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Scarring effects of early unemployment among young workers with vocational credentials in Switzerland

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Abstract

Background: Using a unique, longitudinal survey that follows school-to-work transitions of pupils who participated in PISA 2000, this paper investigates adverse consequences, so-called scarring effects, of early unemployment among young adults who acquired vocational credentials in Switzerland.

Methods: As social, individual and contextual factors influence both early unemployment and later employment outcomes, taking into account endogeneity is of utmost importance when investigating scarring effects. In this regard we make use of nearest-neighbour propensity score matching and set up statistical control groups.

Results: Our results suggest that young adults who hold vocational credentials are more likely to be neither in employment nor in education, and to earn less and be more dissatisfied with their career progress later in work life than they would be, had they not experienced early unemployment.

Conclusions: We conclude that unemployment scarring also affects young adults with vocational credentials in a liberal labour market setting that otherwise allows for smooth school-to-work transitions. This finding runs counter to expectations that standardised vocational degrees, a liberal and flexible labour market structure, and predominantly short unemployment spells protect young skilled workers from scarring in case they happen to experience early career instability.

Keywords: Scarring effects; Early unemployment; School-to-work transition; Vocational education and training (VET)

Background

The 2008–09 recession has hit youth hard in terms of their employment prospects across the OECD (OECD 2010). With regard to its low youth unemployment rates, Switzerland is often recognized as a country that performs well in international comparison (OECD 2010, 2013b; Hoeckel et al. 2009). Institutional settings such as comparatively weak employment protection legislations (EPL) (see OECD 2013a) that allow school leavers to more easily set foot within the labour market (see Breen 2005) as well as the strong vocational orientation of the upper secondary education system both have a share in this. Vocational education and training (VET) is the dominant form of upper secondary education in Switzerland and equips the majority of youth with vocation specific certificates that foster smooth transitions to the labour market. About two thirds of youth

pursue a vocational education at upper secondary level in Switzerland while only about one fourth takes up a general education (SERI 2014; Stalder and Nägele 2011). In international comparison, Switzerland stands out in terms of the share of school leavers who pursue a dual-vocational education (Hoeckel et al. 2009: 10–11), which is an apprenticeship that combines school and workplace-based training. Most apprenticeships take three to four years to complete and are awarded with a federal certificate of vocational education and training that qualifies one for taking up work in the occupation trained in. About a quarter of the students who pursue vocational education at upper secondary level further obtain a federal vocational baccalaureate, which is an optional qualification that allows them to enrol in tertiary vocational education such as at the universities of applied sciences (Fuentes 2011; Hoeckel et al. 2009; Stalder and Nägele 2011). Overall, the Swiss VET system can be described as highly standardised as it equips the young with vocational training and certificates that meet similar standards nationwide (see Müller and Shavit 1998: 6–7). These vocational certificates send clear signals to employers about the occupation-specific skills and suitability of the young entrants for particular jobs (Breen 2005), further fostering smooth transitions.

Even though skilled workers, particularly those who have undergone vocational education and training, fare comparatively well when transiting to the labour market, they are nevertheless increasingly facing problems at labour market entry in Switzerland (Salvisberg and Sacchi 2013, 2014). The fact that early unemployment may not only be a temporary blemish but can evolve into permanent scars (Ellwood 1982) is theoretically and empirically well established. However, while negative long-term consequences of unemployment experiences, so-called scarring effects, have been the focus of research conducted in a lot of industrialised and industrialising countries (see e.g., Arulampalam et al. 2000; Mroz and Savage 2001; Nordström-Skans 2004; Gregg and Tominey 2005; Luijkx and Wolbers 2009; Vandenberghe 2010; Nilsen and Holm Reiso 2011, Cruces et al. 2012), little is known about unemployment scarring concerning those who pursued vocational education and training. To help towards closing this gap, this paper looks at scarring effects of early unemployment among young workers who have completed vocational education and training in Switzerland. As institutional settings such as weak employment protection legislations (OECD 2013a) and high standardisation of VET presumably do not provide strong incentives for employers to base their hiring and wage-setting decisions on the young applicant's short work histories and transition processes, we expect that in the Swiss context VET graduates will not be substantially affected by unemployment scarring. This assumption finds further support in that unemployment spells of young skilled workers are generally of short duration in Switzerland (see Sacchi and Salvisberg 2012). Whether these potentially advantageous institutional settings indeed manage to offset unemployment scarring will be put to the test within this paper.

Besides focusing on a group of skilled young workers that has so far been assumed to be mainly sheltered from various labour market risks, we go beyond previous research in that we not only investigate unemployment scars with respect to objective dimensions of labour market outcomes but also take individual's assessments of their career progress into account. Young adults who are to some extent worse off in the mid-term due to the exposure to early unemployment may still be satisfied with their careers, if the experience of early unemployment was a prolonged job search or welcome career-adjustment such that they are happy with the job-matches found and the way their

career unfolded. For this reason we complement our analysis of unemployment scarring on objective employment outcomes with the analysis of how the young themselves perceive their career progress. This allows for a more comprehensive understanding of the impact of early unemployment in terms of both objective and subjective notions. Against this backdrop, we investigate the following research questions:

1.) Are young skilled adults who experienced unemployment in early work life disadvantaged in terms of their subsequent employment outcomes (such as labour market integration and wages) compared to a similar group of young skilled adults who did not experience early unemployment?

2.) Do young skilled workers who experienced unemployment in early work life perceive their career progress as less satisfying compared to a similar group of young skilled workers who did not experience early unemployment?

In order to investigate these research questions we first briefly review theoretical explanations and expectations as well as we report the current state of research concerning unemployment scarring. Following this, we introduce the analytical strategy employed, which is propensity score matching, and move on to describe the data, model and variables used. We then present our findings and add some concluding remarks. Finally we outline the need for future research and discuss some limitations of our analysis.

Theoretical considerations and empirical findings
What drives unemployment scarring?

Different competing explanations have been proposed in order to frame unemployment scarring, such as economic assumptions about returns on accumulation of human capital (Becker 1964), human capital depreciation (see e.g. Pissarides 1992; Edin and Gustavsson 2008) or statistical discrimination (Aigner and Cain 1977) and signalling (Spence 1973). Becker's (1964) economic approach to returns on human capital assumes that specific on-the-job training is an investment in human capital and thus goes together with higher wages in later career. Those who experience spells of early unemployment can be seen as missing out on the possibility of acquiring job specific training and thus have a lower market value when hired compared to their cohort members (see Becker 1964). Over and beyond differing job prospects due to missed accumulation of human capital, it is further assumed that human capital depreciates during periods of economic inactivity. Loss of work specific skills due to unemployment periods is seen as leading to lower productivity and thus to worse occupational prospects when returning to the labour market (see Edin and Gustavsson 2008; Mooi-Reci and Ganzeboom 2012). Yet, as skilled labour market entrants in Switzerland mainly experience short spells of unemployment (see Sacchi and Salvisberg 2012), human capital depreciation is presumably not very important as missed work experience may not be extensive. The duration of unemployment is further considered to drive unemployment scarring from an application-behavioural viewpoint. Following wage search perspectives (Mortensen 1986), unemployed are thought to lower their reservation wages with search tenure. As time spent in unemployment passes, individuals become more prone to apply for jobs and to accept job offers that do not match their initial expectations. Thus not only the incidence of unemployment but also its duration may be seen as mechanisms driving unemployment scarring.

Statistical discrimination (Aigner and Cain 1977) and signalling theory (Spence 1973) draw on the assumption that hiring is an uncertain investment since the worker's productivity is unknown to the employer. Therefore the employer has to rely on observable characteristics, so-called signals (Spence 1973), which serve as a proxy for worker's unknown productivity. These signals then determine to a great deal job offers and the job quality attached to these (see Spence 1973). In line with this theoretical argument, employers may not attribute early unemployment to structural problems and shortages in the demand for newcomers, but rather take prior unemployment as a "signal" about these worker's lower capabilities, productivity or motivation. Following Aigner and Cain (1977) employer's assumptions about differential reliability of credentials to proxy true productivity across different groups of workers in combination with risk-aversion may be thought to result in statistical discrimination. Thus, irrespective of their individual ability and productivity, young adults who experience unemployment at an early stage of career formation can be assumed to have worse employment prospects since they are less attractive to hire. Particularly in the absence of reliable information on ability as well as if costs to overcome imperfect ability assessments are high, firms may be assumed to take diverse individual characteristics as proxies for ability. On the other hand, where standardised and reliable credentials of individual skills are available, incentives to use and gather additional information may be weak (see Müller and Wolter 2014).

In addition, experiences of unemployment may also leave a psychological scar. Following Erikson (1959), a healthy psychological ego development during the transition from adolescence to adulthood comprises identity formation that encompasses the formation of an occupational identity (see Erikson 1959: 94–100). In this perspective, early unemployment may be regarded as conflicting with the formation of an occupational identity, harming perceptions of self-worth (see Goldsmith et al. 1997). Additionally, social comparison processes adversely impact self-esteem and foster depression among unemployed (Sheeran et al. 1995). Drawing on Seligman (1975), the exposure to events perceived as uncontrollable, such as unemployment, bring about a feeling of helplessness, which diminishes psychological well-being and self-esteem and further undermines the motivation to control outcomes (Seligman 1975; Goldsmith et al. 1997). Such poor psychological adjustments are thus in turn thought to affect job search strategies and success so that a vicious circle may ensue (Furnham 1985).

In contrast to these theoretical explanations concerning unemployment scarring, there exist assumptions about potentially positive effects of early unemployment. Following e.g. Kahn and Low (1982) it is argued that off-the-job searches (searching for jobs while economically inactive), may be more efficient, resulting in better job matches that go together with higher re-employment wages and good career prospects. According to this theoretical perspective, early episodes of economic inactivity and career-adjustment may be regarded as prolonged matching processes leading to better job matches in the longer run. In this sense, periods of early economic inactivity are not necessarily damaging with regard to future occupational outcomes.

Focusing on the proposed mechanisms driving unemployment scarring while taking into account the institutional setting of Switzerland it is ambiguous whether or not these mechanisms really impact the careers of VET graduates who experienced bumpy transitions. Firstly, in a country with high standardisation of VET, where high vocational specificity and transparency of skills allows employers to rely on credentials of

occupation-specific skills (see Müller and Shavit 1998: 6–7), one may argue that employers will not further base their hiring and wage-setting decisions on the young applicants' short and uninformative work histories. Where vocational training systems provide tight linkages between education and occupational status, post-unemployment job matches should be of higher quality preventing severe scarring (see Dieckhoff 2011: 237). Furthermore, the Swiss labour market is rather liberal, with weak employment protection of the workforce (see OECD 2013a). Low employment protection allows labour market outsiders such as entrants and unemployed to more easily (re-)enter the labour market (see van der Velden and Wolbers 2003; Breen 2005; Bukodi et al. 2006) as there are no high dismissal costs and work contracts can be terminated easily in case employers are not satisfied with their newly hired employees. In line with this, investment in screening based on prior work histories as well as stigmatisation of those formerly unemployed may be assumed to be not as pronounced in liberal and flexible labour markets. In a similar vein it has been argued that prolonged job searches may indeed be thought to increase job quality in more liberal labour markets compared to rigid labour markets with strict employment protection legislation (EPL) (see Schmelzer 2012). Therefore prolonged job search and career-adjustment in early work life may not negatively impact subsequent employment outcomes of the young in Switzerland. The assumption that there are no distinct scarring effects further finds support in the fact that, for many skilled young entrants in Switzerland, unemployment spells are short in duration (see Sacchi and Salvisberg 2012). Thus foregone work experience due to early unemployment among young skilled entrants is generally low, and no profound psychological scars may be expected in this regard. Against this backdrop, we expect no or only negligible scarring effects regarding vocationally skilled workers in countries with highly standardised VET and liberal labour market structures such as Switzerland.

If this hypothesis were to be rejected then this would suggest that even within an advantageous institutional context, early unemployment inflicts scars. Which would mean that either firms already consider short unemployment spells among VET graduates to be negative signals or that the experience of short unemployment may be enough to exert a psychological scar and to alter the application behaviour and job search success of the young.

Scarring effects: current state of research

Controlling for selection bias, evidence for several industrialised and industrialising countries suggests that unemployment at both labour market entry as well as in later career is in general scarring. For Germany, Britain, New Zealand, the Netherlands, Sweden, Norway, Finland and the U.S. as well as the developing countries Argentina and Brazil, past unemployment and early economic inactivity have been found to be positively related to the risk of future unemployment, suggesting significant state dependence (see Niedergesäss 2012; Arulampalam et al. 2000; Maloney 2004; Luijkx and Wolbers 2009; Nordström Skans 2004; Nilsen and Holm Reiso 2011; Hämäläinen 2003; Mroz and Savage 2001; Cruces et al. 2012). Focusing on VET graduates in Germany, Schmillen and Umkehrer (2013) find that the total length of unemployment experienced in early career significantly predicts unemployment tenure later in career. Scarring further not only emerges in form of state dependence but also with regard to future occupational outcomes such as earnings. Evidence for the U.S. points towards positive effects of job

stability in early career on adult wages (Neumark 1998) and spells of unemployment in early work life have been found to go together with reduced future earnings (Mroz and Savage 2001). Results for several western European countries, such as e.g. Britain, Sweden and Germany, as well as for Latin American countries, similarly suggest that unemployment experiences have a damaging effect on post-unemployment earnings (see Arulampalam 2000; Gregg and Tominey 2005; Nordström Skans 2004; Schmelzer 2012 Gangl 2006; Cruces et al. 2012). Conducting a field experiment, Eriksson and Rooth (2011) find that Swedish employers do not take past unemployment of young applicants as a negative signal when deciding upon invitations to job interviews. They find, however, that employers sort young applicants based on their prior work experience. In addition to monetary scarring effects, there also exists evidence suggesting a psychological impact of past unemployment on psychological distress and life satisfaction in later life (see Daly and Delaney 2013; Clark et al. 2001; Young 2012; Lucas et al. 2004). On the one hand, individual resources such as self-efficacy, self-esteem and a positive attitude towards life shape transition processes (see e.g., Rüfenacht and Neuenschwander 2013; Neuenschwander 2012; Neuenschwander and Kracke 2011; Gerber-Schenk et al. 2010). On the other hand, the very same individual resources may also be adversely influenced by unemployment experiences, further manifesting themselves in worse occupational outcomes (Furnham 1985).

With respect to Switzerland, there exist several studies pointing towards increased state dependence amongst the unemployed (see e.g., AMOSA 2010; Sheldon 1999). However, these studies do not fully take into account the potential confounders among the unemployed. Djurdjevic (2005) identified two types of unemployed for the Swiss context. The "higher risk" unemployed include less-skilled, foreign and female workers, while young, skilled, Swiss, male workers constitute the "lower risk" unemployed. The "lower risk" unemployed have better employment prospects and leave unemployment more quickly for employment. They further succeed in moving to better paid jobs after some initial earning losses (Djurdjevic 2005: 57–58).

Even though a lot of studies conducted in different institutional settings point into the direction of unemployment scarring in early and later career, scars may be heterogeneous regarding different groups of workers (see e.g., Arulampalam 2000; Gangl 2006; Burgess et al. 2003; Schmelzer 2011; Schmillen and Umkehrer 2013). So far, only little is known about the existence of unemployment scarring concerning young workers with vocational credentials. While Schmillen and Umkehrer (2013) shed some light on unemployment scarring affecting VET graduates in the rigid labour market of Germany, it still remains an open question whether a liberal market structure combined with highly standardised VET not only allows for smooth transitions but may also protect the young from scarring. This question will be investigated in the following.

Methods

Essentially, the idea of this paper is to identify the causal effects of early unemployment on subsequent employment outcomes among VET graduates. The problem we face is that both early unemployment as well as subsequent employment outcomes may depend on similar social, individual and contextual characteristics that bias the estimation of causal effects. Thus it is crucial to properly control for endogeneity when assessing

causal effects of early unemployment. In this regard we make use of propensity score matching, which allows for the estimation of causal effects based on non-experimental survey data (Guo and Fraser 2010; Rosenbaum and Rubin 1983). The question we investigate using this technique is whether or not young people who pursued a vocational education would have had more favourable career outcomes had they not experienced early unemployment. However, we do not know what would have happened to these young entrants had they not experienced early unemployment. Addressing this problem, propensity score matching allows us to set up a statistical control group of young workers who experienced smooth transitions but who are comparable in relevant characteristics to those who experienced early unemployment. The employment outcomes of the control group then serve as a proxy for the potential career outcomes of those who experienced early unemployment, had they not experienced it.

Overall, propensity score matching may be thought of as a two stage procedure. First, propensity scores, that is conditional probabilities of experiencing early unemployment, are estimated based on a set of potentially confounding variables. Second, based on these propensity scores, a comparable control sample of individuals who have not experienced early unemployment but who are similar with regard to their propensity of experiencing early unemployment, and with this their relevant characteristics, is created (for a more thorough discussion of this equalisation see Rosenbaum and Rubin 1983; Heckman et al. 1997). The estimate we focus on to assess scarring is the average treatment effect on the treated (ATT). The ATT can be thought of as the estimated (hypothetical) difference between the employment outcome of respondents who experienced early unemployment (the treated) and their potential outcome had they not experienced unemployment. This unobserved and thus hypothetical outcome is also known as the counterfactual outcome and is estimated based on the matched control group. Two assumptions are highly important for the estimation of causal effects within the context of propensity score matching. First, the stable unit treatment value assumption (SUTVA) assumes that there exists no spill-over between treated and controls such that e.g. processes within the group of controls affect the outcome among treated and vice versa. If this is the case then causal inference may not be possible (see Gangl and di Prete 2004). With regard to the conditional independence assumption (CIA) it is assumed that after controlling for confounding covariates based upon which propensity scores are estimated, treatment-assignment is independent of potential outcomes so that a counterfactual outcome can be estimated without bias based on the matched controls. In the literature on propensity score matching, this assumption is also referred to as "ignorability assumption" (see Gangl and di Prete 2004; Rosenbaum and Rubin 1983; Heckman et al. 1997). The rich data at hand allows us to control for a wide variety of potentially confounding variables in order to make the CIA assumption plausible. Yet, irrespective of the fact that we control for a diverse set of potentially relevant characteristics, unobserved factors that are not related to the variables based on which we balance the sample always pose a potential risk when assessing causal effects based on non-experimental survey data.

Defining treatment: early unemployment
We define all young adults who are economically inactive as unemployed if they are either officially registered as unemployed or if they are actively in search of a job. By this definition, inactive young adults in search of an upper secondary education are not

regarded as unemployed. This definition of unemployment corresponds to the ILO definition (see ILO 1982).

Data

We make use of data provided by TREE (Transition from Education to Employment), which is the first longitudinal survey aimed at surveying patterns of post-compulsory educational pathways and transitions to the labour market of young people in Switzerland. TREE is an ongoing prospective panel survey based on a sample of approximately 6000 youths who participated in the PISA survey (Programme for International Student Assessment) in the year 2000 and who left Swiss compulsory schools in the same year. The sample was followed in annual surveys from 2001–2007, while an additional survey took place in 2010 (Stalder et al. 2011; TREE 2013). We restrict our analysis to a subsample of labour market entrants who have completed a first vocational education by the year of 2007, which encompasses the vast majority of those who pursued a vocational education after compulsory schooling in the cohort investigated. Concerning vocational education, both standard three to four year apprenticeships[a] and vocational baccalaureates are included. We focus on early unemployment experiences after completion of upper secondary vocational education that occur during the main transition period for the cohort investigated – which is between the years of 2003–2007 when the young are about 19–23 years old (see Bertschy et al. 2008). We then assess whether or not unemployment within the first (one to four) years after graduation from VET between the ages of 19–23 adversely affects employment outcomes of the young in 2010 when they are 26 years old[b]. Young adults who report no unemployment experiences for the time observed but for whom there exist no full records on their transition period as well as a few unclear cases[c] are excluded from the analysis as we do not know whether or not they really have experienced smooth transitions. In order to increase the homogeneity within treated and non-treated groups (see Imbens 2003) we further excluded 18 cases who experienced unemployment when trying to set foot in the labour market before finishing a first vocational education[d].

The estimation of propensity scores is based on an extended sample including all youth and young adults who have completed a first upper secondary vocational education by the year 2007, regardless of whether or not they respond to the TREE survey in 2010. The final sample we derive the propensity scores from consists of 1588 young persons (777 women and 811 men) with vocational credentials, of whom 344 (152 women and 192 men) have experienced unemployment in early career. For matching and the investigation of scarring effects we restrict our sample to those young adults who respond to the TREE survey in 2010, when they are about 26 years of age[e].

The main sample based upon which we investigate whether or not previously unemployed young adults are more likely to be neither in employment nor in education (NEET) consists of 1269 skilled young persons. With regard to these respondents, 244 young persons have experienced a spell of unemployment in early career at the age of 19–23 years. Overall, of those formerly unemployed 31 persons are NEET in 2010 while of those who experienced smooth transitions 35 are NEET in 2010. With regard to the analysis on wage scarring and subjective career assessment, we further restrict our analysis to skilled young adults who have succeeded in finding a job in the labour market and who respond to the complementary employment questionnaire of the

TREE survey in 2010. The main sample based on which we investigate wage scarring and persisting differences in career assessment consists of 773 skilled young workers. Within this group of respondents, 119 young persons have experienced early unemployment.

Variables used

A necessity for yielding unbiased estimates when applying propensity score matching is a thoroughly considered model based on which the propensity scores are estimated (see Shadish and Steiner 2010; Bryson et al. 2002; Smith and Todd 2005)[f]. Since the TREE survey has been designed particularly with respect to the investigation of school-to-work transitions, it offers a rich source of data to estimate the propensity scores and balance samples. The following variables are included in the estimation of propensity scores based on which we then match a control group: We include social categories such as *gender* (coding is 1 = male and 0 = female) and *migrant status* modelled in terms of the *language spoken at home* (coding is 1 = national language vs. 0 = foreign language) as well as the *country of birth* (coding is 1 = Switzerland, Luxembourg vs. 0 = other country). As *educational qualifications* further play an important role in terms of labour market integration and future job prospects we include measures of *competencies* (PISA literacy scores and mark in math) and the *type of track at lower secondary education* (coding is 1 = basic requirements, 2 = extended requirements/pre-gym and 3 = no formal tracking). As vocational education and training should not be seen as a uniform level track in Switzerland (Stalder 2011), the *level of vocational education and training* is furthermore taken into account (coding is 1 = low-skill VET, 2 = medium-skill VET, 3 = high-skill VET and 4 = vocational maturity). The coding of the level of demand of the vocational education is based on a coding scheme proposed by Stalder (2011). As a successful transition and career advancement are also influenced by family background (see e.g., Buchmann 2011; Neuenschwander and Kracke 2011) we include *socio-economic status* (Isei), familial possessions of *poetry literature* (coding is 1 = poetry at home vs. 0 = no poetry at home), a PISA index for *social communication* within the family (Soccom), *family structure* (coding is 0 = nuclear family, 1 = single parent and 2 = mixed/other) and the *number of siblings* (coding is 0 = no siblings, 1 = one sibling, 2 = two siblings and 3 = three or more siblings). Important individual resources that determine labour market integration of the young (see Rüfenacht and Neuenschwander 2013; Neuenschwander 2012; Neuenschwander and Kracke 2011; Gerber-Schenk et al. 2010) are also taken into account by the inclusion of measures for *self-efficacy*, *persistency* and a *positive attitude towards life* (measured prior to labour market entry in order to avoid bias due to reversed causality). The dummy-variables are coded 1 if the individual resource is available vs. 0 if it is not. Attendance and punctuality are important behavioural resources with regard to a successful entry into an apprenticeship (see Hupka et al. 2006) and thus they may also be regarded as indicators for transitional outcomes and success in later work life. Therefore we include measures for behaviour at lower secondary level such as *skipping classes* (coding is 1 = yes vs. 0 = no) and *finishing homework on time* (coding is *1 = yes vs. 0 = no)* in the estimation of propensity scores. As the demand for newcomers varies according to the field trained in (see Sacchi and Salvisberg 2012), we also include measures for the *field of vocational education and training*. The classification of educational fields is based on an international ISCED-coding scheme proposed by Andersson and Olsson (1999). Overall, different traditions concerning the orientation of educational

systems across linguistic regions in Switzerland exist (Seibert et al. 2009; Meyer 2009). Thus, we further include the *region of residence* (coding is 1 = German speaking part, 2 = French speaking part and 3 = Italian speaking part) as well as *average cantonal youth unemployment rates* between 2003–2007, which is for the main entry period we look at.

Outcome variables, based on which we assess scarring are monthly full-time equivalent gross earnings in 2010, a dichotomous variable coded 1 if a person is neither in employment nor in education or training (NEET) in 2010 and coded 0 otherwise, as well as a binary variable indicating whether or not a person is dissatisfied with the progress made in career towards meeting his/her overall career goals. The variable on career dissatisfaction is coded 1 if young adults report to be not satisfied or only partially satisfied with their career progress and it is coded 0 if young adults report to be satisfied with their career progress. A more detailed report of the variables included in the analysis can be found in the Appendix.

Analysis

In a first step we estimate propensity scores based on a logistic regression, taking into account the complex survey design of the PISA/TREE sample regarding variance estimation[g]. We further apply customized weights[h], which we derived based on sampling weights provided by TREE (see Sacchi 2011). Besides the estimation of propensity scores, the logistic regression allows for insight into the determinants of early unemployment among VET graduates in Switzerland. Following the estimation of propensity scores, we move on to matching and the estimation of average treatment effects on the treated (ATT). For matching and for the estimation of average treatment effects on the treated (ATTs), nearest-neighbour matching of at most 5 nearest-neighbours (with replacement) within a caliper of 0.05 is applied. We further impose the criteria of a common support. This means we set up a statistical control group by matching up to five young adults who experienced smooth transitions, who are closest with respect to their propensity scores, to each respondent who experienced unemployment (treated). However, we do not match anyone whose propensity score falls outside a common support and we further restrict the number of potential matches for a respondent to a caliper, meaning a limited range of propensity scores close to the treated respondent, in order to avoid matches of poor quality (see Bryson et al. 2002). The same control individual may be matched multiple times (for more details see e.g., Guo and Fraser 2010).

In order to assess the quality of sample balance between treated and matched controls, we follow recommendations by Stuart (2010) and test for differences in mean and variances of propensity scores across treated and control groups. We find no significant mean-differences and the ratio of variances of propensity scores (with a value of 1.3) further indicates good sample balance.

Regarding significance testing of average treatment effects on the treated (ATT), commonly applied bootstrap procedures have proven to be not valid (see Abadie and Imbens 2008). Therefore, we apply a bootstrap procedure proposed by de Luna et al. (2010). We bootstrap estimated individual causal effects (EICE) over circular block-differences (under the less rigid assumption of heterogeneous causal effects) (see de Luna et al. 2010). In order to obtain estimates that can be generalised to the population of young skilled adults, we apply a sampling weight (wt8_kal) for the TREE sweep in 2010 when estimating ATTs and their sampling distribution (see Du Goff et al. 2014). This sampling weight corrects for both the disproportionality due to sampling-design and panel attrition. We further report results

when applying a weight (basewt), which only corrects for the disproportionality of the sample but does not adjust for panel attrition. The analysis is run in the software framework of STATA (12) using the programme package psmatch2 (see Leuven and Sianesi 2003).

Results and discussion

In Table 1 we present findings from logistic regression analysis, modelling the risk of early unemployment among skilled young adults. We report average marginal effects (AME), which are, in contrast to odds-ratios, intuitively interpretable and robust towards unobserved heterogeneity due to scaling issues that arise in non-linear regression analysis (see Best and Wolf 2012; Mood 2010). Based on this model we also estimate propensity scores for the following analysis on scarring effects.

Results on the determinants of early unemployment among VET graduates reveal that young men are on average 11% more likely to experience early unemployment controlling for the other confounding covariates included in the model. This finding may reflect differing job opportunities for male and female VET graduates according to their often highly gender-specific occupational credentials (Kriesi et al. 2010). Our findings further suggest that young persons with vocational credentials who speak a foreign language at home (migrant background) are on average 22% more likely to be exposed to unemployment in early work life. We further find that young adults who were raised in single parent or mixed/other households are about 18-21% more likely to experience early unemployment compared to young adults who grew up in nuclear families. Young adults who have three or more siblings are 13% less likely to experience early unemployment compared to young persons who have no siblings (weakly statistically significant at $p < 0.1$). Looking at the impact of educational credentials and school competencies our results suggest that those who achieved average marks in math at lower secondary level are by 8% somewhat more likely to experience unemployment in early career compared to skilled young workers who achieved above average marks (significant at $p < 0.1$). With regard to differing levels of demand across vocational education and training tracks we find that young adults with high levels of upper secondary vocational education (VET) are 11% less at risk of experiencing unemployment compared to young entrants who hold a low-skill VET diploma. This finding also holds for young adults who absolved an occupational baccalaureate (significant at $p < 0.1$). In addition, labour demand (for newcomers) varies considerably across occupational segments in Switzerland (Sacchi and Salvisberg 2012). This variation in demand across occupational segments is also reflected in our findings, which show that not only the level of vocational education but also the field trained in matters in terms of smooth transitions to work. Young skilled adults who pursued an apprenticeship in the field of (3) business and sale and those who pursued their training in the field of (4) [applied] computer science are 22% resp. 19% more likely to experience a bumpy labour market entry period compared to those who did their training in the field of (5) mechanics and electronics. Our results further support that individual resources play an important role in determining the risk of early unemployment. We find that young graduates who have a positive attitude towards life (measured prior to the labour market entry period) are 15% less likely to experience unemployment in early career. One may note that if we do not control for a positive attitude towards life then self-efficacy becomes significant. Furthermore young entrants who have been sincere and reliable students in terms of finishing their homework on time at lower secondary level are on average 8% less likely to experience unemployment during

Table 1 Logistic regression

Early unemployment	AME	SE
N = 1351		
Social categories		
Gender (Male)	**0.11****	0.04
Migration background (foreign language)	**0.22****	0.08
Country of birth (abroad)	0.05	0.06
Social and familial background		
Socio-economic background (Isei)	0.00	0.00
Poetry at home	−0.01	0.03
Social communication with parents	0.00	0.02
Family structure (single parent)[a]	**0.18***	0.08
Family structure (mixed/other)[a]	**0.21****	0.07
Number of siblings (1)[b]	−0.06	0.07
Number of siblings (2)[b]	−0.05	0.08
Number of siblings (3)[b]	**−0.13(*)**	0.07
Education		
Lower secondary education (extended requirements)[c]	0.01	0.04
Lower secondary education (no formal tracking)[c]	−0.01	0.07
Reading Literacy (Wleread)	−0.00	0.00
Math mark (at average)[d]	**0.08(*)**	0.05
Math mark (below average)[d]	−0.06	0.04
Level of VET (medium)[e]	−0.09	0.05
Level of VET (high)[e]	**−0.11***	0.05
Level of VET (occupational baccalaureate)[e]	**−0.11(*)**	0.06
Field of printing and design (2)[f]	0.12	0.11
Field of business and sale (3)[f]	**0.22*****	0.05
Field of applied computer science (4)[f]	**0.19***	0.09
Field of agriculture and gardening (6)[f]	−0.04	0.06
Field of medical assistance (7)[f]	−0.02	0.06
Field of gastronomy and hairdressing (8)[f]	0.05	0.05
Field of other (9)[f]	−0.08	0.05
Individual resources		
Self-efficacy	−0.11	0.07
Positive life attitude	**−0.15***	0.06
Persistency	−0.01	0.06
Skipping classes	−0.05	0.05
Finishing homework on time	**−0.08(*)**	0.04
Demographics		
Region of residence (French)[g]	**0.13***	0.06
Region of residence (Italian)[g]	0.12	0.09
Cantonal unemployment rate	0.01	0.02

(*) <0.1 *< 0.05 **< 0.01.
[a]Ref. category: nuclear family, [b]Ref. category: no siblings, [c]Ref. category: basic requirements, [d]Ref. category: above average, [e]Ref. category: Low skill VET, [f]Ref. category: field of mechanics and electronics (5), [g]Ref. category: German speaking part.

their career formation (weak statistical significance at $p < 0.1$). In addition to social and individual resources, the region of residence also matters. Young entrants from the French speaking part are on average 13% more likely to experience early unemployment compared to young labour market entrants from the German speaking part. One may note that not including the region of living in the logistic regression results in a statistically significant finding for average cantonal youth unemployment rates, indicating that these variables are somewhat confounded.

Overall, these findings suggest that social, structural as well as individual resources simultaneously shape transition processes of skilled young adults. Therefore, accounting for heterogeneity in the exposure to unemployment when investigating scarring effects seems to be a necessity in order to yield unbiased results.

Unemployment scarring

Looking at scarring effects of early unemployment based on balanced samples from propensity score matching, we find that young skilled adults are by 9% somewhat more likely to be neither in employment nor in education or training (NEET) at the age of 26 years in 2010, compared to a comparable group of young workers who experienced smooth transitions. Yet, using a weight (wt8_kal) correcting for panel attrition the result we find is not statistically significant. One may note, however, that we find a significant effect if we applied a weight (basewt) correcting only for the disproportionality of the sample. All in all, we interpret these results as evidence pointing towards a scarring effect on later labour market attachment. Looking at young persons who are engaged in the labour market in 2010 our results further suggest that young skilled adults would earn higher wages at the age of 26 years, had they not experienced unemployment at the early stage of career formation. On average young adults who experienced some unemployment in early work life earn about 360 CHF (monthly gross wage) less compared to a comparable group of young skilled workers who did not experience early unemployment. This wage scar amounts to 7% of their average monthly gross earnings of 4861 CHF. Hence, young skilled adults would earn about 7% higher wages at the age of 26 years, had they not experienced unemployment in early work life, between the ages of 19–23 years. Furthermore we find that those who experienced early unemployment are on average about 18% more dissatisfied with the progress they made toward meeting their overall career goals compared to a similar group of young skilled workers. Therefore young skilled workers do not only earn less but scarring effects are also reflected in their subjective assessment of career progress. Main results are the same if we apply a weight not correcting for panel attrition (see Table 2).

Table 2 Average treatment effects on the treated

Outcomes:	Weight[a]	N_T	N_C	Outcome[T]	Outcome[C]	ATT	SE	ATT/SE
NEET-ratio	wt8_kal	205	560	0.15	0.06	**0.09**	0.06	1.5
	basewt	205	560	0.10	0.04	**0.06***	0.02	3.0
Wage level	wt8_kal	95	289	4861	5221	**−360***	143	−2.5
	basewt	95	289	4887	5255	**−368***	139	−2.6
Career dissatisfaction	wt8_kal	103	320	0.45	0.27	**0.18***	0.06	3.0
	basewt	103	320	0.41	0.24	**0.17***	0.06	2.8

*$p < 0.05$, [T]refers to Treated, [C]refers to matched Controls.
[a]wt8_kal corrects for both, panel attrition and the disproportionality of the sample, basewt corrects only for the disproportionality of the sample.

Conclusion

Dual-education systems that equip the young with standardised diplomas and liberal employment protection legislations, such as in Switzerland, are well known to allow for smooth transitions from school-to-work (see Fuentes 2011; De Lange et al. 2014; van der Velden and Wolbers 2003; Gangl 2003; Breen 2005). However, as our results show, this does not necessarily mean that standardised vocational credentials and liberal market structures protect the young from adverse consequences in case they happen to experience unemployment in early work life.

Investigating causal effects of early unemployment, it is crucial to control for endogeneity. Based on balanced samples from nearest-neighbour propensity score matching, our results suggest that vocationally skilled young workers, who experience unemployment in early work life, are more likely to be neither in employment nor in education or training (NEET). They also earn less later in their careers compared to a similar group of skilled young workers who did not experience early unemployment. In addition, we find that also from a subjective point of view, skilled young workers who experience early unemployment are more dissatisfied with the progress they made toward meeting their overall career goals than they would be had they not experienced early unemployment. In this way, our findings run counter to the expectation that early unemployment does not have much of an impact when vocational degrees are sufficiently standardised, dismissal costs are low and unemployment is of generally short duration.

Drawing this conclusion, we must keep in mind that we only observe that young workers with vocational credentials who experienced some unemployment are worse off in the mid-term compared to a similar group of young workers who experienced smooth transitions. Mechanisms behind unemployment scarring still remain a black box and may only be theorised about. It may be that employers take transitory unemployment as a relevant sorting criterion even if degrees are sufficiently standardised and dismissal costs are low. As early unemployment experiences may also exert a psychological impact, scarring effects may also stem from reduced self-efficacy and self-esteem due to the experience of early unemployment, which in turn influence future job search effort and success (see Furnham 1985). Over and above this, those who experience early unemployment may be more prone to apply for and accept jobs that offer worse career advancement and employment prospects (see e.g., Mortensen 1986). In this case it may be self-selection rather than sorting by employers that is at play. Whatever the driving forces of unemployment scarring are, our results clearly contradict assumptions about improvement in job-matching quality as proposed by search and matching theories (see Kahn and Low 1982). Therefore, we conclude that even a potentially advantageous institutional setting, which on the one hand allows for smooth transitions, does on the other hand not protect the young from adverse consequences in case they happen to experience bumpy transitions. As vocationally skilled entrants are not sheltered from unemployment scarring even within a favourable institutional setting, they should not be left unattended within research and policy considerations addressing labour market vulnerability.

In order to understand scarring effects more comprehensively, future research is needed with regard to the mechanisms driving unemployment scarring among (vocationally skilled) young workers and the development of employment scars in the longer run. It is further not exclusively clarified in which way standardised and vocation specific degrees affect unemployment scarring. Where unemployment is less prevalent, one may hypothesise unemployment to be more stigmatising (e.g., Nilsen and Holm Reiso 2011). Since unemployment rates for young entrants holding standardised vocational degrees are comparatively low, one may for this reason also assume scarring to be more pronounced among VET graduates. In addition, scarring effects among VET graduates may be heterogeneous. Focusing on potential gender differences with respect to scarring our results (not reported in this paper) point in the direction that wage scars are more pronounced among male graduates while differences in career satisfaction are to some extent more distinct among female graduates. However, due to small group sizes, we cannot stably confirm these results and need to leave the investigation of potentially heterogeneous scarring effects among VET graduates for future research. Paying attention to differences in wage growth and unemployment experiences, comparing those who stay with the same employer where they pursued vocational education and those who need to search for a job at a new firm after graduation (see e.g., von Wachter and Bender 2006), may also allow for further insight in future research.

Last but not least we must keep in mind that assessment of causation is a risky business. As we have a lot of information on social and individual characteristics of the young entrants, we have the advantage of removing bias based on a comparably comprehensive set of relevant variables. Nevertheless, estimates of causal effects based on non-experimental data may always be affected by unobserved confounders and therefore should be interpreted with caution.

Endnotes

[a]39 young adults completed a two year pre-apprenticeship program. They are not included in the analysis in order to increase sample balance and reliability of results.

[b]This definition of early unemployment includes all unemployment spells observed between 2003–2007, the main transition period of the cohort investigated. This includes unemployment experienced directly after graduation as well as unemployment experienced in the first one to four years of working life, depending on the date of graduation. Scarring effects are then estimated at a cross-section in 2010, which is not the same amount of time after graduation for all respondents. A design in which we focused on unemployment and employment outcomes after the same time span following graduation was, even though preferable, not feasible because no interviews were conducted in 2008 and 2009 as well as because we face small sample sizes concerning those who experienced early unemployment and of whom we observe subsequent employment outcomes (treatment group). Due to these restrictions, the effects we look at should to some extent be seen as combined effects, assessing scarring in a universal way. They do not, however, indicate the exact size of scarring for a certain elapsed period after the experience of early unemployment.

[c]4 cases do not report any unemployment spells during the main transition period but retrospectively indicate that they actually have been unemployed at some stage during their transition period or report having been unemployed shortly after transition in 2008.

[d]These young adults may be seen as interim drop-outs as they were trying to set foot in the labour market after lower secondary education and therefore may not be classified as either unemployed after secondary education nor can they be classified as "never unemployed during transition".

[e]As substantial results are the same whether or not we exclude those who retrospectively indicate having experienced some unemployment in 2008/2009, we leave those who experienced unemployment in 2008/2009 in both treatment and control group.

[f]Note: A perfect or "close to perfect" prediction of treatment assignment would cause problems in finding a control group (see Heckman et al. 1997; Bryson et al. 2002). The aim is not only to find good predictors to model the risk of early unemployment but to include particularly those variables in the estimation of propensity scores which are further expected to be related to future employment outcomes. However, over-parameterized models should be avoided due to arising support problems and possibly increased variation in the matching estimates (see Bryson et al. 2002).

[g]The initial sample of the TREE-Panel was a disproportionally stratified two-stage sample of ninth-graders, where schools and school classes served as primary sampling units (PSU's). Hence, in order to obtain unbiased population inference and correct estimates of their sampling variance it is necessary to take into account survey weights, stratification, multi-stage-sampling, and finite population corrections (PSU-stage). We use Stata's svy-commands to accomplish this.

[h]For the logistic regression analysis (estimation of propensity scores), we apply a customized and truncated survey weight (for details cf. Sacchi 2011: 44). For cases with unemployment spells, the panel weight of the first panel wave with a record of unemployment is used. For the censored cases without unemployment spells up to TREE wave 7 (end of the observation period), we employ the panel weights of this wave. Main results regarding the analysis of scarring effects are the same if no weights are included when estimating the propensity scores.

Appendix
Variables used
Gender and Migrant background

- *Gender*, coding is 1 = male and 0 = female
- *Migration background* modelled by *language spoken at home* (st17n01), coding is 0 = National languages and High German vs. 1 = other language
- *Migration background* operationalised by *country of birth* (st16n01), coding is 1 = Switzerland vs. 0 = abroad

Family background

- *Socio-economic status* (ISEI)
- *Familial possession of Poetry literature* (st21q10), coding is 1 = yes vs. 0 = no
- PISA Index of *Social Communication within family* (Soccom)

- *Family structure* (Coding is 0 = nuclear family, 1 = single parent and 2 = mixed/ other family structure)
- *Number of siblings* (Coding is 0 = no siblings, 1 = one sibling, 2 = two sibling and 3 = three or more siblings)

Individual resources

- *Self-efficacy* (measured prior to the labour market entry period)

Question: To what extent does the following statement apply to you? I can always manage to solve difficult problems if I try hard enough. Coding is 1 = moderately or exactly true vs. 0 = not at all or hardly true.

- *Persistency* (measured prior to labour market entry period)

Question: To what extent does the following statement apply to you? Even if I en-counter difficulties, I persistently continue. Coding is 1 = moderately or exactly true vs. 0 = not at all or hardly true.

- *Positive life attitude* (measured prior to the labour market entry period)

Question: In general, what do you think about your life? My life seems to be meaningful. Coding is 1 = rather, very or totally right vs. 0 = totally, very or rather wrong.

Lower secondary educational track/School competencies

- *Type of school*, coding is 1 = extended, 0 = basic (reference category), 2 = no formal tracking
- PISA *Literacy skills* (wleread)
- *Mathematical skills* measured by self-reported school mark, coding is 0 = below average (reference category), 1 = average, 2 = above average

Upper secondary Education (VET)

- *Classification of vocational education*

The classification of upper vocational diploma is based on Stalder (2011) "The Intel-lectual Demands of Initial Vocational Education and Training in Switzerland". Stalder (2011) distinguishes between 6 different levels of demand of vocational education in Switzerland. We summarise these 6 different levels of vocational education into 3 levels and add a 4th level including vocational maturity.

1 Low VET comprises level 1 and 2 according to Stalder (2011)
2 Medium VET comprises level 3 and 4 according to Stalder (2011)
3 High VET comprises level 5 and 6 according to Stalder (2011)
4 Vocational Maturity (BMS)

– *Field of occupational training or education*

The categories of occupational training are coded into 9 broad fields of education and training (one-digit) and one rest-category. This coding is based on the ISCED-97 classification scheme revised by Andersson and Olsson (1999). The fields 0 (general programmes) and 1 (education) are not included as the focus of this paper is on VET graduates and thus no-one is observed pursuing an educational track in these fields. One may note that the classification of educational fields as proposed by Andersson and Olsson (1999) differs from the ISCED-97 coding scheme insofar as the coding into educational fields is independent of educational level as well as it is more detailed.

The coding of the field of occupational training is based on the first occupational credential achieved. For those who indicated having absolved a vocational maturity, which is not a field of occupational training on it's own, we base coding on the vocational education pursued in 2002. We renamed the ISCED blocks of educational fields so that they fit to the dominant forms of vocational education and training in our sample which make up these educational fields.

The following blocks of broad educational fields are built:

2 Humanities and Arts (referred to as printing and design)
3 Social Sciences, Business and Law (referred to as business and sale)
4 Science, Mathematics and Computing (referred to as [applied] computer science)
5 Engineering, Manufacturing and Construction (referred to as mechanics and electronics)
6 Agriculture and Veterinary (referred to as agriculture and gardening)
7 Health and Welfare (referred to as medical assistance and care)
8 Services (referred to as gastronomy and hairdressing)
9 Field of occupational training unknown (referred to as other)

Deviant behaviour

– *Finishing home work* in time during lower secondary education, coding is 0 = never or sometimes vs. 1 = mostly or always
– *Skipping classes* during lower secondary education, coding is 0 = never during the last two weeks, 1 = one or more times during the last two weeks

Demographics

– *Language region*, Coding is: 1 = German(reference category), 2 = French and 3 = Italian speaking part
– *Average cantonal youth unemployment rates* for the period of 2003–2007, calculations are based on SECO (2013)

Outcomes

NEET in 2010 We measure labour market attachment based on a dichotomous variable coded 1 if a person is neither in employment nor in education or training (NEET) in 2010 and coded 0 otherwise. The category of NEET includes among others unemployed (whether officially registered or not), housewives/housemen, those who are in search of a job or education place as well as those engaged in voluntary work and who are neither in paid work, education nor training besides. Thus the category of NEET comprises heterogeneous situations. (Due to sample size restrictions we could not investigate separate groups but need to use this more global measure to address scarring concerning the future labour market attachment of the young).

Wage Calculation of monthly fulltime equivalent gross earnings for the TREE data is based on the BELODIS project (see Bertschy et al. 2014).

Career dissatisfaction The subjective assessment of career progress is measured based on agreement vs. disagreement regarding the following statement: "I am satisfied with the progress I have made toward meeting my overall career goals". Respondents were asked to indicate how strongly they agreed with this statement based on an ordinal scale of 5 categories. If they reported to strongly disagree, disagree or only half and half agreed with this statement we take this as an indication of dissatisfaction with the career progress and coded our binary outcome variable on career dissatisfaction as 1. If the respondents reported to agree or to strongly agree with this statement we take this as an indication of satisfaction with the career progress and correspondingly coded our binary outcome variable on career dissatisfaction as 0. (One may note that about two-thirds of the sample investigated reports to be satisfied or very satisfied with the progress made towards meeting their overall career goals).

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