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Vocational qualification as safety-net? Education-to-work transitions of higher education dropouts in Germany

Mirte Scholten¹ and Nicole Tieben^{2*}

*Correspondence:
nicole.tieben@uni-tuebingen.de

² University of Tübingen/
LEAD Graduate School
& Research Network,
Gartenstraße 29a,
72074 Tübingen, Germany
Full list of author information
is available at the end of the
article

Abstract

Background: In Germany, almost 15 per cent of all first-year students leave higher education without obtaining a degree. The German post-secondary educational system is tracked however, and many dropouts enter the labour market with pre-tertiary vocational training certificates. We therefore examine if higher education dropouts benefit from these vocational qualifications obtained outside higher education and use vocational credentials as a safety net.

Methods: Using data from the German National Educational Panel Study (NEPS Starting Cohort 6), this study employs Cox and OLS regression models to examine the labour market transition of higher education dropouts. We distinguish the actual transitions (finding a job) from the occupational status of the first job.

Results: Our results suggest that higher education dropouts without pre-tertiary vocational qualifications have more difficulties finding a job, compared to dropouts with pre-tertiary vocational qualifications. Comparing the occupational status of dropouts with and without pre-tertiary vocational qualifications, we find that these are not associated with a higher occupational status.

Conclusions: We conclude that pre-tertiary vocational qualifications do serve as a safety net in case of drop out, because they protect from protracted pathways into the labour market. Apart from this we do not find evidence for additional returns of vocational certificates in terms of occupational status.

Background

A considerable proportion of students leaves higher education without a degree and has to enter the labour market without formal vocational qualifications. Previous research shows that the group of higher education dropouts has a higher risk of being unemployed, working part-time or on fixed term contracts and on average obtains lower wages than higher education graduates (e.g. Becker et al. 2010; Davies and Elias 2003; Griesbach et al. 1977; Johnes and Taylor 1991; Lewin et al. 1995; Reisel 2013). In Germany however, approximately a quarter of all first year students enters higher education after having obtained a formal vocational training degree (Bildungsberichterstattung 2014). This 'double-qualification' usually serves to improve labour market opportunities or to bridge waiting periods (e.g. when entrance restrictions prevent an immediate

transition into the desired course), but is also a risk-mitigating strategy among students who expect a certain risk of failure in higher education (Büchel and Helberger 1995; Pilz 2009). Research on double qualifiers has shown that an additional vocational degree does not result in additional labour market benefits for higher education graduates (Büchel and Helberger 1995; Hammen 2011; Tuor and Backes-Gellner 2010; Weiss et al. 2014). The question if a vocational qualification indeed serves as a safety net in case of higher education non-completion however, has not been examined yet. This paper aims to fill this gap and to examine labour market transitions of higher education dropouts. We examine if these pre-tertiary vocational qualifications mitigate the risk of protracted labour market transitions and low occupational status when higher education has not been completed with a degree. We distinguish two labour market outcomes: First, the actual transition into a stable first employment indicates if higher education dropouts have more difficulties finding a job. Second, the occupational status of the first job, which indicates if higher education dropouts without pre-tertiary vocational training are more likely to enter low status jobs than dropouts with formal vocational qualifications. We also examine whether a non-completed higher education episode generates advantages compared to individuals who have graduated from non-tertiary vocational training, but never entered higher education. The remainder of this paper will give an overview of previous research and an introduction to the institutional setting in Germany. From general theories of education-to-work transitions we will derive our theoretical framework and hypotheses, followed by data description and an empirical test. We discuss our results in the conclusions section and develop an outlook on future research.

Previous research

Although there is a large body of research examining returns to education, these generally focus on formal qualifications, such as (general upper/vocational) secondary and tertiary certificates. A number of researchers acknowledge that attendance in higher education without graduation may deliver returns in the labour market, but empirical results are inconclusive (Bailey et al. 2004; Davies and Elias 2003; Flores-Lagunes and Light 2007; Grubb 2002; Johnes and Taylor 1991; Kane and Rouse 1995; Matković and Kogan 2012; Reisel 2013; Schnepf 2017; Stegmann and Kraft 1988). Schnepf (2017) for example shows that university dropouts are more likely to hold professional and managerial positions than upper secondary education graduates who never entered higher education in Belgium, the Czech Republic, Denmark, the Netherlands, Poland, and Slovakia, but not in France, Germany, Italy, Norway, Spain, and the UK. For Germany, Stegmann and Kraft (1988) find that higher education dropouts do not have a higher risk of being unemployed but achieve a lower occupational status and a lower income than higher education graduates. The same study also reveals that dropouts in Germany achieve a slightly higher income but no higher occupational status than upper secondary education graduates with a formal vocational training certificate.

The above summary of existing research suggests that 'some college' without graduating generates benefits in some countries, but not in others and in Germany the additional benefit of a non-completed higher education episode seems to be low. Existing literature however, does not take into account that higher education dropouts may enter the labour market with formal vocational qualifications that were gained outside higher

education. The German educational system, for example, provides vocational training opportunities which are perceived as an attractive alternative pathway by a large proportion of general upper secondary education graduates. In the following sections, we therefore give a brief overview of the German post-secondary educational system and develop implications for the labour market transitions of higher education dropouts in the specific context conditions of the German case.

The German post-secondary educational system

The German system of post-secondary education is divided into higher (tertiary) education and (post-secondary, non-tertiary) vocational training. The German higher education consists of traditional universities and universities of applied sciences.¹ The universities of applied sciences were established in the 1970s to replace the ‘schools of engineering’, but meanwhile they have considerably expanded and offer a wide range of programs—including, for example, business administration, design, education and media-studies.

Entrance certificates for higher education typically are obtained by graduation from general upper secondary education (*Abitur* or *Fachabitur*). Besides this traditional route into higher education, there are several alternative pathways and especially vocational training can also result in entrance qualifications for higher education² (Schindler 2014). The rules for obtaining a higher education entrance certificate via vocational training are very heterogeneous across federal states, but in general students can choose to take extra lessons and exams in maths and languages to obtain a full or restricted entrance certificate. Besides the ‘traditional’ and ‘vocational’ route to a higher education entrance certificate, it is also possible to enter adult and evening education. In exceptional cases, higher education can be entered without an entrance certificate—but this applies to a small group of approximately 3% of all students³ (Dahm and Kerst 2013).

The most-attended vocational track is the dual or apprenticeship system. The dual system combines formal schooling with on-the-job training in form of in-firm apprenticeships (Müller et al. 1998; Walden and Troltsch 2011). The second, less-frequented training type is the purely school-based vocational training. Both training types theoretically can be entered after graduation from lower secondary education. However, especially the dual training involves considerable commitment of the training companies and for this reason the companies select their trainees carefully. Admission to very attractive apprenticeships hence is competitive, so that companies often require an upper secondary leaving certificate (which in fact would qualify for higher education).

The German vocational training system is characterized by a relatively high degree of standardization and occupational specificity, which—in general—is associated with

¹ Next to these two main types of higher education, the German system also comprises a number of specialized types of institutions, such as, for example, Dual Academies (Duale Hochschulen), Academies of Public Administration and Management (Verwaltungsfachhochschulen) and Universities of the Armed Forces (Hochschule der Bundeswehr). These programs usually combine an apprenticeship with higher education and hence cannot unambiguously be treated as higher education.

² Entry requirements for higher education are given when a vocational training course with additional lessons from the general upper secondary curriculum has been successfully completed.

³ Admission of these “non-traditional” students in fact usually is based on vocational qualifications as well. Often a vocational training certificate plus work experience or specialists training is required and admission usually is restricted to related fields.

structured and smooth education-to-work-transitions (Allmendinger 1989; Shavit and Müller 2000). Graduating from vocational training in Germany therefore is highly attractive as it usually results in good employment opportunities and high chances of a direct entry into a stable position within the training company (Bol and Weeden 2015; Kerckhoff 2000; Soskice 1994; Wolbers 2007). For this reason an increasing proportion of general upper secondary education graduates, who already fulfil the entry requirements for higher education, choose vocational training instead of higher education (Jacob 2004; Büchel and Helberger 1995; Pilz 2009). Vocational training and higher education in Germany, however, are not preclusive and a growing number of young adults enter higher education after vocational training (Hillmert and Jacob 2004; Jacob 2004). Currently, one-fifth of all higher education students have graduated from vocational training before entering higher education (Bildungsberichterstattung 2014).

Theories on education-to-work transitions

The relationship between education and labour market returns has been examined from different theoretical perspectives (see Bills 2003 for a comprehensive overview). Human capital approaches assume that educational investments result in skills that increase productivity and hence lead to better jobs and higher incomes (Becker 1964; Bowman 1966; Mincer 1958, 1989; Schultz 1962). Some researchers have applied human capital approaches to higher education non-completion, assuming that longer time spent in higher education before drop out may result in better job-opportunities (Groot and Oosterbeek 1994; Matković and Kogan 2014; Matković and Kogan 2012). This approach bears the disadvantage that a longer persistence in higher education captures delays and does not convey clear information about the student's actual course commitment and learning progress (Groot and Oosterbeek 1994; Rosenbaum 1986).

Later approaches rather assume that the recruitment process takes place in a context of uncertainty. Since employers cannot determine job candidates' actual productivity levels, they screen potential employees on the basis of observable characteristics such as educational attainment, grades, gender, age, work experience, unemployment duration or other personal characteristics. These observable characteristics are termed 'signals' (Spence 1973). It is, however, rarely discussed if higher education dropout serves as a signal in the recruiting process and if it is perceived as a positive or negative signal by employers. Higher education dropout could in fact be interpreted as failure and as a signal for a lack of ability, perseverance and goal commitment (Heckman and Rubinstein 2001). Future employers therefore might perceive hiring dropouts as a risky investment as they might be likely to show these characteristics in the job as well. Arrow (1973) to the contrary argues that time spent in higher education sends a positive signal to prospective employers. His model describes the signalling role of higher education as a 'double filter': admission to higher education acts as a first filter, while graduation serves as a second filter. Thus the mere enrolment in higher education can be seen as a positive signal for employers, and consequently enhances applicants' labour market chances even if they did not obtain a higher education degree. Our above summary of previous research reveals that it seems to depend on the context whether dropouts are more successful in the labour market than job-seekers who never entered higher education (see especially Schnepf 2015 for a comparison of European countries). Germany appears to

be one of the countries where ‘some college’ is not associated with higher labour market returns (Schnepf 2017; Stegmann and Kraft 1988). The reasons for this, however, are largely unexplored. We suggest that vocational training might play a non-negligible role here.

As outlined above, vocational training and higher education are not mutually exclusive in Germany and vocational training graduates can choose to enter higher education later in life (Büchel and Helberger 1995; Hammen 2011; Jacob 2004; Tieben and Rohrbach-Schmidt 2014). The reasons for this double qualification are manifold. On the one hand, we have to assume that individuals adjust their educational and occupational goals during their life course and decide to enter higher education after periods of labour market participation. Often, this happens in order to improve career prospects or because of dissatisfaction with the initially chosen occupation. Entering higher education can also be a strategy to escape from unemployment (Hammen 2011; Jacob 2004). On the other hand, double qualification may also be part of a deliberate education strategy. Especially in the 1990s, it became increasingly popular to enter vocational training after having obtained a higher education entrance certificate. Büchel and Helberger (1995) assume an ‘insurance strategy’ of these double qualifiers in the German educational system as they hope to benefit from their vocational skills during higher education and in the labour market later on. Büchel and Helberger (1995) also mention the assumption that a vocational training certificate may serve as fall-back option in case of higher education dropout. In a similar vein, Shavit and Müller (2000) discuss how vocational education is a ‘safety net’: A vocational training certificate reduces the risk of unemployment and unskilled labour, especially in countries with a vocational training system which is specific rather than general, such as the German.

At this point we return to the above discussion of the ‘signaling’ value of higher education dropout and derive why ‘some college’ may not result in higher labour market returns in Germany, compared to individuals who have never entered higher education. The signalling value of vocational qualifications in the recruitment process depends on the link between the educational system and the labour market (Allmendinger 1989; Gangl 2003; Shavit and Müller 2000; van de Werfhorst 2011; Wolbers 2003). The German labour market can be regarded as being highly credentialist due to its strong linkage between vocational education and the labour market.⁴ Because of the high specificity of the German vocational training system, the signals sent by job seekers’ formal vocational qualifications to prospective employers are particularly informative, whereas an unfinished higher education episode does not convey any information about the actual skills of an applicant. If we assume that higher education dropouts are aiming to enter skilled or even high skilled employment, they thus compete with applicants with formal qualifications for these jobs. From the perspective of an employer, an applicant with a vocational training certificate hence should be the less ‘risky’ choice, e.g. in terms of training costs. We therefore expect that dropouts without vocational qualifications achieve lower returns in the labour market than individuals who graduated from vocational training but never entered higher education. More specifically, we expect them to be less likely to

⁴ In addition, high occupational positions, like for example in the civil service or in traditional professions such as teachers, medical doctors, lawyers and the clergy can only be accessed via a specific higher education diploma (Müller and Shavit 1998).

enter a stable employment. (Hypothesis 1a) and to achieve on average a lower occupational status (Hypothesis 1b).

If we compare dropouts with and without vocational qualifications, we should expect that the vocational credential indeed serves as an ‘insurance’ as suggested by Büchel and Helberger (1995). Dropouts with a vocational qualification hence should be more likely to enter a stable employment (Hypothesis 2a) and achieve on average a higher occupational status than dropouts without a vocational qualification (Hypothesis 2b).

Data and analytical approach

Data

For our empirical analyses we rely on the starting Cohort 6 ‘Adult Education and Life-long learning’ from Germany’s NEPS (Blossfeld et al. 2011; Leopold et al. 2013; Skopek 2013). The data set provides detailed retrospective life history data with comprehensive information on the education and employment biography of each respondent as well as panel data on several subjects. The sample of NEPS starting Cohort 6 comprises 11,932 German residents born between 1944 and 1986.⁵ In order to ensure maximal comparability of individuals in the analytic sample, we select respondents who have obtained a general upper secondary leaving certificate. These are respondents who received their certificate by graduating from general upper secondary education (*Abitur* or *Fachabitur*) but also by alternative routes like vocational upper secondary education or evening schools. Students from universities of cooperative education (*Berufsakademie*), business academies (*Wirtschaftsakademien*) and academies of public administration (*Verwaltungsakademien*) are excluded because students of these institutions usually pursue a training that combines employment and training simultaneously. As these groups cannot be clearly assigned to either vocational training or higher education and the case numbers are not sufficient to treat them separately, they were removed from the sample. Furthermore, we excluded respondents who were older than 36 years at the time of leaving the educational system to capture only those who are actually searching for their first stable job. To ensure that the results are not biased by the specific educational and labor market context of former East Germany we deleted respondents who were born in and who graduated from higher education in former East Germany before 1989. We also excluded individuals who obtained their higher education entrance qualification outside Germany or who studied abroad. The final sample comprises 5387 cases.

Variables

Dependent variables

The education-to-work transition of post-secondary education leavers is measured in two versions: the first is a binary variable which indicates if a respondent enters a first stable job. Following common definitions (Noelke et al. 2012), we define the first stable job as occupations that last at least 6 months and include a minimum of 20 h of work per week. The advantage of using the first stable job instead of any first job is that we omit short employment episodes like trainee positions and internships as well as periods of early career instability. This approach makes it more likely that we capture the

⁵ For more detailed information on the studies and sampling strategies, see Allmendinger et al. (2011), Antoni et al. (2010) and Aßmann et al. (2011).

first meaningful employment relationship. Post-secondary education leavers may have a smooth labour market transition but enter a lower status job when they do not succeed in finding a job that matches their actual skills to avoid unemployment (Scherer 2005; Wolbers 2007). To rule out this possibility, we also have a closer look at the occupational status of the first stable employment in a second step. The second dependent variable hence is a metric variable measuring the occupational status of the first stable job (ISEI), which is the same occupation used for the first education-to-work transition [Ganzeboom et al. (1992)]. Unlike alternative measures of occupational status, such as EGP or the required skill-level, ISEI allows a parsimonious OLS-estimation because of its quasi-metric level of measurement. In our sample the scale of the status scores ranges from 12 to 89.

Independent variables

Our main independent variable is educational attainment. We distinguish four groups: (1) students who graduated from vocational training, but never entered higher education, (2) students who dropped out of higher education but have additionally graduated from vocational training before entering the higher educational system, (3) students who dropped out of higher education, but did not graduate from vocational training before entering higher education and (4) students who graduated from higher education.

Control variables include socio-demographic characteristics like the highest educational level of the parents, sex and age at education-to-work transitions. First, family of origin might have an influence on the highest educational degree attained but also on education-to-work transitions. From previous research we know that social resources increase the efficiency of job search in terms of search duration and occupational position (Kogan 2011). On the other hand, high financial resources allow job applicants to extend the search until they receive a satisfactory job offer. This prolongs the education-to-work transition but optimises the job match at the same time. For that reason we control whether at least one parent has got a higher education degree. To avoid spurious effects caused by the higher age at education-to-work transitions, we introduce a metric variable for age at de-registration. Furthermore, we control for the GPA of the higher education entry certificate (*(Fach-)Abitur*) to take differences in competence levels into account. For 2.993 respondents, upper secondary GPA is not recorded for reasons of the survey-design. In order to maintain the maximal sample size, we used multiple imputation techniques to impute the values.⁶ Differences between female and male education-leavers are considered by including a dummy variable for sex (female = 0). We also control for work experience, as this is likely to ease labour market transitions. This dichotomous variable accounts for occupational experiences acquired between obtaining the higher education entrance qualification and entering the first significant job. The variable does not include work experience gained during vocational training. To control for structural changes in the labour market as well as in the educational system, we include four education-leaving cohort-dummies in our models. These dummy variables

⁶ The dataset consists of data collected in a 'forerunner study' (ALWA) and data from the nearly identical NEPS study. However, in ALWA, the upper secondary GPA was not collected. We acknowledge that it is highly debatable to impute large shares of missing data, but we argue that it is reasonably safe to assume these values to be missing at random because the missingness is design-based and not due to (possibly selective) non-response. Besides, we ran robustness checks and observed that the impact of including/excluding GPA in the models is negligible.

vary in length: the oldest cohort is broader than 10 years in order to obtain a sufficient number of cases. For further definitions of the independent variable and basic descriptive information, see Table 1.

Analytical approach

In a first step, we describe the transition from education to first stable job depending on the educational attainment. We approach this from an event history perspective. For a descriptive overview, we estimate failure functions using the Kaplan–Meier product-limit method. In the multivariate analyses of the transition from education to a first stable job, we apply Cox proportional hazards regression models (Blossfeld and Rohwer 2002; Cleves et al. 2010; Cox 1972). We chose an event history approach because it allows us to take right-censored cases into account and avoid bias caused by cases who

Table 1 Description and basic descriptive statistics of variables

Variable	N	% (Mean)	Description
Educational attainment			
Only pre-tertiary vocational training	1533	28.46	Graduated from vocational training but never entered higher education
Higher education dropout + pre-tertiary vocational training	133	2.47	Dropped out from higher education but graduated from vocational training before entering higher education
Higher education dropout without pre-tertiary vocational training	446	8.28	Dropped out from higher education, never graduated from vocational training
Higher education degree	3275	60.79	Graduated from higher education, double qualification included
At least one parent higher education			
No (=0)	2608	48.41	At least one parent has graduated from higher education
Yes (=1)	2779	51.59	
Age at de-registration	5387	25.62 (mean)	Age when students leave post-secondary education (metric variable)
Sex			
Female (=0)	2598	48.23	
Male (=1)	2789	51.77	
Upper secondary final GPA	5387	2.49 (mean)	GPA of the highest secondary school exam (<i>Abitur</i>) (metric variable, from 1 'very good' to 4 'sufficient')
Work experience			
No (=0)	3897	72.34	Employed at least 20 h per week (occasional jobs and work experience gained during vocational training excluded)
Yes (=1)	1490	27.60	
Education-leaving cohort			
1964–1984	1331	24.71	Year of leaving post-secondary education
1985–1994	1636	30.37	
1995–2004	1328	24.65	
2005–2014	1092	20.27	
Stable employment			
No (=0)	1447	26.86	Number of respondents, who find a stable employment position within the observation period
Yes (=1)	3940	73.14	
Occupational status (ISEI)	3813	62.07 (mean)	Standard International Socio-Economic Index of Occupational Status of the first stable job
N	5387	100.00	

were at risk for less than the defined observation period (48 months). We have no theoretical concerns about time dependency, which is introduced in this model as an unspecified baseline hazard rate. As our main interest is the direction and strength of the covariate effects on the event occurrence (not the search duration), the Cox model is appropriate.⁷ We assume that individuals are available for the labour market as soon as they leave the educational system, so the start of the observation period is set accordingly. We observe that 192 dropouts enter vocational training after leaving higher education. As these individuals are unavailable for the labour market for at least 2 years, we define these cases as being 'not at risk' and set them to censored from the time the vocational training starts. We do not allow them to re-enter the risk set after graduation from vocational training. In the same way, we treated 639 individuals who are unavailable for the labour market for reasons of parental leave, military or voluntary service, sick-leave and non-tertiary education. In a second step, we select respondents who successfully entered the labour market and conduct ordinary least squares (OLS) models to analyse the occupational status of the first stable job.

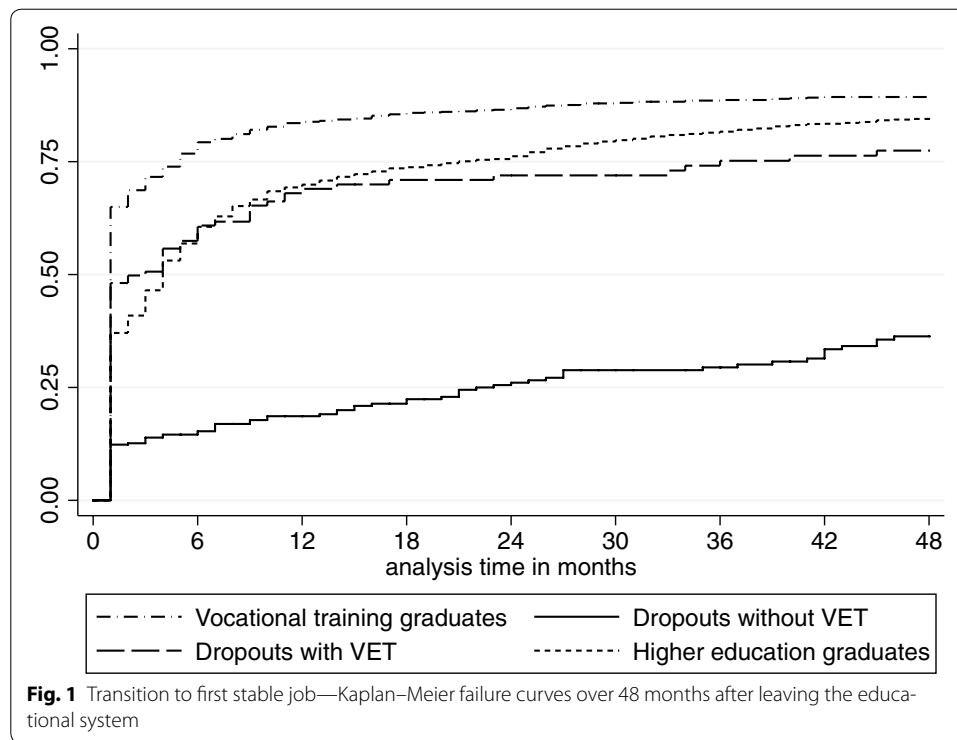
Results

Entering a first stable job

Descriptive overview

To get a first impression of how the transition patterns into a first stable job differ by post-secondary educational attainment, we estimated failure functions using the Kaplan–Meier method. The failure functions in Fig. 1 show the cumulative proportion of individuals that had entered a stable job at time t after leaving education, separated by educational attainment. Individuals who did not enter the labour market by the time of the interview or within 4 years after leaving education are treated as right-censored. In such cases, the time at risk is defined as the period of time between leaving educational system and the date of interview (respectively a duration of 48 months without event). The figure shows how important it is to take additional formal vocational qualifications of dropouts into account. We observe that dropouts who did not graduate from pre-tertiary vocational training have a high risk of remaining without a stable job (only 35% do enter a stable job within 48 months). Dropouts with pre-tertiary vocational qualifications have considerably better chances of entering a stable job. Approximately 50% of the higher education dropouts with a pre-tertiary vocational qualification enter a stable job immediately after leaving the educational system and two-thirds of this group make a transition within the first year. Their transition rates thus are comparable to those of higher education graduates. This indicates that pre-tertiary vocational qualifications can be used as a safety net by higher education dropouts and protects them from the risk of

⁷ As the basic assumption of the Cox model is that the hazard ratio is constant during the observation period (Blossfeld, Golsch, & Rohwer, 2007), we conduct a statistical test of this assumption based on the Schoenfeld residuals. The results show that the proportional assumption of the Cox model is violated for our central independent variable, 'educational attainment'. Therefore, additional stratified Cox models were calculated, which allowed for interactions between time at risk and level of education. We find that the hazard ratios differed by time in the first 6 months after leaving the educational system. However, the overall results remain the same. As a robustness check we also run piece-wise constant exponential models with different specifications of the time intervals. The results of interest remain unchanged across the different ways of modelling (results available from the authors). Therefore we keep to the Cox proportional hazards regression model for reasons of parsimony. Our theory-driven reasoning for this modelling strategy is that the actual search duration does not deliver additional insights as this is rather caused by properties of the different transition patterns of graduates from vocational training and higher education, as further elaborated in the results and conclusions-sections of this paper.



remaining unemployed or in precarious job situations. For the higher education graduates, we observe a similar transition pattern, although an immediate transition occurs somewhat less frequently. This is probably due to the fact that this group is more likely to enter a transition or orientation period after deregistration. It is also likely that entering the first job is deliberately postponed among higher education graduates and that they ‘take some time off’ or take an internship before entering the working world. Many higher education dropouts, on the contrary, probably postpone their deregistration until they find a job, which possibly explains that they are more likely to enter a stable job than graduates during the first 6 months. The labour market transition of vocational training graduates is particularly smooth, as the majority enters a stable job within the first 6 months and the risk of not finding a job within 48 months is below 10%. Regarding the German context, this is not surprising because vocational training usually takes place as in-firm-apprenticeship and employers have an interest in keeping their apprentices in their companies after graduation.

Cox-regressions

In order to rule out that the group-differences in the labour market transitions are merely driven by individual characteristics, such as sex, age, social background, cognitive competences and work experiences or by specific context conditions at the time of the transition, we run multivariate Cox-regressions with corresponding controls. Table 2 shows the results of these models. The coefficients are displayed as hazard ratios, i.e., coefficients greater than 1 indicate a positive association with the transition rate and coefficients smaller than 1 indicate a negative association. We run two versions of the models, varying only the reference category to contrast the groups against higher

Table 2 Results of Cox proportional hazards regression models for the transition into the first stable job

	Model 1a		Model 1b	
	Hazard ratios	t	Hazard ratios	t
Educational attainment				
Only pre-tertiary vocational training	Ref.	Ref.	6.96***	18.28
Higher education dropout + pre-tertiary vocational training	0.66***	−3.78	4.59***	10.70
Higher education dropout without pre-tertiary vocational training	0.14***	−18.28	Ref.	Ref.
Higher education degree	0.68***	−8.85	4.74***	15.39
At least one parent higher education (yes = 1)	0.90**	−3.07	0.90**	−3.07
Age at de-registration	1.01	1.17	1.01	1.17
Sex (male = 1)	1.13**	3.85	1.13**	3.85
Upper secondary final GPA	0.98	−0.54	0.98	−0.54
Work experience	0.44***	−19.67	0.44***	−19.67
Education-leaving cohort				
1964–1984	1.12*	2.28	1.12*	2.28
1985–1994	1.28***	5.23	1.28***	5.23
1995–2004	1.24***	4.39	1.24***	4.39
2005–2014	Ref.	Ref.	Ref.	Ref.
N	5387		5387	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

education dropouts without pre-tertiary vocational qualifications and to vocational training graduates who never entered higher education. Doing so, we can identify the returns for higher education graduates and for dropouts with and without pre-tertiary vocational qualifications, compared to respondents who have never entered higher education (Model 1a). In Model 1b we identify returns for higher education graduates and for dropouts with pre-tertiary vocational training, compared to dropouts without any formal vocational qualifications.

Our results of Model 1a largely confirm the findings of the descriptive Kaplan–Meier failure curves. They reveal that vocational training graduates have the smoothest transition into the labour market even when control variables are taken into account. The results also indicate that dropouts without pre-tertiary vocational qualifications have by far the lowest transition rate. In Model 1b, we observe that the disadvantage of dropouts without pre-tertiary vocational qualifications is significant, compared to dropouts with a pre-tertiary vocational qualification. As expected in our Hypothesis 1a we can conclude that a pre-tertiary vocational qualification seems to buffer the disadvantages of being a dropout by smoothening the transition from education to the labour market. It seems that vocational qualifications serve as a stronger signal than higher education experiences.

Although the control variables do not explain much of the group differences presented from the Kaplan–Meier failure functions, we would like to stress that upper secondary GPA does not seem to be related with the transition to a stable job. Women are less

likely to enter a stable job within the observation period. This may be related to family obligations, which are not captured in the models. The negative coefficients of work experience and social background however, are somewhat surprising, but we only can speculate about the reasons for this. The negative association might be due to the higher status expectations of the respondents from highly educated family backgrounds. Respondents with work experience or highly educated parents might not take the very first job opportunity but take their time to find an occupation that meets their own or the parental expectations. Furthermore, we also find that in younger cohorts, the transition rate is lower than in older cohorts.⁸ This is in line with research showing that labour market transitions in recent cohorts comprise longer periods of orientation and instable labour market perspectives.

Occupational status: OLS regressions

The results from the cox-models show the transition ratios of higher education dropouts and give an overview of how successfully the different groups enter their first stable job. From the hazard ratios however, we can hardly draw conclusions about the actual 'attractiveness' of a job-applicant for employers or about the signalling value of their educational outcomes. This is because an applicant who does not succeed to obtain the most desired job is likely to enter less attractive positions instead of extending the search until the desired job is offered. Therefore, we run linear regression models comparing the occupational status (ISEI) of first job entrants with different educational outcomes.⁹ We observe in Table 3 that higher education graduates obtain by far the highest returns to education in terms of occupational status, which is in line with the established theories and empirical findings on returns to education. There seems to be a constrained access to specific occupations that can only be entered via higher education degrees. Against our Hypothesis 1a, however, the results of Model 2a show no significant difference in the obtained occupational status of the first stable job between vocational training graduates and higher education dropouts with and without pre-tertiary vocational qualifications. The results in Model 2b even indicate that dropouts without pre-tertiary vocational qualifications obtain slightly higher occupational positions than dropouts with a vocational training degree.

Similar to the first models we like to summarize the results for the control variables. For parental education, we observe a small positive association with the occupational status of the first stable employment. Older respondents obtain slightly higher status positions than younger respondents. Work experience has no significant explanatory value. The negative coefficient for being male is in line with prior research that shows that women enter slightly higher job positions than men, when comparing women and men with comparable qualifications in full time jobs (Schimpl-Neimanns 2004). Low grades in the upper secondary final exam are associated with lower job positions and respondents from the oldest cohort obtain higher occupational positions than respondents from the youngest cohort. With regard to the latter, in the last decades educational

⁸ Due to the small subsamples, it is not productive to test for cohort "effects". Running the analyses separately for each cohort however, shows relatively stable estimators across cohorts. Therefore we can exclude the possibility of significant interactions between cohort and our central independent variables. The same also holds for the subsequent analyses.

⁹ There are only those respondents in the model that entered the labour market. This explains the lower number of respondents in Model 2a and Model 2b.

Table 3 Results of ordinary least squares models for the occupational status of the first stable job (ISEI)

	Model 2a		Model 2b	
	b	t	b	t
Educational attainment				
Only pre-tertiary vocational training	Ref.	Ref.	−2.65	−1.64
Higher education dropout + pre-tertiary vocational training	−2.26	−1.37	−4.91*	−2.26
Higher education dropout without pre-tertiary vocational training	2.65	1.64	Ref.	Ref.
Higher education degree	22.00***	33.65	19.35***	12.44
At least one parent higher education (yes = 1)	1.18*	2.36	1.18*	2.36
Age at de-registration	0.40***	4.17	0.40***	4.17
Sex (male = 1)	−1.15*	−2.30	−1.15*	−2.30
Upper secondary final GPA	−0.68	−1.12	−0.68	−1.12
Work experience	−0.96	−1.46	−0.96	−1.46
Education-leaving cohort				
1964–1984	2.47**	3.17	2.47**	3.17
1985–1994	0.80	1.11	0.80	1.11
1995–2004	0.41	0.55	0.41	0.55
2005–2014	Ref.	Ref.	Ref.	Ref.
Constant	38.93***	14.76	38.93***	14.76
N	3813		3813	

ISEI Standard International Socio-Economic Index of Occupational Status

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

requirements for the workforce changed with the rapid technological and organisational change: qualifications of the workforce increased due to the higher educational attainment of employees in the service sector compared to those in agriculture or manufacturing. As a consequence the occupational status of the first job decreases with education-leaving cohort as the competition on the labour market increases with educational expansion and the change of the labour market structure (Jacob et al. 2013; Müller et al. 1998).

Conclusions

In this paper we set out to examine the labour market returns of higher education dropouts relative to graduates from higher education and vocational training. As in Germany a considerable share of students enter higher education after the completion of vocational training, we particularly aimed to answer the question if pre-tertiary vocational qualifications serve as a safety net in case of higher education non-completion. In contrast to prior research we do not only compare labour market outcomes of higher education dropouts and graduates but enlarge our comparison group to vocational training graduates without higher education experiences and distinguish between higher education dropouts with and without vocational qualifications.

In line with common labour market theories, we assumed that the matching process of job applicants to open positions takes place in a context of uncertainty and that employers evaluate 'signals' of job-applicants (Spence 1973). We discussed if higher education dropout signals a lack of ability and non-cognitive skills, as proposed by Heckman and Rubinstein (2001), or if enrolment in higher education as such is assessed as positive signal (Arrow 1973). As Germany is known for a highly credentialist labour market, we expected dropouts without pre-tertiary vocational qualifications to have large disadvantages in the labour market transitions, compared to job-seekers with pre-tertiary vocational qualifications.

We therefore proposed that dropouts without formal vocational qualifications should have lower chances to enter a stable employment (Hypothesis 1a) and achieve a lower occupational status in the first stable employment (Hypothesis 1b) than graduates from vocational training, who have not entered higher education. We confirm Hypothesis 1a, but surprisingly, the dropouts without formal vocational qualifications achieve status scores that are comparable to those of graduates from vocational training, so that we have to refute Hypothesis 1b. Regarding the comparison of dropouts with and without vocational qualifications, we expected that the vocational credential serves as an 'insurance' as suggested by Büchel and Helberger (1995). We proposed that dropouts with a vocational qualification should be more likely to enter a stable employment (Hypothesis 2a) and achieve on average a higher occupational status than dropouts without a vocational qualification (Hypothesis 2b). Again, the overall probability of entering a stable job is higher for dropouts with pre-tertiary vocational training. This confirms Hypothesis 2a, but against our expectation, dropouts without pre-tertiary vocational qualifications achieve on average a slightly higher occupational status. We acknowledge that this coefficient is small and not robust against alternative specifications, it hence remains debatable if this finding is in fact meaningful.

Our conclusions therefore are as follows: Entering the German labour market without formal vocational qualifications is risky. Employers seem to rely on these signals when they screen potential candidates for a vacancy and the risk of unemployment or unstable employment is considerably higher without a formal vocational qualification. Regarding this, vocational training indeed is a safety net in case of drop out. On the other hand, we also observe that among the successful candidates only a completed higher education degree is associated with (clearly) higher status scores, whereas we do not find large differences between dropouts with and without pre-tertiary vocational qualifications and candidates who never entered higher education. At first sight, it thus does not seem to matter which route into stable employment was taken, because detours and vocational qualifications do not make a difference regarding occupational status. Still, the reasons for the non-existent labour market disadvantages of the dropouts are to be examined.

We may speculate that those dropouts who do succeed, have certain characteristics that are helpful in the labour market. We know for example, that dropout rates in STEM subjects are particularly high and that STEM dropouts are sought after in the labour market (see Becker et al. 2010 for a qualitative study examining this issue). We therefore suspect that the high occupational status of dropouts without formal vocational qualifications is to a large extent driven by this group. Single case analyses indeed show that many higher education dropouts with high occupational positions are those who finally

work as engineer or managers of medium-sized companies. We therefore suggest that these are students who were lured away from higher education by attractive exit options in the labour market. This in fact would call for a control of field of study, which we did not do for the following reasons: First, we compare respondents with and without higher education experiences, so we cannot control field of study for respondents who did not enter higher education. Second, respondents who have entered higher education often transfer to another subject, resulting in multiple higher education spells. Field of study therefore is not necessarily constant across the entire higher education episode before drop out.¹⁰ Besides, it would be desirable to know more about the reasons for dropping out of higher education. Obviously the group of dropouts is not homogenous. Some apparently leave higher education because of low performance and/or a lack of motivation, whereas others leave higher education for (perceived) better options elsewhere. It is, for example, very likely that dropouts with poor labour market opportunities decide to enter vocational training after leaving higher education (or leave higher education because they want to pursue vocational training instead). It therefore is likely that we do not observe differences between the groups of dropouts with and without vocational training because only the more promising candidates of both groups are actually searching for a job. We must also consider gender differences, as female dropouts with family formation plans possibly postpone labour market entry or alternative educational activities to later stages of their life courses. Due to data limitations we had no possibility to disentangle these mechanisms. We therefore have to keep in mind these points when interpreting the results.

Authors' contributions

Both authors substantially contributed to the conception and design, data preparation and analysis, interpretation of results and to drafting and editing the manuscript. Both authors read and approved the final manuscript.

Author details

¹ University of Mannheim/Mannheim Center for European Social Research, A5/6, 68159 Mannheim, Germany. ² University of Tübingen/LEAD Graduate School & Research Network, Gartenstraße 29a, 72074 Tübingen, Germany.

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Competing interests

The authors declare that they have no competing interests.

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¹⁰ One could argue that the type of higher educational system might also serve as an important signal. Just like the field of study we cannot control for the type of higher educational system as it might vary between the higher education episode.

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