAINMENT TEN YEARS AFTER COMPLETION OF COMPULSORY SCHOOL

| | (1) No post-compulsory certificate | (2) Upper secondary level | (3) Tertiary-type B | (4) Tertiary-type A |
|---|--|---------------------------------|------------------------|------------------------|
| Gender: female ¹ | 0.01 | 0.01 | -0.02 | 0.00 |
| Immigrant background ² | | | | |
| 2nd generation | 0.04 | 0.01 | -0.04 | -0.01 |
| 1st generation | 0.04+ | 0.00 | 0.04 | -0.08* |
| Highest parental educational attainment ³ | | | | |
| Upper secondary level | -0.04 | 0.00 | 0.00 | 0.04 |
| Tertiary level | -0.08** | -0.04 | 0.05+ | 0.06* |
| Socio-economic status (HISEI) ⁴ | | | | |
| Medium | 0.00 | 0.00 | 0.00 | 0.00 |
| High | 0.08** | -0.11* | -0.03 | 0.06* |
| Non-nuclear family structure ⁵ | -0.02 | 0.04 | 0.00 | -0.02 |
| Neither parent employed full-time | 0.00 | 0.00 | 0.06 | -0.06+ |
| Track attended at lower secondary school ⁶ | | | | |
| Extended academic requirements | -0.02 | -0.20** | 0.05+ | 0.18** |
| <i>Progymnasium</i> | -0.08* | -0.20** | 0.00 | 0.23** |
| No formal tracking | 0.00 | -0.28** | 0.08* | 0.20** |
| PISA Reading literacy ⁷ | | | | |
| Medium | -0.02 | -0.14* | 0.01 | 0.16** |
| High | 0.00 | -0.17* | -0.01 | 0.18** |
| 9th grade grades in language of instruction ⁸ | | | | |
| Sufficient | -0.08** | -0.06 | 0.06 | 0.08* |
| Good to excellent | -0.11** | -0.01 | 0.05 | 0.07+ |
| 9th grade grades in mathematics ⁹ | | | | |
| Sufficient | -0.02 | -0.02 | -0.03 | 0.07* |
| Good to excellent | 0.00 | -0.10+ | -0.02 | 0.13** |
| Educ. status in post-compulsory years 1 & 2 ¹⁰ | | | | |
| Not in certifying education in year 1 | 0.09** | 0.03 | 0.03 | -0.15** |
| Not in certifying education in year 2 | 0.12** | -0.21** | 0.09** | 0.00 |
| Language region ¹¹ | | | | |
| French-speaking | 0.06** | -0.01 | -0.10** | 0.04+ |
| Italian-speaking | 0.01 | -0.11* | -0.05 | 0.15** |
| Urban area ¹² | -0.01 | 0.00 | -0.03 | 0.03* |
| N | | | 3424 | |
| Pseudo-R ² | | | 0.24 | |

Significances: * $p < .05$; ** $p < .01$; + $p < .10$; the table reports average marginal effects (AME)

Reference categories: ¹male, ²no immigrant background, ³compulsory school, ⁴low, ⁵nuclear family structure, ⁶basic academic requirements, ⁷low, ^{8,9}poor, ¹⁰in certifying education or training, ¹¹German-speaking Switzerland, ¹²rural area

Note: Unless indicated otherwise, all independent variables refer to the last year of compulsory education (the year 2000). In the estimate, missing values were considered and controlled for as a category in their own right. For purposes of legibility, however, they are not listed separately in the table. All calculations were performed on weighted samples to account for sample attrition across the various panel waves (Sacchi, 2011).

Explanatory note on Table 6

If a certain group of individuals has a greater likelihood of not attaining a post-compulsory certificate (column 1), members of that group will also have lower probabilities of achieving any of the other certificates accordingly. The row total for each row is zero. The left column indicates the probability of not having attained an upper secondary certificate by 2010. The second column reports the effects of the predictors on the probability of having acquired an upper secondary certificate as the highest educational attainment. The effects on the probability of having attained a tertiary certificate are given in column 3 (tertiary-type B) and 4 (tertiary-type A).

Example of how to read the table: First-generation immigrants have an about four percentage points higher likelihood of not having attained a post-compulsory certificate ten years after leaving compulsory schooling.

UPPER SECONDARY POST-COMPULSORY CERTIFICATES

The second column from the left in Table 6 gives the likelihood of having obtained a post-compulsory certificate at the upper secondary level as the highest educational attainment by 2010. Of the individual characteristics only social background proves to be a significant factor. Other things being equal, individuals with high socio-economic status (HISEI) have an about 11 percentage points lower probability of achieving an upper secondary certificate than those from a less privileged background.

In regard to educational characteristics, our model suggests that individuals who attended a *Progymnasium* track during lower secondary education are about 20 percentage points less likely to have attained an upper secondary certificate by 2010 compared to those enrolled in the basic track. Having attended a type of school without tracking lowers this likelihood by even about 28 percentage points. Moreover, performance characteristics also prove to be relevant: respondents with medium to high PISA reading literacy or good to excellent grades in mathematics at the end of compulsory education also have a lower likelihood of holding an upper secondary certificate as their highest educational attainment at age 26.

For individuals who failed to enter a certifying education or training programme within two years after completing compulsory education, the likelihood of achieving an upper secondary certificate drops by roughly 21 percentage points, for individuals in Italian-speaking Switzerland by roughly 11 percentage points.

ADVANCED VOCATIONAL CERTIFICATES (TERTIARY-TYPE B)

Taken altogether, only few characteristics are predictive of the likelihood of attaining an advanced vocational certificate (tertiary-type B) within ten years after completing compulsory education. Young adults whose parents hold a tertiary certificate are about five percentage points more likely to (also) attain a tertiary-type B certificate than those whose parents have no post-compulsory certificate at all.

In regard to educational characteristics, former students of lower secondary schools without tracking have an eight percentage points higher chance of attaining a tertiary-type B certificate than persons who attended a basic-track school. Persons who attended a *Progymnasium* track also tend to have a slightly higher likelihood of holding such a certificate (by about five percentage points). Educational status after leaving compulsory education also plays a role: individuals who failed to enter a certifying education or training programme within two years after completing compulsory education have an about nine percentage points higher likelihood of graduating from tertiary-type B education. This could be related to the fact that the nursing profession, up until 2004, required a minimum age of 18 for trainees entering VET.¹⁷

We further observed disparities by language region: persons from French-speaking Switzerland are by about 10 per cent less likely to attain an advanced vocational certificate than those from German-speaking Switzerland.

UNIVERSITY DEGREES (TERTIARY-TYPE A)

All individual characteristics, with the exception of gender and family structure, prove to have a significant effect on the probability of attaining a degree from a university or university of applied sciences (tertiary-type A). Young first-generation immigrants have an about eight percentage points lower likelihood of attaining a university degree than Swiss “natives”. Individuals whose parents’ highest educational attainment is also a tertiary degree as well as those whose families have high socio-economic status are more

¹⁷ Regulation of training for the nursing professions was originally in the responsibility of the Swiss Red Cross. With the introduction of the new Swiss VET law in 2004, those training programmes have been moved to the tertiary level. The TREE cohort falls precisely in this period of transition. Their classification is therefore somewhat ambiguous. In the TREE data, trainees in the field of nursing are coded as being enrolled in tertiary education. The new basic VET programme to become a “nursing/care specialist” (*Fachfrau Pflege/Betreuung*), which basically can be begun immediately after post-compulsory education, has not yet been accessible for the TREE sample. Many of the young women pursuing a nursing career bridged the two years between compulsory education and VET by participating in a preparatory internship or a language stay.

likely to achieve a tertiary-type A degree, by about six percentage points. Parental employment status appears to be a potential risk factor in cases where both parents do not work full-time.

Educational characteristics have a clear impact. All other factors being equal, students who attended the basic track of lower secondary education are between 18 and 28 percentage points more likely to attain a tertiary-type A degree than those who attended any other track. PISA reading literacy has a marked effect on university graduation as well. Here, the dividing line runs between those with medium to high reading literacy skills (between whom there are no significant differences) and those with low skills. Students who achieve satisfactory grades in the language of instruction at the end of lower secondary education have an about eight percentage points higher likelihood of attaining a tertiary degree than those with poor grades. Overall, the grades in the language of instruction, other factors being equal, seem to be of lesser significance for attaining a tertiary-type A degree. The grades achieved in mathematics, by contrast, are clearly more important: students who had good to excellent grades in mathematics have a 13 per cent greater likelihood of attaining a university degree than those who had poor grades. Students with satisfactory grades in math are seven percentage points more likely to do so than their peers with poor grades. Individuals who did not enter a certifying education or training programme within the first year after leaving compulsory education are nearly 15 per cent less likely to graduate from a university.

For the language regions, the analyses show that individuals from Italian-speaking Switzerland have an around 15 percentage points greater likelihood of attaining a tertiary-type A certificate than those from the German-speaking regions. There are only minor differences between the French- and German-speaking parts in this respect, with the former having slightly better chances than the latter. When we control for all other factors, those that lived in an urban area at the time of leaving compulsory school tend to have a slightly higher probability (by about three percentage points) of having attained a university degree by 2010 than those that lived in a rural area. Residents of urban areas with universities seem to have an “advantage of location” in this respect.

Appendix 3: Operationalisation of variables

| Variable | Definition |
|---|---|
| Highest certificate | <p>Highest educational attainment by 2010</p> <p>Source: TREE panel waves 1–8</p> <p>Categories: no certificate upper secondary (general education) upper secondary (vocational education) tertiary-type A tertiary-type B</p> |
| Gender | <p>Source: PISA 2000</p> <p>Variable: sex</p> <p>Categories: 1 female 2 male</p> |
| Immigrant background | <p>Source: PISA 2000</p> <p>Variables: st16q01 (respondent's country of birth) st16q02 (mother's country of birth) st16q03 (father's country of birth)</p> <p>Note: Individuals born in Switzerland with at least one Swiss-born parent are included in the category of "natives" without an immigrant background. Persons born in Switzerland whose parents come from abroad belong to the group of second-generation immigrants. Persons born abroad who immigrated to Switzerland are classified as first-generation immigrants.</p> |
| Parents' highest educational attainment | <p>Source: PISA 2000</p> <p>Variables: st14q01 / st12q01 (mother's educational attainment) st15q01 / st13q01 (father's educational attainment)</p> <p>Note: The highest value of the two variables was considered for the construction of a composite variable with the following categories:</p> <p>Categories: 0 completion of compulsory education 1 completion of upper secondary education 2 completion of tertiary education</p> |
| Parental employment status | <p>Source: PISA 2000</p> <p>Variables: st06q01 (mother's employment status) st07q01 (father's employment status)</p> <p>Categories: 1 full-time employment (if at least one parent works full-time) 0 other (i.e., part-time employment, not working but seeking employment, or other status, e.g., homemaker, retiree)</p> |
| HISEI | <p>Source: PISA 2000</p> <p>Variables: bmmj (index of the mother's occupational status) bfmj (index of the father's occupational status)</p> <p>Note: The highest value of the two variables was considered for the construction of a composite variable with the following categories:</p> <p>Categories: 1 1st quartile = low 2 2nd and 3rd quartile = medium 3 4th quartile = high</p> |
| Language region | <p>Source: PISA 2000</p> <p>Variable: reg_ling</p> <p>Categories: 1 German-speaking 2 French-speaking 3 Italian-speaking</p> |
| Nuclear family structure | <p>Source: PISA 2000</p> <p>Variable: famstruc</p> <p>Categories: 1 nuclear family 0 non-nuclear family structure (i.e., single parent, patchwork family, other type of family)</p> |

| Variable | Definition |
|--|--|
| Type of school | <p>Source: PISA 2000</p> <p>Variable: typ</p> <p>Categories: 0 track with basic academic requirements 1 <i>Progymnasium</i> 2 track with extended academic requirements 3 no formal tracking</p> <p>Note: Refers to the type of lower secondary school attended at the time of the PISA survey (2000)</p> |
| PISA reading literacy | <p>Source: PISA 2000</p> <p>Variable: wlerlev</p> <p>Categories: 0 PISA score: very low (< proficiency level I) 1 PISA score: low (< proficiency level I) 2 PISA score: medium-low (proficiency level II) 3 PISA score: medium-high (proficiency level III) 4 PISA score: high (proficiency level IV) 5 PISA score: very high (\geq proficiency level V)</p> |
| Grade in the language of instruction at the time of the PISA 2000 survey | <p>Source: PISA 2000</p> <p>Variable: st41n01</p> <p>Note: The variable was rescaled for the canton Vaud. For the regression, a new variable was created consisting of the following categories:</p> <p>Categories: 1 poor (< 4) 2 satisfactory (≥ 4 and < 5) 3 good (≥ 5 and ≤ 6)</p> |
| Grade in mathematics at the time of the PISA 2000 survey | <p>Source: PISA 2000</p> <p>Variable: st41n02</p> <p>Note: The variable was rescaled for the canton Vaud. For the regression, a new variable was created with the following categories:</p> <p>Categories: 1 poor (< 4) 2 satisfactory (≥ 4 and < 5) 3 good (≥ 5 and ≤ 6)</p> |
| Urban area | <p>Source: PISA 2000</p> <p>Variable: agglo</p> <p>Categories: 1 rural area 2 urban area/agglomeration</p> <p>Note: Refers to the place of attending lower secondary school at the time of the PISA survey (in 2000)</p> |
| Educational status in 1 st and 2 nd post-compulsory years (T1, T2) | <p>Source: TREE</p> <p>Variables: t1educ22 (educational status in 1st post-compulsory year T1) t2educ22 (educational status in 2nd post-compulsory year T2)</p> <p>Categories: 0 not in a certifying programme of upper secondary education (i.e., additional year of schooling, preparatory training programmes, language stay, or other or no programme of upper secondary education) 1 in a certifying programme of upper secondary education (i.e., VET, business, commerce and trade schools [<i>Handelsmittelschule, Diplom-/Fachmittelschule</i>], teacher college, general education preparing for university studies [<i>Maturitätsschule</i>])</p> |

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