

Life course in the making: Educational and labor market trajectories through the lens of the Swiss TREE panel survey

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Abstract:

TREE (Transitions from Education to Employment) is a prospective interdisciplinary multi-cohort panel survey following up on the (post-compulsory) education and employment trajectories of two large samples of Swiss compulsory school leavers. The first TREE cohort (TREE1) was launched in 2000, drawing on the sample tested on the occasion of Switzerland's first-time participation in PISA (N_{t0}=6.343, N_{t10} in 2020 ≈ 3.900). Since then, the sample has been followed up by means of 10 panel waves, the most recent one conducted in 2019/20. Further panel waves are planned at five years intervals. To date, TREE1 respondents have reached an average age approaching 40 and been surveyed for a period of over 20 years, spanning from early adolescence up to early middle-age. Under a replication design allowing for cohort comparison, the second TREE cohort (TREE2) covers a comparable population of school leavers who left compulsory education in 2016. As its baseline survey, it draws on a national large-scale assessment of mathematics skills. Since then, the TREE2 sample (N_{t0} = 8.429, N_{t6} in 2022 ≈ 4.500) has been re-surveyed six times at yearly intervals, up to average age 21. Further panel waves at two to five years intervals are planned. The present contribution includes a detailed description of TREE's study and survey design as well as a synoptic summary of salient results from some of the several hundred publications that draw on the TREE data.

Keywords: Panel study, multi-cohort design, longitudinal survey, life course, educational and employment trajectories in Switzerland.

Introduction

“The opportunity should not be missed to equip Switzerland with a longitudinal survey of transitions at national level (...) Transition pathways to employment are becoming increasingly complex. To understand young people’s decisions and options, and to take them into account in policy decisions, appropriate analytical instruments are needed. (...) The data are essential in understanding trajectories into the labor market and young people’s use of the training system.” (OECD, 1999: 53)

The quoted recommendation from the 1999 OECD country report on school-to-work transitions in Switzerland reflects the situation in the late 1990s, underlining the country’s lack of robust national panel data on transitions throughout adolescence and young adulthood. TREE (Transitions from Education to Employment) was initially conceived in response to the data gaps hinted at above. Today, some twenty years later, TREE is a multi-disciplinary, multi-cohort panel study that collects data on post-compulsory education and employment trajectories of two Swiss school leavers’ cohorts (Gomensoro & Meyer, 2017; Hupka-Brunner et al., 2021). Located at the University of Bern, TREE is funded by the Swiss National Science Foundation as a major social scientific data infrastructure. The TREE data (TREE, 2016a, 2021) belong to the country’s most widely used datasets in the social sciences. They provide unique opportunities to study educational and employment careers of two cohorts who left compulsory school at an interval of 16 years (2000 and 2016, see Figure 1). As both the education system and labor market conditions in Switzerland have known substantial changes and transformations within this period, the TREE data provide excellent opportunities for cross-cohort comparisons.

The present contribution first provides a brief overview of Switzerland’s education and school-to-work transition system, which forms the macro-context of the observed trajectories. In a second section, we outline TREE’s theoretical framework. Section three describes TREE’s study design, while section four summarizes its main findings. The remaining sections provide some key messages, policy implications as well as an outlook on TREE’s analytic potential in the years to come.

The Swiss education and school-to-work transition system

The Swiss education system is characterized by a federal, small-knit structure and a pronounced horizontal and vertical stratification from lower secondary level onwards. Upper secondary education is dominated by firm-based dual vocational education and training (VET), with only about one third of all students attending general, academically oriented programs. Completion rates at tertiary level education is relatively low by international standards, particularly in the VET sector (for a general outline regarding VET and higher education, see Nikolai & Ebner, 2011). Furthermore, there are historically and culturally

determined differences between cantons and language regions, which reflect varying institutional structures of opportunity (see e.g. Glauser & Becker, 2016; for a detailed institutional self-description, see www.edk.ch).

In most cantons, after primary school (at around 12 years of age), students are divided into two to four different tracks of lower secondary school, which differ according to their level of academic requirements. The extent and form of tracking varies greatly from canton to canton. Approximately 30% of all students are assigned to tracks of the so-called "basic requirements" type, with inter-cantonal variation ranging from 10 to 40 percent.¹ Even though educational policy postulates permeability between tracks, the initial allocation to a given track remains largely irreversible (Bayard, 2018; Oesch, 2017). The tracking not only influences further skills development (Angelone & Ramseier, 2012; Baumert, Stanat, & Watermann, 2006; Tomasik, Oostlander, & Moser, 2018) but also further education trajectories (Gomensoro & Meyer, 2021; OECD, 2002; Scharenberg, Hupka-Brunner, Meyer, & Bergman, 2016; Scharenberg, Wohlgemuth, & Hupka-Brunner, 2017). Although track allocation claims to be achievement-based, allocation criteria strongly vary within and between cantons, are lacking valid discriminatory power and most of all highly socially selective even while controlling for academic achievement (Felouzis, Charmillot, & Fouquet-Chauprade, 2011; Kronig, 2007; Neuenschwander, Gerber, Frank, & Rottermann, 2012). Moreover, there are considerable scissor effects between tracks with regard to learning progress throughout the track-specific three years programs (Angelone, Keller, & Moser, 2013; Tomasik et al., 2018).

In Switzerland, compulsory schooling ends after lower secondary level (i.e. after 11 years including two years of kindergarten). With the exception of two among the 26 Swiss cantons (Geneva and Ticino), students are neither legally entitled nor obliged to pursue their education at upper secondary level (and further; for more detail see www.edk.ch/en/education-system).

Upper secondary level education in Switzerland includes, on the one hand, general education programs geared towards later attendance of university studies (approx. 25% of a school leavers' cohort). However, the large majority of Swiss compulsory school leavers (65 to 70%) attends vocational education and training (VET). There are VET programs in over 200 training professions with varying academic requirements, their duration ranging between two and four years. Most programs are provided in a "dual" form, i.e. learners attend a (usually larger) part of their training "on the job" in a training company, while the remaining time is spent in (vocational) school. VET trainees in this type of program sign an apprenticeship contract with the training firm and receive a (modest) salary. Upon completion of their training,

¹ See Swiss Federal Statistical Office (SFO), indicators of education, "Selektion auf Sekundarstufe I" (selection at lower secondary level of education), www.bfs.admin.ch.

VET trainees obtain a VET diploma which provides access to the labor market and/or further training at post-secondary and tertiary levels.²

In this context, it should be noted that the Swiss labor market is strongly segmented by the occupation-specific formal credentials obtained through VET. The occupation-specific segment of the labor market, by far the largest in Switzerland, is subdivided in itself into some hundred occupation-specific sub-segments, each of which is based on an occupation-specific VET diploma. Access to jobs in these sub-segments is generally limited to people holding the respective diploma (Sacchi, Kriesi, & Buchmann, 2016). While this mechanism is known to smooth transitions from VET to the labor market, it is also known to substantially hamper labor market mobility between occupations (Buchs, Müller, & Buchmann, 2015; Mueller & Schweri, 2015).

Furthermore, it should be noted that career choices in dual VET systems such as Switzerland's start as early as at age 13 to 14. It is widely acknowledged that career choices at such an early age, combined with the close VET-labor market linkage mentioned above, tend to reinforce gendering of both educational and labor market trajectories (Buchmann & Kriesi, 2012; Kriesi & Imdorf, 2019; Leemann & Keck, 2005).

At tertiary level, Swiss students enroll in either universities, universities of applied sciences (UAS), universities of teacher training or programs for professional education and training (PET).³ While tertiary level completion rates are fairly high among general education graduates from upper secondary level (70% and above), they are, by international standards, low among VET graduates (at approximately one third only; see Kriesi & Leemann, 2020; Meyer, 2016a, 2016b).

Theoretical Framework

Analyzing long-term trajectories calls for a theoretical framing that best addresses the specifics of different biographical phases as well as contextual changes at the macro and meso levels between cohorts. The multi-disciplinary nature of TREE also requires an open theoretical framework that both connects to the various disciplines in the research field and allows for cross-cohort comparative analyses. Therefore, TREE relies on the life course paradigm as an overarching theoretical framework. The theoretical considerations outlined here do not claim to replace specific (disciplinary) theoretical approaches, but aim at providing a comprehensive framework in which the latter are embedded. Life-course perspectives have been established in a wide variety of disciplines (Bernardi, Huinink, & Settersten, 2019) and draw on both sociological (Elder, 1975) and psychological theoretical traditions (Baltes, Lindenberger, & Staudinger,

² For more detail see www.edk.ch/en/education-system.

³ For more detail, see www.edk.ch/en/education-system/diagram.

2007) that are relevant for the analysis of transitions in the education system and to the labor market. From a psychological perspective, the most significant issues are intrapersonal development and the individual's adaptation to external conditions (Bernardi et al., 2019; Diewald & Mayer, 2009). Understanding individual agency also requires analyses of the multiple life domains that adolescents and their families must contend with (Bernardi et al., 2019). These domains are interconnected in multiple ways, e.g. when critical life events such as health problems or accidents affect an individual's educational pathway. We furthermore expect interdependencies that are strongly influenced by societal structures and arrangements, e.g. the strong VET dominance with regard to individuals' school-to-work transition or the reconciliation of the family and the work sphere (for more details and examples, see Hupka-Brunner, Krebs-Oesch, Sacchi, Meyer, & Jann, 2022, particularly Fig. 2 at page 15).

Theoretical approaches regarding the life course consider young people as social actors who, in their striving to master relevant transitions throughout adolescence, can draw on personal, family and contextual resources. These resources may be found in various domains of life such as education, family, health, etc., and may be expected to influence each other. In the theoretical tradition of Havighurst (1972 [1948]) they are conceived as developmental tasks. The underlying assumption is that individuals need certain skills to successfully manage transitions, such as the ability to set and pursue goals. Motivational aspects (Deci & Ryan, 2012; Wild, 2001), self-efficacy as well as skills of problem-solving and decision-making ability are held to be the central characteristics that favor successful educational and acquisition pathways (Schoon & Silbereisen, 2009; Silbereisen et al., 2006). Eccles (1980) and Gottfredson (1981) underline that not only skills in their own right, but also their intra-individual representation are crucial for educational choices and success (see also Greve, 2000).

In addition to motivational aspects, personality aspects (e.g. 'Big Five', see Rammstedt & John, 2007) and behavioral characteristics also influence educational and employment trajectories (Wohlkinger, Ditton, von Maurice, Haugwitz, & Blossfeld, 2011). In particular, core self-evaluations (Judge, Locke, Durham, & Kluger, 1998) are considered an important personal resource for job satisfaction. Furthermore, satisfaction is considered a central component of well-being. In a life course perspective, Bernardi et al (2019) emphasize that increasing well-being (Diener & Biswas-Diener, 2000), an important component of health, is a central aspect of human behavior. Satisfaction with the training or employment situation is also strongly influenced by contextual factors. Hackman & Oldham (1980) or Semmer (2003) were able to show how job tasks should be conceptualized so that employees are more motivated and fluctuation can be avoided.

In the 16 years that lie between the two 'TREE cohorts' completion of compulsory school, a number of societal changes of the contexts relevant for the surveyed youths' development leads us to expect significant cohort effects. Apart from substantial reforms within the education system, we observe, e.g., new

developments in the labor market (including the market for dual VET training places), demographic changes, new emerging patterns of immigration to Switzerland, an increasing diversity of forms of family life as well as fundamental shifts in ICT and media use (Hupka-Brunner et al., 2022).

Accordingly, when designing the survey program of the TREE study, care was taken to ensure that the surveyed dimensions appropriately reflect the life course framework outlined in this section, the various disciplinary traditions and the specific macro-societal contexts with which the two TREE cohorts are confronted.

TREE study design

Main Features of the study

The first TREE cohort (TREE1) was launched in 2000, when a large national (compulsory) school leavers' sample ($N=6.343$) was tested on the occasion of Switzerland's first-time participation in PISA. Since then, the sample has been followed up by means of 10 panel waves, the most recent one conducted in 2019/20 ($N_{t10} \approx 3.900$). Further panel waves are planned at five years intervals. To date, TREE1 respondents have reached an average age approaching 40 and been surveyed for a period of over 20 years, spanning from early adolescence up to early middle-age (Gomensoro & Meyer, 2017; TREE, 2016). The second TREE cohort (TREE2) covers a comparable population of school leavers who left compulsory education in 2016. As its baseline survey, it draws on AES⁴ 2016, a national large-scale assessment of mathematics skills. Since then, the TREE2 sample ($N=8.429$) has been re-surveyed six times at yearly intervals, up to average age 21 (N_{t6} in 2022 ≈ 4.500). Further panel waves at two to five years intervals are planned.

The baseline surveys of both TREE cohorts provide elaborate measurements of cognitive skills that are at the respondents' command at the end of their compulsory schooling (9th grade). While the 1st cohort was mainly tested in reading literacy, the 2nd cohort was tested in mathematics.⁵ Furthermore, detailed information on student background characteristics as well as future plans and aspirations have been collected at baseline. Beyond the mathematics test at baseline, TREE2 implemented further cognitive tests: a general cognitive skills test at baseline measuring figural analogies (see Heller & Perleth 2000) and a reading speed test administered at various points of measurement (Zimmermann et al. 2012).

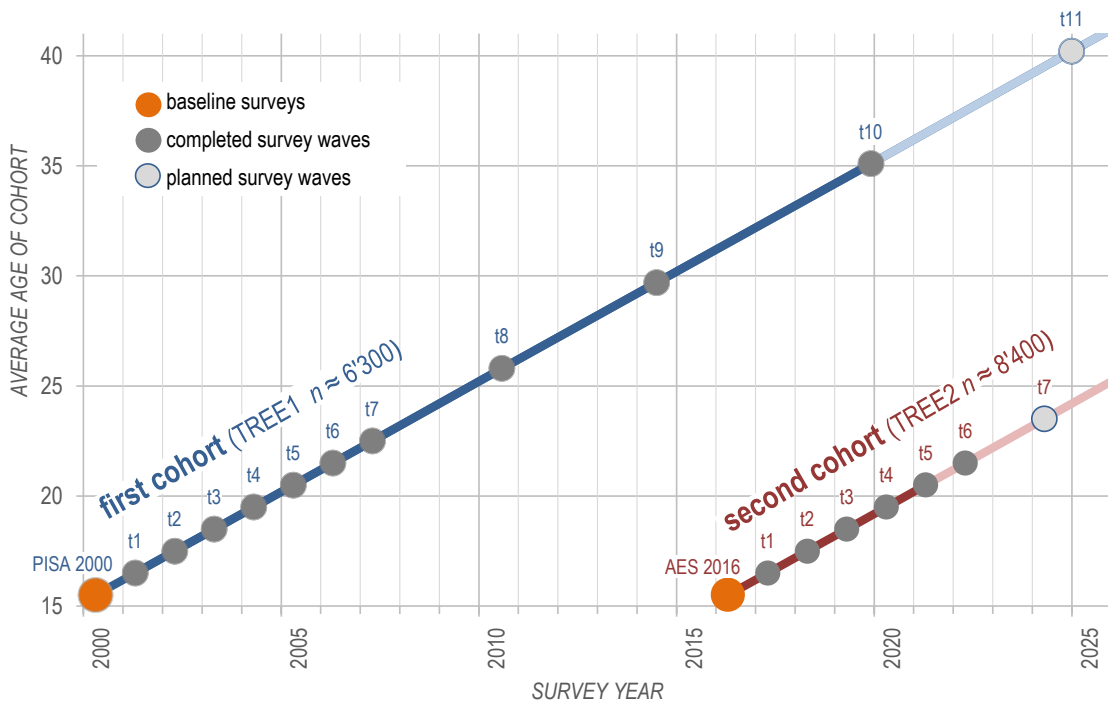
The subsequent TREE panel waves collect detailed data on education and labor market pathways, which are contextualized by a rich set of complementary information on various life domains that have been

⁴ Assessment of the Attainment of Educational Standards. See www.uegk-schweiz.ch/uegk-2016-neu/ (German), <https://cofo-suisse.ch/cofo-2016-2/> (French) or <https://vecof-svizzera.ch/1712-2/> (Italian).

⁵ In PISA 2000, mathematics and science were tested as secondary domains.

identified, in previous research, as factors relevant for the respondents' later transitions from education into working and adult life.⁶ This allows researchers not only to analyze respondents' pathways in great detail, but also to examine how these context factors shape the observed pathways.

Figure 1: TREE multi-cohort design



Sampling, Data Collection & Field Work

Both cohorts draw on a large, nationally and regionally representative sample of students in their last year of compulsory education (i.e. at the end of lower secondary education).

The Swiss PISA 2000 sample was designed to be representative of both ninth-graders and, regardless of their grade at the time of the PISA survey, fifteen-year-olds. The sampling adopted a two-stage, multiple disproportionate random selection with predetermined sample sizes for the two groups mentioned above, for language regions and for specific cantons (for details, see Renaud, Ramseier, & Zahner, 2000;

⁶ In order to foster and ensure inter-disciplinary use of the data, TREE has launched, over the years, several calls for instruments among scholars of the respective disciplines (sociology, economics, psychology, educational and health sciences). When selecting submitted instruments for implementation in the survey, preference was given to short, validated, widely used and internationally established instruments, as well as to instruments that are relevant for several disciplines and/or theoretical strands of research. See also Appendix for detailed information on survey topics.

Sacchi, 2011a, 2011b). Additionally and independently, a class sample was drawn from all ninth-grade classes in French-speaking Switzerland. The TREE study population is essentially identical to the Swiss PISA 2000 subsample of ninth-grade students. As PISA 2000 and TREE were designed as two distinctly separate surveys, PISA test administrators informed PISA participants about TREE and asked for their consent to be contacted by TREE at a later date and provide their contact details to this end. Approximately half of the initial PISA 2000 sample ended up doing so.

The baseline survey of the second TREE cohort (TREE2), AES 2016, drew on a large, complex random sample of 22423 ninth-grade students. The sample was drawn by means of a two-step, disproportionally stratified sampling procedure with schools as primary sampling units. In cantons with small student populations, all students were drawn. Stratification aimed at obtaining sufficient sample sizes for analyses at cantonal level, which leads to a marked over-representation of small rural cantons. Moreover, students enrolled in tracks with low academic requirements were privileged in the drawing of some cantonal samples. For a detailed description of the complex sampling design we refer to Verner und Helbling (2019). The AES test administrators introduced TREE and asked respondents consent to be contacted by TREE at a later date. After completion of the baseline survey, 13728 ninth-grade students had provided their consent and contact details. Due to restricted funding, TREE was not able to include all respondents providing their contact details in the TREE2 panel sample. In a first step, we therefore excluded most of the consenting respondents with incomplete baseline data. In a second step, we excluded another 2235 respondents by means of a randomized subsampling, leaving us with a gross initial panel sample of 9741 students.

The subsampling aimed to optimise sample composition in a longitudinal perspective. The general idea was to privilege respondent groups of particular analytic value and/or groups known to be particularly affected by panel attrition. Privileged inclusion of these groups was achieved by either omitting them from the subsampling altogether (i.e. including them in the sample with a probability of one) or by assigning them an elevated sampling probability (Hupka-Brunner et al., 2023; Sacchi, 2023).

AES basically covers the population of ninth-grade students enrolled in the school year 2015/16. For survey-practical reasons, about three per-cent of the students had been excluded from the AES (mostly students from schools for special needs; see Verner & Helbling, 2019). Furthermore, students who had repeated their 9th grade in the school year 2016/17 were excluded. By limiting the TREE2 population to (compulsory) school leavers, comparability of populations between the two TREE cohorts is maximised.

Moreover, survey participation of both baseline surveys is extraordinarily high (PISA 2000: 95 %; AES 2016: 93 %; see EDK, 2002; Verner & Helbling, 2019), which substantially facilitates measures to correct for non-response bias due to panel attrition. Response rates among the 1st cohort were significantly higher

(average wave-specific response >80%), than among the 2nd (around 70%). For detailed information on sampling, attrition and weighting see Sacchi (2011a, 2023 (in press)).

Main field operations of each panel wave run from February/March to July (end of the Swiss school year). A pretest in January/February ensures that adjustments of the complex survey instrument design are adequately and correctly implemented. A letter of announcement mailed out shortly before the start of the main field includes a newsletter and a reply card for contact data corrections. Whereas TREE1 respondents never received (material) incentives, we developed a complex incentive regime for TREE2 where specific target groups receive non-conditional pre-incentives.⁷ Throughout the entire field phase, we operate a hotline in each of the three survey languages.⁸ Field interventions such as announcements, reminders contact and interview scheduling management are administered in parallel via several communication channels: (postal mailing, e-mail, SMS, WhatsApp and telephone).

Educational and labor market pathways are surveyed by means of computer assisted telephone interviews (CATI).⁹ Following the CATI part, a self-administered written questionnaire tailored to the respondents' individual education and employment situation is sent out, in which respondents are asked to assess their current situation. On the one hand, this two-part split-mode survey design aims at better reflecting the individual educational and employment histories, which become increasingly complex and diverse over time. On the other hand, it addresses mode effects with regard to sensitive questions, e.g. regarding health, drug (ab)use, income, etc., which are mostly placed in the self-administered part of the survey (for more detailed information on survey methods, fieldwork etc. see Gomensoro & Meyer, 2017; Hupka-Brunner et al., 2023; TREE, 2016b).

Access to and use of TREE data

TREE is basically funded as a social science data infrastructure. The TREE2 data collection, treatment and publication strictly complies with Swiss ethical and data protection legislation. A detailed data management plan guarantees:

- Strict confidentiality with regard to collection, treatment and transfer of contact and survey data;
- Strict separation of contact and survey data;

⁷ I.e. subsamples for which higher-than-average attrition is to be expected; e.g.: youths with disadvantaged family background, youths with specific migration backgrounds.

⁸ German, French and Italian.

⁹ For reasons of insufficient initial funding, data collection for the follow-up surveys of the 1st cohort was carried out by means of self-administered paper & pencil questionnaires until 2004 (survey waves 1 to 4).

As of wave 6 in cohort 2, we have introduced an additional CAWI mode (computer-assisted [self-administered] web interview) for part of the sample.

- State-of-the-art security standards as to the (physical) storage and the treatment of data;
- Transparent communication of voluntariness of participation to respondents;
- Strict observation of respondents' consent to panel participation and data linkage,
- Thorough anonymization of published data.

After treatment according to the principles mentioned above, scientific use files are published at SWIS-SUbase, a central data archive managed by FORS (TREE, 2016a, 2021). Data documentation is extensive and state-of-the art. Upon signature of a data user agreement in which scholars commit themselves to comply with the usual professional standards, data use is free of charge and unrestricted except for commercial purposes. Upon request, TREE provides technical support to its users (see https://www.tree.unibe.ch/index_eng.html for details). The TREE data belong to Switzerland's most widely used data infrastructures in the social sciences.

Main findings

Over the past 20 years, hundreds of TREE-based analyses have been published (see www.tree.unibe.ch/results for more detail). Owing to the broad, multi-dimensional contextualization of the collected data on education and employment trajectories, the TREE data, in line with their anchorage in life course theory, particularly lend themselves to investigate the complex interplay between structure and agency, i.e. institutional opportunities of the systems of education and employment on the one hand and individual skills, resources and dispositions on the other.

The findings summarized in this section are structured as follows: In the next section, we summarize the most salient results of major strands of research that have been repeatedly drawing on TREE data (social inequality and gender issues throughout the life course). In section "Findings regarding psychology and well-being", we aim at highlighting how psychological issues have been addressed in analyses drawing on TREE data, with a particular focus on well-being. The (sub-)disciplinary foci of the reviewed contributions are heterogeneous, covering the fields of work & organizational psychology, psychology of education, as well as multi-disciplinary approaches such as life course issues (combining sociology & psychology). We also include a few contributions dealing with health issues (as part of well-being). In terms of methodology, it should be noted that the reviewed analyses generally employ sophisticated methods of analysis which take into account interdependencies and time-variance of observed characteristics and/or several levels of analysis (e.g. aggregate/structural vs. individual in multi-level analyses): Apart from analyses of variance, linear or logistic regressions and confirmatory factor analyses (CFA), structural equation models (SEM) as well as latent growth and cross-lagged regressions are employed, including complex combinations between them such as autoregressive mixture models.

Social inequality and gendered life chances throughout the life course

When looking, at a purely descriptive level, at the “outcome” of the first TREE cohort’s educational trajectories at average age 30, i.e. 14 years after the end of compulsory schooling, about half of the cohort had successfully completed upper secondary, and 40 per cent tertiary level education. One in ten had not acquired a post-compulsory certificate of any kind (Gomensoro et al., 2017).

Inequality of educational opportunities

A major strand of (predominantly) sociological research drawing on TREE data examines the extent to which educational institutional structures affect young people’s educational opportunities. Due to its high variability of institutional arrangements for school-to-work transitions as well as learning contexts, the Swiss case is particularly informative in this respect and is referred to as a kind of “life-size laboratory” (Meyer, 2009) for comparative research at both the sub- and cross-national levels (Gomensoro & Meyer, 2017).

TREE analyses for both cohorts invariably highlight the marked influence of social origin on educational trajectories (Falter, 2012; Hupka-Brunner, Sacchi, & Stalder, 2010; Robin Samuel, Manfred Max Bergman, & Sandra Hupka-Brunner, 2013b), which is partly mediated by the early and strong vertical and horizontal tracking in Switzerland’s education system. On grounds of comprehensive achievement and literacy skills measured in the TREE baseline surveys, an important strand of findings discloses the particular mechanisms by which tracking in lower secondary level education translates into and affects students’ trajectories at subsequent levels of education. They particularly show that, *ceteris paribus* (i.e. especially when controlling for achievement and skills), lower secondary tracking is associated with restrictions regarding post-compulsory educational opportunities, increases of the risk of premature drop-out and subsequent risks of exclusion from the labor market -- thereby heavily compromising the “meritocratic claim” of the Swiss education system (Gomensoro & Meyer, 2021; Gomensoro et al., 2017; Meyer & Sacchi, 2020).

Against the background of the country’s accentuated record of immigration of low-qualified labor throughout the second half of the 20th century (B. Lüthi & Skenderovic, 2019), social inequality in Switzerland is inextricably linked with migration status. At a descriptive level and particularly with regard to the 1st TREE cohort, both first and second generation migrants in Switzerland fare significantly less well in terms of educational success than their native counterparts (Gomensoro & Bolzman, 2015, 2019; Hupka-Brunner & Stalder, 2011; Sacchi, Hupka-Brunner, Stalder, & Gangl, 2011; Scharenberg, Rudin, Müller, Meyer, & Hupka-Brunner, 2014), even when controlling for skills and academic achievement. While ethnic discrimination is proved to be widespread (Fibbi, Kaya, & Piguet, 2003; Imdorf, 2017), numerous analyses show that the (negative) effects of migration background on educational success sub-

stantially decrease (or disappear altogether) once parental socio-economic status and/or educational attainment is taken into account (Gomensoro & Bolzman, 2015; Sacchi et al., 2011). Analyses on intergenerational mobility reveal, on their part, reveal that young migrants display substantially higher upward social mobility than natives (Gomensoro & Bolzman, 2019). Recent cohort-comparative analyses drawing on data of the second TREE cohort suggest that the changing social composition of Switzerland's migrant population is beginning to take its effect on educational outcomes of students with migration background: While young migrants of the 1st TREE cohort were markedly underrepresented in the academic tracks of post-compulsory education, this disparity has disappeared in the 2nd cohort. The assumption underlying this change is that the share of migrants with high parental socio-economic status and/or educational attainment has dramatically increased between the older and the younger cohort (Gomensoro & Meyer, 2021, p. 11).

Gendered life courses

Gender and gendered life courses are undeniably one of the most salient research focuses for which scholars draw on TREE data. In two innovative mixed-methods studies¹⁰ drawing on TREE data, Schwiter et al. (2014) hold that, when leaving compulsory school at average age 15 to 16, almost two thirds of the respondents aspired to a future profession “typical” for their gender. Seven years later, at average age 23 to 24, this share had grown to over three quarters among those who were then gainfully employed. One of the most striking findings of these studies is to what extent anticipated gender roles¹¹ affect professional aspirations early on – and hence gendered education and training choices at the transition from lower to upper secondary education. The authors emphasize that occupational choices with regard to dual VET have to be made very early on, at an age and biographical phase during which adolescents' gender identity has yet to emerge and consolidate. This fosters conformity with traditional gender roles and hence gender-typical occupational choices (Heiniger & Imdorf, 2018; Imdorf, Sacchi, Wohlgemuth, Cortesi, & Schoch, 2014; Schwiter et al., 2014).

With regard to labor market outcomes, gender is by far the most significant single factor influencing the employment situation at age thirty – strongly coupled with the family situation. The TREE findings clearly demonstrate the extent to which and the persistence with which men's and women's labor market

¹⁰ See <https://p3.snf.ch/project-129220> and <https://p3.snf.ch/project-153241> for more detail.

¹¹ I.e. mostly issues regarding the reconciliation of family and work. It is particularly striking that notions of a future family are a key mechanism for both young women and young men when it comes to explain why both sexes mostly choose gender-typical professions. While young women with work experience in gender-atypical occupations anticipate incompatibility with their potential future motherhood, their male counterparts anticipate the problem of not being able to conform to the male breadwinner model in their occupational field. On the other hand, many young men seem to want to be actively involved in childcare, which is often associated with a reduction of the level of employment (see also Buchmann & Kriesi, 2009).

careers are still disparate in Switzerland. First and foremost, they show that women earn significantly less than men. The "wage gap" is at around one eighth of the average income for the TREE cohort at age 30 (Gomensoro et al., 2017).

Previous TREE analyses had furthermore established that women are already affected by significant unexplained wage gaps at the very beginning of their labor market career, i.e. usually long before a later family phase (see e.g. Bertschy, Walker, Baeriswyl, & Marti, 2014). This is the case even when controlling for family resources, skills and educational credentials (Combet & Oesch, 2019). Young women in Switzerland do not seem to be able to "cash in" on their educational attainment, which can be explained, at least in part, by the horizontal gender segregation (i.e. women "choosing" other training professions or fields of study than men) in the Swiss education system, which translates into vertical segregation on the labor market (Schwiter et al., 2014).

When the first child is born, the "gender gap" in Switzerland also opens (further) with regard to the degree of employment: While men with children are or remain employed full-time almost without exception, around one fifth of all women with children drop out of the labor market altogether (at least temporarily). Three quarters of working mothers work part-time, at a level of employment of less than 50% in almost half of the cases, regardless of their level of education attained (Gomensoro et al., 2017).

(Further) Labor market outcomes

Overall, the labor market situation of the observed Swiss school leavers' cohort at an average age of approximately 30 years can be described as extraordinarily favorable -- particularly in international comparison. Employment rate is high, unemployment low, and at age 30, the cohort achieves a median income that has already reached the level of the total of the Swiss labor force (Gomensoro et al., 2017). This is not least due to the fact that since the turn of the millennium, the Swiss labor market has been marked by a relatively constant favorable overall economic situation, which is accompanied by high labor demand at all levels of education, but especially at the tertiary level.

Numerous TREE analyses confirm that education pays. Conversely, the lack of a post-compulsory degree in particular is associated with significantly increased risks on the labor market (op. cit.). Compared to their peers with at least an upper secondary level degree, youth without post-compulsory credentials (approx. 10% of the observed cohort) are less likely to be employed and significantly more likely to be in precarious employment. On the positive side, it should be noted that four out of five individuals without a post-compulsory degree are to be found in gainful employment by the age of thirty. The longitudinal perspective also suggests that a considerable proportion of this group is able to hold their own in the labor market over several years.

Among those who have completed tertiary education, the high employment rate and the considerable wage advantage over those without a tertiary degree are particularly striking. This indicates a considerable return on education for those who continue their education at the tertiary level (op. cit.).

Compared to those failing to obtain a post-compulsory degree, graduates from upper secondary level VET are more likely to be gainfully active and less likely to be in precarious employment. In terms of average income, however, the two groups do not differ significantly on average. Overall, the TREE results indicate that the “safety” effect of an upper secondary VET degree, which has long been regarded as a “guarantee” for a smooth and sustainable transition to the labor market, has diminished or shifted to the tertiary level of education (op. cit.). Furthermore, additional analyses show that occupational mobility of VET graduates without tertiary level degree is low and often goes hand in hand with wage losses (Buchs & Helbling, 2016; Mueller & Schweri, 2015). Moreover, access to tertiary level education proves to be difficult for a substantial proportion of VET graduates, especially for those with low volumes of VET school (Meyer & Sacchi, 2020).

Another significant finding of many TREE-based analyses is the long shadow that previous transitions in the education system cast on the labor market situation at the age of 30. Two early transitions in particular increase the risk (all else being equal) of having dropped out of the labor market at this age: Firstly the allocation to a lower secondary level track of the “basic requirements” type, and secondly a delayed, discontinuous entry into upper secondary level education (Gomensoro et al., 2017).

Findings regarding psychology and well-being

Satisfaction with the learning and working environment

Among many other things, TREE allows for detailed study of the learning and working environment. Analyses on aspects of learning environment such as quality of teaching, learning climate and learning opportunities, autonomy and training requirements show that these affect learning development and, above all, satisfaction and hence well-being (F. Lüthi, Stalder, & Elfering, 2021; Samuel & Burger, 2019; Schmid & Stalder, 2012; B. Stalder, 2013; B. E. Stalder, 2009, 2012). The alternation between (vocational) school and training company in VET programs involves two distinct learning resp. working contexts in which young people have to find their way around. According to Stalder (2003), learners in dual VET generally assess the learning conditions in the training firm more favorably than those in (vocational) school. This is highly significant insofar as a high level of satisfaction with practical training reduces the tendency to drop out of training and thus increases the likelihood of educational success (see also section “Well-being and health”).

Another factor that proves to be important are critical (or: significant; see below) life events. With respect to the workplace situation after transition to the labor market, TREE analyses generally underpin the

importance and interplay of personal and contextual resources for success (F. Lüthi et al., 2021; Samuel & Burger, 2019; Schmid & Stalder, 2012; B. Stalder, 2013; B. E. Stalder, 2009, 2012).

Educational achievement, success & well-being

With regard to “success”, the TREE data lend themselves to a broad range of criteria of measurement both in terms of life domains and “outcomes”: In sociology, success usually focuses on positions of higher social status, prestige or lifestyle aspirations (Bourdieu, 1986; Treiman & Yip, 1989). In psychology, success often refers to achieving a personally meaningful goal, such as completing a developmental task. Psychological analyses of transitions thus frequently emphasize the role of individual resources such as self-esteem or self-efficacy when it comes, for instance, to coping with challenging periods of the educational and employment trajectory (Keller, Samuel, Bergman, & Semmer, 2014). This is where life satisfaction and other indicators of well-being come into the focus of investigation (see also next section “Well-being and health”).

Samuel (2013a)¹² on his part longitudinally examines the complex interplay between educational achievement, occupational success and well-being, especially focusing on the consequences of intergenerational transfer of educational attainment on well-being (self-esteem, positive attitude towards life). The relationship between these domains was examined drawing on a structure-agency framework derived from Bourdieu (1986) and social comparison theory (Festinger, 1954). Results show that over time, downward educational mobility is associated with deteriorating well-being (Samuel, Hupka-Brunner, Stalder, & Bergman, 2011). They also suggest that social comparison between adolescents and their parents might be the mechanism explaining the effects of intergenerational transmission of educational achievement and occupational success on well-being. It is further argued that well-being may serve as an individual resource fostering educational and occupational outcomes (Samuel et al., 2013a). Furthermore, young females seem to be more likely to succeed and to experience positive effects in terms of well-being during successful episodes when compared to males. On the downside, females’ well-being seems to be more strongly affected by failure. Samuel (2014) concludes that well-being is to be considered as a gendered personal resource during the transition to adulthood. In another analysis with Burger, Samuel shows that baseline levels of stress and self-efficacy, as well as their within-person change over time, affect adolescents’ life satisfaction, whereas self-efficacy mitigates the negative effect of baseline stress on life satisfaction (Burger & Samuel, 2016).

Well-being and health

TREE data also allow for in-depth analysis of well-being owing to the fact that the TREE surveys include detailed constructs and scales on health-related issues such subjective assessment of physical and mental health, somatic complaints and substance use.

¹² See <https://p3.snf.ch/project-130042> for more detail.

Jafflin et al. (2019) drew on these data and furthermore took self-esteem, stress and significant life events (SLE) into account. They concluded that, in addition to their known influence on mental health, stress and self-esteem are important factors influencing individuals' general health. More particularly, they found that self-esteem has a significant positive impact on health, whereas cumulative SLE had a significant negative impact. In a similar vein, Berchtold et al. (2018) hold that the number of SLE is related to the trajectories of somatic complaints over time. In their attempt to cluster respondents according to their reported somatic complaints, they furthermore found distinct groups differing with regard to gender, literacy skills and substance use. With a focus on cannabis consumption, Brodbeck et al. (2011) on their part analyzed respondents' use of other substances and correlates regarding their health. According to their findings, even occasional cannabis use was associated with more smoking, more regular alcohol consumption, more physical complaints and more psychosocial stress. For young women occasional cannabis use was furthermore associated with a less positive attitude towards life, whereas frequent use was related to higher scores of depression.

Key messages and main policy implications

With respect to returns on educational investment in the labor market, TREE results clearly show that education “pays”. While the lack of any post-compulsory degree in particular is associated with significantly increased risks of exclusion and precariousness on the labor market, graduates from tertiary level education have a particularly high employment rate and a considerable wage advantage over those without a tertiary degree. With respect to those who attain an upper secondary VET degree, the TREE findings indicate that its “safety net” effect, which has long been regarded as a “guarantee” for a smooth and sustainable transition to the labor market, has diminished or shifted to the tertiary level of education.

The internationally low share of tertiary level graduates is critical from the point of view of both the learners and the labor market, which has been experiencing a marked shortage of high-qualified workers for years. In the past two decades, this shortage has been compensated to a considerable extent by the recruitment of workers from abroad.¹³ Given that two thirds of a Swiss age cohort enroll in VET programs, the burden of increasing tertiary level completion rates lies primarily with the VET sector.

With regard to gender issues, TREE's longitudinal design unfolds its full potential insofar as it allows to analyze how individuals' agency unfolds within institutional structures of the education and transition system. Early tracking and early career choices (particularly in VET tracks) reinforce gendered career orientation, which in turn, owing to the marked path-dependencies of the Swiss education and transition

¹³ According to various statistical sources, labor market migration from abroad accounts for one third to 40 percent of the demand for high-skilled labor in Switzerland (BFS, 2019).

system, has long-term consequences for labor market careers: The horizontal segregation of the education system thus reinforces vertical segregation in the labor market.

One of the most striking findings of TREE analyses on gender is to what extent anticipated gender roles affect professional aspirations early on -- and hence gendered education and training choices at the transition from lower to upper secondary education, especially in the VET tracks. With regard to labor market outcomes, gender is shown to be by far the most significant single factor influencing the employment situation at age thirty – strongly coupled with the family situation.

In terms of policy implications, these findings underline the political urgency of de-gendering educational and labor market trajectories. Gendered career choices do not just reflect individual preferences, but tend to exacerbate social inequalities between men and women in the labor market and in society at large. Consequently, the exceptionally early (i.e. as early as age 14) career choices typical for the Swiss VET system needs to be addressed, e.g. by increasing their corrigibility in later phases of the educational trajectory by means of improving track and/or occupational permeability. Furthermore, the normative dimension of gender roles with regard to career choices should be taken into more careful account than seems to be the case in presently practiced career guidance. Finally, it should be noted that de-gendering education and labor market trajectories also inevitably involves measures in the wider area of social, family and labor market policy, such as promoting equal pay, equal career opportunities and reconciliation of family and career.

As regards psychological issues and well-being, several TREE analyses underscore the extent to which structure and agency are intertwined and the development of educational and employment trajectories is shaped by contextual and personal resources: This is particularly true with respect to educational and work satisfaction, where the shaping of the learning and working environment proves to be as significant as personal resources (e.g., core self evaluations). This is crucial insofar as satisfaction has shown to be a strong predictor of further educational and career success. In addition, the analyses presented show that the effect of environmental factors is not limited to educational success, but also extends to the development of health and self-concepts. These results can help to improve the design of training contexts, to support (VET) trainers in their work and thus to better accompany young people on their educational pathways.

Further contributions underpin the importance of significant (or critical) life events (SLE) for both successful trajectories and general health.

Such findings pinpoint the importance of understanding the interaction between different life domains in order to facilitate both healthy and productive training and work contexts, which in turn can make an important contribution to stable mental and physical health.

TREE's analytic potential in a European (comparative) perspective

In a European perspective, TREE is one of the very few panel studies that a) comprise more than one cohort; b) are inter-disciplinary in their design; c) draw on large, both nationally and regionally representative samples; d) cover a long observation period.

TREE's survey instruments draw on established, widely used, and versatile concepts and constructs that meet the analytical needs and interests of a variety of disciplines and theoretical frameworks. This enables interdisciplinary and comparative research at both national and international levels. Comparability is further enhanced by the fact that, owing to Switzerland's multilinguality, TREE survey instruments are largely available in four European languages (i.e. the three Swiss national languages German, French and Italian, complemented by an English version in the data documentation).

The marked variability of institutional, regional, economic, and cultural settings in federal Switzerland, which on occasion has been referred to as a "life-size laboratory" (Meyer, 2009), provides ample analytical potential for comparative analyses at meso and micro level, but also in an international perspective.

With particular respect to the data of the second TREE cohort, it should be further noted that they allow the linkage to official statistical register data of various domains (education, employment, health, social security, etc.). This greatly enhances the analysis potential of the collected survey data in terms of topical scope on the one hand, but also with respect to the compensation of response biases caused by panel attrition.

Moreover, we should keep in mind that the TREE panel study is ongoing. This applies to both cohorts in the field to date. By the mid-2020s, the first cohort (TREE1) will have reached an average age of approximately 40 and will have responded to a total of 11 survey waves (see Figure 1). With the advent of biographical middle-age and a cumulative panel observation span of 25 years, we expect research foci to gradually shift to other phases of the life course such as the progress of family formation or the development of further stages of respondents' professional career, including lifelong education.

As to the second TREE cohort (TREE2), it will be in its mid-twenties on average by 2026 and will have responded to a total of seven survey waves, which will allow us to examine its transition from education to employment and young adulthood in a more complete and comprehensive manner.

In step with each additional panel wave and thus extension of the panel's observation span, the potential of the TREE data for cohort comparison multiplies. Owing to the multi-cohort design of the study, the data lend themselves for cohort comparison not only at a descriptive level, but also in view of research questions pertaining to how changing macro-contexts affect the observed trajectories and the dynamics between structure and agency in which they unfold.

More particularly and in view of the results presented in this contribution, the role of well-being both as a resource and an outcome of trajectories deserves further in-depth investigation. In view of the reforms and changes in the education system, the labor market and society as a whole, it also seems immensely promising to have a cohort-comparative look at the issue of reconciliation of family and work. Furthermore, as the measurement of skills (both at baseline and longitudinal) has been greatly refined and enhanced for the second TREE cohort, the TREE2 data will allow more in-depth analysis of skills formation throughout post-compulsory education. Finally, as we have introduced an extensive COVID-19 module in panel waves five and six (2021 and 2022) of the second cohort, the TREE2 data will also allow to investigate mid- to long-term effects of the pandemic not only on the observed education and labor market trajectories, but also on other life-domains and well-being.

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Appendix: Survey topics

Main	Detailed	(partly) comparable	extended or refined in TREE2	improved time references in TREE2
Socio demographics	Socio-demographic characteristics and housing situation			
	Age and Gender	C		
	Civil Status	C		⊕
	Housing situation	C	*	
	Composition of (own) family	C		⊕
	Migration background and nationality			
	Migration background	C	*	
Education, training and employment	Nationality, residence status		**	⊕
	Educational pathways and transitions (lower sec. level)			
	Educational biography (compulsory school)	C	(*)	
	Educational decisions (transitions lower => upper sec. education): perceived cost, benefit and chances of success			**
	Educational objectives and aspirations	C	**	
	Plans for education and training	C	*	
	Characteristics of maths lessons (end of lower secondary education)			+
	Educational situation and post-compulsory pathways			
	Attended educational programmes	C		⊕
	Attended schools	C		⊕
	Attended training firms	C		⊕
	Skills requirements for educational activities / media use			*
	Absenteeism / intention to change education	C		
	Resources and strains (education)	C	*	
	Credentials and marks	C	**	⊕
	Reasons discontinuing education and training			**
	Employment situation (incl. internships) and pathways			
	Employment / internships	C		⊕
	Conditions of employment	C	*	
	Job position within company's hierarchy	C		
	Salary	C	*	
	Resources and strains (employment)	C	*	
	Job tasks, requirements and job-skills-mismatch	C	**	
	Absenteeism / intention to change job	C		
	Reasons for termination of employment			*
	Desired job situation			
	Self-assessment of education and employment pathways			
Assessment of current education and training			**	
Assessment of completed education & training				
Perceived fit and commitment: main activity (?)	C	*		
Other activities, job and training search	Search for education or employment			
	Search for education (end of lower secondary education)		*	
	Search for VET training place (upper sec.)	C	**	⊕
	Job search (upper sec.)	C	**	⊕
	Search for general education programme (upper sec.)		**	⊕
	Other activities			
	Unemployment (unregistered and registered)	(C)	*	⊕
	Vacation / holidays	(C)		⊕
Military service	(C)		⊕	
Childcare (as main activity)	(C)		⊕	

Appendix: Survey topics

Main	Detailed	(partly) comparable	extended or refined in TREE2	improved time references in TREE2
	Illness / accident	(C)		⊕
	Maternity / paternity leave	(C)		⊕
	Gap / missing information	(C)		⊕
	Reasons for non-participation in education and employment			
	Reasons for non-participation in education and employment		*	
	Reasons for non-participation in education		*	
	Reasons for part-time & non-employment			
Family, significant others, social origin and networks	Family background			
	Family climate	C	*	
	Socio-economic origin	C	*	
	Childcare situation (own children)			
	Social, cultural, and economic resources			
	Social capital (own)		*	
	Cultural capital (family of origin)	C	*	
	Cultural capital (own)	C	*	
	Economic capital (family of origin)	C	*	
Financial situation (general)	C	*		
Social participation	Social and cultural participation			
	Politics	(C)	[**]	
	Leisure		**	
	Group affiliation and sense of belonging (identity)	C	*	
Well-being and health	Satisfaction and well-being			
	Satisfaction	C	*	
	School-related well-being		*	
	Critical life events	C	*	
	Health	C	[**]	⊕
Corona		[**]		
Self	Non-cognitive factors			
	Motivational concepts	C	*	
	Self-perception	C	*	
	Emotions related to maths classes		+	
	Volitional strategies	C	*	
	Personality characteristics		*	
	Global preferences (risk, time and social preferences)		*	
	Values and attitudes	C		
	Attitudes related to maths classes		+	
	Cognitive skills (assessments)			
	basic mathematical skills	(C+)	**	
	reading speed		**	
cognitive skills		**		

Legend for columns on comparison with TREE1:

C = Data (partly) comparable across cohorts. (C) Comparable data for both cohorts in upcoming data releases. (C+) Elaborated, but not fully comparable assessment of math competences available for both cohorts (TREE1: randomized split-half sample).

* Survey programme slightly extended compared to TREE1. ** Survey programme strongly extended compared to TREE1. + extended survey programme (AES topic). (*) = data on transition primary school to secondary I not in this release. [**] New survey modules ⊕ "Improved time references in TREE2" refers to the fact that the time dimension of some aspects was surveyed more precisely in TREE2. For example, when not only the current marital status was collected (as in TREE1), but also since when it has been active (TREE2).

Author Biographies

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