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## No experience, no employment: The effect of vocational education and training work experience on labour market outcomes after higher education

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**KOF** Swiss Economic Institute

**No Experience, No Employment:  
The Effect of Vocational Education and  
Training Work Experience on Labour Market  
Outcomes after Higher Education**

Maria Esther Oswald-Egg and Ursula Renold

KOF Working Papers, No. 469, December 2019

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# **No Experience, No Employment: The Effect of Vocational Education and Training Work Experience on Labour Market Outcomes after Higher Education**

Maria Esther Oswald-Egg and Ursula Renold\*

## **Abstract**

Higher education graduates with work experience enter the labour market more smoothly. This paper analyses how work experience from vocational education and training (VET) affects labour market outcomes after higher education. To account for selection into VET we use the regional enrolment rate as an instrument for upper-secondary VET. Results suggest that work experience gained during VET leads to significantly higher wages one year after graduation from higher education and less search time for first employment, but does not significantly lower the probability of an internship in the post-graduation year. However, these positive effects do not persist: the effect is no longer robustly significant for wages, unemployment, or employment position after five years. The effect operates through the human capital, social network, and screening channels, not the signalling channel. Our results suggest that upper-secondary VET is a good choice, not the second-best, for individuals planning on higher education.

## **I. INTRODUCTION**

Workers with experience are in high demand in the labour market (Salvisberg, 2010) due to high productivity (Arrow, 1962) and low training costs (Thurow, 1975). This demand for experienced workers is the reason that institutions of higher education – such as conventional academic universities (hereafter, ‘universities’) and universities of applied sciences (hereafter,

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‘UAS’)<sup>1</sup> – have begun providing work experience in their curricula, including (mandatory) internships (Cranmer, 2006; Helyer and Lee, 2014; Billett, 2014; Silva et al., 2018), to equip students with marketable skills before they graduate and enter the labour market.

However, a number of empirical studies that account for self-selection into work experience opportunities before graduation from higher education find mixed results for labour market outcomes after graduation. These studies typically analyse the effects of having an internship and/or a student job during higher education (San, 1986; Ehrenberg and Sherman, 1987; Häkkinen, 2006; Klein and Weiss, 2011; Weiss et al., 2014; Baert et al., 2016; Nunley et al., 2016; Baert et al., 2017; Margaryan et al., 2019; Bolli et al., 2019a). Evidence on the effect of internships shows either no effect (Klein and Weiss, 2011; Weiss et al., 2014) or a significantly positive one (Nunley et al., 2016; Margaryan et al., 2019; Bolli et al., 2019a). Evidence on student jobs also shows mixed results: some studies find no effect (Ehrenberg and Sherman, 1987; Häkkinen, 2006; Baert et al., 2016), whereas others find positive effects (San, 1986; Weiss et al., 2014). Two major drawbacks of gaining work experience while studying – the time it takes away from studying and its lack of relevance to the student’s field (Stern et al., 1990) – may account for these mixed results.

Students who gain work experience before studying can avoid these drawbacks, but suffer from their own drawback of delayed graduation. However, the evidence of pre-study work experience’s effect on labour market outcomes after higher education is scarce. Weiss et al. (2014) analyse work experience from employment previous to studying, finding no significant effects on wages, search time nor class positions. An as-yet under-explored way of gaining work experience before studying without graduation delay is from vocational education and training (VET), an upper-secondary education pathway lasting three to four years and combining formal education at school with syllabus-driven practical training (OECD, 2004). In school-based VET, the practical training takes place in classroom workshops, and in dual VET the training takes place at a company, usually in the form of apprenticeships (Wolter and Ryan, 2011). The likely advantage of VET, especially dual VET, is that its graduates enter the labour market with work experience and may continue with higher education.

Evidence on the impact of VET work experience on labour market outcomes is mixed. Shaw (2012) finds that upper secondary VET diplomas improve labour market outcomes after higher education in the UK, while Agarwal et al. (2019) find that VET work experience reduces search time after graduation but negatively impacts wages, working hours and job positions in Italy. However, neither the UK nor Italy has a great deal of dual VET, limiting the amount of work experience students can gain from those programmes. In a similar vein, their education systems

<sup>1</sup>Universities of applied sciences are institutions of higher education, which according to Lehnert and Pfister (2018) teach and conduct applied research. Pfister et al. (2018) state that they are ‘Swiss institutions called “Fachhochschulen” or for German institutions called “Fachhochschulen” and more recently “Hochschulen für angewandte Wissenschaften (HAW)”’. (p. 1)

are either not very permeable,<sup>2</sup> meaning that relatively few students progress from VET to higher education (Pauline and Simon, 2013), or appear to be unlinked to the needs of the labour market (OECD, 2017).

This paper adds to the literature on the value of work experience for higher education graduates, focusing on VET work experience and its effect on labour market outcomes after higher education. We expand the current literature by focusing on dual VET in a permeable education system where students commonly progress from VET to higher education. We use a case where dual VET predominates over school-based VET, which has weaker labour market outcomes Bolli et al. (2019b). This is important in times when policymakers promote VET, because neglecting the differentiation is likely to lead to the wrong conclusion that all VET is a second-best option. This is especially harmful because dual VET enhances students' motivation to stay in education (Wolter and Ryan, 2011) and is not prone to the drawbacks of delayed graduation or study-unrelated work experience. We further contribute by not only examining the effects of VET work experience on labour market outcomes after higher education, but also by exploring the channel through which those effects flow. The origins of the effect matter for finding the right strategy to improve the youth labour market.

To analyse the effect of VET work experience on labour market outcomes after higher education, we use Switzerland as a case study, both for its permeable education system and for its large share of upper-secondary dual VET students. We exploit data from the Swiss graduate survey conducted in 2011, 2013, 2015, and 2017 on higher education graduates (HE graduates) one year after graduation and in 2015 and 2017 on HE graduates five years after graduation. These surveys provide data on their labour market outcomes, such as wage, search time, internship, unemployment and employment position. Moreover, these data allow us access to a rich collection of variables about personal characteristics, education, continuous education, work experience, and employer characteristics.

Given the self-selection of HE graduates into obtaining an academic certificate or a VET diploma on the upper-secondary level, we use two estimation methods. In the first method, we include a large set of control variables on observable characteristics. In the second method, to capture unobservable differences, we use instrumental variable regressions. Our instrument for having VET work experience is the regional<sup>3</sup> enrolment rate into VET. Specifically, we use the enrolment rate into VET when HE graduates were 14, in the region where they were living before starting higher education. Because HE graduates are mobile after graduation (Oggenfuss and Wolter, 2018), the regional enrolment rate into VET does not influence their labour market outcomes.

<sup>2</sup>The definition of the European Centre for the Development of Vocational Training for permeability is as follows: 'Capacity of education and training systems to enable learners to (1) access and move among different pathways (programmes, levels) and systems; (2) validate learning outcomes acquired in another system or in non-formal/informal settings.'

<sup>3</sup>The 26 regions, called cantons, in Switzerland are the member states, much like states in the US.

We find that, one year after graduation, HE graduates with VET work experience have significantly higher wages and need significantly less time to find their first employment. However, we find no significant effect on the likelihood of their doing an internship after graduation. Although these positive effects from work experience are very robust to the inclusion of control variables, they diminish over time: five years after graduation the estimated coefficients for wages, unemployment and employment position remain positive but are no longer significant. As for the channel through which VET work experience operates, we find that the benefits stem from an extended network (social network), employers knowing the worker's productivity level (screening) and an increase in human capital (both general and specific). Our robustness checks confirm that we are measuring work experience, have representative results for HE graduates, and do not suffer from selection bias.

Our results contribute to the literature in three ways. First, we show empirically that VET work experience from predominantly dual programmes in a permeable education system has a significant positive effect on labour market outcomes, even after higher education. Second, we show that the advantage of VET diminishes only slowly over time for HE graduates. Third, we identify the channels through which VET work experience operates as being social capital, screening and human capital, not signalling. Starting off with dual VET is beneficial not only for early entry into the labour market but also for later entry after higher education. Stigma that VET is a second-best option exists even in Swiss society where VET is the majority pathway (Wolter et al., 2014), but these results show it is a stronger start even for eventual HE graduates. Furthermore, the results underline the importance of having a permeable education system in place for complementing the short-term benefits of dual VET with the long-term benefits of an academic degree.

This article is organised as follows. In Section II. we define work experience, explain its value to the labour market, summarize the current literature on causal estimation of work experience, and state our hypotheses. In Section III. we present our variables and our estimation methods. In Section IV. we show, first, the results for the effect of VET work experience on income, search time, and internship after graduation. Second, we show the results of our analysis on the persistence of the effect from VET on income, unemployment and employment position. Third, we analyse the working channel through which VET creates an advantage. Fourth, we discuss robustness tests on the validity of our results. In Section V. we summarize our findings, discuss the implication of the findings, and acknowledge its limitation.

## II. LITERATURE REVIEW ON WORK EXPERIENCE AND HYPOTHESES

Although economists consider work experience when estimating earnings, there is no clear economic definition of what work experience is exactly. Most of the economic literature treats work experience as a kind of skill (see for example Rosen, 1972; Mincer, 1974; Yamaguchi, 2010). Raelin (1997) defines experience as the ability to make decisions in complex, novel situations.



Similarly, Gruber (1999, p. 47) defines work experience as '... the ability to repeatedly cope with complex situations that have changing elements'.<sup>4</sup> Therefore, work experience is the skill of reacting appropriately to new and complex circumstances.

Individuals and the labour market value work experience. For individuals, having work experience is a good way to differentiate oneself from other job applicants with the same attained education (Tomlinson, 2008). Furthermore, work experience is transferable from previous employment to new employment (Yamaguchi, 2010). The degree of transferability depends on the extent to which the work experience is firm-specific or general (Jung and Magrabi, 1991). The more general it is, the better the work experience can be kept and applied in a new environment (Burdett et al., 2011). Individuals with work experience also need less training, which reduces employers' training costs (Thurow, 1975). For this reason, the labour market values work experience and expresses this by paying higher wages and offering better conditions (for example Mincer, 1974; Altonji and Shakotko, 1987; Williams, 1991; Lemieux, 2006; Dustmann and Meghir, 2005; Heckman et al., 2006a) resulting in higher lifetime earnings for individuals with experience (Mincer, 1974).

The method and means by which individuals obtain work experience are well known. Individuals gain work experience when they actively solve a problem (Arrow, 1962). In this process of learning by doing (Dustmann and Meghir, 2005; Burdett et al., 2011), learning and attaining work experience are complementary (Rosen, 1972; Mincer, 1974). Therefore, work experience is not learnt at school, but rather best obtained at the workplace. For example, Mincer (1974) argues that certain skills, such as practical problem solving, are best learnt at the workplace. Cranmer (2006) finds that although education institutions attempt to transmit marketable skills, their success is mixed and the effort would be better spent on transmitting real experience. Billett (2008) goes further, stating that work experience (he calls it marketable skills) can only be acquired at the workplace. From this perspective, gaining work experience is a way of acquiring marketable skills that are useful on the labour market (Autor, 2001), which are best acquired – or can only be acquired – at the workplace.

Because the labour market values workers with work experience, many students attain work experience during their education. Studies show that work experience gained during upper-secondary education – be it through a student job after school or on weekends (for example Ruhm, 1997), an internship during holidays (Neyt et al., 2019) or vocational education and training (VET; for example Arum and Shavit, 1995) – has a positive impact on the transition into the labour market and earnings. However, these advantages may come at the cost of worse education outcomes (for an overview see Ruhm, 1997), less education attainment (Neyt et al., 2019) or worse labour market outcomes in the long run (for example Hampf and Woessmann, 2017).

Students also gain work experience before graduating from higher education. These students

<sup>4</sup>Authors' translation from German.

can attain work experience during and before their education. Work experience opportunities during higher education include student jobs, internships, sandwich placements or work-based higher education that includes both studying and working part-time. Studies analysing the effects of work experience during higher education on labour market outcomes find mixed results for HE graduates. For example Ehrenberg and Sherman (1987) find no effect of student jobs on labour market outcomes while Baert et al. (2016) find no overall effect of work experience from a student job on labour market outcomes, but negative effects for certain subgroups. In contrast, San (1986) and Häkkinen (2006) finds positive effects of work experience from student jobs for HE graduates, although the latter study only finds these positive effects when HE graduates did not extend total study time, with no effect for HE graduates who extended their study time.

Internships, sandwich placements, and work-based higher education may have different effects than general student jobs because they are often related to the students' field of study. Nunley et al. (2016), Margaryan et al. (2019) and Bolli et al. (2019a) find positive effects of work experience from internships on labour market outcomes after higher education, but Klein and Weiss (2011) and Weiss et al. (2014) find no effect of internships. Work experience from sandwich placements has positive effects on labour market outcomes (Brooks and Youngson, 2016). While there is a lot of evidence on the effect of work experience from internships on labour market outcomes, we could not find any evidence for the effect of work experience from work-based higher education on labour market outcomes. The overall mixed results for work experience gained during higher education may arise from two major drawbacks of gaining work experience while studying – the time it takes away from studying may result in lower grades, and it may impact students' choice to continue with higher education (Stern et al., 1990; Curtis and Shani, 2002; Bartolj and Polanec, 2018; Neyt et al., 2019).

If students wish to gain work experience before entering higher education, they can enter the labour market for regular employment or attain a VET diploma. There is little evidence on the effect of work experience from pre-study work on labour market outcomes after higher education. The only study considering pre-study work experience finds no significant effect on labour market outcomes (Weiss et al., 2014). The disadvantage for individuals is delayed graduation and therefore less time to get returns from their investment in higher education.

VET's structured curriculum and recognized diploma differentiate it from other training at the workplace, such as internships (Steedman, 2012). The evidence for the effect of work experience from VET on labour market outcomes after higher education is mixed. There are two studies looking directly at the relationship between VET and the labour market outcomes of HE graduates. Shaw (2012) studies the labour market outcomes after graduation of six female BA (Hons) Educational Studies graduates in Britain qualitatively. Three of the six had entered higher education with an academic certificate, and the other three with a VET diploma. She finds that having a VET diploma is a positive factor. The second study examines the effect of a VET diploma compared to an academic certificate after higher education in Italy (Agarwal

et al., 2019). They find that a VET diploma helps HE graduates find jobs more quickly after graduation, but create disadvantages for other labour market outcomes such as employment, wages, working hours and job position.

The contradictory evidence for VET may arise due to the variation in VET programmes concerning workplace training. The OECD (2004) differentiates school-based from work-based (dual) VET by the proportion of time spent at work. In school-based VET, 75 percent or more of the curriculum takes place at school, while dual VET students spend between 10 and 75 percent of their time at school and the rest in training workshops or at a company. Workplace training in dual VET takes place at a company, where VET students have contact with real clients, experience teamwork with older co-workers and are able to apply the theory from school to practice (Ryan, 2001; Wolter and Ryan, 2011). In this way, VET students gain work experience. Dual VET is also more closely linked to the labour market because of the shared responsibility between the education and the employment systems (Rageth and Renold, 2019). The differences among VET programmes with regard to workplace training affect their effects on the labour market. For example Bolli et al. (2019b) show that only dual VET programmes have a positive effect on labour market outcomes.

Tuor and Backes-Gellner (2010) consider different education pathways and their impact on labour market outcomes. They find that following a mixed pathway (vocational in upper-secondary then academic in higher education, or the converse) increases earnings after higher education, although they cannot account for student self-selection into education pathways. They also stress that a permeable education system is key for this finding, because students must be able to transition between vocational and academic education. This study examines a system where dual VET is the norm, not the school-based variant. Because dual VET provides work experience and a permeable education system with a large share of dual VET in upper-secondary education enables transitions, we expect these to generate an advantage for HE graduates:

**H1:** *Graduates from higher education with VET work experience have better labour market outcomes one year after graduation than graduates from higher education with an academic certificate.*

Thus far, there are no studies looking at the longer-term impacts of VET on labour market outcomes after higher education. The evidence on the long-term effect of work experience shows that the effect of work experience fades away with time due to the depreciation of human capital, such that there are diminishing returns to work experience (Mincer, 1974; Burda, 2001). Accordingly, HE graduates with an academic certificate will catch up over time in terms of labour market outcome. Nevertheless, the lifetime earnings of HE graduates with VET work experience will still be larger, unless HE graduates with an academic certificate delay pension.

It is unlikely that a reversal in labour market outcomes will occur such that HE graduates

with an academic certificate have better labour market outcomes because all HE graduates have the same highest education regardless of their upper-secondary education. Thus, the differences in general education should be minimal. Therefore, we do not expect to observe the findings that VET can become a liability in the long term due to having fewer general skills (Forster et al., 2016; Hanushek et al., 2017; Hampf and Woessmann, 2017; Rözer and Bol, 2019). Furthermore, not all evidence finds a negative effect of VET. (Hanushek et al., 2017) state that the disadvantage of VET does not apply to all countries (in this case Switzerland, p. 82), when VET is mostly dual, already contains a great amount of general education, and is part of a permeable system (Wolter and Ryan, 2011). Our expectation therefore is:

**H2:** *Five years after graduation from higher education there is no longer a significant difference between the labour market outcomes of HE graduates with a VET diploma and HE graduates with an academic certificate.*

There are various explanations in the literature for how work experience influences labour market outcomes (Bills, 2003; Weiss et al., 2014; Margaryan et al., 2019). We follow up on four of them: social networks, screening, human capital (specific and general), and signalling.

The social network channel, based on Granovetter (1973), is about building up personal relationships to find employment more easily in the future. In VET, students have the opportunity to build an extensive network not only through their own supervisors and colleagues, but also their peers' co-workers. HE graduates with an academic certificate do not have that opportunity. The advantage of VET work experience might be that previous VET students' established network helps them as HE graduates when they need to find a job. Our hypothesis for the social network channel is:

**H3a:** *If VET work experience operates through the social network channel, then the effect of VET work experience on the labour market outcome is only for HE graduates finding their employment through their social networks.*

The screening and signalling channels are related – both are efforts to reduce information asymmetry. By screening potential workers, employers reduce information asymmetry through observation of the employee at work (Stiglitz, 1975). Employers might use VET work experience as a screening device to sort productive workers from the unproductive ones before offering employment (Brooks and Youngson, 2016). However, only the VET student's training company would have that information. Thus our hypothesis for the screening channel is:

**H3b:** *If VET work experience operates through the screening channel, then the effect of VET work experience on the labour market outcome is only for HE graduates starting work at*

*a previous employer.*

According to the human capital channel, which goes back to Becker's human capital theory (1962; 1964), the labour market pays workers depending on their skills and productivity. Mincer (1974) states that work experience is a major source of productivity, along with schooling. Experience also reduces training costs by shortening initial unproductive time (Thurow, 1975). Some studies argue that VET only provides specific human capital, which is only suitable at the training firm or a firm in the same industry. However, VET work experience can also build general human capital, in which marketable skills are transferable across occupations (Winkelmann, 1996; Rauner and Maclean, 2008; Shaw, 2012). In dual VET, where the education and employment systems cooperate to develop curricula (Rageth and Renold, 2019), VET work experience will also entail general human capital. Therefore, we hypothesise for the human capital channel that:

**H3c:** *If VET work experience operates through the general human capital channel, then the effect of VET work experience on the labour market outcome is present when the VET occupation is unrelated to the study field or post-graduation employment.*

We still need to differentiate between the general human capital and the signalling channel. Signalling theory, from Spence (1973), states that employers cannot observe the actual productivity of new workers due to information asymmetry. To reduce this asymmetry, individuals look for ways to signal their high productivity to employers. Any observable characteristic that highly productive workers can more easily obtain is suitable, such as education attainment or accumulation of work experience (Heckman et al., 2006b). Thus, VET work experience may just be a signal of higher productivity and not a source of human capital. Indeed, Van Belle et al. (2019) find in a vignette study that work experience signals better work attitude, larger social network, sense of responsibility, motivation and maturity to employers. However, if the mechanism is general human capital, then we can apply the skills-beget-skills idea of Cunha and Heckman (2007). In that case, we can exploit a unique feature of the Swiss education system: work experience from VET should be more valuable for HE graduates from universities of applied sciences because they have more work experience elements (e.g. mandatory internships) in their curricula than students in conventional universities do. To differentiate between the signalling and the general human capital channel, we hypothesize the following:

**H3d:** *If VET work experience operates through the signalling channel, then the effect of VET work experience on the labour market outcomes for university graduates and university of applied science graduates is the same. In contrast, if VET work experience operates through the general human capital channel, then the effect on university of applied science graduates*

*should be larger than for university graduates.*

Thus far, there is no evidence on the channel through which VET work experience operates. Studies on work experience from internships during higher education predominantly find signalling to be the operational channel (for example Weiss et al., 2014; Nunley et al. (2016)), but there is also evidence for the general human capital channel (Bolli et al., 2019a).

### III. METHODOLOGY

In this section we describe our dataset, define the variables for the analysis and explain the estimation methods.

#### *III.1. Data*

Our data stem from the Swiss graduate survey conducted by the Swiss Federal Statistical Office (SFSO) every second year on all graduates from formal institutions of higher education. The SFSO survey contains detailed information on employment and education during studies and for both one and five years after graduation. Our dataset consists of pooled cross-sectional data from the one-year post-graduation survey waves in 2011, 2013, 2015 and 2017, and the five-year post-graduation survey waves in 2015 and 2017.

We limit our analysis to HE graduates from fields of study in which work experience is not largely included or an internship required after graduation. We therefore drop all HE graduates with a teaching, medical, law or doctoral degree. Next, to have HE graduates with uninterrupted study paths, and thereby to avoid unobserved work experience, we restrict our sample to HE graduates not older than 30. Further, they must have completed their entry certification for higher education (i.e. academic or vocational baccalaureate) within seven years before higher education graduation – this gives them five years for studying if obtaining both bachelor and master degrees, one additional year to repeat a semester and one year to fulfil potential entry requirements. Finally, we also focus on HE graduates from the Swiss education system who transitioned directly into the labour market, therefore dropping all HE graduates who have a non-Swiss educational background, have acquired a higher education degree abroad, continue their higher education studies, are self-employed, or do not seek employment due to family, health or other issues.

We consider a set of dependent variables because, as Nunley et al. (2016) argue, work experience might operate through different channels, thereby influencing the labour market outcomes differently at different stages in the recruitment process. One year after graduation, only a handful of HE graduates remain unemployed. Therefore, we focus on analysing the impact of work experience on wages, search time and internships (within one year after graduation). To analyse longer-term consequences, we consider wages and employment positions five years

after graduation, also considering whether HE graduates had any unemployment spells during that period.

Wage is important because it measures the labour market value of an employee. We consider gross wage – expressed in full-time employment – comprising contract wage, wage from additional hours and bonuses. Time of job search stands for a period of wage absence and insecurity: the shorter it is, the better. We construct the search time variable by accumulating all search time before and after graduation in months (censored at 24 months) and including HE graduates who were offered a job at zero search time and therefore did not seek employment.

Internships pays less – if they have a wage at all – than regular employment, so HE graduates entering the labour market via an internship forgo wages (generation internship; for more information see The Economist, 2014, Schmidlin and Witmer, 2007; Cerulli-Harms, 2017). Therefore, accepting an internship in the first year after graduation, employment position and any unemployment spells are all of interest as they capture workplace security and also foregone wages. Our variable for employment position has five levels: apprentice, employee without management function, lower management employee, middle management employee and higher management employee. Unemployment spells indicate whether HE graduates were unemployed during the five years after graduation.

Swiss HE graduates can choose among two main upper-secondary pathways towards a higher education degree, due to the permeability of the Swiss education system (see SERI, 2019; Hoffman and Schwartz, 2015). They decide between obtaining an upper-secondary academic certificate (i.e. baccalaureate) and an upper secondary VET diploma (i.e. federal VET diploma). The four-year academic certificate qualifies its graduates for direct entry into a conventional university or federal institute of technology (Uni). It also gives them access – although indirectly through a working year – to universities of applied sciences (UASs). The VET diploma, which takes three to four years to complete, qualifies its graduates for the labour market. To enter a UAS, graduates need a vocational baccalaureate, which can be done either during the VET diploma or in one year thereafter. To enter a Uni, VET graduates must have an additional year of academic education.

One main difference between the two education pathways on the upper secondary level is that the academic certificate entails completely theoretical education whereas the VET diploma includes both theoretical education and practical training. In Switzerland, about two-thirds of students completing compulsory education enrol in VET. Most enter a dual VET programme (SERI, 2019), in which the practical training is performed at a workplace. Therefore, graduates with a VET diploma have not only some academic education but also work experience during their education, whereas graduates with an academic certificate have no work experience. This difference in work experience is what we analyse: our variable of interest is whether the HE graduate has obtained an academic certificate or a VET diploma in upper-secondary education.

We can account and control for observable differences in personal characteristics, educa-

tion, further education, experience and current employer characteristics, all of which may affect labour market outcomes (Altonji and Blank, 1999). For personal characteristics we consider age, gender (male/female), parents' highest education (socio-economic background), marital status, having children, region of residence and region of origin. For education we control for type of institution (Uni/UAS), level of education (BA/MA), education institutions (20)<sup>5</sup>, subject (10)<sup>6</sup>, number of semesters, final grade, and cohort.

For further education we have information on continuing studies (e.g. doctorate), additional studies (i.e. non-university education), and continuing education (e.g. course or training). For life experience we differentiate between kinds of work experience (i.e. work experience gained before higher education, student internship, student job and work-based higher education) and other experience (i.e. exchange to another university). For employer characteristics we use whether the company is from the public sector, size according to full-time employees, industry (21 on NOGA-1)<sup>7</sup>, and the labour market region of the employer (17)<sup>8</sup>.

However, HE graduates do not randomly pick their education pathway but have unobservable selection criteria. Thus we face an endogeneity problem, or the risk of an omitted variable confounding with the labour market outcomes and the decision to obtain a VET diploma. For example, motivation to work could be higher for people choosing the VET diploma, in turn leading to higher labour market outcomes even if they had not chosen the VET pathway. Not accounting for such issues biases the estimates. Instrumental variables constitute one way of solving this problem, so we use a variable correlating with the decision to attain a VET diploma but not with the labour market outcomes of HE graduates (Angrist et al., 1996; Angrist and Krueger, 2001). However, this method provides causality only for the group of HE graduates who would have changed their choice had the instrument changed (local average treatment effect, LATE).

Some studies use regional borders as the instrumental variable for looking at the effect of an intervention (Bolli and Hof, 2018; West and Woessmann, 2010; Frölich and Lechner, 2010;

<sup>5</sup>The 20 education institutions are universities from Basel, Bern, Fribourg, Geneva, Lausanne, Lucerne, Neuchatel, St. Gallen, Zurich and the Swiss-Italian as well as the Swiss Federal Institute of Technology in Lausanne, and the Swiss Federal Institute of Technology in Zurich. The UAS are from Bern, Central Switzerland, Eastern Switzerland, Kalaidos, North-Western Switzerland, Swiss-Italian, Western Switzerland and Zurich.

<sup>6</sup>The 10 education subjects are the humanities, arts, educational sciences, economics, natural sciences, medical sciences, health, engineering, agricultural sciences and interdisciplinary.

<sup>7</sup>The 21 industries are 'agriculture, forestry and fishing', 'mining and quarrying', manufacturing, 'electricity, gas, steam and air conditioning supply', 'water supply; sewerage, waste management and remediation activities', construction, 'wholesale and retail trade; repair of motor vehicles and motorcycles', 'transportation and storage', 'accommodation and food service activities', 'information and communication', 'financial and insurance activities', 'real estate activities', 'professional, scientific, and technical activities', 'administrative and support service activities', 'public administration and defence; compulsory social security', 'education', 'human health and social work activities', 'arts, entertainment and recreation', 'other service activities', 'activities of households as employers; undifferentiated goods- and services-producing activities of households for own use' (no data) and 'activities of extraterritorial organisations and bodies'.

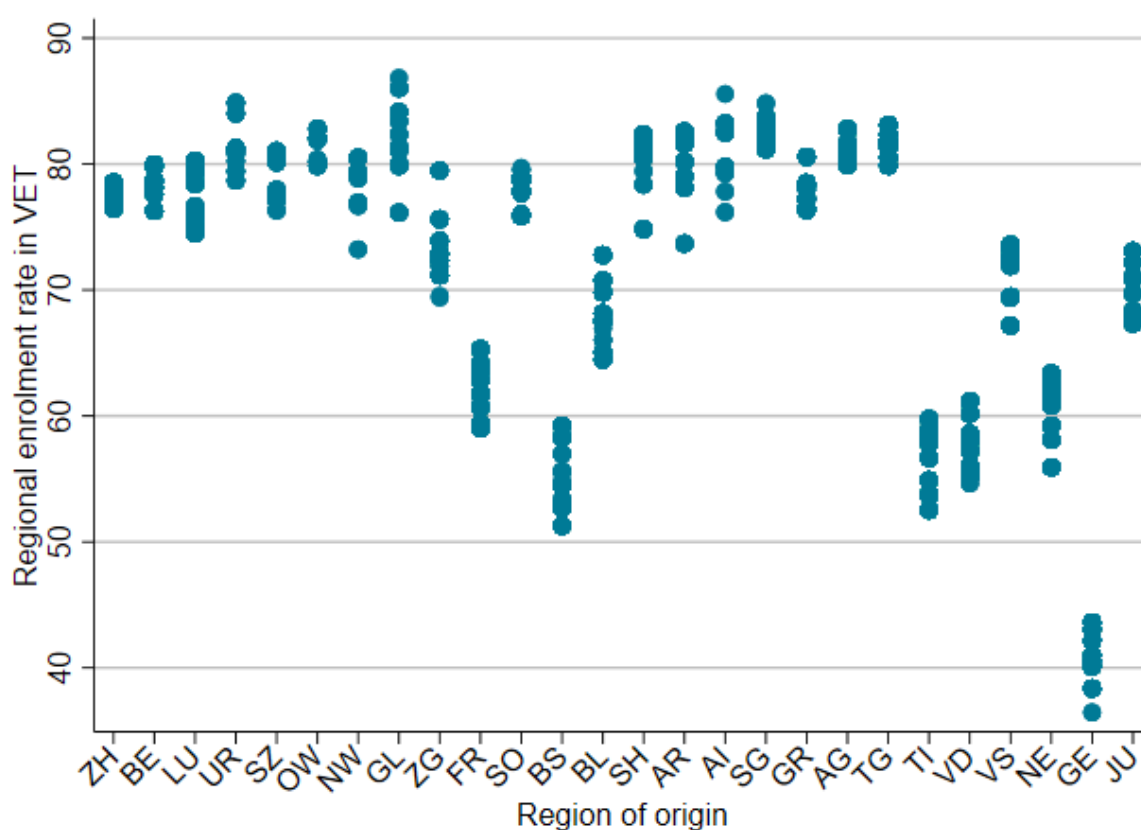
<sup>8</sup>The 17 labour market regions are Aarau-Olten, abroad, Basel, Bellinzona, Bern, Biel, Chur, Geneva, Fribourg, Lausanne, Lugano, Luzern, Neuchatel, Sion, St. Gallen, Winterthur-Schaffhausen, Zurich.



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Card and Krueger, 1994). Following Bolli and Hof (2018), we use the VET enrolment rates of the HE graduates' pre-study living region (origin) at the time they were in their second year of lower secondary education, when they decide on their future education pathway. Figure 1 shows the variation in VET enrolment rates among regions and within regions for individuals of different cohorts. The regional VET enrolment rate at the time of education decision correlates with the decision to enrol in VET. The first stage coefficients are significant and robust (see Appendix A2.). Additionally, this variable fulfils the exclusion restriction, because students are mobile within Switzerland after their graduation from higher education (Oggenfuss and Wolter, 2018) and their labour market outcomes do not depend on the VET enrolment rate in their region of origin.

**Figure 1:** Variation of VET enrolment rate by region and within region for different cohorts



Note: The figure shows variation in enrolment rates in VET both across regions and within regions, because the enrolment rate in a region fluctuates from year to year.

We use three additional variables to identify the channel through which work experience from VET operates. The first indicates whether or not the VET diploma is related to the education subject, to employment, or to both. The second variable is on HE graduates' finding employment through their social networks (family and previous employer). The third variable captures HE graduates' starting employment at a previous employer.

### III.2. Estimation method

We use explanatory analysis to estimate the effect of work experience from VET on the labour market outcomes, exploiting our rich set of control variables. Thus we tackle endogeneity by including controls for presumably all differences between HE graduates with VET diploma and academic certificates. For wages one year and five years after graduation, we assume a log-level specification following the Mincer earnings function (Mincer, 1974) and use a Tobit model with left-censoring at 0. We also assume a log-level function in line with survival analysis for search time until first employment, using the cox proportional hazard model for estimation. The regression equation reads:

$$\log(y_i + 1) = \beta_0 + \beta_1 VET_i + \beta_2 X_i + \varepsilon_i \quad (1)$$

The  $y_i$  stands for a labour market outcome of a graduate,  $i$ .  $\beta_0$  is a constant,  $\beta_1$  the coefficient of interest as it tells us the effect of experience from VET,  $\beta_2$  is a vector of coefficients for the control variables, and  $\varepsilon_i$  stands for the individual-specific error term.  $VET_i$  indicates the education route taken in upper-secondary education, and  $X_i$  is the vector of control variables, where we include education of father, education of mother, region of residence, institution, subject of study, cohort, company size, industry and labour market region as fixed effects.

For the other labour market outcome variables – internship during the first year after graduation, unemployment spells during the five years after graduation and the employment position five years after graduation – the underlying function is level-level:

$$y_i = \beta_0 + \beta_1 VET_i + \beta_2 X_i + \varepsilon_i \quad (2)$$

However, due to the different ranges of the dependent variables, we use a probit model for internship and unemployment, and an ordered probit model for the employment position. All models are estimated with robust standard errors.

Although, the set of controls we have is very rich, claiming that we capture all differences is not credible. We use an instrumental variable approach as a second specification to tackle unobserved heterogeneity from confounding factors. This estimation consists of two stages. A first stage (FS) that estimates having a VET diploma ( $\widehat{VET}_i$ ) from the enrolment rate into VET of the region of origin ( $regVET$ ), and a second stage (SS) in which the estimation for the VET diploma is used to analyse its effect on the HE graduates' labour market outcomes. We include our control variables in both regressions to further reduce heterogeneity ( $X_i$ ). The  $\gamma$  are coefficients in the first stage, and  $\eta_i$  the individual-specific error term of the first stage. The error terms are robust.

$$FS : \widehat{VET}_i = \gamma_0 + \gamma_1 regVET + \gamma_2 X_i + \eta_i \quad (3)$$

$$SS : y_i = \beta_0 + \beta_1 \widehat{VET}_i + \beta_2 X_i + \varepsilon_i \quad (4)$$

We use a probit specification for the first stage because VET is a binary variable. We use various models for the second stages. We use the OLS estimator with left-side truncation at 0 for wages one year and five years after graduation. We use interval regression with left-side truncation at 0 for the search time (Bartus and Roodman, 2014). The estimation method for internship during the first year after graduation and unemployment spells is probit, and the method for employment positions is ordered probit. Conditional mixed-process models (cmp in Stata; Roodman, 2011) are optimal to model the two stages with different estimators.

We perform subsample analyses using the previous estimation methods to identify the channel through which VET work experience operates. However, we only do this for the dependent variables where we initially found significant results – wage one year after graduation and search time. We check for the social network channel by looking at HE graduates with a VET diploma who find their job through their social networks compared to those who do not. For screening, we compare HE graduates with a VET diploma who go to a previous employer to those who do not. To distinguish the general from specific human capital channel, we compare HE graduates with work- or study-related VET and HE graduates without work- or study-related VET. To check whether there is a general human capital component to VET, we compare HE graduates with unrelated VET diploma to HE graduates with an academic certificate, restricting our initial sample to them and estimating the standard models. We look at the differences between HE graduates with a VET diploma from universities and UASs to differentiate general human capital from signalling.

#### IV. RESULTS

This section briefly describes our variables in the dataset. Next we present results, starting with the effect of VET work experience on the labour market entry outcomes of HE graduates. Thereafter, we check whether our results are a short-term effect or if they persist four years later. Then, we examine the channel through which VET work experience operates. In the end we present robustness checks to support that our results are measuring work experience, are representative for Swiss HE graduates, and are examining comparable groups with each other.

##### *IV.1. Descriptive statistics*

In our dataset 38% of HE graduates have a VET diploma (5340 compared to 8552 HE graduates with an academic certificate). The correlation matrices in Table A.1 and Table A.2 of Appendix A1. show how the variables in our dataset correlate with each other for one year after graduation and five years after graduation, respectively. The relation between having a VET diploma and the dependent variables is especially of interest. There we see that VET is

positively correlated with wage and employment position, but negatively correlated with search time, doing an internship after graduation and unemployment spells.

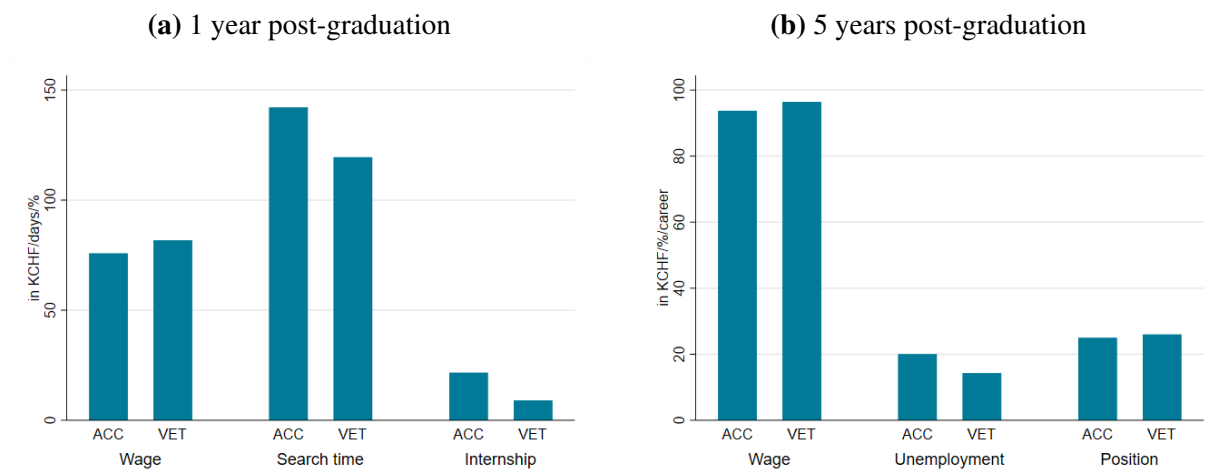
We focus on the differences between HE graduates with an upper-secondary academic certificate (ACC) and an upper-secondary VET diploma (VET). We report the descriptive statistics separately for those groups. The left side of Figure 2 displays the dependent variables for HE graduates with ACC and VET one year after graduation. We observe that HE graduates with VET earn on average roughly CHF 81,700 in the first year after graduation, which is about CHF 6,000 more than HE graduates with ACC. On average, HE graduates with VET also search three-fourths of a month less for employment, searching for four months while HE graduates with ACC search for 4.74 months. About every tenth HE graduate with VET starts the career with an internship, whereas twice as many HE graduates with ACC (every fifth) do so. The regional enrolment rate in VET is higher for HE graduates with VET (75%) than for HE graduates with ACC (70%).

Concerning the control variables, on average 34% of HE graduates with VET are female, compared to 60% of HE graduates with ACC. HE graduates are 26 years old, and married in 6% of cases. The parents of HE graduates with VET have slightly more practical qualification than those of HE graduates with ACC. HE graduates with ACC study at university of applied sciences (UASs) 40% of the time, compared to 96% of HE graduates with VET. Just as they choose different institutions, HE graduates with VET or ACC also choose different subjects. The average grade of HE graduates with ACC is slightly higher (5.14 compared to 5). Both groups of graduates have work experience from pre-study jobs (around 90%) and student jobs (roughly 87%), although HE graduates with ACC bring more internship experience (59% vs. 26%), which is not surprising as an internship is a requirement for HE graduates with ACC to enter UAS. HE graduates with ACC are more likely to work for a public employer (36% compared to 27%) but company size, industry and employer region are comparable.

HE graduates with VET have, in 71% of cases, done their VET diploma in an occupation related to their studies, current employment, or both. In finding employment, 22% of HE graduates with ACC rely on their social network while only 19% of HE graduates with VET do so. Furthermore, 15% of HE graduates with VET go back to a previous employer, whereas 8% of HE graduates with ACC do so. Table A.3 in Appendix A1. contains the detailed numbers.

The right side of Figure 2 shows the dependent variables for HE graduates with VET or ACC five years after graduation. We observe that wages of HE graduates with VET have increased to CHF 96,400 and are still higher by CHF 3000 than HE graduates' with ACC wages. HE graduates with VET were about one-fourth less likely to be unemployed during the post-graduation period, with only about every seventh unemployed compared to every fifth HE graduate with ACC. HE graduates with VET have slightly higher employment positions (2.6 vs 2.5). In this dataset, as in the one before, the regional enrolment rate in VET is 71% for HE graduates with ACC and 75% for HE graduates with VET.

**Figure 2:** Descriptives of dependent variables by upper-secondary education pathway

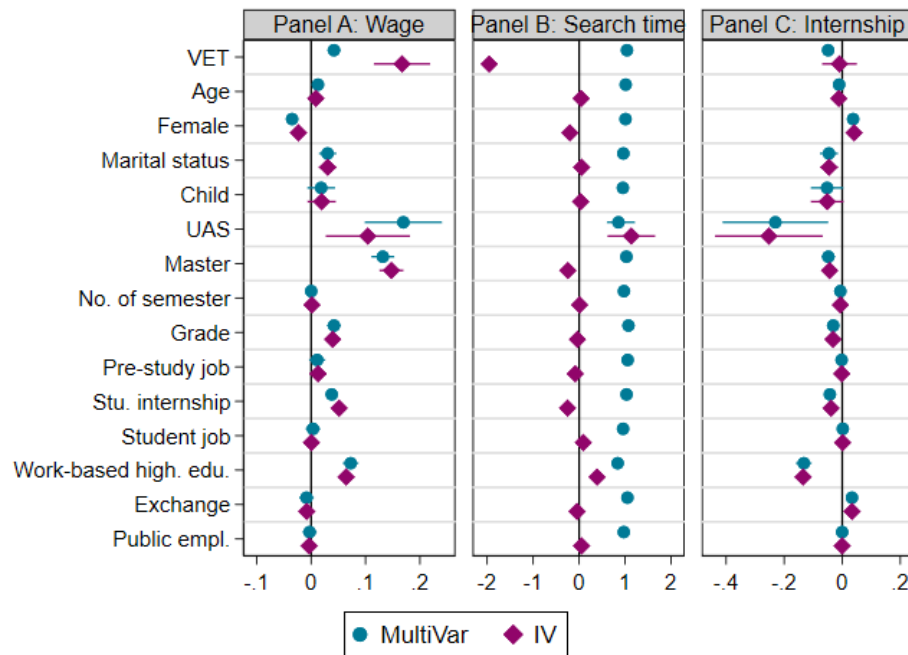


Regarding the difference between HE graduates with VET or ACC in the control variables we find the same patterns as in the previous dataset for gender, parents' education, institution, subject, education level, and employers characteristics. They have the same average age (29 years old), are married equally often (21%), are equally likely to have children (13%), and attain further education at the same rate (10% additional studies, 12% continuing education, and 12% continuing studies). Table A.4 in appendix A1. displays all the information.

#### *IV.2. The effect of VET work experience on higher education graduates' labour market entry outcomes*

We start our analysis by estimating the effect of VET work experience on HE graduates wages, search time until first employment and internships one year after graduation. Figure 3 shows the results for all three labour market outcomes.

Panel A shows the estimation results for wages. Having a VET diploma in the Tobit (multi-variate) estimation model increases wages by 4.2% for an average HE graduate (average treatment effect, ATE). The results for the estimates from the IV model suggest also that having a VET diploma increases wages for HE graduates. Here the wage increase is 16.7% for HE graduates, who are prone to the instrumented variable (local average treatment effect, LATE). We check the other variables to test the plausibility of our estimation. As expected, age, Master degree and Grade have significant positive effects on wages, whereas being female has a significant negative effect. We check the robustness of our results by also looking in the Tobit regression and the IV regression at the effect without controls. For the IV regression we further check whether our results still hold when including region of origin fixed effects. This accounts for the difference in the enrolment rates into VET and ACC between regions, which could otherwise lead to differences in wages and invalidate our instrument. Table A.5 in Appendix A2. shows the estimated coefficients. For wage the coefficient for the models without control are larger but they stay significantly positive. Including region of origin fixed effects

**Figure 3:** Estimation results for labour market outcomes one year after graduation from higher education

Note: Panel A shows the effect of VET on wages one year after graduation from higher education. The blue dots show the results from the Tobit estimation and the pink dots the results from the IV estimation. Panel B shows the effect of VET on search time until the first job after graduation from higher education. The blue dots show the hazard ratios from the Cox survival estimation and the pink dots the coefficients from the IV estimation. Panel C shows the effect of VET on internship after graduation from higher education. The blue dots show the marginal effects from the Probit estimation and the pink dots the marginal effects from the IV estimation. The horizontal lines in all panels indicate the point estimates with robust 95% confidence intervals. Tables A.5- A.7 in Appendix A2. show the estimated coefficients. The tables display all estimates whereas the figure does not display the estimates of the fixed effects for fathers highest education, mothers highest education, region of residence, institution, subject, cohort, size of employer, industry, and labour market region.

does not change the results.

Panel B shows the estimation results for search time of HE graduates until first employment after higher education. The resulting hazard ratio from the Cox survival estimation model (multivariate) indicates that HE graduates with a VET diploma take less time to find employment (hazard ratio above 1), but the result is not significant. The coefficient for the IV model is significantly negative, indicating that HE graduates with a VET diploma take about 2 months less time to find employment. In sum, the ATE for VET is not significant but the LATE is. Comparing the size of the effect with the other variables we find that the Hazard ratio is comparable, but the IV estimation is much larger than the effect of the other variables including the other work experience variables. Looking at the robustness of the finding, we see that the coefficients without controls have the same sign as with controls and are significant in both models (see all results in Table A.6 in Appendix A2.). Including the region-of-origin fixed effects does not influence the IV coefficients. Thus, we infer that VET work experience reduces search time for

HE graduates significantly.

Panel C displays the marginal effects for doing an internship after graduation from higher education. In the probit model (multivariate) the marginal effect of a VET diploma is -0.05, so the probability of doing an internship decreases by five percentage points when the HE graduate has a VET diploma (ATE). In the IV model we find the same marginal effect of five percentage points but it is not significant (LATE). The size of the effect has a similar magnitude to the other effects. Excluding the controls increases the size of the coefficients and is significant for IV (all estimates in Table A.7 in Appendix A2.). However, including the region-of-origin fixed effects does not change the IV coefficients. Therefore, we are not able to find a significant effect of VET on reducing internship experience after graduation from higher education.

### *IV.3. The stability of VET work experience over time*

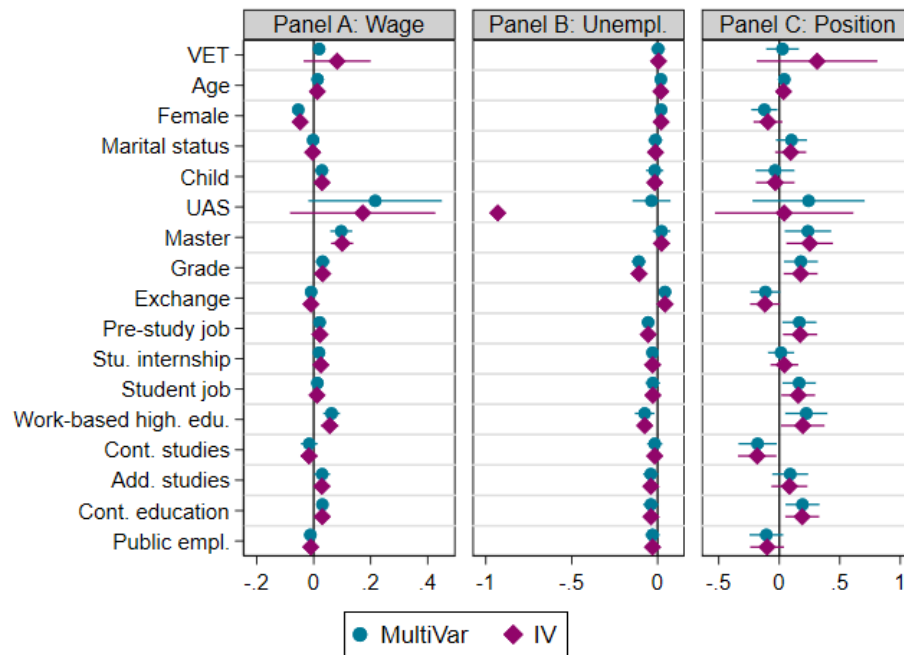
Next, we explore whether the benefit of VET on HE graduates' labour market outcomes persists after four years, or if the initial advantage turns into a disadvantage. Figure 4 displays the results for wages five years after graduation, unemployment spells, and employment positions.

Panel A shows the results for wages five years after graduation from higher education. The coefficients for VET are positive but smaller than the previous estimate (1.9% vs. 8.2%). The coefficient of the Tobit model remains significant, but not that of the IV model. Furthermore, the IV model does not work any longer because the first stage is insignificant. The estimated coefficients are plausible, as Age, Master and Grade increase wages but Female decreases them. Excluding the control variables results in significant coefficients, thus the results are not robust. Introducing region-of-origin fixed effects into the IV does not influence the results and the first stages are also insignificant (see Table A.8 in Appendix A2.). Therefore, we do not find a robust effect of VET on wages five years after higher education.

Panel B displays the result for unemployment. We find no significant evidence on the influence of a VET diploma on HE graduates being unemployed during the first five years after graduation. Both estimation methods find a small positive effect. However, excluding the control variables changes the sign so that the effect becomes significantly negative (all results are in Table A.9 in Appendix A2.). As for wage, the first stage becomes insignificant when including controls and region dummies in the IV estimation. Therefore, there is no evidence that VET work experience prevents unemployment after graduation.

Finally, Panel C shows the evidence for the effect of VET work experience on employment positions. Both coefficients for VET are positive but not significant. As in the two previous labour market outcomes, the results are not robust. When we exclude control variables the results become significant, and when we add regional dummies they change sign (see results in Table A.10 in Appendix A2.). Therefore, we find no robust evidence that VET work experience significantly increases the employment positions five year after graduation.

**Figure 4:** Estimation results for labour market outcomes five years after graduation from higher education



Note: Panel A shows the effect of VET on wages five years after graduation from higher education. The blue dots show the coefficients from the Tobit estimation and the pink dots the coefficients from the IV estimation. Panel B shows the effect of VET on unemployment spells within five years after graduation from higher education. The blue dots show the marginal effects from the Probit estimation and the pink dots the marginal effects from the IV estimation. Panel C shows the effect of VET on employment position five years after graduation from higher education. The blue dots show the coefficients from the ordered Probit estimation and the pink dots the coefficients from the IV estimation. The horizontal lines in all panels indicate the point estimates with robust 95% confidence intervals. Tables A.8- A.10 in Appendix A2. show the estimated coefficients. The tables display all estimates whereas the figure does not display the estimates of the fixed effects for fathers highest education, mothers highest education, region of residence, institution, subject, cohort, size of employer, industry, and labour market region.

#### IV.4. The channels work experience from VET operate through

After finding that VET work experience has significant influence on short-term labour market outcomes, we extend our analysis to examine the four theoretical channels through which VET work experience may be an advantage (all the results are in Table 1). For these analyses we restrict our sample to HE graduates with a VET diploma and assume that the findings are transferable to the comparison of HE graduates with ACC and VET.

We compare HE graduates that found employment through their social networks with HE graduates who did not to analyse the social network channel. We find social capital to reduce search time, but not to influence wage. Thus the VET diploma operates through the social network channel to decrease search time.

The analysis for the screening channel is similar to the one for the social network channel. Here, we compare the effect of VET work experience when HE graduates find employment at a new employer to the effect of VET when HE graduates return to a previous employer. For wage, the coefficient of screening is significantly positive. We cannot say anything about search time, because all HE graduates returning to their previous employer have zero search time. Therefore, the VET diploma works for HE graduates through the screening channel for wages, increasing them by 4.7 percentage points



a general human capital component to VET.

In the analysis of whether VET work experience operates through the signalling or the general human capital channel, we compare the effect of VET work experience between HE graduates from Unis and HE graduates of UASs. For wages, we find that VET work experience has a larger significant effect for HE graduates from UAS. The effect size is quite large at 17.6 percentage points. Also the effect on search time is significantly different, where again HE graduates from UAS profit more from a VET diploma.

Summarizing the results, we find that the advantages of a VET diploma for HE graduates operates through the social capital, screening and human capital channels, transmitting both specific and general human capital.

### *IV.5. Robustness checks*

We make certain assumptions in the course of our analyses. In this part we support these assumptions with empirical data.

#### *IV.5.1. Are we really measuring work experience?*

Economic scholars use work experience and its quadratic form for the estimation of wages (also called earnings) since Mincer (1974). However, scholars still debate on how to approximate work experience. Some scholars use potential work experience by taking a person's age and subtracting the number of school years and the entry age for school (for example Altonji and Blank, 1999). Other scholars estimate actual work experience by looking at the work history of individuals (for example Light and Ureta, 1995). These procedures, however, generate an attenuation bias due to their crudeness (Gullason, 1990; Altonji and Blank, 1999; Blau and Kahn, 2013): they neglect the quality of work experience and the possibility of obtaining work experience during schooling. Economist scholars have developed new methods to measure actual work experience (Light and Ureta, 1995; Regan and Oaxaca, 2009; Zveglic et al., 2019) and also capture the quality of work experience (Gullason, 1990, for example). However, one difficulty in measuring work experience is that more than one ideal type of work experience exists (Blackwell et al., 2001). Quiñones et al. (1995) avoid this difficulty by establishing a conceptual framework to classify work experience. They classify work experience based on two axes: measurement mode and level of specificity. Three elements contribute to their measurement mode: number of times that something (e.g. a task, job) was done, time spent doing it, and the respective difficulty or complexity of doing it. Their level of specificity axis captures gaining work experience at different levels: task, job or organisation. Together, the two axes constitute a nine-cell matrix (p. 892).

In our focus on VET work experience, differentiation at the task level is sufficient because no job or organisation change is involved in VET. We focus on the number of times the task was performed, time spent on the task and the difficulty or complexity of the task. Applying

the framework of Quiñones et al. (1995) to VET, students do perform the same tasks over and over in a workplace. The time spent on the tasks will differ depending on the required days at school in the occupational curriculum. The complexity of the task will differ too, especially in dual VET, because clients' varying needs lead to a variation in the complexity. For example, although a hairdressing apprentice will cut hair almost daily during dual VET, the time he or she spends on the haircut will differ according to the length of the hair and the difficulty will depend on the hairstyle the client wants. Likewise, a salesperson in a store is responsible for serving cash at checkout but also for placing products on shelves, knowing the products well enough to give clients advice and understanding the whole flow of warehouse goods.

Therefore, in the framework of Quiñones et al. (1995) HE graduates with a VET diploma have work experience. But do we really measure work experience or something else connected to the VET diploma? A possible way to check whether we actually measure work experience is to compare our coefficients from VET to the other work experience coefficients we have in our estimations. We can differentiate six sources of work experience, of which four are related to students' field of study and two are not. Internships and the work done by part-time students (work-based higher education) can be in the curriculum, and we can observe which pre-study work experience and student jobs are related to the field of study. Conversely, we also observe pre-study work experience and student jobs that are unrelated to the field of study. We do this to show that our results for the other work experience sources are in line with the literature's claim that only related work experience is helpful (e.g. Geel and Backes-Gellner 2012; Baert et al. 2016). Based on Egg (2016), who relies on the experience classification framework of Quiñones et al. (1995), we hypothesise that the coefficient for VET should be around the same size as student internships and related student jobs, smaller than work-based higher education, and larger than pre-study employment.

Table 2 shows the estimated coefficients for wage. Regarding the Tobit estimation, work experience from VET has about the same effect as a student internship or a student job related to the study field. Work experience from VET is larger than from pre-study employment related to the study field and smaller than work-based education. However, the results from the IV estimation are puzzling. Differentiating related and unrelated pre-study jobs does for some reason influence the results for VET and for student internship. It remains unclear, why the differentiation has such an influence but because the results for VET and student internship are strange, we do not interpret those estimations. From the first estimation, however, which shows comparable results to the literature, we conclude that we are measuring work experience.

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**Table 2:** Regression table on work experience

	Wage		IVWage	
	Coef.	SE	Coef.	SE
First stage: VET				
Regional enrolment rate in VET			1.010***	(0.31)
Second stage: Wage				
VET	0.039***	(0.01)	-0.260***	(0.02)
Pre-study job	-0.002	(0.01)	-0.013	(0.01)
Related pre-study job	0.022***	(0.01)	0.035***	(0.01)
Student internship	0.034***	(0.01)	0.001	(0.01)
Student job	-0.022***	(0.01)	-0.021**	(0.01)
Related student job	0.039***	(0.01)	0.048***	(0.01)
Work-based high. edu.	0.060***	(0.01)	0.076***	(0.01)
Observations	13485		13485	
Pseudo $R^2$	0.659			

Note: The table shows the regression coefficients from the Tobit regression and IV regression for wage. The estimations from the first and second stage include all the previous controls and the standard errors are robust.

### *IV.5.2. Are the results representative for higher education graduates?*

In our analysis we focus on HE graduates from bachelor or master degrees who enter the labour market and do not continue their studies<sup>10</sup>. Here selection might occur, in the sense that more able students continue studying and those more able students have an ACC. Then our findings for VET would be biased upwards. We compare the summary statistics of the entire dataset with our sample to examine whether that is the case (Table A.11 in Appendix A3. contains the results).

Comparing the means of our dependent variables – wage, search time, internship – we see that the dataset has lower wages, higher search time and about the same amount of internship than our sample. Lower wages are natural because there are still students in the dataset. A longer search time is unexpected, because students should not have had any. Finally, the proportion of students with a VET diploma in the dataset is lower (23%) than that in our sample (38%) indicating that HE graduates with VET are indeed overrepresented in our sample. The regional enrolment rate in VET is about the same in both the dataset and our sample.

Regarding personal characteristics, the students in the dataset and our HE graduates are comparable. The students in the dataset are only slightly older (27 instead of 26) and more likely to be married and have children. In the education characteristics we find no differences in the proportion of master students, the average final grade, nor the number of semesters. However, our sample contains an over-representation of HE graduates from UAS. The largest differences in the subjects are for Economics and Agricultural Sciences, for which we have an

<sup>10</sup>PhD graduates are a special case with too many unknowns. Therefore, we exclude them and focus on bachelor and master graduates.

over-representation in the former and an under-representation in the latter. Finally, there are practically no differences between the dataset and our sample concerning work experience and its source.

From this comparison we see that our sample contains a higher rate of HE graduates with VET and from UAS. These two features are critical for our analysis and might therefore be driving our results. To rule out any special influence of these features we estimate a Heckit – a two-stage Heckman correction model developed by Heckman (1979). Table A.12 in appendix A3. shows the results. The coefficient for VET is still significantly positive for wage, thus the selection of our sample does not drive our results.

#### *IV.5.3. Are we comparing apples to oranges?*

Another assumption we make is that HE graduates with VET or ACC are comparable. The reason is that having the same degree from the same institution in the same study field generates similar crowds. We estimate our results of wage with a nearest neighbour matching method to justify this assumption. The observables we match HE graduates on are age, gender, type of education, level of education, subject, and grades. Our new results show that also when comparing similar HE graduates with different education background, work experience from VET affects wage significantly and positively (estimated coefficient are in Table A.13 in Appendix A3.).

## V. CONCLUSION

This study analyses the effect of VET work experience on the labour market outcomes of HE graduates. Our findings show that having VET work experience increases wages and diminishes search time, but does not reduce the probability of internships one year after graduation. The beneficial effect persists to five years after graduation, but is no longer significant for wage, unemployment spells, and employment positions. The analysis of possible channels shows that social network, screening and human capital are the prevailing channels, not signalling.

The benefits of work experience from VET one year after graduation are sizeable. The estimated effect for wages ranges between 4.2% higher wages for HE graduates with a VET diploma in the Tobit model with controls up to 16.7% higher wages in the IV model. Having work experience from VET reduces search time by 2 months in the IV model. As for internship, work experience from VET significantly reduces the probability of doing an internship after graduation by 23.8% in the Probit model but not significantly in the IV model. Comparing these coefficients to the coefficients of the other sources of work experience makes the estimated coefficients from the IV model seem a bit too large. However, we have to keep in mind that we estimated the local average treatment effect, so the effects of the IV model are only relevant for HE graduates who would have switched, not for all HE graduates. This circumstance might explain the large differences. Compared to the literature, our study is in line with Shaw (2012) for

VET, Nunley et al. (2016), Margaryan et al. (2019), and Bolli et al. (2019a) for internships, and San (1986) and Weiss et al. (2014) for student jobs, finding a positive effect of work experience on labour market outcomes.

Five years after graduation, HE graduates with VET work experience have higher wages by 1.9 percentage points in the Tobit model (significant) and 8.2 percentage points in the IV model (not significant), but are equally likely to be unemployed and have no significant difference in their employment positions. This finding of no negative effect for HE graduates with a VET diploma in the longer run (five years after graduation) is in line with Hanushek et al., 2017, who find no negative long-term effect of VET on labour market outcomes after upper secondary education in Switzerland. Even more, we still get positive effects that are simply not as robust as the results for one year after graduation. However, the results are not typical and contrast with the findings from other countries, which find negative long-term effects of a VET diploma (Forster et al., 2016; Hanushek et al., 2017; Hampf and Woessmann, 2017).

We have three explanations for these opposing results. First, our sample focuses on highly educated individuals. There might be heterogeneity within the effect of VET depending on the highest education level attained. Second, our time horizon is relatively short for the long run, so it might be possible that negative effects appear only after prime age. However, we argue that this is unlikely because all HE graduates have general skills due to their highest education degree being from higher education. Third, Switzerland's VET system is so well established that a VET diploma does not become a disadvantage.

We find that HE graduates with VET have an advantage at one year and similar outcomes after five years to their academic peers. We have no reason to expect that the HE graduates with ACC will surpass their VET counterparts because evidence shows that experience profiles converge in the long term rather than inverting (Mincer, 1974). In addition, all HE graduates have the same highest education level, so we should not expect any differences in wages due to education.

Overall, our results suggest that, for individuals who are not sure whether to continue their education with a VET diploma or an academic certificate, starting with a VET diploma is not a disadvantage – even when continuing on to higher education. Indeed, pursuing dual VET reduces the foregone earnings during upper-secondary education, results in higher wages after higher education and helps HE graduates start earning wages sooner. These findings extend the evidence in the literature that labour market outcomes for VET are as good as or better than those for academic education when controlling for years of education (Tuor and Backes-Gellner, 2010), demonstrating that VET is a good starting point even for individuals planning to attend higher education. Transitioning from higher education into the labour market can be a major challenge, but HE graduates with VET can use their work experience to better capitalize on their higher education.

In contrast to the main findings in the literature, we find in line with Bolli et al. (2019a)

the human capital channel to be important, joined to a lesser extent by the social network and screening channels. That work experience from VET works through the human capital channel is plausible insofar as VET conveys marketable skills according to a structured curriculum developed in cooperation with industry. Longer programme duration in VET – three to four years – ensures that a durable level of work experience is acquired. It is also plausible that having a larger network to contact during a job search is an advantage. The screening channel is also not implausible because employers learn the productivity of their HE graduates with VET. The importance of human capital indicates that the structure of a VET programme is important for its later impact on labour market outcomes. A school-based programme, one that is too short, or one that is too narrow will not provide sufficient general human capital to increase work experience and drive positive impacts.

A limitation of our results is that we are only able to causally identify the local average treatment effect. Therefore, the external validity to all HE graduates is not guaranteed, although our results from the explanatory analysis suggest that the effects are present but smaller. Our results only apply to HE graduates who enter the labour market. In addition, the possibility to transfer our results to other countries depends on the comparability of their education systems to the Swiss system, especially in terms of the strong linkage between the education and employment systems. Finally, the advantages of VET might only arise in countries with a permeable education system where individuals with a VET diploma have the same access to educational possibilities as individuals with an academic certificate. In such systems, VET can be seen as a first step in a lifelong learning process – this is especially important as technological and other changes make lifelong learning a necessity (Laal and Salamati, 2012).

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## A APPENDIX

### A1. Descriptive Statistics

**Table A.1:** Correlation matrix 1 year post-graduation

	wage	sear	inta	VET	rVET	Age	fem	faedu	moedu	mars	child	UAS	mast	inst	subj	sem	grad	wave	prewe	ints	stuwe	wbe	ex	publ	size	noga	empr	rVET	net	screen
wage	1.00																													
sear	-0.09	1.00																												
inta	-0.28	0.10	1.00																											
VET	0.13	-0.07	-0.16	1.00																										
rVET	0.16	-0.05	-0.04	0.23	1.00																									
Age	0.16	-0.04	-0.06	0.08	0.15	1.00																								
fem	-0.15	0.05	0.08	-0.25	-0.05	-0.16	1.00																							
faedu	0.03	-0.01	0.03	-0.08	0.07	0.01	-0.02	1.00																						
moedu	-0.02	-0.01	0.04	-0.12	-0.03	0.00	0.01	0.47	1.00																					
mars	0.04	0.00	-0.06	0.02	0.01	0.10	0.01	-0.02	-0.03	1.00																				
child	0.03	0.00	-0.04	0.03	0.01	0.11	-0.04	-0.01	-0.02	0.33	1.00																			
UAS	0.00	-0.05	-0.20	0.54	0.12	-0.09	-0.03	-0.12	-0.12	0.04	0.04	1.00																		
mast	0.09	0.01	0.10	-0.43	-0.11	0.26	-0.02	0.12	0.11	-0.02	-0.02	-0.76	1.00																	
inst	0.06	-0.08	-0.21	0.49	0.23	-0.04	-0.09	-0.06	-0.08	0.02	0.03	0.83	-0.59	1.00																
subj	0.10	-0.08	-0.19	0.29	0.07	-0.03	-0.32	-0.00	-0.02	-0.01	-0.00	0.21	-0.10	0.31	1.00															
sem	-0.02	0.02	-0.09	0.14	0.05	0.02	0.03	-0.05	-0.04	0.04	0.04	0.28	-0.45	0.20	-0.02	1.00														
grad	0.05	-0.02	-0.00	-0.18	-0.06	0.00	0.08	0.05	0.07	0.01	-0.01	-0.21	0.30	-0.19	-0.03	-0.17	1.00													
wave	-0.03	-0.00	0.01	-0.02	-0.07	0.27	0.02	-0.00	0.05	0.03	0.04	0.01	0.04	0.00	-0.02	0.03	0.05	1.00												
prewe	0.04	-0.03	-0.02	0.09	0.09	0.13	0.00	0.01	-0.01	0.02	0.02	0.11	-0.11	0.09	-0.05	0.05	-0.03	0.02	1.00											
ints	-0.04	0.01	-0.05	-0.32	-0.13	-0.05	0.25	0.03	0.07	0.02	0.00	-0.18	0.16	-0.16	-0.07	-0.03	0.16	0.00	-0.04	1.00										
stuwe	0.03	0.01	0.02	0.02	0.07	0.06	0.08	0.00	-0.00	0.01	0.01	0.01	-0.01	-0.02	-0.13	0.07	0.00	-0.00	0.22	-0.01	1.00									
wbe	0.16	-0.05	-0.13	0.25	0.12	0.22	-0.05	-0.05	-0.06	0.07	0.06	0.27	-0.16	0.25	-0.04	0.26	-0.07	0.08	0.10	-0.25	0.14	1.00								
ex	-0.01	0.00	0.08	-0.07	-0.02	0.01	0.02	0.03	0.04	-0.03	-0.01	-0.09	0.09	-0.05	-0.10	-0.03	0.07	-0.01	0.01	-0.01	0.03	-0.06	1.00							
publ	-0.06	0.05	0.00	-0.10	-0.06	-0.04	0.23	-0.06	-0.03	0.03	0.02	0.03	-0.02	-0.05	-0.11	0.02	0.09	0.04	-0.02	0.18	0.00	-0.06	-0.06	1.00						
size	0.16	-0.03	0.00	0.02	0.04	0.01	-0.04	0.01	-0.00	-0.01	-0.00	0.01	0.01	0.02	0.03	-0.03	0.01	0.02	0.00	0.01	0.01	0.05	0.03	0.12	1.00					
noga	-0.14	0.05	0.03	-0.21	-0.11	-0.04	0.29	-0.03	0.02	0.03	0.01	-0.03	0.00	-0.09	-0.27	0.04	0.11	0.05	0.00	0.23	0.02	-0.05	-0.01	0.37	-0.15	1.00				
empr	0.04	-0.02	-0.00	0.12	0.47	0.07	-0.04	0.04	-0.00	-0.02	-0.02	0.05	-0.06	0.23	0.04	0.00	-0.06	-0.03	0.02	-0.10	-0.02	0.05	-0.00	-0.08	0.01	-0.10	1.00			
rVET	0.12	-0.07	-0.15	0.78	0.17	-0.01	-0.23	-0.07	-0.10	0.01	0.02	0.43	-0.33	0.38	0.28	0.10	-0.13	-0.04	0.07	-0.32	0.02	0.24	-0.05	-0.11	0.03	-0.20	0.09	1.00		
net	0.01	0.03	-0.04	-0.04	-0.03	0.01	0.02	0.02	0.02	-0.00	0.01	-0.02	0.01	-0.02	-0.02	0.01	-0.00	-0.01	0.01	0.06	0.02	-0.01	-0.01	-0.01	-0.05	0.05	-0.01	-0.04	1.00	
screen	0.09	-0.31	-0.12	0.11	0.02	0.09	-0.08	-0.03	-0.02	0.03	0.03	0.10	-0.08	0.10	0.03	0.11	-0.02	0.04	0.05	-0.08	0.04	0.30	-0.04	-0.02	-0.03	-0.02	0.02	0.11	0.00	1.00

Source: Own calculation

Note: The abbreviations stand for the variables wage (wage), search time (sear), internship after graduation (inta), vocational education and training diploma (VET), regional enrolment rate in VET (rVET), female (fem), education of father (faedu), education of mother (moedu), marital status (mars), child (child), type of education being university of applied science (UAS), education level being master level (mast), institution (inst), subject (subj), number of semesters (sem), grade (grad), cohort (wave), work experience gained before higher education (prewe), student internship (ints), student job (stuwe), workbased education (wbe), exchange during studies (ex), public employment (publ), size (size), noga1 (noga), region of employer (empr), VET related to studies and/or employer (rVET), employment found through social network (net), employment found at previous employer (screen)

**Table A.2:** Correlation matrix 5 year post-graduation

	wage	unemp	pos	VET	rVET	Age	fem	faedu	moedu	mars	child	UAS	mast	inst	subj	wave	constud	addstud	conedu	publ	size	noga	empr
wage	1.00																						
unemp	-0.11	1.00																					
pos	0.24	-0.10	1.00																				
VET	0.05	-0.07	0.06	1.00																			
rVET	0.14	-0.21	0.09	0.21	1.00																		
Age	0.18	0.04	0.08	0.01	0.14	1.00																	
fem	-0.19	0.02	-0.09	-0.30	-0.02	-0.10	1.00																
faedu	0.06	-0.06	0.03	-0.06	0.07	0.03	-0.01	1.00															
moedu	0.02	-0.02	0.01	-0.12	-0.04	-0.02	0.06	0.44	1.00														
mars	0.01	-0.03	0.02	0.02	-0.01	0.12	0.01	-0.01	-0.01	1.00													
child	0.02	-0.03	-0.00	0.02	-0.03	0.14	0.01	-0.03	-0.02	0.56	1.00												
UAS	-0.13	-0.08	-0.00	0.58	0.16	-0.11	-0.06	-0.10	-0.09	0.02	0.05	1.00											
mast	0.19	0.07	0.06	-0.46	-0.15	0.25	0.01	0.11	0.08	0.01	-0.02	-0.79	1.00										
inst	-0.05	-0.11	0.02	0.51	0.24	-0.06	-0.12	-0.04	-0.06	0.02	0.03	0.83	-0.62	1.00									
subj	0.04	-0.13	0.02	0.32	0.06	-0.04	-0.38	0.02	-0.04	0.01	0.01	0.26	-0.11	0.34	1.00								
wave	-0.02	0.02	-0.02	-0.09	0.01	0.28	0.00	0.04	0.04	0.06	0.06	-0.01	0.04	-0.01	-0.02	1.00							
constud	-0.02	-0.02	-0.05	0.02	0.04	-0.10	-0.02	0.02	0.01	-0.08	-0.07	0.00	-0.13	0.00	-0.05	-0.00	1.00						
addstud	0.04	-0.01	0.01	-0.04	-0.03	-0.01	0.07	0.01	0.01	-0.01	-0.02	-0.03	0.03	-0.05	-0.05	-0.01	-0.09	1.00					
conedu	0.01	-0.05	0.06	0.00	0.07	0.01	0.06	0.04	0.01	-0.01	-0.02	0.06	-0.06	0.04	-0.07	0.02	-0.11	-0.06	1.00				
publ	-0.15	-0.02	-0.13	-0.14	-0.06	-0.06	0.26	-0.03	0.01	0.05	0.07	0.04	-0.07	-0.04	-0.13	0.01	-0.00	0.08	0.09	1.00			
size	0.15	-0.03	-0.16	0.00	0.03	-0.00	-0.03	0.02	0.01	0.00	-0.00	0.00	0.01	0.01	0.05	-0.01	0.03	0.04	0.01	0.13	1.00		
noga	-0.16	0.00	-0.09	-0.25	-0.12	-0.06	0.33	-0.03	0.02	0.04	0.05	-0.04	-0.01	-0.11	-0.32	-0.01	0.05	0.10	0.07	0.38	-0.17	1.00	
empr	0.07	-0.12	0.08	0.14	0.51	0.07	-0.02	0.03	-0.04	-0.03	-0.06	0.08	-0.10	0.24	0.04	0.00	0.04	-0.05	0.03	-0.10	0.01	-0.12	1.00

Source: Own calculation

Note: The abbreviations stand for the variables wage (wage), unemployment (unemp), position (pos), vocational education and training diploma (VET), regional enrolment rate in VET (rVET), female (fem), education of father (faedu), education of mother (moedu), marital status (mars), child (child), type of education being university of applied science (UAS), education level being master level (mast), institution (inst), subject (subj), wave (wave), continuing studies (constud), additional studies (conadd), continuing education (conedu), work experience gained before higher education (prewe), student internship (ints), student job (stuwe), workbased education (wbe), exchange during studies (ex), public employment (publ), size (size), noga1 (noga), region of employer (empr)

# NO EXPERIENCE, NO EMPLOYMENT

**Table A.3:** Summary statistics 1 year post-graduation

	ACC			VET		
	Mean	SD	Obs	Mean	SD	Obs
<b><i>Dependent variables</i></b>						
Wage in KCHF	75.76	22.97	8552	81.69	19.42	5340
Search time	4.74	5.41	8552	3.98	4.80	5340
Internship	0.22	0.41	8552	0.09	0.29	5340
<b><i>Instrumental variable</i></b>						
Regional enrolment rate in VET	0.70	0.12	8552	0.75	0.09	5340
<b><i>CV: Personal characteristics</i></b>						
Age	26.10	1.51	8552	26.35	1.73	5340
Female	0.60	0.49	8552	0.34	0.47	5340
Education of father						
Dad: Comp.	0.08	0.26	8552	0.08	0.27	5340
Dad: Upp.-sec.	0.38	0.49	8552	0.47	0.50	5340
Dad: Post-sec.	0.54	0.50	8552	0.45	0.50	5340
Education of mother						
Mom: Comp.	0.09	0.28	8552	0.10	0.30	5340
Mom: Upp.-sec.	0.56	0.50	8552	0.68	0.47	5340
Mom: Post-sec.	0.35	0.48	8552	0.22	0.41	5340
Marital status	0.06	0.24	8552	0.07	0.26	5340
Child	0.02	0.13	8552	0.03	0.16	5340
<b><i>CV: Education</i></b>						
UAS	0.41	0.49	8552	0.96	0.21	5340
Master	0.51	0.50	8552	0.09	0.28	5340
Institute						
UNI 1	0.04	0.20	8552	0.00	0.05	5340
UNI 2	0.06	0.24	8552	0.01	0.08	5340
UNI 3	0.06	0.23	8552	0.00	0.06	5340
UNI 4	0.04	0.20	8552	0.00	0.05	5340
UNI 5	0.05	0.23	8552	0.00	0.06	5340
UNI 6	0.01	0.08	8552	0.00	0.02	5340
UNI 7	0.02	0.15	8552	0.00	0.05	5340
UNI 8	0.04	0.19	8552	0.00	0.07	5340
UNI 9	0.08	0.27	8552	0.01	0.08	5340
UNI 10	0.01	0.12	8552	0.00	0.02	5340
UNI 11	0.05	0.23	8552	0.00	0.07	5340
UNI 12	0.12	0.32	8552	0.01	0.08	5340
UAS 1	0.05	0.21	8552	0.12	0.32	5340
UAS 2	0.16	0.37	8552	0.17	0.38	5340
UAS 3	0.04	0.21	8552	0.13	0.34	5340
UAS 4	0.03	0.18	8552	0.11	0.32	5340
UAS 5	0.02	0.13	8552	0.02	0.15	5340
UAS 6	0.03	0.18	8552	0.13	0.34	5340
UAS 7	0.08	0.27	8552	0.26	0.44	5340
UAS 8	0.00	0.02	8552	0.01	0.08	5340
Subject						
Humanities	0.05	0.21	8552	0.01	0.08	5340
Arts	0.04	0.20	8552	0.03	0.16	5340
Edu. Sciences	0.20	0.40	8552	0.06	0.23	5340
Economics	0.27	0.44	8552	0.33	0.47	5340
Nat. Sciences	0.10	0.30	8552	0.01	0.08	5340
Medi. Sciences	0.03	0.17	8552	0.00	0.04	5340
Health	0.10	0.30	8552	0.07	0.26	5340
Engineering	0.08	0.27	8552	0.11	0.31	5340
Agri. Sciences	0.11	0.31	8552	0.39	0.49	5340
Others	0.02	0.13	8552	0.00	0.05	5340
No. of semester	5.97	2.17	8552	6.52	1.44	5340
Grade	5.14	0.39	8552	5.00	0.38	5340
Cohort						
2011	0.10	0.30	8552	0.12	0.32	5340
2013	0.24	0.43	8552	0.22	0.41	5340
2015	0.28	0.45	8552	0.32	0.47	5340
2017	0.38	0.49	8552	0.35	0.48	5340
<b><i>CV: Experience</i></b>						

Pre-study job	0.86	0.35	8552	0.91	0.28	5340
Student internship	0.59	0.49	8552	0.26	0.44	5340
Student job	0.87	0.34	8552	0.88	0.32	5340
Work-based high. edu.	0.06	0.24	8552	0.23	0.42	5340
Exchange	0.18	0.38	8552	0.13	0.33	5340
<b>CV: Employer characteristics</b>						
Public empl.	0.36	0.48	8552	0.27	0.44	5340
Company size						
Small	0.34	0.47	8552	0.32	0.47	5340
Medium	0.20	0.40	8552	0.20	0.40	5340
Large	0.46	0.50	8552	0.48	0.50	5340
<b>NOGA1</b>						
Agriculture ...	0.00	0.01	8552	0.00	0.04	5340
Mining ...	0.00	0.00	8552	0.00	0.02	5340
Manufacturing	0.09	0.28	8552	0.20	0.40	5340
Electricity ...	0.01	0.08	8552	0.01	0.10	5340
Water Supply ...	0.00	0.04	8552	0.00	0.04	5340
Construction	0.01	0.09	8552	0.02	0.13	5340
Wholesale ...	0.07	0.26	8552	0.06	0.23	5340
Transportation ...	0.02	0.15	8552	0.03	0.16	5340
Accommodation ...	0.01	0.12	8552	0.01	0.08	5340
Information ...	0.07	0.26	8552	0.10	0.30	5340
Financial ...	0.08	0.27	8552	0.10	0.29	5340
Real Estate	0.00	0.07	8552	0.01	0.08	5340
Scientific ...	0.22	0.42	8552	0.24	0.43	5340
Administrative ...	0.03	0.16	8552	0.02	0.15	5340
Public ...	0.06	0.23	8552	0.03	0.17	5340
Education	0.08	0.28	8552	0.05	0.22	5340
Health ...	0.18	0.38	8552	0.11	0.31	5340
Arts ...	0.03	0.17	8552	0.01	0.09	5340
Other service ...	0.03	0.17	8552	0.01	0.11	5340
Extraterritorial ...	0.01	0.07	8552	0.00	0.01	5340
Employer region						
Geneva	0.08	0.27	8552	0.02	0.15	5340
Lausanne	0.12	0.32	8552	0.06	0.23	5340
Sion	0.03	0.17	8552	0.02	0.15	5340
Fribourg	0.03	0.18	8552	0.03	0.16	5340
Neuchatel	0.03	0.16	8552	0.02	0.14	5340
Biel	0.03	0.16	8552	0.04	0.19	5340
Bern	0.11	0.32	8552	0.12	0.33	5340
Basel	0.06	0.24	8552	0.05	0.22	5340
Aarau-Olten	0.03	0.17	8552	0.05	0.21	5340
Zurich	0.29	0.45	8552	0.34	0.47	5340
Winterthur-SH	0.02	0.15	8552	0.06	0.24	5340
St. Gallen	0.03	0.17	8552	0.07	0.26	5340
Chur	0.01	0.12	8552	0.02	0.14	5340
Luzern	0.04	0.20	8552	0.06	0.25	5340
Bellinzona	0.01	0.12	8552	0.01	0.09	5340
Lugano	0.02	0.15	8552	0.01	0.10	5340
Abroad	0.04	0.19	8552	0.02	0.14	5340
<b>Channel</b>						
Related VET	0.00	0.00	8552	0.71	0.45	5340
Network	0.22	0.41	7456	0.19	0.39	4257
Screening	0.08	0.28	8470	0.15	0.36	5294

**Table A.4:** Summary statistics 5 years post-graduation

	ACC			VET		
	Mean	SE	Obs	Mean	SE	Obs
Wage in KCHF	93.70	28.03	1990	96.43	25.67	1327
Unemployment	0.20	0.40	1990	0.14	0.35	1327
Position	2.49	0.77	1990	2.60	0.81	1327
<b>Instrumental variable</b>						
Regional enrolment rate in VET	0.71	0.11	1990	0.75	0.09	1327



# NO EXPERIENCE, NO EMPLOYMENT

<b>CV: Personal characteristics</b>						
Age	29.67	1.23	1990	29.69	1.31	1327
Female	0.62	0.48	1990	0.31	0.46	1327
Education of father						
Dad: Comp.	0.07	0.25	1990	0.07	0.26	1327
Dad: Upp.-sec.	0.40	0.49	1990	0.47	0.50	1327
Dad: Post-sec.	0.53	0.50	1990	0.46	0.50	1327
Education of mother						
Mom: Comp.	0.09	0.29	1990	0.11	0.31	1327
Mom: Upp.-sec.	0.59	0.49	1990	0.70	0.46	1327
Mom: Post-sec.	0.31	0.46	1990	0.19	0.40	1327
Marital status	0.20	0.40	1990	0.22	0.41	1327
Child	0.12	0.33	1990	0.14	0.34	1327
<b>CV: Education</b>						
UAS	0.40	0.49	1990	0.97	0.17	1327
Master	0.49	0.50	1990	0.05	0.22	1327
Institute						
UNI 1	0.05	0.21	1990	0.00	0.03	1327
UNI 2	0.07	0.25	1990	0.00	0.06	1327
UNI 3	0.05	0.21	1990	0.00	0.05	1327
UNI 4	0.05	0.22	1990	0.00	0.05	1327
UNI 5	0.06	0.24	1990	0.01	0.07	1327
UNI 6	0.01	0.08	1990	0.00	0.00	1327
UNI 7	0.03	0.18	1990	0.00	0.07	1327
UNI 8	0.03	0.16	1990	0.00	0.03	1327
UNI 9	0.07	0.26	1990	0.00	0.07	1327
UNI 10	0.01	0.12	1990	0.00	0.00	1327
UNI 11	0.06	0.24	1990	0.00	0.05	1327
UNI 12	0.11	0.32	1990	0.00	0.04	1327
UAS 1	0.05	0.22	1990	0.12	0.33	1327
UAS 2	0.16	0.36	1990	0.19	0.39	1327
UAS 3	0.03	0.17	1990	0.13	0.34	1327
UAS 4	0.03	0.18	1990	0.11	0.31	1327
UAS 5	0.01	0.12	1990	0.03	0.17	1327
UAS 6	0.03	0.17	1990	0.15	0.36	1327
UAS 7	0.09	0.28	1990	0.23	0.42	1327
UAS 8	0.00	0.00	1990	0.00	0.06	1327
Subject						
Humanities	0.05	0.21	1990	0.01	0.09	1327
Arts	0.03	0.17	1990	0.02	0.13	1327
Edu. Sciences	0.23	0.42	1990	0.05	0.21	1327
Economics	0.24	0.43	1990	0.31	0.46	1327
Nat. Sciences	0.09	0.29	1990	0.00	0.07	1327
Medi. Sciences	0.03	0.18	1990	0.00	0.00	1327
Health	0.11	0.32	1990	0.06	0.24	1327
Engineering	0.07	0.26	1990	0.09	0.29	1327
Agri. Sciences	0.13	0.33	1990	0.45	0.50	1327
Others	0.02	0.14	1990	0.00	0.03	1327
Cohort						
2015	0.31	0.46	1990	0.39	0.49	1327
2017	0.69	0.46	1990	0.61	0.49	1327
Cont. studies	0.12	0.32	1990	0.13	0.34	1327
Add. studies	0.11	0.32	1990	0.09	0.29	1327
Cont. education	0.12	0.33	1990	0.12	0.33	1327
<b>CV: Employer characteristics</b>						
Public empl.	0.35	0.48	1990	0.22	0.41	1327
Company size						
Small	0.32	0.47	1990	0.30	0.46	1327
Medium	0.19	0.39	1990	0.21	0.41	1327
Large	0.50	0.50	1990	0.49	0.50	1327
NOGA1						
Manufacturing	0.10	0.30	1990	0.25	0.43	1327
Electricity ...	0.01	0.09	1990	0.01	0.12	1327
Water Supply ...	0.00	0.05	1990	0.00	0.00	1327
Construction	0.01	0.09	1990	0.01	0.12	1327
Wholesale ...	0.07	0.25	1990	0.08	0.26	1327
Transportation ...	0.03	0.16	1990	0.02	0.16	1327

Accommodation ...	0.01	0.08	1990	0.00	0.07	1327
Information ...	0.08	0.27	1990	0.11	0.32	1327
Financial ...	0.08	0.27	1990	0.09	0.28	1327
Real Estate	0.00	0.06	1990	0.01	0.08	1327
Scientific ...	0.21	0.41	1990	0.21	0.41	1327
Administrative ...	0.02	0.14	1990	0.02	0.12	1327
Public ...	0.07	0.26	1990	0.04	0.19	1327
Education	0.05	0.21	1990	0.03	0.17	1327
Health ...	0.21	0.40	1990	0.09	0.28	1327
Arts ...	0.02	0.15	1990	0.01	0.10	1327
Other service ...	0.04	0.19	1990	0.02	0.13	1327
Extraterritorial ...	0.00	0.06	1990	0.00	0.04	1327
Employer region						
Geneva	0.07	0.26	1990	0.03	0.16	1327
Lausanne	0.13	0.34	1990	0.06	0.24	1327
Sion	0.04	0.19	1990	0.03	0.17	1327
Fribourg	0.03	0.17	1990	0.03	0.16	1327
Neuchatel	0.02	0.15	1990	0.03	0.18	1327
Biel	0.03	0.18	1990	0.05	0.21	1327
Bern	0.12	0.33	1990	0.11	0.31	1327
Basel	0.06	0.23	1990	0.04	0.21	1327
Aarau-Olten	0.03	0.17	1990	0.05	0.22	1327
Zurich	0.29	0.46	1990	0.32	0.47	1327
Winterthur-SH	0.03	0.17	1990	0.06	0.24	1327
St. Gallen	0.04	0.19	1990	0.06	0.24	1327
Chur	0.02	0.12	1990	0.02	0.15	1327
Luzern	0.05	0.22	1990	0.06	0.24	1327
Bellinzona	0.01	0.12	1990	0.01	0.10	1327
Lugano	0.02	0.15	1990	0.02	0.15	1327
Abroad	0.01	0.07	1990	0.01	0.10	1327

## A2. Complete Estimation Results

Table A.5: Regression table for wage one year post-graduation

	Tobit1		Tobit2		IV1		IV2		IV3		IV4	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
A. First stage												
Reg. enrol. rate VET					3.283***	(0.11)	1.344***	(0.32)	3.964***	(0.70)	0.803	(1.00)
B. Second stage												
VET	0.088***	(0.00)	0.042***	(0.01)	0.309***	(0.01)	0.167***	(0.03)	0.213***	(0.01)	0.168***	(0.03)
Age			0.013***	(0.00)			0.009***	(0.00)			0.009***	(0.00)
Female			-0.035***	(0.01)			-0.023***	(0.01)			-0.023***	(0.01)
Dad: Upp.-sec.			-0.006	(0.01)			-0.010	(0.01)			-0.010	(0.01)
Dad: Post-sec.			-0.001	(0.01)			-0.002	(0.01)			-0.002	(0.01)
Mom: Upp.-sec.			0.005	(0.01)			0.005	(0.01)			0.005	(0.01)
Mom: Post-sec.			-0.003	(0.01)			0.003	(0.01)			0.003	(0.01)
Marital status			0.030***	(0.01)			0.031***	(0.01)			0.032***	(0.01)
Child			0.018	(0.01)			0.019	(0.01)			0.019	(0.01)
Res: BE			-0.041***	(0.01)			-0.040***	(0.01)			-0.042***	(0.02)
Res: LU			-0.020	(0.01)			-0.015	(0.01)			-0.030*	(0.02)
Res: UR			-0.024	(0.04)			-0.021	(0.04)			-0.027	(0.06)
Res: SZ			-0.035**	(0.01)			-0.028*	(0.02)			-0.019	(0.02)
Res: OW			-0.110*	(0.06)			-0.103*	(0.06)			-0.087	(0.07)
Res: NW			-0.116**	(0.05)			-0.106**	(0.05)			-0.091*	(0.05)
Res: GL			-0.056	(0.04)			-0.042	(0.04)			-0.052	(0.06)
Res: ZG			0.004	(0.02)			0.003	(0.02)			0.001	(0.02)
Res: FR			-0.042**	(0.02)			-0.042**	(0.02)			-0.074***	(0.02)
Res: SO			-0.015	(0.01)			-0.015	(0.01)			-0.031*	(0.02)
Res: BS			-0.055**	(0.02)			-0.046**	(0.02)			-0.056**	(0.02)
Res: BL			-0.027	(0.02)			-0.019	(0.02)			-0.046*	(0.03)
Res: SH			-0.011	(0.02)			-0.014	(0.02)			0.006	(0.03)
Res: AR			-0.023	(0.03)			-0.031	(0.03)			-0.019	(0.04)
Res: AI			0.078	(0.07)			0.076	(0.06)			0.058	(0.08)
Res: SG			-0.007	(0.01)			-0.011	(0.01)			-0.015	(0.02)
Res: GR			-0.057**	(0.02)			-0.052**	(0.02)			-0.053*	(0.03)
Res: AG			-0.027**	(0.01)			-0.031***	(0.01)			-0.031**	(0.01)
Res: TG			-0.015	(0.01)			-0.021	(0.02)			-0.028	(0.02)
Res: TI			-0.099***	(0.03)			-0.094***	(0.03)			-0.046	(0.04)

# NO EXPERIENCE, NO EMPLOYMENT

Res: VD	-0.067*** (0.02)	-0.066*** (0.02)	-0.073*** (0.02)
Res: VS	-0.035 (0.02)	-0.027 (0.02)	-0.024 (0.03)
Res: NE	-0.064*** (0.02)	-0.060** (0.02)	-0.064** (0.03)
Res: GE	-0.097*** (0.03)	-0.083*** (0.03)	-0.094*** (0.03)
Res: JU	-0.061** (0.03)	-0.064** (0.03)	-0.051 (0.04)
UAS	0.170*** (0.04)	0.104*** (0.04)	0.103*** (0.04)
Master	0.132*** (0.01)	0.148*** (0.01)	0.148*** (0.01)
UNI 2	0.001 (0.02)	-0.001 (0.02)	-0.002 (0.02)
UNI 3	0.041 (0.03)	0.037 (0.03)	0.035 (0.03)
UNI 4	-0.000 (0.03)	-0.014 (0.03)	-0.015 (0.03)
UNI 5	-0.061** (0.03)	-0.065** (0.03)	-0.066** (0.03)
UNI 6	-0.114* (0.06)	-0.118** (0.06)	-0.118** (0.06)
UNI 7	-0.053 (0.03)	-0.064* (0.03)	-0.064* (0.03)
UNI 8	0.161*** (0.03)	0.163*** (0.03)	0.163*** (0.03)
UNI 9	0.010 (0.02)	0.011 (0.02)	0.013 (0.02)
UNI 10	-0.085** (0.04)	-0.084** (0.04)	-0.079** (0.04)
UNI 11	-0.018 (0.03)	-0.009 (0.03)	-0.011 (0.03)
UNI 12	0.046** (0.02)	0.063*** (0.02)	0.063*** (0.02)
UAS 1	-0.051* (0.03)	-0.038 (0.03)	-0.037 (0.03)
UAS 2	-0.088*** (0.03)	-0.060* (0.03)	-0.060* (0.03)
UAS 3	-0.048 (0.03)	-0.037 (0.03)	-0.037 (0.03)
UAS 4	-0.046 (0.03)	-0.040 (0.03)	-0.040 (0.03)
UAS 5	-0.049 (0.04)	-0.031 (0.04)	-0.025 (0.04)
UAS 6	-0.081*** (0.03)	-0.070** (0.03)	-0.069** (0.03)
UAS 7	-0.068** (0.03)	-0.060** (0.03)	-0.058* (0.03)
UAS 8	0.000 (.)		
Arts	-0.152*** (0.03)	-0.135*** (0.03)	-0.135*** (0.03)
Edu. Sciences	0.106*** (0.02)	0.099*** (0.02)	0.098*** (0.02)
Economics	0.100*** (0.02)	0.088*** (0.02)	0.087*** (0.02)
Nat. Sciences	0.050** (0.02)	0.034 (0.02)	0.034 (0.02)
Medi. Sciences	0.170*** (0.03)	0.147*** (0.03)	0.146*** (0.03)
Health	0.096*** (0.02)	0.090*** (0.02)	0.088*** (0.02)
Engineering	0.071*** (0.02)	0.041* (0.02)	0.040* (0.02)
Agri. Sciences	0.120*** (0.02)	0.088*** (0.02)	0.087*** (0.02)
Others	0.033 (0.03)	0.015 (0.03)	0.016 (0.03)
No. of sem.	0.000 (0.00)	0.001 (0.00)	0.001 (0.00)
Grade	0.042*** (0.01)	0.040*** (0.01)	0.039*** (0.01)
Cohort=2013	-0.059*** (0.01)	-0.048*** (0.01)	-0.048*** (0.01)
Cohort=2015	-0.071*** (0.01)	-0.062*** (0.01)	-0.062*** (0.01)
Cohort=2017	-0.070*** (0.01)	-0.059*** (0.01)	-0.059*** (0.01)
Pre-study job	0.011 (0.01)	0.013* (0.01)	0.013* (0.01)
Student internship	0.038*** (0.01)	0.051*** (0.01)	0.051*** (0.01)
Student job	0.003 (0.01)	0.001 (0.01)	-0.000 (0.01)
Work-based high. edu.	0.073*** (0.01)	0.064*** (0.01)	0.065*** (0.01)
Exchange	-0.008 (0.01)	-0.008 (0.01)	-0.009 (0.01)
Public empl.	-0.003 (0.01)	-0.004 (0.01)	-0.004 (0.01)
Medium	0.051*** (0.01)	0.051*** (0.01)	0.051*** (0.01)
Large	0.059*** (0.01)	0.058*** (0.01)	0.057*** (0.01)
Manufacturing	0.241 (0.18)	0.262 (0.17)	0.263 (0.17)
Electricity ...	0.314* (0.18)	0.334* (0.17)	0.336* (0.17)
Water Supply ...	0.274 (0.18)	0.300* (0.18)	0.303* (0.18)
Construction	0.259 (0.18)	0.274 (0.17)	0.274 (0.17)
Wholesale ...	0.242 (0.18)	0.268 (0.17)	0.269 (0.17)
Transportation ...	0.198 (0.18)	0.233 (0.17)	0.235 (0.17)
Accommodation ...	0.134 (0.18)	0.172 (0.18)	0.174 (0.18)
Information ...	0.243 (0.18)	0.267 (0.17)	0.268 (0.17)
Financial ...	0.312* (0.18)	0.336* (0.17)	0.337* (0.17)
Real Estate	0.187 (0.18)	0.211 (0.18)	0.212 (0.18)
Scientific ...	0.231 (0.18)	0.257 (0.17)	0.258 (0.17)
Administrative ...	0.164 (0.18)	0.195 (0.17)	0.197 (0.17)
Public ...	0.215 (0.18)	0.245 (0.17)	0.247 (0.17)
Education	0.252 (0.18)	0.281 (0.17)	0.282 (0.17)
Health ...	0.208 (0.18)	0.241 (0.17)	0.243 (0.17)
Arts ...	0.154 (0.18)	0.188 (0.18)	0.189 (0.17)
Other service ...	0.114 (0.18)	0.145 (0.17)	0.147 (0.17)
Extraterritorial ...	-0.087 (0.21)	-0.053 (0.21)	-0.048 (0.21)
Lausanne	-0.065*** (0.02)	-0.064*** (0.02)	-0.064*** (0.02)
Sion	-0.067** (0.03)	-0.074*** (0.03)	-0.074*** (0.03)
Fribourg	-0.050** (0.02)	-0.050** (0.02)	-0.053** (0.02)
Neuchatel	-0.044* (0.03)	-0.049* (0.03)	-0.049* (0.03)
Biel	-0.038 (0.02)	-0.044* (0.02)	-0.045* (0.02)
Bern	-0.040* (0.02)	-0.045* (0.02)	-0.046* (0.02)
Basel	-0.066** (0.03)	-0.064** (0.03)	-0.064** (0.03)
Aarau-Olten	-0.046* (0.03)	-0.044 (0.03)	-0.044 (0.03)
Zurich	-0.028 (0.02)	-0.029 (0.02)	-0.029 (0.02)
Winterthur-SH	-0.019 (0.03)	-0.025 (0.03)	-0.025 (0.03)
St. Gallen	-0.024 (0.03)	-0.026 (0.03)	-0.026 (0.03)
Chur	-0.028 (0.03)	-0.027 (0.03)	-0.027 (0.03)
Luzern	-0.042 (0.03)	-0.042 (0.03)	-0.041 (0.03)
Bellinzona	-0.060 (0.04)	-0.062 (0.04)	-0.066* (0.04)
Lugano	-0.143*** (0.04)	-0.140*** (0.04)	-0.144*** (0.04)
Abroad	-0.233*** (0.05)	-0.233*** (0.05)	-0.234*** (0.05)

MARIA ESTHER OSWALD-EGG/URSULA RENOLD

Ori: BE								-0.041***	(0.01)	0.004	(0.01)	
Ori: LU								0.013	(0.01)	0.023	(0.02)	
Ori: UR								0.007	(0.03)	0.008	(0.04)	
Ori: SZ								0.007	(0.02)	-0.009	(0.02)	
Ori: OW								-0.077	(0.05)	-0.017	(0.05)	
Ori: NW								-0.091*	(0.05)	-0.014	(0.04)	
Ori: GL								-0.014	(0.04)	0.013	(0.05)	
Ori: ZG								0.029	(0.02)	0.001	(0.03)	
Ori: FR								-0.033***	(0.01)	0.046**	(0.02)	
Ori: SO								-0.007	(0.01)	0.025	(0.02)	
Ori: BS								-0.065**	(0.03)	-0.004	(0.03)	
Ori: BL								-0.004	(0.02)	0.037*	(0.02)	
Ori: SH								-0.031*	(0.02)	-0.021	(0.03)	
Ori: AR								-0.040	(0.03)	-0.016	(0.03)	
Ori: AI								0.104	(0.06)	0.024	(0.07)	
Ori: SG								0.001	(0.01)	0.007	(0.01)	
Ori: GR								-0.047**	(0.02)	0.004	(0.02)	
Ori: AG								-0.016	(0.01)	0.002	(0.01)	
Ori: TG								-0.008	(0.01)	0.010	(0.02)	
Ori: TI								-0.136***	(0.02)	-0.046	(0.03)	
Ori: VD								-0.086***	(0.01)	0.013	(0.02)	
Ori: VS								-0.054***	(0.01)	-0.000	(0.02)	
Ori: NE								-0.096***	(0.02)	0.009	(0.03)	
Ori: GE								-0.041***	(0.02)	0.016	(0.03)	
Ori: JU								-0.108***	(0.02)	-0.009	(0.03)	
Constant	11.199***	(0.00)	10.316***	(0.19)	11.113***	(0.01)	10.369***	(0.19)	11.185***	(0.01)	10.373***	(0.19)
Observations	13566		13566		13566		13566		13566		13566	
Pseudo R <sup>2</sup>	0.055		0.639									

Note: The table shows the regression coefficients from the Tobit regression and IV regression for wage. The estimations from the first stage include the same controls as the estimations from the second stage. Standard errors are robust.

**Table A.6:** Regression table for search time of first post-graduation employment

	Cox1		Cox2		IV1		IV2		IV3		IV4	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
A. First stage												
Reg. enrol. rate VET					0.000	(.)	0.486*	(0.26)	0.004***	(0.00)	0.323	(0.71)
B. Second stage												
VET	0.079***	(0.02)	0.040*	(0.02)	-2.627***	(0.01)	-1.954***	(0.04)	-2.628***	(0.01)	-1.942***	(0.04)
Age			0.012**	(0.01)			0.044***	(0.01)			0.044***	(0.01)
Female			0.009	(0.02)			-0.202***	(0.03)			-0.202***	(0.03)
Dad: Upp.-sec.			-0.007	(0.04)			0.078	(0.05)			0.078	(0.05)
Dad: Post-sec.			0.001	(0.04)			0.026	(0.05)			0.025	(0.05)
Mom: Upp.-sec.			0.038	(0.03)			-0.041	(0.04)			-0.044	(0.04)
Mom: Post-sec.			0.065*	(0.03)			-0.177***	(0.05)			-0.181***	(0.05)
Marital status			-0.039	(0.03)			0.053	(0.05)			0.053	(0.05)
Child			-0.050	(0.05)			0.035	(0.08)			0.027	(0.08)
Res: BE			0.009	(0.04)			-0.019	(0.06)			0.076	(0.07)
Res: LU			-0.052	(0.05)			-0.018	(0.06)			0.072	(0.08)
Res: UR			-0.072	(0.15)			0.047	(0.19)			-0.043	(0.29)
Res: SZ			-0.139**	(0.06)			0.066	(0.09)			0.166	(0.12)
Res: OW			-0.056	(0.13)			0.008	(0.17)			0.185	(0.25)
Res: NW			-0.222	(0.16)			0.056	(0.22)			0.242	(0.29)
Res: GL			-0.013	(0.12)			-0.150	(0.23)			-0.172	(0.30)
Res: ZG			-0.142**	(0.07)			0.164*	(0.10)			0.280**	(0.12)
Res: FR			-0.015	(0.06)			0.035	(0.09)			0.161	(0.10)
Res: SO			-0.007	(0.05)			0.023	(0.08)			0.045	(0.09)
Res: BS			-0.086	(0.06)			-0.049	(0.09)			0.131	(0.10)
Res: BL			-0.015	(0.07)			-0.143	(0.09)			0.156	(0.11)
Res: SH			-0.118	(0.09)			0.183	(0.14)			0.312*	(0.18)
Res: AR			-0.151	(0.11)			0.317*	(0.17)			0.464***	(0.18)
Res: AI			-0.243	(0.22)			0.328	(0.30)			0.748**	(0.38)
Res: SG			0.000	(0.05)			0.063	(0.07)			0.082	(0.08)
Res: GR			0.027	(0.07)			-0.095	(0.10)			0.039	(0.12)
Res: AG			-0.002	(0.04)			0.087*	(0.05)			0.107*	(0.06)
Res: TG			-0.098*	(0.05)			0.248***	(0.08)			0.342***	(0.10)
Res: TI			-0.100	(0.08)			0.029	(0.10)			0.069	(0.15)
Res: VD			-0.111*	(0.06)			0.061	(0.09)			0.186*	(0.10)
Res: VS			-0.034	(0.07)			-0.045	(0.09)			0.134	(0.12)
Res: NE			-0.123	(0.08)			0.003	(0.12)			0.273*	(0.14)
Res: GE			-0.198**	(0.08)			-0.018	(0.11)			0.274**	(0.14)
Res: JU			-0.183**	(0.09)			0.238*	(0.14)			0.415**	(0.19)
UAS			-0.156	(0.18)			1.134***	(0.26)			1.076***	(0.26)

# NO EXPERIENCE, NO EMPLOYMENT

Master	0.027 (0.03)	-0.245*** (0.04)	-0.237*** (0.04)
UNI 2	-0.005 (0.06)	0.012 (0.08)	-0.000 (0.08)
UNI 3	0.076 (0.07)	-0.035 (0.09)	-0.034 (0.09)
UNI 4	0.118 (0.08)	0.022 (0.10)	0.043 (0.10)
UNI 5	-0.003 (0.07)	0.058 (0.09)	0.075 (0.09)
UNI 6	0.104 (0.13)	-0.087 (0.16)	-0.112 (0.16)
UNI 7	0.054 (0.08)	0.091 (0.11)	0.116 (0.11)
UNI 8	-0.045 (0.07)	-0.008 (0.09)	-0.019 (0.09)
UNI 9	0.111* (0.06)	-0.152** (0.08)	-0.192** (0.08)
UNI 10	-0.066 (0.10)	0.099 (0.14)	0.100 (0.14)
UNI 11	0.103 (0.08)	-0.315*** (0.10)	-0.287*** (0.10)
UNI 12	0.146** (0.06)	-0.484*** (0.08)	-0.490*** (0.08)
UAS 1	0.249 (0.17)	-0.548** (0.26)	-0.501** (0.25)
UAS 2	0.253 (0.17)	-0.794*** (0.26)	-0.715*** (0.25)
UAS 3	0.271 (0.17)	-0.537** (0.26)	-0.498** (0.25)
UAS 4	0.391** (0.17)	-0.595** (0.26)	-0.551** (0.25)
UAS 5	0.409** (0.18)	-0.742*** (0.27)	-0.693** (0.27)
UAS 6	0.343** (0.17)	-0.615** (0.26)	-0.588** (0.25)
UAS 7	0.298* (0.17)	-0.518** (0.25)	-0.505** (0.25)
UAS 8	0.000 (.)		
Arts	-0.119* (0.07)	-0.147 (0.09)	-0.141 (0.09)
Edu. Sciences	0.046 (0.05)	0.060 (0.07)	0.056 (0.07)
Economics	0.099** (0.05)	0.069 (0.07)	0.067 (0.07)
Nat. Sciences	0.018 (0.05)	0.216*** (0.07)	0.214*** (0.07)
Medi. Sciences	0.213*** (0.08)	0.037 (0.10)	0.019 (0.10)
Health	0.184*** (0.06)	-0.078 (0.08)	-0.078 (0.08)
Engineering	0.234*** (0.06)	0.217*** (0.08)	0.215*** (0.08)
Agri. Sciences	0.127** (0.05)	0.408*** (0.07)	0.400*** (0.07)
Others	-0.165* (0.08)	0.506*** (0.11)	0.484*** (0.11)
No. of semester	-0.026*** (0.00)	0.010 (0.01)	0.009 (0.01)
Grade	0.071*** (0.02)	-0.036 (0.03)	-0.035 (0.03)
Cohort=2013	-0.084** (0.03)	-0.040 (0.04)	-0.036 (0.04)
Cohort=2015	-0.117*** (0.03)	0.040 (0.04)	0.042 (0.04)
Cohort=2017	-0.098*** (0.03)	-0.017 (0.04)	-0.012 (0.04)
Pre-study job	0.053** (0.02)	-0.085** (0.03)	-0.083** (0.03)
Student internship	0.031 (0.02)	-0.252*** (0.03)	-0.247*** (0.03)
Student job	-0.046* (0.02)	0.090*** (0.03)	0.086** (0.03)
Work-based high. edu.	-0.177*** (0.03)	0.391*** (0.04)	0.379*** (0.04)
Exchange	0.049** (0.02)	-0.046 (0.03)	-0.044 (0.03)
Public empl.	-0.030 (0.02)	0.051* (0.03)	0.048 (0.03)
Medium	0.053** (0.02)	-0.051 (0.03)	-0.054* (0.03)
Large	0.060*** (0.02)	-0.042 (0.03)	-0.037 (0.03)
Manufacturing	-0.729** (0.28)	0.429 (0.42)	0.449 (0.42)
Electricity ...	-0.693** (0.29)	0.409 (0.44)	0.435 (0.43)
Water Supply ...	-0.970*** (0.35)	0.627 (0.54)	0.678 (0.54)
Construction	-0.922*** (0.29)	0.760* (0.43)	0.773* (0.43)
Wholesale ...	-0.752*** (0.28)	0.368 (0.42)	0.389 (0.42)
Transportation ...	-0.859*** (0.29)	0.369 (0.43)	0.396 (0.43)
Accommodation ...	-1.071*** (0.29)	0.638 (0.43)	0.642 (0.43)
Information ...	-0.748*** (0.28)	0.391 (0.42)	0.412 (0.42)
Financial ...	-0.734*** (0.28)	0.393 (0.42)	0.417 (0.42)
Real Estate	-0.652** (0.30)	0.330 (0.45)	0.359 (0.45)
Scientific ...	-0.692** (0.28)	0.298 (0.42)	0.318 (0.42)
Administrative ...	-0.766*** (0.29)	0.288 (0.43)	0.312 (0.43)
Public ...	-0.811*** (0.29)	0.374 (0.42)	0.395 (0.42)
Education	-0.845*** (0.28)	0.436 (0.42)	0.458 (0.42)
Health ...	-0.802*** (0.28)	0.309 (0.42)	0.329 (0.42)
Arts ...	-0.964*** (0.29)	0.521 (0.43)	0.526 (0.43)
Other service ...	-0.860*** (0.29)	0.442 (0.43)	0.453 (0.43)
Extraterritorial ...	-0.818*** (0.31)	0.451 (0.45)	0.415 (0.45)
Lausanne	-0.065 (0.06)	0.058 (0.08)	0.055 (0.08)
Sion	-0.119 (0.09)	0.170 (0.12)	0.164 (0.12)
Fribourg	-0.133* (0.08)	0.124 (0.10)	0.124 (0.10)
Neuchatel	-0.147* (0.08)	0.246** (0.12)	0.258** (0.12)
Biel	-0.145* (0.08)	0.247** (0.11)	0.248** (0.11)
Bern	-0.089 (0.07)	0.161* (0.10)	0.163* (0.10)
Basel	-0.095 (0.08)	0.056 (0.11)	0.057 (0.11)
Aarau-Olten	-0.125 (0.08)	0.125 (0.11)	0.133 (0.11)
Zurich	-0.093 (0.07)	0.087 (0.10)	0.092 (0.10)
Winterthur-SH	-0.146* (0.08)	0.244** (0.11)	0.251** (0.11)
St. Gallen	-0.147* (0.08)	0.187 (0.12)	0.191* (0.12)
Chur	-0.199* (0.10)	0.163 (0.14)	0.157 (0.14)
Luzern	-0.087 (0.08)	0.105 (0.11)	0.116 (0.11)
Bellinzona	-0.216* (0.12)	0.253 (0.16)	0.260 (0.16)
Lugano	-0.299*** (0.11)	0.237 (0.15)	0.243* (0.15)
Abroad	-0.345*** (0.10)	0.377** (0.16)	0.383** (0.16)
Ori: BE		-0.140** (0.06)	-0.179*** (0.06)
Ori: LU		-0.261*** (0.05)	-0.179** (0.07)
Ori: UR		-0.402*** (0.05)	0.012 (0.24)
Ori: SZ		-0.355** (0.14)	-0.199* (0.11)
Ori: OW		-0.464*** (0.05)	-0.278 (0.21)
Ori: NW		-0.343*** (0.05)	-0.281 (0.21)

# MARIA ESTHER OSWALD-EGG/URSULA RENOLD

Ori: GL					-0.103**	(0.05)	-0.032	(0.25)
Ori: ZG					-0.250***	(0.05)	-0.222*	(0.13)
Ori: FR					-0.413***	(0.05)	-0.232***	(0.09)
Ori: SO					0.024	(0.11)	-0.071	(0.08)
Ori: BS					-0.711***	(0.05)	-0.265**	(0.11)
Ori: BL					-0.611***	(0.05)	-0.437***	(0.09)
Ori: SH					0.208**	(0.08)	-0.220	(0.15)
Ori: AR					-0.205***	(0.05)	-0.252*	(0.13)
Ori: AI					-0.740***	(0.05)	-0.646*	(0.35)
Ori: SG					0.045	(0.09)	-0.069	(0.07)
Ori: GR					-0.329***	(0.12)	-0.224**	(0.10)
Ori: AG					0.022	(0.08)	-0.087	(0.06)
Ori: TG					0.122*	(0.07)	-0.174**	(0.08)
Ori: TI					-0.516***	(0.05)	-0.140	(0.12)
Ori: VD					-0.636***	(0.05)	-0.221***	(0.08)
Ori: VS					-0.565***	(0.05)	-0.289***	(0.09)
Ori: NE					-0.604***	(0.05)	-0.413***	(0.12)
Ori: GE					-1.029***	(0.05)	-0.428***	(0.11)
Ori: JU					-0.249***	(0.05)	-0.299**	(0.15)
Constant			1.528***	(0.01)	0.333	(0.53)	1.865***	(0.05)
Observations	12070	12070	13566	13566	13566	13566		
Pseudo R <sup>2</sup>	0.000	0.002						

Note: The table shows the regression coefficients from the Cox regression and IV regression for search time. The estimations from the first stage include the same controls as the estimations from the second stage. Standard errors are robust.

**Table A.7:** Regression table for internship position one year post-graduation

	Probit1		Probit2		IV1		IV2		IV3		IV4	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
A. First stage												
Reg. enrol. rate VET					2.984***	(0.11)	1.369***	(0.34)	3.217***	(0.65)	0.778	(1.04)
B. Second stage												
VET	-0.559***	(0.03)	-0.238***	(0.04)	-0.632***	(0.11)	-0.046	(0.15)	-1.703***	(0.13)	-0.114	(0.15)
Age			-0.053***	(0.01)			-0.058***	(0.01)			-0.056***	(0.01)
Female			0.183***	(0.03)			0.200***	(0.03)			0.196***	(0.04)
Dad: Upp.-sec.			0.058	(0.07)			0.052	(0.07)			0.050	(0.07)
Dad: Post-sec.			0.035	(0.07)			0.034	(0.07)			0.032	(0.07)
Mom: Upp.-sec.			-0.054	(0.06)			-0.055	(0.06)			-0.055	(0.06)
Mom: Post-sec.			-0.002	(0.06)			0.005	(0.06)			0.002	(0.06)
Marital status			-0.224***	(0.08)			-0.223***	(0.08)			-0.227***	(0.08)
Child			-0.255*	(0.14)			-0.253*	(0.14)			-0.257*	(0.14)
Res: BE			0.067	(0.08)			0.069	(0.08)			0.099	(0.09)
Res: LU			0.104	(0.08)			0.112	(0.08)			0.089	(0.11)
Res: UR			0.041	(0.25)			0.044	(0.25)			0.081	(0.41)
Res: SZ			-0.015	(0.13)			-0.006	(0.13)			-0.031	(0.15)
Res: OW			-0.010	(0.25)			-0.000	(0.25)			-0.109	(0.32)
Res: NW			0.220	(0.23)			0.235	(0.23)			0.231	(0.32)
Res: GL			-0.238	(0.36)			-0.218	(0.36)			-0.402	(0.43)
Res: ZG			-0.013	(0.14)			-0.015	(0.14)			0.090	(0.18)
Res: FR			-0.004	(0.11)			-0.005	(0.11)			0.143	(0.14)
Res: SO			0.035	(0.11)			0.035	(0.11)			0.107	(0.13)
Res: BS			-0.151	(0.12)			-0.137	(0.12)			-0.093	(0.13)
Res: BL			-0.189	(0.12)			-0.174	(0.12)			-0.142	(0.15)
Res: SH			-0.032	(0.18)			-0.039	(0.18)			0.404	(0.27)
Res: AR			0.099	(0.23)			0.088	(0.23)			-0.021	(0.27)
Res: AI			-0.001	(0.40)			-0.006	(0.40)			0.022	(0.56)
Res: SG			0.083	(0.09)			0.076	(0.09)			0.066	(0.11)
Res: GR			0.264**	(0.13)			0.270**	(0.13)			0.349**	(0.16)
Res: AG			0.046	(0.07)			0.039	(0.07)			0.108	(0.09)
Res: TG			0.023	(0.11)			0.015	(0.11)			0.075	(0.14)
Res: TI			0.416***	(0.11)			0.423***	(0.11)			0.408**	(0.20)
Res: VD			0.004	(0.11)			0.007	(0.11)			0.103	(0.13)
Res: VS			-0.127	(0.12)			-0.117	(0.13)			-0.099	(0.17)
Res: NE			0.019	(0.14)			0.026	(0.14)			0.066	(0.18)
Res: GE			0.230*	(0.14)			0.248*	(0.14)			0.470***	(0.18)
Res: JU			-0.184	(0.22)			-0.185	(0.22)			-0.126	(0.28)
UAS			-1.127**	(0.45)			-1.234***	(0.46)			-1.207***	(0.46)
Master			-0.234***	(0.06)			-0.213***	(0.06)			-0.214***	(0.06)
UNI 2			-0.161	(0.11)			-0.163	(0.11)			-0.164	(0.11)
UNI 3			-0.443***	(0.12)			-0.447***	(0.12)			-0.439***	(0.12)
UNI 4			-0.163	(0.13)			-0.180	(0.13)			-0.148	(0.14)
UNI 5			-0.042	(0.12)			-0.048	(0.12)			-0.032	(0.12)
UNI 6			-0.032	(0.20)			-0.037	(0.20)			-0.039	(0.20)

# NO EXPERIENCE, NO EMPLOYMENT

UNI 7	-0.231 (0.14)	-0.244* (0.14)	-0.232 (0.14)
UNI 8	-0.799*** (0.13)	-0.795*** (0.13)	-0.809*** (0.13)
UNI 9	-0.203** (0.10)	-0.201* (0.10)	-0.219** (0.10)
UNI 10	-0.477*** (0.18)	-0.474*** (0.18)	-0.476*** (0.18)
UNI 11	-0.230* (0.13)	-0.214* (0.13)	-0.192 (0.13)
UNI 12	-0.529*** (0.11)	-0.502*** (0.11)	-0.521*** (0.11)
UAS 1	0.231 (0.45)	0.260 (0.45)	0.261 (0.45)
UAS 2	0.333 (0.45)	0.388 (0.45)	0.399 (0.45)
UAS 3	0.321 (0.45)	0.347 (0.45)	0.354 (0.45)
UAS 4	0.275 (0.45)	0.293 (0.45)	0.289 (0.45)
UAS 5	0.233 (0.47)	0.274 (0.47)	0.272 (0.47)
UAS 6	0.404 (0.45)	0.430 (0.45)	0.419 (0.45)
UAS 7	0.363 (0.44)	0.385 (0.45)	0.374 (0.45)
UAS 8	0.000 (.)		
Arts	0.192* (0.10)	0.217** (0.11)	0.210** (0.11)
Edu. Sciences	-0.220*** (0.08)	-0.233*** (0.08)	-0.233*** (0.08)
Economics	-0.113 (0.08)	-0.131 (0.08)	-0.127 (0.08)
Nat. Sciences	-0.066 (0.09)	-0.089 (0.09)	-0.081 (0.09)
Medi. Sciences	-1.392*** (0.17)	-1.417*** (0.18)	-1.415*** (0.18)
Health	-1.246*** (0.13)	-1.249*** (0.13)	-1.247*** (0.13)
Engineering	-0.733*** (0.10)	-0.777*** (0.11)	-0.762*** (0.11)
Agri. Sciences	-0.378*** (0.09)	-0.428*** (0.10)	-0.413*** (0.10)
Others	-0.116 (0.13)	-0.142 (0.13)	-0.147 (0.13)
No. of semester	-0.032*** (0.01)	-0.030*** (0.01)	-0.032*** (0.01)
Grade	-0.152*** (0.04)	-0.155*** (0.04)	-0.155*** (0.04)
Cohort=2013	0.154*** (0.05)	0.170*** (0.05)	0.164*** (0.05)
Cohort=2015	0.198*** (0.05)	0.210*** (0.05)	0.209*** (0.05)
Cohort=2017	0.239*** (0.05)	0.255*** (0.05)	0.252*** (0.05)
Pre-study job	-0.010 (0.05)	-0.008 (0.05)	-0.005 (0.05)
Student internship	-0.208*** (0.03)	-0.189*** (0.04)	-0.196*** (0.04)
Student job	0.010 (0.05)	0.006 (0.05)	0.008 (0.05)
Work-based high. edu.	-0.647*** (0.07)	-0.659*** (0.07)	-0.661*** (0.07)
Exchange	0.164*** (0.04)	0.164*** (0.04)	0.166*** (0.04)
Public empl.	-0.001 (0.04)	-0.002 (0.04)	-0.003 (0.04)
Medium	-0.052 (0.04)	-0.052 (0.04)	-0.053 (0.04)
Large	0.061 (0.04)	0.059 (0.04)	0.060 (0.04)
Manufacturing	0.040 (0.51)	0.079 (0.53)	0.064 (0.52)
Electricity ...	0.177 (0.53)	0.213 (0.55)	0.191 (0.54)
Water Supply ...	0.330 (0.60)	0.374 (0.61)	0.355 (0.61)
Construction	0.092 (0.53)	0.122 (0.55)	0.112 (0.54)
Wholesale ...	0.125 (0.51)	0.171 (0.53)	0.151 (0.53)
Transportation ...	0.329 (0.52)	0.387 (0.54)	0.368 (0.53)
Accommodation ...	0.048 (0.53)	0.113 (0.54)	0.083 (0.54)
Information ...	0.143 (0.51)	0.186 (0.53)	0.173 (0.52)
Financial ...	0.012 (0.51)	0.056 (0.53)	0.043 (0.53)
Real Estate	0.096 (0.54)	0.139 (0.56)	0.121 (0.55)
Scientific ...	0.134 (0.51)	0.180 (0.53)	0.164 (0.52)
Administrative ...	0.162 (0.52)	0.215 (0.54)	0.197 (0.53)
Public ...	0.567 (0.52)	0.619 (0.53)	0.602 (0.53)
Education	-0.263 (0.52)	-0.211 (0.53)	-0.230 (0.53)
Health ...	-0.045 (0.52)	0.011 (0.53)	-0.015 (0.53)
Arts ...	0.207 (0.52)	0.263 (0.54)	0.238 (0.53)
Other service ...	0.527 (0.52)	0.580 (0.53)	0.551 (0.53)
Extraterritorial ...	0.516 (0.58)	0.570 (0.59)	0.499 (0.59)
Lausanne	0.252** (0.10)	0.254** (0.10)	0.249** (0.10)
Sion	0.200 (0.16)	0.193 (0.16)	0.191 (0.16)
Fribourg	0.348** (0.14)	0.349** (0.14)	0.354*** (0.14)
Neuchatel	0.216 (0.15)	0.208 (0.15)	0.204 (0.15)
Biel	0.155 (0.15)	0.149 (0.15)	0.149 (0.15)
Bern	0.444*** (0.12)	0.437*** (0.12)	0.435*** (0.12)
Basel	0.459*** (0.14)	0.461*** (0.14)	0.455*** (0.14)
Aarau-Olten	0.195 (0.14)	0.199 (0.14)	0.197 (0.14)
Zurich	0.288** (0.12)	0.289** (0.12)	0.287** (0.12)
Winterthur-SH	0.147 (0.15)	0.139 (0.15)	0.130 (0.15)
St. Gallen	0.077 (0.15)	0.076 (0.15)	0.072 (0.15)
Chur	0.070 (0.18)	0.073 (0.18)	0.065 (0.18)
Luzern	0.128 (0.14)	0.129 (0.14)	0.121 (0.14)
Bellinzona	0.142 (0.20)	0.139 (0.20)	0.141 (0.20)
Lugano	-0.048 (0.18)	-0.043 (0.18)	-0.045 (0.18)
Abroad	0.716*** (0.16)	0.717*** (0.16)	0.721*** (0.16)
Ori: BE		-0.040 (0.05)	-0.070 (0.08)
Ori: LU		-0.154*** (0.06)	-0.005 (0.10)
Ori: UR		-0.306* (0.18)	-0.077 (0.33)
Ori: SZ		-0.226** (0.09)	-0.014 (0.13)
Ori: OW		-0.113 (0.15)	0.081 (0.26)
Ori: NW		-0.150 (0.17)	-0.041 (0.28)
Ori: GL		-0.083 (0.21)	0.163 (0.30)
Ori: ZG		-0.219** (0.11)	-0.185 (0.18)
Ori: FR		-0.305*** (0.07)	-0.239* (0.13)
Ori: SO		-0.012 (0.07)	-0.128 (0.11)
Ori: BS		-0.333*** (0.13)	-0.092 (0.14)
Ori: BL		-0.260*** (0.08)	-0.081 (0.12)

Ori: SH									-0.096	(0.13)	-0.564**	(0.24)
Ori: AR									0.037	(0.13)	0.103	(0.19)
Ori: AI									-0.418	(0.30)	-0.082	(0.46)
Ori: SG									-0.028	(0.06)	-0.019	(0.09)
Ori: GR									-0.081	(0.07)	-0.129	(0.13)
Ori: AG									0.016	(0.05)	-0.119	(0.09)
Ori: TG									-0.075	(0.08)	-0.100	(0.11)
Ori: TI									-0.313***	(0.09)	-0.037	(0.17)
Ori: VD									-0.391***	(0.07)	-0.160	(0.12)
Ori: VS									-0.427***	(0.07)	-0.070	(0.13)
Ori: NE									-0.362***	(0.09)	-0.092	(0.15)
Ori: GE									-0.601***	(0.10)	-0.326**	(0.15)
Ori: JU									-0.320***	(0.10)	-0.119	(0.20)
Constant	-0.794***	(0.02)	1.798***	(0.66)	-0.765***	(0.05)	1.854***	(0.67)	0.032	(0.13)	1.880***	(0.66)
Observations	13566		13566		13566		13566		13566		13566	
Pseudo $R^2$	0.033		0.178									

Note: The table shows the regression coefficients from the Probit regression and IV regression for internship. The estimations from the first stage include the same controls as the estimations from the second stage. Standard errors are robust.

**Table A.8:** Regression table for wage five years post-graduation

	Tobit1		Tobit2		IV1		IV2		IV3		IV4	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
A. First stage												
Reg. enrol. rate VET					2.644***	(0.23)	1.097	(0.77)	-0.070	(1.84)	-3.379	(2.94)
B. Second stage												
VET	0.027***	(0.01)	0.019*	(0.01)	0.300***	(0.03)	0.082	(0.06)	0.271***	(0.05)	0.057	(0.09)
Age			0.014***	(0.00)			0.013***	(0.00)			0.013***	(0.00)
Female			-0.054***	(0.01)			-0.048***	(0.01)			-0.050***	(0.01)
Marital status			-0.002	(0.01)			-0.004	(0.01)			-0.005	(0.01)
Child			0.029**	(0.01)			0.029**	(0.01)			0.029**	(0.01)
Dad: Upp.-sec.			-0.017	(0.02)			-0.020	(0.02)			-0.018	(0.02)
Dad: Post-sec.			-0.014	(0.02)			-0.016	(0.02)			-0.014	(0.02)
Mom: Upp.-sec.			0.017	(0.01)			0.017	(0.01)			0.015	(0.01)
Mom: Post-sec.			0.023	(0.02)			0.025	(0.02)			0.023	(0.02)
Res: BE			-0.049**	(0.02)			-0.050**	(0.02)			-0.053**	(0.03)
Res: LU			-0.011	(0.02)			-0.006	(0.02)			-0.017	(0.03)
Res: UR			0.004	(0.07)			0.006	(0.06)			0.006	(0.09)
Res: SZ			0.020	(0.04)			0.022	(0.04)			0.029	(0.06)
Res: OW			0.068	(0.08)			0.063	(0.08)			0.023	(0.08)
Res: NW			-0.070	(0.06)			-0.066	(0.06)			0.035	(0.07)
Res: GL			-0.099**	(0.04)			-0.098**	(0.04)			-0.056	(0.06)
Res: ZG			0.018	(0.02)			0.023	(0.02)			0.041	(0.03)
Res: FR			-0.041	(0.03)			-0.041	(0.03)			-0.034	(0.04)
Res: SO			-0.054**	(0.02)			-0.061***	(0.02)			-0.063**	(0.03)
Res: BS			-0.104***	(0.03)			-0.095***	(0.03)			-0.096***	(0.03)
Res: BL			0.055	(0.05)			0.060	(0.05)			0.065	(0.06)
Res: SH			0.009	(0.05)			0.005	(0.05)			-0.022	(0.08)
Res: AR			0.053	(0.05)			0.051	(0.05)			0.070	(0.05)
Res: AI			0.028	(0.05)			0.025	(0.05)			-0.008	(0.07)
Res: SG			0.029	(0.02)			0.025	(0.02)			0.041	(0.03)
Res: GR			0.039	(0.07)			0.046	(0.07)			0.051	(0.07)
Res: AG			0.000	(0.02)			-0.001	(0.02)			0.007	(0.02)
Res: TG			0.021	(0.03)			0.011	(0.03)			0.003	(0.03)
Res: TI			-0.016	(0.04)			-0.014	(0.04)			-0.035	(0.05)
Res: VD			-0.050	(0.03)			-0.048	(0.03)			-0.047	(0.04)
Res: VS			-0.079***	(0.03)			-0.077***	(0.03)			-0.079**	(0.04)
Res: NE			-0.035	(0.03)			-0.032	(0.03)			0.003	(0.04)
Res: GE			-0.082*	(0.04)			-0.076*	(0.05)			-0.057	(0.05)
Res: JU			-0.103**	(0.05)			-0.110**	(0.05)			-0.144	(0.10)
UAS			0.216*	(0.12)			0.172	(0.13)			0.181	(0.14)
Master			0.097***	(0.02)			0.100***	(0.02)			0.098***	(0.02)
UNI 2			0.056*	(0.03)			0.055*	(0.03)			0.051*	(0.03)
UNI 3			0.030	(0.03)			0.025	(0.03)			0.023	(0.03)
UNI 4			0.025	(0.04)			0.021	(0.04)			0.027	(0.04)
UNI 5			0.039	(0.05)			0.038	(0.05)			0.035	(0.04)
UNI 6			-0.064	(0.07)			-0.070	(0.07)			-0.064	(0.07)
UNI 7			0.019	(0.04)			0.013	(0.04)			0.019	(0.04)
UNI 8			0.187***	(0.05)			0.192***	(0.05)			0.191***	(0.05)
UNI 9			-0.007	(0.03)			-0.008	(0.03)			-0.009	(0.03)
UNI 10			-0.025	(0.05)			-0.020	(0.05)			-0.031	(0.05)
UNI 11			0.004	(0.03)			0.013	(0.03)			0.008	(0.04)
UNI 12			0.050*	(0.03)			0.060**	(0.03)			0.052	(0.03)



# NO EXPERIENCE, NO EMPLOYMENT

UAS 1	-0.185	(0.12)	-0.171	(0.12)	-0.175	(0.13)
UAS 2	-0.210*	(0.12)	-0.189	(0.12)	-0.193	(0.13)
UAS 3	-0.198*	(0.12)	-0.188	(0.12)	-0.184	(0.13)
UAS 4	-0.206*	(0.12)	-0.195	(0.12)	-0.195	(0.13)
UAS 5	-0.192	(0.12)	-0.181	(0.13)	-0.187	(0.13)
UAS 6	-0.207*	(0.12)	-0.195	(0.12)	-0.193	(0.12)
UAS 7	-0.168	(0.12)	-0.156	(0.12)	-0.157	(0.12)
UAS 8	0.000	(.)				
Arts	-0.080**	(0.04)	-0.073*	(0.04)	-0.079*	(0.04)
Edu. Sciences	0.070***	(0.03)	0.066**	(0.03)	0.064**	(0.03)
Economics	0.143***	(0.02)	0.133***	(0.03)	0.134***	(0.03)
Nat. Sciences	0.052*	(0.03)	0.042	(0.03)	0.043	(0.03)
Medi. Sciences	0.186***	(0.04)	0.178***	(0.04)	0.176***	(0.04)
Health	0.001	(0.03)	0.000	(0.03)	-0.000	(0.03)
Engineering	0.072***	(0.03)	0.055*	(0.03)	0.061	(0.04)
Agri. Sciences	0.126***	(0.03)	0.106***	(0.03)	0.112***	(0.04)
Others	0.061	(0.06)	0.051	(0.06)	0.054	(0.06)
Grade	0.031**	(0.01)	0.031**	(0.01)	0.031**	(0.01)
Cohort=2017	-0.032***	(0.01)	-0.026***	(0.01)	-0.028**	(0.01)
Exchange	-0.009	(0.01)	-0.010	(0.01)	-0.009	(0.01)
Pre-study job	0.021*	(0.01)	0.022*	(0.01)	0.023**	(0.01)
Student internship	0.019**	(0.01)	0.025**	(0.01)	0.023*	(0.01)
Student job	0.013	(0.01)	0.012	(0.01)	0.012	(0.01)
Work-based high. edu.	0.063***	(0.01)	0.057***	(0.02)	0.061***	(0.02)
Cont. studies	-0.016	(0.01)	-0.017	(0.01)	-0.018	(0.02)
Add. studies	0.030**	(0.01)	0.028**	(0.01)	0.028**	(0.01)
Cont. education	0.031***	(0.01)	0.030***	(0.01)	0.031***	(0.01)
Medium	0.038***	(0.01)	0.037***	(0.01)	0.038***	(0.01)
Large	0.056***	(0.01)	0.056***	(0.01)	0.056***	(0.01)
Public empl.	-0.012	(0.01)	-0.010	(0.01)	-0.010	(0.01)
Electricity ...	0.016	(0.03)	0.013	(0.03)	0.006	(0.03)
Water Supply ...	-0.159*	(0.09)	-0.133	(0.09)	-0.142	(0.09)
Construction	0.098**	(0.04)	0.094**	(0.04)	0.100**	(0.04)
Wholesale ...	0.029	(0.02)	0.023	(0.02)	0.025	(0.02)
Transportation ...	-0.005	(0.03)	-0.002	(0.03)	-0.004	(0.03)
Accommodation ...	-0.028	(0.04)	-0.024	(0.04)	-0.025	(0.04)
Information ...	0.036**	(0.02)	0.036**	(0.02)	0.036**	(0.02)
Financial ...	0.131***	(0.02)	0.130***	(0.02)	0.130***	(0.02)
Real Estate	0.098	(0.07)	0.100	(0.07)	0.108	(0.07)
Scientific ...	0.016	(0.01)	0.016	(0.01)	0.017	(0.01)
Administrative ...	-0.065***	(0.02)	-0.060**	(0.02)	-0.056**	(0.03)
Public ...	0.058***	(0.02)	0.058***	(0.02)	0.059***	(0.02)
Education	-0.015	(0.03)	-0.012	(0.03)	-0.016	(0.03)
Health ...	-0.001	(0.02)	0.003	(0.02)	-0.001	(0.02)
Arts ...	-0.073***	(0.03)	-0.068***	(0.03)	-0.070***	(0.03)
Other service ...	0.011	(0.02)	0.009	(0.02)	0.012	(0.02)
Extraterritorial ...	-0.217	(0.16)	-0.215	(0.16)	-0.215	(0.16)
Lausanne	-0.051	(0.03)	-0.048	(0.03)	-0.053*	(0.03)
Sion	-0.031	(0.04)	-0.030	(0.04)	-0.033	(0.04)
Fribourg	-0.060	(0.04)	-0.063	(0.04)	-0.069*	(0.04)
Neuchatel	-0.103**	(0.04)	-0.110***	(0.04)	-0.109**	(0.04)
Biel	-0.069*	(0.04)	-0.067	(0.04)	-0.072*	(0.04)
Bern	-0.018	(0.04)	-0.015	(0.04)	-0.022	(0.04)
Basel	0.017	(0.05)	0.019	(0.05)	0.017	(0.05)
Aarau-Olten	-0.043	(0.04)	-0.038	(0.04)	-0.042	(0.05)
Zurich	0.004	(0.04)	0.007	(0.04)	0.003	(0.04)
Winterthur-SH	-0.040	(0.05)	-0.037	(0.05)	-0.043	(0.05)
St. Gallen	-0.065	(0.05)	-0.059	(0.05)	-0.069	(0.05)
Chur	-0.110	(0.07)	-0.118	(0.07)	-0.121*	(0.07)
Luzern	-0.037	(0.05)	-0.035	(0.05)	-0.037	(0.05)
Bellinzona	-0.167***	(0.06)	-0.166***	(0.06)	-0.167***	(0.06)
Lugano	-0.213***	(0.06)	-0.215***	(0.06)	-0.215***	(0.06)
Abroad	-0.242***	(0.07)	-0.238***	(0.07)	-0.241***	(0.07)
Ori: BE					-0.039*	(0.02)
Ori: LU					0.015	(0.03)
Ori: UR					-0.000	(0.04)
Ori: SZ					0.050	(0.04)
Ori: OW					0.060	(0.06)
Ori: NW					-0.089**	(0.04)
Ori: GL					-0.097**	(0.05)
Ori: ZG					-0.005	(0.04)
Ori: FR					-0.065**	(0.03)
Ori: SO					-0.043	(0.03)
Ori: BS					0.017	(0.06)
Ori: BL					0.019	(0.03)
Ori: SH					-0.021	(0.05)
Ori: AR					-0.070	(0.05)
Ori: AI					-0.081	(0.07)
Ori: SG					-0.052**	(0.02)
Ori: GR					-0.021	(0.04)
Ori: AG					-0.031	(0.02)
Ori: TG					-0.031	(0.03)

Ori: TI								-0.092***	(0.03)	0.021	(0.03)	
Ori: VD								-0.029	(0.02)	-0.000	(0.03)	
Ori: VS								-0.060**	(0.03)	0.002	(0.03)	
Ori: NE								-0.099***	(0.03)	-0.053	(0.04)	
Ori: GE								-0.032	(0.03)	-0.032	(0.04)	
Ori: JU								-0.180***	(0.04)	0.037	(0.07)	
Constant	11.432***	(0.01)	10.698***	(0.14)	11.323***	(0.01)	10.732***	(0.15)	11.368***	(0.02)	10.739***	(0.15)
Observations	2816		2816		2816		2816		2816		2816	
Pseudo R <sup>2</sup>	-0.266		-41.006									

Note: The table shows the regression coefficients from the Tobit regression and IV regression for wages five years after graduation from higher education. The estimations from the first stage include the same controls as the estimations from the second stage. Standard errors are robust.

**Table A.9:** Regression table for unemployment during the five years post-graduation

	Probit1		Probit2		IV1		IV2		IV3		IV4	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
A. First stage												
Reg. enrol. rate VET					2.665***	(0.22)	1.169	(0.80)	-2.835	(1.99)	-3.248	(2.93)
B. Second stage												
VET	-0.242***	(0.06)	0.015	(0.09)	-1.549***	(0.06)	0.022	(0.38)	-0.970*	(0.57)	-0.051	(0.41)
Age			0.086***	(0.03)			0.086***	(0.03)			0.095***	(0.03)
Female			0.091	(0.07)			0.091	(0.08)			0.085	(0.08)
Marital status			-0.056	(0.09)			-0.057	(0.09)			-0.072	(0.09)
Child			-0.074	(0.11)			-0.074	(0.11)			-0.058	(0.12)
Dad: Upp.-sec.			-0.095	(0.13)			-0.096	(0.13)			-0.084	(0.13)
Dad: Post-sec.			-0.237*	(0.13)			-0.237*	(0.13)			-0.237*	(0.13)
Mom: Upp.-sec.			-0.196*	(0.11)			-0.196*	(0.11)			-0.198*	(0.11)
Mom: Post-sec.			-0.117	(0.12)			-0.117	(0.12)			-0.139	(0.12)
Res: BE			0.360**	(0.18)			0.360**	(0.18)			0.397**	(0.20)
Res: LU			0.134	(0.21)			0.134	(0.21)			0.045	(0.26)
Res: UR			0.000	(.)			0.000	(.)			0.000	(.)
Res: SZ			-0.225	(0.30)			-0.225	(0.30)			0.265	(0.30)
Res: OW			0.000	(.)			0.000	(.)			0.000	(.)
Res: NW			0.000	(.)			0.000	(.)			0.000	(.)
Res: GL			0.000	(.)			0.000	(.)			0.000	(.)
Res: ZG			0.044	(0.22)			0.044	(0.22)			-0.036	(0.26)
Res: FR			0.306	(0.25)			0.306	(0.25)			0.465	(0.30)
Res: SO			0.100	(0.23)			0.099	(0.23)			0.114	(0.28)
Res: BS			0.456*	(0.26)			0.457*	(0.26)			0.454*	(0.27)
Res: BL			0.173	(0.29)			0.174	(0.29)			0.207	(0.32)
Res: SH			-0.002	(0.37)			-0.002	(0.37)			-0.365	(0.48)
Res: AR			0.000	(.)			0.000	(.)			0.000	(.)
Res: AI			0.000	(.)			0.000	(.)			0.000	(.)
Res: SG			0.146	(0.19)			0.146	(0.19)			-0.010	(0.22)
Res: GR			0.051	(0.34)			0.052	(0.35)			0.053	(0.41)
Res: AG			-0.059	(0.15)			-0.059	(0.15)			0.148	(0.18)
Res: TG			-0.423	(0.31)			-0.424	(0.31)			-0.448	(0.33)
Res: TI			0.365	(0.29)			0.365	(0.30)			0.363	(0.36)
Res: VD			0.223	(0.23)			0.224	(0.23)			0.065	(0.27)
Res: VS			-0.305	(0.30)			-0.305	(0.30)			-0.044	(0.34)
Res: NE			0.004	(0.27)			0.005	(0.27)			-0.352	(0.32)
Res: GE			0.114	(0.29)			0.114	(0.30)			-0.206	(0.36)
Res: JU			0.282	(0.34)			0.282	(0.34)			-0.051	(0.48)
UAS			-0.158	(0.25)			-4.179	(.)			-3.555***	(0.51)
Master			0.103	(0.12)			0.104	(0.12)			0.093	(0.12)
UNI 2			-0.166	(0.25)			-0.166	(0.25)			-0.173	(0.26)
UNI 3			-0.103	(0.27)			-0.104	(0.27)			-0.094	(0.28)
UNI 4			0.067	(0.28)			0.067	(0.28)			-0.019	(0.30)
UNI 5			0.180	(0.26)			0.180	(0.26)			0.092	(0.28)
UNI 6			0.404	(0.47)			0.404	(0.47)			0.513	(0.48)
UNI 7			0.364	(0.29)			0.363	(0.29)			0.213	(0.31)
UNI 8			-0.581*	(0.34)			-0.580*	(0.34)			-0.594	(0.36)
UNI 9			-0.263	(0.25)			-0.263	(0.25)			-0.256	(0.26)
UNI 10			0.067	(0.37)			0.067	(0.37)			0.011	(0.39)
UNI 11			0.274	(0.27)			0.276	(0.27)			0.190	(0.29)
UNI 12			-0.285	(0.25)			-0.283	(0.26)			-0.325	(0.27)
UAS 1			-0.121	(0.18)			3.898	(.)			3.317***	(0.37)
UAS 2			0.173	(0.16)			4.192	(.)			3.532***	(0.38)
UAS 3			-0.079	(0.16)			3.939	(.)			3.379***	(0.35)
UAS 4			0.004	(0.17)			4.022	(.)			3.424***	(0.35)
UAS 5			0.233	(0.29)			4.251	(.)			3.641***	(0.44)
UAS 6			-0.308*	(0.17)			3.710	(.)			3.077***	(0.36)
UAS 7			0.000	(.)			4.018	(.)			3.420***	(0.33)

# NO EXPERIENCE, NO EMPLOYMENT

UAS 8	0.000	(.)					
Arts	0.249	(0.24)	0.249	(0.24)	0.264	(0.25)	
Edu. Sciences	-0.319*	(0.17)	-0.319*	(0.17)	-0.256	(0.18)	
Economics	-0.306*	(0.17)	-0.308*	(0.18)	-0.275	(0.18)	
Nat. Sciences	-0.044	(0.19)	-0.045	(0.20)	0.003	(0.20)	
Medi. Sciences	-1.975***	(0.45)	-1.976***	(0.45)	-1.944***	(0.46)	
Health	-0.947***	(0.24)	-0.947***	(0.24)	-0.920***	(0.24)	
Engineering	-0.896***	(0.23)	-0.898***	(0.25)	-0.922***	(0.25)	
Agri. Sciences	-0.514***	(0.19)	-0.516**	(0.22)	-0.481**	(0.23)	
Others	-0.282	(0.31)	-0.283	(0.31)	-0.245	(0.31)	
Grade	-0.488***	(0.10)	-0.488***	(0.10)	-0.479***	(0.10)	
Cohort=2017	0.088	(0.07)	0.088	(0.08)	0.069	(0.08)	
Exchange	0.192**	(0.08)	0.192**	(0.08)	0.201**	(0.08)	
Pre-study job	-0.245***	(0.09)	-0.245***	(0.09)	-0.255***	(0.09)	
Student internship	-0.131*	(0.07)	-0.130	(0.08)	-0.129	(0.08)	
Student job	-0.124	(0.10)	-0.124	(0.10)	-0.133	(0.10)	
Work-based high. edu.	-0.336***	(0.13)	-0.337**	(0.14)	-0.326**	(0.14)	
Cont. studies	-0.075	(0.10)	-0.075	(0.10)	-0.065	(0.10)	
Add. studies	-0.177*	(0.10)	-0.177*	(0.10)	-0.161	(0.10)	
Cont. education	-0.172	(0.11)	-0.172	(0.11)	-0.173	(0.11)	
Medium	0.018	(0.09)	0.018	(0.09)	0.028	(0.09)	
Large	-0.174**	(0.08)	-0.174**	(0.08)	-0.177**	(0.08)	
Public empl.	-0.132	(0.10)	-0.132	(0.10)	-0.134	(0.10)	
Electricity ...	0.090	(0.29)	0.089	(0.29)	0.134	(0.30)	
Water Supply ...	0.000	(.)	0.000	(.)	0.000	(.)	
Construction	-0.110	(0.30)	-0.110	(0.30)	-0.054	(0.30)	
Wholesale ...	0.049	(0.14)	0.048	(0.14)	0.062	(0.15)	
Transportation ...	-0.066	(0.21)	-0.066	(0.21)	-0.113	(0.21)	
Accommodation ...	-0.051	(0.39)	-0.051	(0.39)	-0.024	(0.39)	
Information ...	-0.416***	(0.13)	-0.416***	(0.13)	-0.394***	(0.14)	
Financial ...	-0.183	(0.15)	-0.183	(0.15)	-0.174	(0.15)	
Real Estate	-0.455	(0.40)	-0.455	(0.40)	-0.542	(0.41)	
Scientific ...	-0.281**	(0.12)	-0.280**	(0.12)	-0.269**	(0.12)	
Administrative ...	0.067	(0.21)	0.067	(0.21)	0.020	(0.21)	
Public ...	-0.031	(0.18)	-0.031	(0.18)	-0.048	(0.18)	
Education	0.162	(0.19)	0.162	(0.19)	0.139	(0.19)	
Health ...	0.128	(0.16)	0.128	(0.16)	0.107	(0.16)	
Arts ...	0.047	(0.23)	0.048	(0.24)	0.047	(0.24)	
Other service ...	-0.447**	(0.21)	-0.447**	(0.21)	-0.471**	(0.21)	
Extraterritorial ...	-0.574	(0.70)	-0.573	(0.70)	-0.453	(0.74)	
Lausanne	-0.177	(0.19)	-0.176	(0.19)	-0.136	(0.19)	
Sion	-0.203	(0.34)	-0.203	(0.34)	-0.130	(0.35)	
Fribourg	-0.474*	(0.27)	-0.474*	(0.27)	-0.365	(0.28)	
Neuchatel	-0.064	(0.27)	-0.065	(0.28)	-0.051	(0.28)	
Biel	-0.367	(0.28)	-0.366	(0.28)	-0.309	(0.29)	
Bern	-0.557**	(0.25)	-0.557**	(0.25)	-0.462*	(0.25)	
Basel	-0.627**	(0.32)	-0.627**	(0.32)	-0.545*	(0.32)	
Aarau-Olten	-0.525*	(0.29)	-0.524*	(0.29)	-0.442	(0.30)	
Zurich	-0.258	(0.25)	-0.258	(0.25)	-0.176	(0.26)	
Winterthur-SH	-0.601*	(0.32)	-0.601*	(0.32)	-0.508	(0.33)	
St. Gallen	-0.600*	(0.33)	-0.599*	(0.33)	-0.558*	(0.33)	
Chur	-0.464	(0.41)	-0.465	(0.41)	-0.385	(0.42)	
Luzern	-0.567*	(0.32)	-0.567*	(0.32)	-0.449	(0.34)	
Bellinzona	-0.426	(0.42)	-0.426	(0.42)	-0.327	(0.42)	
Lugano	-0.211	(0.39)	-0.212	(0.39)	-0.158	(0.39)	
Abroad	-0.354	(0.50)	-0.354	(0.50)	-0.247	(0.51)	
Ori: BE				0.047	(0.13)	-0.047	(0.17)
Ori: LU				-0.082	(0.17)	0.138	(0.23)
Ori: UR				0.000	(.)	0.000	(.)
Ori: SZ				-0.716**	(0.30)	-0.854**	(0.33)
Ori: OW				0.000	(.)	0.000	(.)
Ori: NW				-0.137	(0.43)	0.307	(0.53)
Ori: GL				0.000	(.)	0.000	(.)
Ori: ZG				-0.037	(0.28)	0.209	(0.34)
Ori: FR				0.155	(0.16)	-0.237	(0.26)
Ori: SO				0.139	(0.16)	0.077	(0.24)
Ori: BS				-0.038	(0.39)	0.070	(0.32)
Ori: BL				-0.185	(0.19)	-0.048	(0.25)
Ori: SH				0.061	(0.27)	0.411	(0.38)
Ori: AR				-0.094	(0.40)	0.067	(0.45)
Ori: AI				0.000	(.)	0.000	(.)
Ori: SG				0.081	(0.14)	0.270	(0.17)
Ori: GR				-0.150	(0.21)	0.059	(0.30)
Ori: AG				-0.166	(0.15)	-0.304	(0.19)
Ori: TG				-0.135	(0.20)	0.031	(0.21)
Ori: TI				0.305	(0.25)	0.057	(0.26)
Ori: VD				0.393	(0.27)	0.300	(0.21)
Ori: VS				-0.103	(0.19)	-0.252	(0.25)
Ori: NE				0.507*	(0.29)	0.585**	(0.27)
Ori: GE				0.411	(0.32)	0.531*	(0.30)
Ori: JU				0.728***	(0.24)	0.451	(0.40)

# MARIA ESTHER OSWALD-EGG/URSULA RENOLD

Constant	-0.824*** (0.03)	0.543 (1.03)	-0.034 (0.05)	0.547 (1.05)	-0.550 (0.43)	0.122 (1.07)
Observations	2816	2759	2816	2807	2816	2804
Pseudo R <sup>2</sup>	0.007	0.155				

Note: The table shows the regression coefficients from the Tobit regression and IV regression for unemployment spell within five years after graduation from higher education. The estimations from the first stage include the same controls as the estimations from the second stage. Standard errors are robust.

**Table A.10:** Regression table for employment position five years post-graduation

	Oprobit1		Oprobit2		IV1		IV2		IV3		IV4	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
A. First stage												
Reg. enrol. rate VET					2.503*** (0.24)		1.263 (0.79)		-3.625* (1.89)		-3.154 (2.93)	
B. Second stage												
VET	0.141*** (0.04)		0.027 (0.07)		0.783*** (0.16)		0.312 (0.25)		-0.905*** (0.17)		0.181 (0.27)	
Age			0.041* (0.02)				0.035 (0.02)				0.035 (0.02)	
Female			-0.123** (0.06)				-0.094 (0.06)				-0.109* (0.06)	
Marital status			0.100 (0.07)				0.093 (0.07)				0.090 (0.07)	
Child			-0.035 (0.08)				-0.033 (0.08)				-0.028 (0.08)	
Dad: Upp.-sec.			-0.188* (0.10)				-0.197* (0.10)				-0.207** (0.10)	
Dad: Post-sec.			-0.126 (0.10)				-0.133 (0.10)				-0.133 (0.10)	
Mom: Upp.-sec.			0.220** (0.09)				0.214** (0.09)				0.213** (0.09)	
Mom: Post-sec.			0.221** (0.10)				0.225** (0.10)				0.221** (0.10)	
Res: BE			-0.085 (0.14)				-0.090 (0.14)				-0.085 (0.15)	
Res: LU			-0.061 (0.16)				-0.041 (0.16)				-0.002 (0.18)	
Res: UR			0.382 (0.43)				0.395 (0.43)				1.073* (0.61)	
Res: SZ			0.108 (0.18)				0.114 (0.18)				0.141 (0.21)	
Res: OW			0.004 (0.28)				-0.017 (0.29)				0.417 (0.35)	
Res: NW			0.013 (0.34)				0.031 (0.34)				0.464 (0.44)	
Res: GL			-0.639** (0.31)				-0.635** (0.30)				-0.326 (0.40)	
Res: ZG			0.057 (0.16)				0.078 (0.16)				0.308 (0.19)	
Res: FR			-0.155 (0.19)				-0.155 (0.19)				-0.021 (0.23)	
Res: SO			-0.214 (0.17)				-0.242 (0.17)				-0.407* (0.21)	
Res: BS			-0.098 (0.19)				-0.059 (0.20)				-0.083 (0.20)	
Res: BL			0.108 (0.18)				0.130 (0.18)				0.073 (0.21)	
Res: SH			-0.066 (0.21)				-0.087 (0.21)				0.078 (0.28)	
Res: AR			0.424 (0.34)				0.412 (0.33)				0.702* (0.39)	
Res: AI			0.014 (0.27)				0.004 (0.28)				-1.353 (0.87)	
Res: SG			0.061 (0.12)				0.041 (0.12)				0.179 (0.14)	
Res: GR			0.029 (0.25)				0.064 (0.26)				0.037 (0.28)	
Res: AG			-0.035 (0.11)				-0.039 (0.11)				0.011 (0.13)	
Res: TG			-0.236 (0.17)				-0.277 (0.17)				-0.251 (0.20)	
Res: TI			-0.328 (0.27)				-0.320 (0.26)				-0.324 (0.31)	
Res: VD			0.017 (0.18)				0.026 (0.18)				0.113 (0.21)	
Res: VS			0.087 (0.20)				0.094 (0.20)				0.208 (0.25)	
Res: NE			0.164 (0.22)				0.176 (0.23)				0.399 (0.29)	
Res: GE			-0.242 (0.23)				-0.215 (0.23)				0.058 (0.31)	
Res: JU			0.183 (0.27)				0.150 (0.27)				0.039 (0.38)	
UAS			0.242 (0.24)				0.040 (0.29)				0.085 (0.31)	
Master			0.237** (0.10)				0.251** (0.10)				0.251** (0.10)	
UNI 2			-0.182 (0.18)				-0.185 (0.18)				-0.180 (0.18)	
UNI 3			-0.478** (0.19)				-0.495** (0.19)				-0.464** (0.20)	
UNI 4			0.200 (0.20)				0.182 (0.20)				0.280 (0.21)	
UNI 5			-0.165 (0.19)				-0.170 (0.19)				-0.125 (0.20)	
UNI 6			-0.379 (0.48)				-0.404 (0.48)				-0.365 (0.48)	
UNI 7			-0.498** (0.23)				-0.518** (0.23)				-0.446* (0.24)	
UNI 8			0.269 (0.21)				0.287 (0.21)				0.298 (0.22)	
UNI 9			-0.254 (0.17)				-0.254 (0.17)				-0.240 (0.18)	
UNI 10			-0.188 (0.26)				-0.164 (0.26)				-0.134 (0.27)	
UNI 11			-0.078 (0.19)				-0.038 (0.19)				-0.007 (0.21)	
UNI 12			-0.200 (0.16)				-0.155 (0.16)				-0.173 (0.17)	
UAS 1			-0.348* (0.20)				-0.284 (0.20)				-0.283 (0.22)	
UAS 2			-0.339* (0.20)				-0.239 (0.21)				-0.193 (0.23)	
UAS 3			-0.273 (0.19)				-0.224 (0.19)				-0.208 (0.20)	
UAS 4			-0.418** (0.19)				-0.366** (0.19)				-0.317 (0.20)	
UAS 5			-0.286 (0.27)				-0.235 (0.27)				-0.204 (0.28)	
UAS 6			-0.491*** (0.19)				-0.434** (0.19)				-0.402** (0.20)	
UAS 7			-0.262 (0.18)				-0.201 (0.18)				-0.187 (0.19)	
UAS 8			0.000 (.)									
Arts			0.177 (0.23)				0.209 (0.23)				0.159 (0.24)	
Edu. Sciences			0.234 (0.16)				0.213 (0.16)				0.176 (0.17)	
Economics			0.641*** (0.16)				0.594*** (0.16)				0.571*** (0.17)	

# NO EXPERIENCE, NO EMPLOYMENT

Nat. Sciences	0.149	(0.18)		0.107	(0.18)	0.087	(0.18)
Medi. Sciences	0.423*	(0.25)		0.389	(0.25)	0.387	(0.25)
Health	0.307	(0.20)		0.305	(0.20)	0.287	(0.20)
Engineering	0.545***	(0.18)		0.465**	(0.19)	0.486**	(0.19)
Agri. Sciences	0.295*	(0.17)		0.207	(0.18)	0.218	(0.19)
Others	0.147	(0.23)		0.101	(0.23)	0.077	(0.23)
Grade	0.178**	(0.07)		0.176**	(0.07)	0.182**	(0.07)
Cohort=2017	-0.164***	(0.05)		-0.140**	(0.05)	-0.148***	(0.06)
Exchange	-0.115*	(0.06)		-0.118*	(0.06)	-0.118*	(0.06)
Pre-study job	0.166**	(0.07)		0.172**	(0.07)	0.179**	(0.07)
Student internship	0.014	(0.06)		0.042	(0.06)	0.041	(0.06)
Student job	0.164**	(0.07)		0.157**	(0.07)	0.156**	(0.07)
Work-based high. edu.	0.223**	(0.09)		0.194**	(0.09)	0.223**	(0.09)
Cont. studies	-0.179**	(0.08)		-0.183**	(0.08)	-0.180**	(0.08)
Add. studies	0.090	(0.08)		0.084	(0.08)	0.088	(0.08)
Cont. education	0.192***	(0.07)		0.189***	(0.07)	0.202***	(0.07)
Medium	-0.292***	(0.07)		-0.293***	(0.07)	-0.286***	(0.07)
Large	-0.471***	(0.06)		-0.470***	(0.06)	-0.466***	(0.06)
Public empl.	-0.107	(0.07)		-0.101	(0.07)	-0.101	(0.07)
Electricity ...	0.038	(0.22)		0.023	(0.22)	-0.061	(0.20)
Water Supply ...	-0.783	(0.52)		-0.667	(0.53)	-0.692	(0.53)
Construction	-0.006	(0.22)		-0.021	(0.22)	0.040	(0.23)
Wholesale ...	0.025	(0.11)		-0.002	(0.11)	0.016	(0.12)
Transportation ...	-0.008	(0.13)		0.006	(0.14)	0.010	(0.14)
Accommodation ...	-0.296	(0.35)		-0.282	(0.34)	-0.328	(0.34)
Information ...	-0.299***	(0.10)		-0.300***	(0.10)	-0.293***	(0.10)
Financial ...	-0.257**	(0.10)		-0.260**	(0.10)	-0.263**	(0.10)
Real Estate	0.166	(0.31)		0.173	(0.31)	0.200	(0.31)
Scientific ...	-0.218***	(0.08)		-0.216***	(0.08)	-0.214**	(0.08)
Administrative ...	-0.061	(0.20)		-0.039	(0.20)	-0.019	(0.21)
Public ...	-0.163	(0.15)		-0.161	(0.15)	-0.165	(0.15)
Education	-0.715***	(0.16)		-0.695***	(0.16)	-0.739***	(0.16)
Health ...	-0.358***	(0.13)		-0.337***	(0.13)	-0.362***	(0.13)
Arts ...	-0.002	(0.20)		0.017	(0.19)	0.006	(0.20)
Other service ...	0.004	(0.15)		-0.003	(0.15)	-0.002	(0.15)
Extraterritorial ...	-0.696**	(0.30)		-0.687**	(0.29)	-0.658**	(0.30)
Lausanne	0.047	(0.15)		0.056	(0.15)	0.024	(0.15)
Sion	0.064	(0.26)		0.065	(0.25)	0.060	(0.26)
Fribourg	0.239	(0.22)		0.225	(0.22)	0.202	(0.22)
Neuchatel	0.056	(0.23)		0.021	(0.24)	0.041	(0.24)
Biel	0.176	(0.22)		0.182	(0.22)	0.187	(0.22)
Bern	0.144	(0.20)		0.153	(0.19)	0.135	(0.20)
Basel	0.213	(0.24)		0.218	(0.24)	0.220	(0.24)
Aarau-Olten	0.339	(0.22)		0.357	(0.22)	0.333	(0.22)
Zurich	0.220	(0.20)		0.232	(0.20)	0.219	(0.20)
Winterthur-SH	0.378*	(0.23)		0.389*	(0.22)	0.372	(0.23)
St. Gallen	0.310	(0.23)		0.333	(0.23)	0.312	(0.23)
Chur	0.390	(0.32)		0.353	(0.32)	0.389	(0.32)
Luzern	0.380	(0.24)		0.384	(0.24)	0.359	(0.24)
Bellinzona	0.840**	(0.36)		0.841**	(0.35)	0.833**	(0.35)
Lugano	0.398	(0.35)		0.388	(0.35)	0.391	(0.36)
Abroad	0.377	(0.31)		0.393	(0.31)	0.391	(0.32)
Ori: BE						-0.214**	(0.09)
Ori: LU						-0.004	(0.11)
Ori: UR						-0.270	(0.30)
Ori: SZ						-0.149	(0.16)
Ori: OW						-0.443**	(0.21)
Ori: NW						-0.162	(0.21)
Ori: GL						-0.287	(0.21)
Ori: ZG						-0.484**	(0.19)
Ori: FR						-0.233*	(0.12)
Ori: SO						0.154	(0.12)
Ori: BS						-0.474**	(0.22)
Ori: BL						-0.053	(0.13)
Ori: SH						0.018	(0.15)
Ori: AR						0.004	(0.24)
Ori: AI						0.377	(0.49)
Ori: SG						0.042	(0.09)
Ori: GR						-0.096	(0.15)
Ori: AG						0.068	(0.09)
Ori: TG						0.137	(0.12)
Ori: TI						-0.360***	(0.11)
Ori: VD						-0.360***	(0.10)
Ori: VS						-0.246**	(0.12)
Ori: NE						-0.423***	(0.14)
Ori: GE						-0.555***	(0.12)
Ori: JU						0.045	(0.16)
Observations	2816	2816	2816	2816	2816	2816	
Pseudo R <sup>2</sup>	0.002	0.072					

Note: The table shows the regression coefficients from the ordered Probit regression and IV regression for employment position five years after graduation from higher education. The estimations from the first stage include the same controls as the estimations from the second stage. Standard errors are robust.

### A3. Estimations from Robustness Checks

**Table A.11:** Summary statistics of entire dataset and our sample

	Dataset			Sample		
	Mean	SE	Obs	Mean	SE	Obs
<b>Dependent variables</b>						
Wage	45459.90	45294.70	95323	78040.26	21867.31	13892
Search time	13.37	10.42	95351	4.45	5.20	13892
Internship	0.15	0.36	57052	0.17	0.37	13892
<b>Explanatory variables</b>						
VET	0.23	0.42	94199	0.38	0.49	13892
Regional VET	0.70	0.12	65232	0.72	0.11	13892
<b>Channel</b>						
Related VET	0.14	0.35	95341	0.27	0.45	13892
<b>CV: Personal characteristics</b>						
Age	27.31	4.62	95351	26.19	1.60	13892
Female	0.53	0.50	95351	0.50	0.50	13892
Marital status	0.10	0.30	89323	0.06	0.24	13892
Child	0.06	0.23	89305	0.02	0.15	13892
Education of father						
Dad: Compulsory	0.08	0.27	86503	0.08	0.27	13892
Dad: Upper-secondary	0.36	0.48	86503	0.42	0.49	13892
Dad: Post-secondary	0.56	0.50	86503	0.51	0.50	13892
Education of mother						
Mom: Compulsory	0.10	0.30	86958	0.09	0.29	13892
Mom: Upper-secondary	0.53	0.50	86958	0.61	0.49	13892
Mom: Post-secondary	0.37	0.48	86958	0.30	0.46	13892
<b>CV: Education</b>						
UAS	0.34	0.47	95351	0.62	0.49	13892
Institute						
UNI 1	0.06	0.24	95351	0.03	0.16	13892
UNI 2	0.08	0.27	95351	0.04	0.20	13892
UNI 3	0.05	0.23	95351	0.04	0.18	13892
UNI 4	0.07	0.25	95351	0.03	0.16	13892
UNI 5	0.07	0.25	95351	0.03	0.18	13892
UNI 6	0.01	0.12	95351	0.00	0.06	13892
UNI 7	0.02	0.15	95351	0.02	0.12	13892
UNI 8	0.03	0.18	95351	0.02	0.15	13892
UNI 9	0.11	0.32	95351	0.05	0.22	13892
UNI 10	0.02	0.13	95351	0.01	0.09	13892
UNI 11	0.04	0.20	95351	0.03	0.18	13892
UNI 12	0.08	0.28	95351	0.08	0.26	13892
UAS 1	0.04	0.19	95351	0.07	0.26	13892
UAS 2	0.09	0.29	95351	0.16	0.37	13892
UAS 3	0.04	0.21	95351	0.08	0.27	13892
UAS 4	0.03	0.18	95351	0.06	0.25	13892
UAS 5	0.02	0.13	95351	0.02	0.14	13892
UAS 6	0.03	0.17	95351	0.07	0.26	13892
UAS 7	0.08	0.27	95351	0.15	0.35	13892
UAS 8	0.00	0.06	95351	0.00	0.06	13892
99.0000	0.00	0.05	95351	0.00	0.00	13892
1310.0000	0.00	0.02	95351	0.00	0.00	13892
Master	0.35	0.48	95351	0.35	0.48	13892
Subject						
Humanities	0.07	0.26	95351	0.03	0.17	13892
Arts	0.05	0.23	95351	0.03	0.18	13892
Educational Sciences	0.18	0.39	95351	0.15	0.35	13892
Law	0.08	0.28	95351	0.00	0.00	13892
Economics	0.19	0.39	95351	0.29	0.46	13892

# NO EXPERIENCE, NO EMPLOYMENT

Natural Sciences	0.11	0.31	95351	0.06	0.24	13892
Medical Sciences	0.07	0.25	95351	0.02	0.14	13892
Health	0.04	0.20	95351	0.09	0.29	13892
Engineering	0.06	0.23	95351	0.09	0.29	13892
Agricultural Sciences	0.12	0.32	95351	0.22	0.41	13892
Others	0.02	0.15	95351	0.01	0.11	13892
Grade	5.08	0.41	86871	5.09	0.39	13892
No. of semester	6.53	2.39	95057	6.18	1.94	13892
Cohort						
2011	0.20	0.40	95351	0.10	0.31	13892
2013	0.26	0.44	95351	0.23	0.42	13892
2015	0.27	0.44	95351	0.30	0.46	13892
2017	0.27	0.44	95351	0.37	0.48	13892
<b>CV: Experience</b>						
Pre-study job	0.83	0.38	95351	0.88	0.33	13892
Student internship	0.43	0.50	95302	0.46	0.50	13892
Student job	0.86	0.35	95351	0.87	0.33	13892
Workbased education	0.10	0.30	95351	0.13	0.33	13892
Exchange	0.16	0.37	95284	0.16	0.37	13892

**Table A.12:** Regression table on sample selection

	HWage	
	Coef.	SE
Wage		
VET	0.041***	(0.01)
Age	0.016***	(0.00)
Female	-0.035***	(0.01)
Marital status	0.032**	(0.01)
Child	0.019	(0.02)
Dad: Upper-secondary	-0.006	(0.01)
Dad: Post-secondary	0.000	(0.01)
Mom: Upper-secondary	0.005	(0.01)
Mom: Post-secondary	-0.002	(0.01)
BE	-0.043***	(0.01)
LU	-0.020	(0.01)
UR	-0.025	(0.04)
SZ	-0.036	(0.02)
OW	-0.109**	(0.04)
NW	-0.116**	(0.04)
GL	-0.055	(0.05)
ZG	0.004	(0.02)
FR	-0.044*	(0.02)
SO	-0.016	(0.02)
BS	-0.056**	(0.02)
BL	-0.030	(0.02)
SH	-0.014	(0.03)
AR	-0.024	(0.04)
AI	0.080	(0.06)
SG	-0.008	(0.01)
GR	-0.058**	(0.02)
AG	-0.029*	(0.01)
TG	-0.017	(0.02)
TI	-0.105***	(0.02)
VD	-0.068***	(0.02)
VS	-0.037	(0.02)
NE	-0.065**	(0.02)
GE	-0.098***	(0.02)
JU	-0.062*	(0.03)
UAS	0.166***	(0.04)
Master	0.135***	(0.01)
UNI 2	0.001	(0.02)
UNI 3	0.040	(0.02)

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UNI 4	0.000	(0.02)
UNI 5	-0.060**	(0.02)
UNI 6	-0.113**	(0.04)
UNI 7	-0.055*	(0.03)
UNI 8	0.163***	(0.02)
UNI 9	0.011	(0.02)
UNI 10	-0.078*	(0.03)
UNI 11	-0.018	(0.02)
UNI 12	0.044*	(0.02)
UAS 1	-0.049	(0.04)
UAS 2	-0.087*	(0.04)
UAS 3	-0.047	(0.04)
UAS 4	-0.047	(0.04)
UAS 5	-0.043	(0.05)
UAS 6	-0.080	(0.04)
UAS 7	-0.066	(0.04)
UAS 8	0.000	(.)
Arts	-0.153***	(0.02)
Educational Sciences	0.102***	(0.02)
Economics	0.097***	(0.02)
Natural Sciences	0.046**	(0.02)
Medical Sciences	0.171***	(0.02)
Health	0.092***	(0.02)
Engineering	0.065***	(0.02)
Agricultural Sciences	0.116***	(0.02)
Others	0.032	(0.03)
Grade	0.042***	(0.01)
No. of semester	0.000	(0.00)
Cohort=2013	-0.068***	(0.01)
Cohort=2015	-0.081***	(0.01)
Cohort=2017	-0.083***	(0.02)
Exchange	-0.008	(0.01)
Pre-study job	0.010	(0.01)
Student internship	0.039***	(0.01)
Student job	0.003	(0.01)
Workbased education	0.073***	(0.01)
Medium	0.051***	(0.01)
Large	0.059***	(0.01)
Public employment	-0.003	(0.01)
Manufacturing	0.228*	(0.10)
Electricity ...	0.303**	(0.10)
Water Supply ...	0.265*	(0.12)
Construction	0.248*	(0.10)
Wholesale ...	0.229*	(0.10)
Transportation ...	0.186	(0.10)
Accommodation ...	0.124	(0.10)
Information ...	0.231*	(0.10)
Financial ...	0.301**	(0.10)
Real Estate	0.176	(0.10)
Scientific ...	0.221*	(0.10)
Administrative ...	0.151	(0.10)
Public ...	0.203*	(0.10)
Education	0.242*	(0.10)
Health ...	0.200*	(0.10)
Arts ...	0.142	(0.10)
Other service ...	0.103	(0.10)
Extraterritorial ...	-0.091	(0.11)
Lausanne	-0.067***	(0.02)
Sion	-0.068**	(0.02)
Fribourg	-0.052*	(0.02)
Neuchatel	-0.046	(0.02)
Biel	-0.039	(0.02)
Bern	-0.043*	(0.02)
Basel	-0.068**	(0.02)
Aarau-Olten	-0.048*	(0.02)
Zurich	-0.032	(0.02)

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# NO EXPERIENCE, NO EMPLOYMENT

Winterthur-SH	-0.022	(0.02)
St. Gallen	-0.027	(0.02)
Chur	-0.031	(0.03)
Luzern	-0.045	(0.02)
Bellinzona	-0.062	(0.03)
Lugano	-0.144***	(0.03)
Abroad	-0.234***	(0.03)
Constant	10.254***	(0.14)
sample		
Continued study	-18.295	(.)
Searched employment	7.586***	(0.37)
VET	0.134***	(0.03)
Age	-0.358***	(0.01)
Female	0.001	(0.02)
Marital status	-0.156***	(0.03)
Child	-0.045	(0.05)
Dad: Upper-secondary	-0.002	(0.04)
Dad: Post-secondary	-0.052	(0.04)
Mom: Upper-secondary	0.062	(0.04)
Mom: Post-secondary	-0.097*	(0.04)
BE	0.123*	(0.05)
LU	0.031	(0.06)
UR	0.085	(0.19)
SZ	0.099	(0.08)
OW	-0.143	(0.16)
NW	-0.008	(0.16)
GL	-0.095	(0.17)
ZG	0.010	(0.08)
FR	0.183*	(0.08)
SO	0.121	(0.07)
BS	0.082	(0.07)
BL	0.197*	(0.08)
SH	0.326**	(0.12)
AR	0.074	(0.16)
AI	-0.225	(0.23)
SG	0.125*	(0.06)
GR	0.116	(0.09)
AG	0.137**	(0.04)
TG	0.097	(0.07)
TI	0.481***	(0.09)
VD	0.037	(0.07)
VS	0.233**	(0.08)
NE	0.054	(0.10)
GE	0.050	(0.09)
JU	-0.005	(0.13)
UAS	-7.069	(3919.59)
Master	-0.213***	(0.03)
UNI 2	-0.026	(0.07)
UNI 3	0.116	(0.08)
UNI 4	-0.021	(0.08)
UNI 5	-0.018	(0.08)
UNI 6	-0.101	(0.14)
UNI 7	0.208*	(0.10)
UNI 8	-0.111	(0.08)
UNI 9	0.004	(0.07)
UNI 10	-0.532***	(0.11)
UNI 11	-0.094	(0.08)
UNI 12	0.125	(0.07)
UAS 1	7.238	(3919.59)
UAS 2	7.270	(3919.59)
UAS 3	7.195	(3919.59)
UAS 4	7.430	(3919.59)
UAS 5	6.899	(3919.59)
UAS 6	7.235	(3919.59)
UAS 7	7.227	(3919.59)
UAS 8	7.406	(3919.59)

99	-15.353	(.)
1310	0.000	(.)
Arts	0.030	(0.07)
Educational Sciences	0.345***	(0.05)
Law	-16.242	(.)
Economics	0.208***	(0.05)
Natural Sciences	0.305***	(0.06)
Medical Sciences	-0.081	(0.07)
Health	0.362***	(0.07)
Engineering	0.519***	(0.06)
Agricultural Sciences	0.400***	(0.06)
Others	0.162	(0.08)
Grade	-0.038	(0.03)
No. of semester	-0.016***	(0.00)
Cohort=2013	0.691***	(0.03)
Cohort=2015	0.863***	(0.03)
Cohort=2017	1.264***	(0.03)
Exchange	-0.033	(0.03)
Pre-study job	0.118***	(0.03)
Student internship	-0.078***	(0.02)
Student job	0.058	(0.03)
Workbased education	-0.128***	(0.03)
Medium	0.025	(0.03)
Large	-0.038	(0.02)
Public employment	0.020	(0.03)
Mining ...	-4.793	(.)
Manufacturing	1.025***	(0.29)
Electricity ...	0.894**	(0.31)
Water Supply ...	0.743*	(0.38)
Construction	0.794**	(0.31)
Wholesale ...	1.053***	(0.29)
Transportation ...	0.962**	(0.30)
Accommodation ...	0.746*	(0.31)
Information ...	0.957**	(0.29)
Financial ...	0.851**	(0.29)
Real Estate	0.871**	(0.32)
Scientific ...	0.814**	(0.29)
Administrative ...	1.062***	(0.30)
Public ...	0.895**	(0.30)
Education	0.725*	(0.29)
Health ...	0.551	(0.29)
Arts ...	0.954**	(0.30)
Other service ...	0.859**	(0.30)
Extraterritorial ...	0.465	(0.34)
Lausanne	0.111	(0.06)
Sion	-0.001	(0.10)
Fribourg	0.165	(0.09)
Neuchatel	0.214*	(0.10)
Biel	0.055	(0.09)
Bern	0.238**	(0.08)
Basel	0.195*	(0.09)
Aarau-Olten	0.239**	(0.09)
Zurich	0.246**	(0.08)
Winterthur-SH	0.184*	(0.09)
St. Gallen	0.231*	(0.10)
Chur	0.240*	(0.12)
Luzern	0.185*	(0.09)
Bellinzona	0.151	(0.14)
Lugano	-0.002	(0.13)
Abroad	0.030	(0.11)
Constant	0.237	(.)
/mills		
lambda	-0.024	(0.03)
Observations	35096	

## NO EXPERIENCE, NO EMPLOYMENT

**Table A.13:** Regression table with nearest neighbour matching

	Wage Coef./SE
ATE r1vs0.VET	0.058*** (0.01)
Observations	6539

**Table A.14:** Regression table on higher education drop outs

	Drop out dy/dx/SE
VET	0.007*** (0.00)
Age	0.001*** (0.00)
Female	-0.001 (0.00)
UAS	-0.000 (0.00)
Master	-0.004** (0.00)
Observations	31017