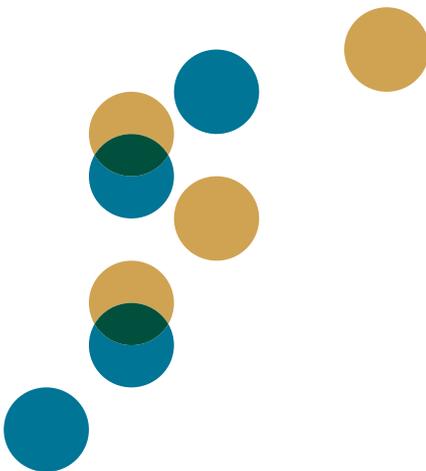


Working Paper



# Labour Market Outcomes of Higher-Education Dropouts in Germany

How Formal Vocational Qualifications  
Shape Education-To-Work Transitions  
and Occupational Status

Mirte Scholten, Nicole Tieben

Mirte Scholten

Nicole Tieben

# Labour Market Outcomes of Higher-Education Dropouts in Germany

How Formal Vocational Qualifications  
Shape Education-To-Work Transitions  
and Occupational Status

Arbeitspapiere – Working Papers

Nr. 168, 2017

Mannheimer Zentrum für Europäische Sozialforschung

**Scholten, Mirte:**

Labour Market Outcomes of Higher-Education Dropouts in Germany: How Formal Vocational Qualifications Shape Education-To-Work Transitions and Occupational Status / Mirte Scholten; Nicole Tieben. – Mannheim: 2017 (Arbeitspapiere - Mannheimer Zentrum für Europäische Sozialforschung; 168) ISSN 1437-8574

Not available in book shops.

Token fee: € 3,00

Purchase: Mannheimer Zentrum für Europäische Sozialforschung (MZES)

68131 Mannheim

[www.mzes.uni-mannheim.de](http://www.mzes.uni-mannheim.de)

**Editorial Notes:**

**Mirte Scholten** is a research associate in the MZES project 'Educational and Occupational Careers of Tertiary Education Drop-outs'. Her research focuses on higher-education non-completion, gender inequalities and labour market transitions.

**Nicole Tieben** is an external fellow of the MZES and principal investigator of the MZES Project 'Educational and Occupational Careers of Tertiary Education Drop-outs', which is funded by the German Science Foundation. Her current affiliation is as a Junior Research Group Leader at LEAD Graduate School & Research Network, University of Tübingen. She previously worked at the MZES as a Research Fellow. Her main research interests are in the field of social inequality and mobility and education.

**Acknowledgments**

This paper greatly benefitted from helpful comments and methodological advice of Irena Kogan, Michael Gebel, Andreas Horr, Sylke Schnepf, Felix Weiss and Markus Weißmann. We also thank the participants of the session "Drop out from Tertiary Education – Life Courses and Returns to Human Capital" on the XVIII ISA World Congress of Sociology in Yokohama 2014, for the discussion of an earlier draft of this paper.

This paper uses data from the National Educational Panel Study (NEPS): Starting Cohort 6 – Adults (Adult Education and Lifelong Learning), doi:10.5157/NEPS:SC6:3.0.1. The NEPS data collection is part of the Framework Programme for the Promotion of Empirical Educational Research, funded by the German Federal Ministry of Education and Research and supported by the Federal States. The work on this paper has been generously funded by the German Research Foundation within the Priority Programme 1646 "Education as a lifelong process".

## Abstract

In Germany, almost 15 per cent of all first-year students leave higher education without obtaining a degree (Tieben 2016). The German post-secondary education system is tracked, however, and many dropouts enter the labour market with additional non-tertiary vocational training certificates. We therefore examine whether higher education dropouts benefit from additional vocational qualifications obtained outside higher education and whether vocational credentials can serve as a 'safety net'. On the basis of data from the German National Educational Panel Study survey 'Starting Cohort 6', this study employs Cox and OLS regression models to analyse the transition to a stable occupation as well as the occupational status of the first stable job. We find that higher education dropouts without formal vocational training certificates have more difficulties finding a stable job compared to applicants with formal vocational qualifications. We therefore conclude that additional vocational training certificates do serve as a safety net in case of drop out, because it prevents protracted pathways to stable occupations. Comparing the occupational status of dropouts with and without additional vocational training certificates, we do not find evidence for additional returns on vocational certificates.

---

## Contents

---

1. Introduction	7
2. Previous research	7
3. The German post-secondary educational system	8
4. Theories on education-to-work transitions	9
5. Data and analytical approach	11
5.1 Data	11
5.2 Variables	12
5.2.1 Dependent Variables	12
5.2.2 Independent Variables	12
5.3 Analytical approach	13
6. Results	14
6.1 Entering a first stable job	14
6.1.1 Descriptive overview	14
6.1.2 Cox-Regressions	15
6.2 Occupational status: OLS regressions	17
7. Conclusions	18
8. References	19

---

## 1. Introduction

A considerable proportion of students leaves higher education without a degree and enters the labour market without formal vocational qualifications. Previous research has shown that higher education dropouts have a higher risk of being unemployed, working part-time or on fixed term contracts and that they on average earn 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 in higher education have obtained a formal vocational training degree before entering higher education (Autorengruppe Bildungsberichterstattung 2014). This 'double qualification' usually serves to enhance labour market opportunities or to bridge waiting periods (e.g. when entrance restrictions prevent an immediate transition to the desired course), but it is also used as a risk-mitigating strategy among students who expect a certain risk of failure in higher education (Büchel and Helberger 1995, Pilz 2009). Yet, 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). The question whether 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. Considering the fact that many dropouts in Germany obtain non-tertiary vocational qualifications on top of their higher education episode, we examine if these formal 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 to a stable first employment, which indicates whether higher education dropouts have more difficulties in finding a job. Second, the occupational status of the first job, which indicates whether higher education dropouts without pre-tertiary vocational training are more likely to enter low-status jobs than dropouts with formal vocational qualifications.

---

## 2. Previous research

Although there is a large body of research examining returns to education, these studies generally focus on formal vocational qualifications, such as (upper/vocational) secondary and tertiary certificates. Yet, a number of researchers acknowledge that also higher education attendance without graduation may deliver labour market returns, 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 2014, Schnepf 2015, Stegmann and Kraft 1988). Reisel (2013), for example, shows that—in the United States—college attendance without graduation leads to higher incomes than high school graduation without college attendance (see also Bailey et al. 2004, Flores-Lagunes and Light 2007, Grubb 2002 for similar results in U.S. studies). However, the same study also reveals that Norwegian college dropouts obtain lower incomes than upper secondary education graduates. A longitudinal study in Serbia and Croatia (Matković and Kogan 2012) shows—for Serbia—that a 'late dropout' is associated with a quicker transition to the labour market and a higher occupational status, compared to early dropouts and job seekers with an upper secondary diploma who never entered higher education. For Croatia, no advantages associated with time spent in higher education are reported, though. Schnepf (2014, 2015) shows that—in Belgium, the Czech Republic, Denmark, the Netherlands, Poland, and Slovakia—university dropouts are more likely to hold professional and managerial positions than upper secondary education graduates who never entered higher education; however, this does not apply to 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 that they 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.

This summary of previous research shows some inconsistencies and open questions when it comes to the labour market transitions of dropouts, compared to reference groups that never entered higher education. In general, job seekers who dropped out of higher education seem to have a small advantage over job seekers who never entered higher education. We nevertheless suggest some aspects that deserve further scrutiny. In the U.S. American context, the labour market opportunities seem to depend on college enrolment or the time spent in higher education (Reisel 2013); Matković and Kogan (2012) report similar findings for Serbia. In Germany, on the contrary, the additional returns to time spent in higher education without graduating are low compared to individuals who never entered higher education (Stegmann and Kraft 1988). Existing literature does not take into account, however, that higher education dropouts may enter the labour market with formal vocational qualifications gained outside higher education. The German educational system, for example, provides ample 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.

### 3. The German post-secondary educational system

Access to higher education in Germany usually requires a higher education entrance certificate (*Abitur* or *Fachabitur*). Besides the traditional route to a higher education entrance certificate via general upper secondary education, there are several alternative pathways, and especially vocational upper secondary education can also result in obtaining entrance qualifications for higher education<sup>1</sup> (Schindler 2014). The most attended vocational track is the so-called dual or apprenticeship system, which combines formal schooling with on-the-job training in the form of in-firm apprenticeships (Müller et al. 1998, Walden and Trotsch 2011). The second, less frequented training type is the purely school-based vocational training. Vocational training typically is entered after graduation from lower secondary education. Students in vocational training can obtain a full or restricted higher education entry certificate at the end of the vocational training course, when they fulfil certain requirements. These requirements differ by federal state, but generally comprise extra lessons and exams in languages and maths. A full higher education entry certificate allows students to enter any type of higher education and any field of study, whereas a restricted higher education entry certificate either restricts the type of higher education (i.e. only access to university of applied sciences) or the field of study. Besides the traditional and vocational route to a higher education entrance certificate, it is also possible to obtain the entrance certificate in adult education, such as evening schools.

The German vocational training system is characterized by a relatively high degree of standardization and occupational specificity of the training schemes (Allmendinger 1989, Shavit and Müller 2000): The curricula, length of training, examination and certification are defined by the chambers of trade, industry and commerce, which ensures a high level of standardization and comparability. Furthermore, the vocational system conveys occupation-specific skills for defined occupations during a training phase of up to three and a half years. These skills are directly transferable to particular occupations and industries (for a comprehensive description, see Brauns 1998, Hamilton and Lempert 1996). This strong link between vocation-

<sup>1</sup> Entry requirements for higher education are given when a vocational training course with additional lessons from the general upper secondary curriculum was completed successfully.

al training and the labour market in Germany leads to a structured education-to-work transition and a direct close match between educational qualifications and labour market positions (Bol and Weeden 2014, Kerckhoff 2000, Shavit and Müller 1998). Consequently, graduating from vocational training in Germany is highly attractive as it usually results in good employment opportunities and high chances of a direct entry into a stable position within the same training company (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). In Germany, vocational training and higher education are not mutually exclusive, though, and a growing number of young adults obtain a double qualification. In many cases, this means that a vocational education graduate enters higher education (Hillmert and Jacob 2004, Jacob 2004). Currently, one-fifth of all higher education students have graduated from vocational training before entering higher education (Autorengruppe Bildungsberichterstattung 2014). Büchel and Helberger (1995) discuss that double qualification is a deliberate education strategy especially among general upper secondary education graduates. They suggest that these students expect better job opportunities after graduation from higher education on the one hand and regard the formal vocational qualification as a safety net in case of failure in higher education on the other hand. Tieben (2016) shows that students with pre-tertiary vocational qualifications have a slightly higher risk of leaving higher education without a degree, so that 40 percent of all dropouts possess a formal (non-tertiary) vocational qualification at the time of leaving higher education. Another 25% of all dropouts enter vocational training after deregistration from higher education and obtain a formal vocational certificate within 5 years after dropping out. This may explain why Stegmann and Kraft (1988) do not find large differences in the labour market returns of dropouts compared to general upper secondary education graduates who did not enter higher education in their German sample, whereas these differences are more marked in other countries (Kane and Rouse 1995, Matković and Kogan 2012, Reisel 2013, Schnepf 2014, Schnepf 2015). We therefore suggest that additional vocational qualifications should be taken into account when examining the labour market transitions of dropouts.

---

#### 4. 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 (Becker 1964, Bowman 1966, Mincer 1958, Mincer 1989, Schultz 1962) assume that educational investments result in skills which increase productivity and that applicants who graduated from higher education thus achieve higher returns in the labour market than those with lower educational attainment. Especially in economics, the human capital assumption is tested by modelling effects of time spent in education and degree completion on returns to education simultaneously (e.g. Antelius 2000, Arkes 1999, Bauer et al. 2005, Bol and van de Werfhorst 2011, Flores-Lagunes and Light 2010, Groot and Oosterbeek 1994, Layard and Psacharopoulos 1974). Other researchers model the time spent in higher education to capture the accumulation of human capital in non-completed higher education episodes (Matković and Kogan 2014, Matković and Kogan 2012). However, this approach has the disadvantage that a longer persistence in higher education captures delays which can be caused for example by poor performance, part-time enrolment or family obligations. Besides, the assumption that time spent in higher education before dropout results in human capital which can be transferred to the labour market remains questionable because it does not convey clear information about the student's actual course commitment and learning progress (Groot and Oosterbeek 1994).

The human capital approaches have generally been criticised for assuming that employers draw conclusions about the productivity of job applicants from the time they spent in the educational system (Rosen-

baum 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, gender, age, work experience, unemployment duration or other personal characteristics. These observable characteristics are termed 'signals' (Spence 1973). Yet, it is rarely discussed whether higher education non-completion serves as a signal in the recruiting process and whether 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, but also for a lack of non-cognitive skills like perseverance and goal commitment (Heckman and Rubinstein 2001). Future employers might therefore consider hiring dropouts a risky investment, as these might be likely to show these characteristics in the job as well. Arrow (1973), on 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 graduate. In order to solve this contradiction, Thurow's (1975) notion of 'queuing' might be helpful: Employers rank applicants according to their observable characteristics and prefer those who rank highest. Given the fact that higher education dropouts are likely to search jobs in the skilled labour market, they probably compete with higher education graduates and applicants who never entered higher education, but graduated from non-tertiary vocational training. In this ranking, higher education graduates should therefore have a large competitive edge over dropouts. However, if we compare the relative position of dropouts and applicants who never entered higher education, the negative signal of being a dropout may be counteracted by the positive signal of having entered higher education at all.

As outlined above, the vocational training system plays an important role in Germany and has been highly debated in social sciences. Vocational training, as an alternative to higher education, may easily divert students from aspiring to higher education and achieving higher returns in the labour market (Hillmert and Jacob 2003, Vanfossen et al. 1987). Shavit and Müller (2000) however, come to the conclusion that vocational training is a highly attractive 'safety net' that guarantees smooth transitions into the labour market and stable occupational careers, especially in countries with high occupational specificity. Nevertheless, it has largely been neglected in previous research that vocational training and higher education are not mutually exclusive and that 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). Büchel and Helberger (1995) assume that an 'insurance strategy' of these double qualifiers is at work in the German educational system, as they hope to benefit from their vocational skills during higher education and in the labour market. Besides, vocational training certificates may also serve as fall back option in case of higher education dropout. A number of studies (Büchel and Helberger 1995, Hammen 2011) conclude that a vocational training certificate does not result in additional labour market returns for successful graduates, but the assumption of vocational training as 'insurance' in case of higher education non-completion has not been empirically tested yet. As outlined above, a large proportion (i.e. 40%) of German dropouts obtains formal vocational qualifications before entering higher education (Tieben 2016). This raises the question whether higher education dropouts with pre-tertiary vocational credentials can profit from their formal vocational qualifications and have advantages in the labour market transition compared to dropouts without formal vocational qualifications. The signalling value of formal vocational qualifications in the recruitment process depends on the structure of the educational system and the labour market—or rather on the link between these two (Allmendinger 1989, Gangl 2003, Shavit and Müller 2000, van de Werfhorst 2011, Wolbers 2003). As discussed above, the German labour market can be regarded as being highly credentialist due to its strong linkage between vocational education and the labour market.<sup>2</sup> Because of the high

---

<sup>2</sup> In addition, high occupational positions, for example in the civil service or in traditional professions such as teachers, medical doctors, lawyers and the clergy, can only be obtained with a specific higher education diploma.

specificity of the German vocational training system, the signals sent by job seekers' formal vocational qualifications to prospective employers are particularly informative. Thus, we expect that higher education dropouts profit from vocational qualifications in their labour market transition: They should have fewer difficulties finding a job than higher education dropouts without a vocational training degree (Hypothesis 1). Furthermore, as a vocational training degree opens the door to skilled employment (Soskice 1994, Wolbers 2007), higher education dropouts with a vocational training degree are expected to obtain higher occupational status positions than higher education dropouts without a vocational training certificate (Hypothesis 2).

---

## 5. Data and analytical approach

---

### 5.1 Data

For our empirical analyses we rely on the starting Cohort 6 'Adult Education and Lifelong 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 respondents born in Germany between 1944 and 1986.<sup>3</sup> In order to ensure maximal comparability of individuals in the analytic sample, we selected respondents who have obtained a general upper secondary leaving certificate, either by graduating from general upper secondary education (*Abitur* or *Fachabitur*) or by alternative routes, such as vocational upper secondary education or evening schools. Students from universities of cooperative education (*Berufsakademie*), business academies (*Wirtschaftsakademien*) and academies of public administration (*Verwaltungsakademien*) were excluded, because they usually pursue programmes that combine employment and formal training and therefore cannot be clearly assigned to either vocational training or higher education. Apart from that, the case numbers are not sufficient to treat them separately. As the paper focuses on the education-to-work transition of higher education dropouts, we also removed persons in parental leave or other types of inactivity, e.g. military service, from our sample. The basic assumption of this exclusion is that these respondents are not actively searching for a job or are unavailable for the labour market. Thus, including them would result in biased estimators of the average job search duration. We excluded respondents who were older than 36 years at the time of leaving higher education in order to capture only those who are actually searching for their first stable job. To ensure that the results are not biased by specific educational and labor market context effects of former East Germany, we deleted respondents who obtained their higher education entrance certificate in former East Germany before 1989. Furthermore, we excluded individuals who obtained their higher education entrance qualification outside Germany or who studied abroad. To maintain the largest possible sample size, we handled missing data with multiple imputation techniques, which take full advantage of the available data and avoid some of the bias in standard errors and test statistics that can accompany listwise deletion.<sup>4</sup> The final sample comprises 4,748 cases.

---

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

4 For respondents who had at least one non-missing value on any of the variables in the analysis, missing data was imputed using chained equations (White et al. 2011). Dependent variables were not imputed.

---

## 5.2 Variables

### 5.2.1 Dependent Variables

We measured the education-to-work transition of post-secondary education leavers in two versions: The first is a binary variable that indicates whether a respondent enters his/her first stable job. Following common definitions (Noelke et al. 2012), we define the first stable job as an occupation that lasts at least six months with a minimum of 20 hours of work per week. The advantage of using the first stable job instead of any first job is that we omit short employment episodes such as trainee positions and internships as well as periods of early career instability. This approach makes it more likely to capture the first meaningful employment relationship. The second dependent variable is a metric variable measuring the occupational status of the first stable job. In our sample, the scale of the status scores ranges from 12 to 89. We distinguished the probability of entering a first stable employment and the occupational status of the first stable job because we assume that analysing the probability of entering first employment only partly describes the process of labour market integration. Post-secondary education leavers might, for example, 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 in order to avoid unemployment (Scherer 2005, Wolbers 2007). To rule out this possibility, we took a closer look at the occupational status of the first stable employment in a second step.

### 5.2.2 Independent Variables

Our main independent variable is educational attainment. As the paper focuses on the difference between dropouts with and without pre-tertiary vocational training, we considered restricting the sample to dropouts and comparing only higher education dropouts with and without additional vocational credentials. However, this strategy bears the drawback that it is difficult to assess the actual magnitude of the coefficients in the models. We therefore include higher education graduates and vocational training graduates without higher education experience to facilitate a meaningful evaluation of our results. We hence distinguish four groups: (1) students who graduated from vocational training but never entered higher education, (2) students who dropped out of higher education but 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 such as the highest educational level of the parents, sex and age at deregistration. 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 duration until they receive a satisfactory job offer. This prolongs the education-to-work transition but at the same time optimises the job match. 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, we introduce a metric variable for age at deregistration. Furthermore, we control for the GPA of the general upper secondary education exam to take differences in competence levels into account. 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 a higher education entrance qualification and entering a 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. For further definitions of the independent variable and basic descriptive information, see Table 1.

**Table 1: Description and basic descriptive statistics of variables**

Variable	N	%	Description
<b>Educational attainment</b>			
Vocational training certificate	1345	28.33	Graduated from vocational training but never entered higher education
Higher education dropout without pre-tertiary vocational training	378	7.96	Dropped out of higher education but never graduated from vocational training
Higher education dropout + pre-tertiary vocational training	119	2.51	Dropped out of higher education but graduated from vocational training before entering higher education
Higher education degree	2906	61.20	Graduated from higher education, double qualification included
<b>At least one parent higher education</b>			
No	2308	48.61	Education of the parents
Yes (=1)	2440	51.39	
Age at deregistration	4748	25.66 (mean)	Age when leaving post-secondary education (metric variable)
<b>Sex</b>			
	2370	49.92	Female
	2378	50.08	Male (=1)
Upper secondary final GPA	4748	2.48 (mean)	GPA of the highest secondary school exam (Abitur) (metric variable, from 1 'very good' to 6 'insufficient')
<b>Work experience</b>			
No	3779	79.59	Employed at least 20 hours per week (occasional jobs and work experience gained during vocational training excluded)
Yes	969	20.41	
<b>Education-leaving cohort</b>			
1964–1984	1154	24.30	Year of leaving post-secondary education
1985–1994	1431	30.14	
1995–2004	1193	25.13	
2005–2014	970	20.43	
<b>Stable employment</b>			
No	808	17.02	Number of respondents who find a stable employment position within the observation period
Yes	3949	82.98	
N	4748	100.00	

### 5.3 Analytical approach

We apply event-history models and set the observation period to 48 months, beginning at the time of leaving the education system. Individuals who did not enter the labour market before the interview took place or within 48 months after leaving education are treated as right-censored. In a first step, we describe the transition from education to a first stable job depending on the educational attainment. 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 (Cox 1972). We chose the Cox model because it allows us to take right-censored cases into account and avoid bias caused by cases that 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 (Blossfeld et al. 2007). Since 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.<sup>5</sup> 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 deregistration. As these individuals are unavailable for the labour market for at least two 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 a second step, we select respondents who successfully entered the labour market and conduct ordinary least squares (OLS) models to predict the occupational status of the first stable job.

---

## 6. Results

---

### 6.1 Entering a first stable job

#### 6.1.1 Descriptive overview

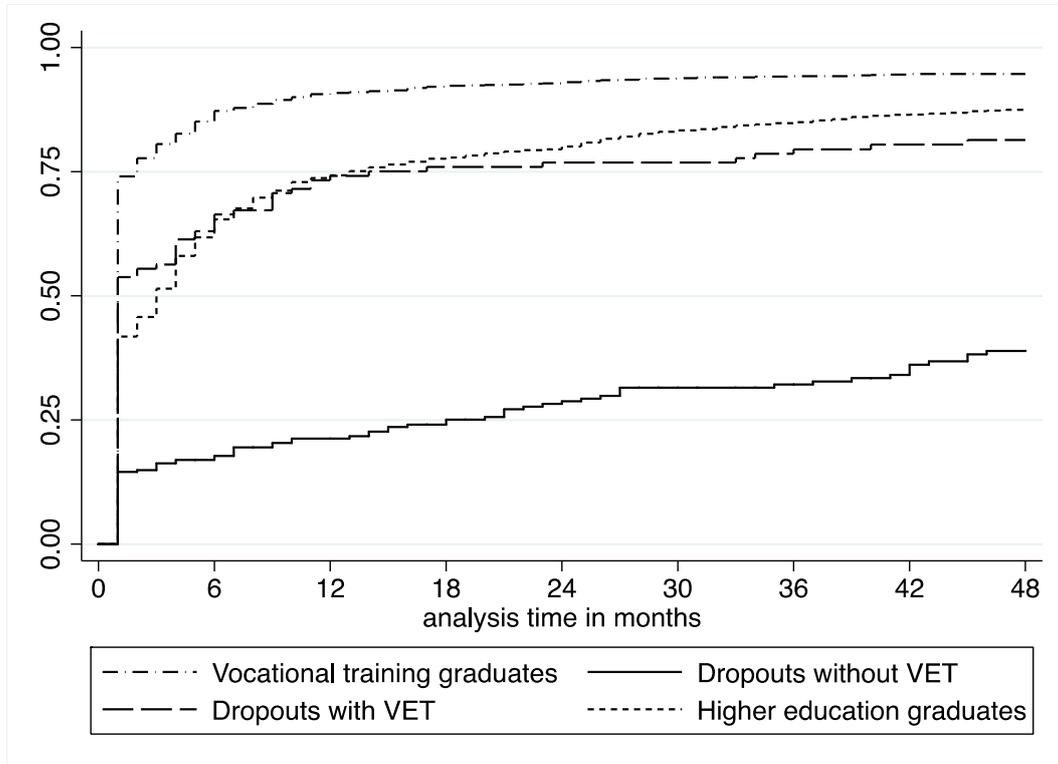
To get a first impression of how the transition patterns into a first stable job differ by post-secondary educational attainment, we estimate failure functions using the Kaplan-Meier method. The failure curves in Figure 1 show the cumulative proportion of individuals who entered a stable job at time  $t$  after leaving education, by educational attainment. The failure curves show how important it is to take additional formal vocational qualifications of dropouts into account. We split the group into dropouts with and without additional vocational qualifications and observe that dropouts who did not graduate from pre-tertiary vocational training have a high risk of remaining without a stable job (less than 50% actually enter a stable job within 48 months). Conversely, dropouts with vocational qualifications have considerably better chances of entering a stable job: Approximately 50% of the higher education dropouts with a vocational training degree enter a stable job immediately after leaving the educational system and three out of four dropouts make the transition within the first year. Their transition rates are thus comparable to those of higher education graduates. This indicates that additional vocational qualifications can serve as a safety net for higher education dropouts and protect them from remaining unemployed or in precarious job situations. For the higher education graduates, we observe a similar transition pattern—although an immediate transition occurs slightly less often. This is probably due to the fact that this group is more likely to enter a transition or orientation period after graduation. It is also likely that entering the first job is deliberately postponed among higher education graduates and that they 'take some time off' or do an internship before entering the working world. Many higher education dropouts, on the contrary, probably postpone the deregistration until they find a job, which possibly explains that they are more likely than graduates to enter a stable job 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 stable job within 48 months is below 5%. This is not surprising in the German context, because vocational training

---

5 Since the basic assumption of the Cox model is that the hazard rate does not differ by subgroups of the population during the observation period (Blossfeld et al. 2007), we conduct a statistical test 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 are calculated, which allow for interaction between duration and level of education. We find that the hazard rates differ by time in the first 6 months after leaving the educational system. However, the overall effect remains 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 are available from the authors). Therefore, we keep to the Cox proportional hazards regression model. 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 graduates' different transition patterns from vocational training and higher education, as further elaborated in the results and conclusions sections of this paper.

usually takes place as in-firm apprenticeship and employers have an interest in keeping apprentices in their companies after graduation.

**Figure 1: Transition to first stable job—Kaplan Meier failure curves across 48 months after leaving the educational system**



### 6.1.2 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. By doing so, we can identify the returns for higher education graduates as well as for dropouts with and without 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 additional 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. All other groups have significantly lower transition rates compared to vocational training graduates. The results also indicate that dropouts without additional vocational training have the lowest transition rate by far. In Model 1b we observe that the disadvantage of dropouts without formal vocational qualifications compared to dropouts with a vocational degree is significant. As

expected in our Hypothesis 1a, we can conclude that a formal vocational qualification seems to buffer the disadvantages of being a dropout by smoothing the transition from education to the labour market. It seems that vocational training qualifications serve as a stronger signal than higher education experiences.

Although the control variables do not explain much of the group differences presented in the Kaplan Meier failure curves, we would like to stress that upper secondary GPA does not seem to have an influence on 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 effects of work experience and social background, however, are somewhat surprising—but we only can speculate about the reasons; they might, for example, be due to the higher status expectations of the respondents and their parents. Respondents with work experience or highly educated parents might not seize the very first job opportunity but instead take their time to find an occupation that meets their own expectations and that of their parents. Furthermore, we also find that the hazard ratio is lower in younger cohorts than in older cohorts.<sup>6</sup> This is in line with research showing that labour market transitions comprise longer periods of orientation and instable labour market perspectives in recent cohorts (Buchholz and Kurz 2008, Gebel 2009, Scherer 2005).

**Table 2: Results of the Cox proportional hazards regression model for the transition into the first stable job**

	Model 1a Cox		Model 1b Cox	
	Hazard ratios	z	Hazard ratios	z
<b>Educational attainment</b>				
Vocational education and training degree	<i>Ref.</i>	<i>(Ref.)</i>	6.64***	(17.80)
Higher education dropout + pre-tertiary vocational training	0.65***	(-3.97)	4.30***	(10.22)
Higher education dropout without pre-tertiary vocational training	0.15***	(-17.80)	<i>Ref.</i>	<i>(Ref.)</i>
Higher education degree	0.67***	(-9.03)	4.48***	(14.83)
At least one parent higher education degree (yes = 1)	0.90**	(-3.14)	0.90**	(-3.14)
Age at deregistration	0.99	(-1.14)	0.99	(-1.14)
Sex (male = 1)	1.20***	(5.45)	1.20***	(5.45)
Upper secondary final GPA	0.97	(-0.92)	0.97	(-0.92)
Work experience	0.61***	(-11.40)	0.61***	(-11.40)
<b>Education-leaving cohort</b>				
1964–1985	1.10	(1.86)	1.10	(1.86)
1986–1995	1.27***	(4.99)	1.27***	(4.99)
1996–2005	1.23***	(4.18)	1.23***	(4.18)
2006–2013	<i>Ref.</i>	<i>(Ref.)</i>	<i>Ref.</i>	<i>(Ref.)</i>
N	4748		4748	

Notes: Hazard ratios; z statistics in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

<sup>6</sup> Due to the small subsamples, it is not productive to test for cohort effects. However, running the analyses separately for each group of cohorts shows relatively stable estimators across cohorts. We can therefore exclude the possibility of significant interactions between cohort and our central independent variables. The same also holds for the subsequent analyses.

## 6.2 Occupational status: OLS regressions

The results from the cox-models show the hazard ratios of higher education dropouts and give an overview of how successfully the different occupational groups enter their first stable job. From the hazard ratios, we can hardly draw conclusions about a job applicant's actual 'attractiveness' to employers or about their human capital, however. This is because an applicant who does not succeed in obtaining the most desired job is likely to enter less attractive positions instead of extending the search until he is offered the desired job. Therefore, we run linear regression models comparing the occupational status (ISEI) of first job entrants with different educational outcomes.<sup>7</sup> In table 3 we observe 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 diplomas. Against our Hypothesis 2, 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 vocational training qualifications. The results in Model 2b even indicate that dropouts without formal vocational qualifications obtain slightly higher occupational positions than dropouts with a vocational training degree. Nonetheless, an additional formal vocational qualification does not improve the occupational status of the first stable job nor does a non-completed higher education episode lower the occupational status of the first job.

**Table 3: Results of the ordinary least square model for the occupational status of the first stable job**

	Model 2a OLS – ISEI		Model 2b OLS – ISEI	
	Coef.	t	Coef.	t
<b>Educational attainment</b>				
Vocational education and training degree (only VET)	<i>Ref.</i>	( <i>Ref.</i> )	-2.50	(-1.55)
Higher education dropout + VET	-2.16	(-1.32)	-4.66*	(-2.15)
Higher education dropout	2.50	(1.55)	<i>Ref.</i>	( <i>Ref.</i> )
Higher education degree	21.52***	(32.68)	19.02***	(12.23)
At least one parent HE degree (yes = 1)	0.98*	(1.97)	0.98*	(1.97)
Age at deregistration	0.44***	(4.57)	0.44***	(4.57)
Sex (male = 1)	-1.16*	(-2.32)	-1.16*	(-2.32)
Upper secondary final GPA	-2.54***	(-4.96)	-2.54***	(-4.96)
Work experience	-0.96	(-5.18)	-0.96	(-5.18)
<b>Education-leaving cohort</b>				
1964–1985	2.77***	(3.56)	2.77***	(3.56)
1986–1995	0.87	(1.19)	0.87	(1.19)
1996–2005	0.41	(0.55)	0.41	(0.55)
2006–2011	<i>Ref.</i>	( <i>Ref.</i> )	<i>Ref.</i>	( <i>Ref.</i> )
Constant	42.87***	(17.02)	42.87***	(17.02)
N	3813		3813	

Notes: *t* statistics in parentheses; ISEI = Standard International Socio-Economic Index of Occupational Status; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

7 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.

Similar to the first models the most important results for the control variables can be summarized as follows: Parental education has a marginally significant positive effect on 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 gender effect 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). Furthermore, low grades in the upper secondary final exam result in lower job positions, and respondents from the oldest cohort obtain higher occupational positions than respondents from the youngest cohort. With regard to the latter, educational requirements for the workforce has changed in the last decades due to the rapid technological and organisational change. As a consequence, the average occupational status decreases in later cohorts (Jacob et al. 2013, Müller et al. 1998).

---

## 7. 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 a considerable share of dropouts in Germany obtains additional formal vocational qualifications, we particularly aimed to answer the question whether vocational qualifications serve as a safety net in case of higher education non-completion. In contrast to prior research, we did not only compare labour market outcomes of higher education dropouts and graduates but enlarged our comparison group to vocational training graduates without higher education experiences and also distinguished between higher education dropouts with and without vocational qualifications.

In line with common labour market theories, we assumed that the matching 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 whether higher education dropout signals a lack of ability and non-cognitive skills, as proposed by Heckman and Rubinstein (2001), or whether enrolment in higher education as such is considered as a positive signal (Arrow 1973). As Germany is known for its highly credentialist labour market, we expected dropouts to have large disadvantages in the labour market transitions compared to job seekers with formal vocational qualifications. As suggested by Büchel and Helberger (1995), dropouts can profit from formal vocational qualifications as safety net. We therefore proposed that dropouts with formal vocational qualifications should have better chances to enter stable employment (H1) and achieve a higher occupational status in the first stable employment (H2). We confirmed Hypothesis 1, but, surprisingly, the dropouts without formal vocational qualifications achieve status scores that are comparable to those of graduates from vocational training. Our conclusions are therefore as follows: Entering the German labour market without formal vocational qualifications is risky. Employers indeed seem to rely on these signals when screening potential candidates for a vacancy. Regarding this, vocational training indeed serves as a safety net in case of dropout. On the other hand, we also observe that only a completed higher education degree results in higher status scores among the successful candidates, whereas we do not find large differences between dropouts with and without vocational qualifications and candidates who never entered higher education. At first sight, it thus does not seem to matter which route through the educational system is taken, because detours and vocational qualifications do not seem to make a difference on terms of later occupational status.

Still, the reasons for the non-existent labour market disadvantages of dropouts need to be further examined. We may only speculate that the dropouts who do succeed possess certain characteristics that are beneficial in the labour market. We know, for example, that dropout rates in STEM subjects are particularly high and that STEM dropouts are highly requested in the labour market (see Becker et al. 2010 for a quali-

tative study examining this issue). The high occupational status of dropouts without formal vocational qualifications could therefore be driven by this group to a large extent. Single case analyses indeed show that many higher education dropouts with high occupational positions ultimately work as engineer or managers of medium-sized companies. We therefore suggest that they could have been lured away from higher education by attractive exit options in the labour market. It would hence be sensible to control for 'field of study', which we did not do in this study for the following reasons: First, 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. Therefore, field of study is not necessarily constant across the entire higher education episode before dropout.<sup>8</sup>

Besides, it would be desirable to know more about the reasons for dropping out of higher education, as the group of dropouts is not homogenous: Some may leave higher education due to their low performance and/or a lack of motivation, whereas others may 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 is therefore 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 also need to consider gender differences, as female dropouts with plans for family formation might postpone labour market entry or alternative educational activities to later stages of their life courses. Due to data limitations, we did not have the possibility to disentangle these mechanisms, though. We therefore have to keep these points in mind when interpreting the results.

## 8. References

- Allmendinger, J. (1989). "Educational systems and labor market outcomes", *European Sociological Review*, 5(3), 231-250.
- Allmendinger, J., Kleinert, C., Antoni, M., Christoph, B., Drasch, K., Janik, F., Leuze, K., Matthes, B., Polak, R., and Ruland, M. (2011). "Adult education and lifelong learning", *Zeitschrift für Erziehungswissenschaft*, 14, 283-299.
- Antelius, J. (2000). *Sheepskin Effects in the Returns to Education: Evidence on Swedish Data*, Stockholm: Trade Union Institute for Economic Research.
- Antoni, M., Drasch, K., Kleinert, C., Matthes, B., Ruland, M., and Trahms, A. (2010). *Arbeiten und Lernen im Wandel. Teil I: Überblick über die Studie*, Bundesagentur für Arbeit: FDZ Methodenreport, 05/2010.
- Arkes, J. (1999). "What do educational credentials signal and why do employers value credentials?", *Economics of Education Review*, 18(1), 133-141.
- Arrow, K. J. (1973). "Higher education as a filter", *Journal of Public Economics*, 2, 193-216.
- Aßmann, C., Steinhauer, D.-V. H. W., Kiesl, H., Koch, D.-P. S., Schönberger, D.-S. B., Müller-Kuller, D.-S. A., Rohwer, G., and Rässler, S. (2011). "Sampling designs of the National Educational Panel Study: challenges and solutions", *Zeitschrift für Erziehungswissenschaft*, 14(2), 51-65.
- Autorengruppe Bildungsberichterstattung (2014). *Bildung in Deutschland 2014. Ein indikatorengestützter Bericht mit einer Analyse zur Bildung von Menschen mit Behinderungen*. Bielefeld: W. Bertelsmann Verlag.

<sup>8</sup> 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 episodes.

- Bailey, T., Kienzl, G., and Marcotte, D. E. (2004). *The Return to a Sub-Baccalaureate Education: The Effects of Schooling, Credentials and Program of Study on Economic Outcomes*, Washington: U.S. Department of Education.
- Bauer, T. K., Dross, P. J., and Haisken-DeNew, J. P. (2005). "Sheepskin effects in Japan", *International Journal of Manpower*, 26(4), 320–335.
- Becker, C., Grebe, T., and Bleikertz, T. (2010). *Berufliche Integration von Studienabbrechern vor dem Hintergrund des Fachkräftebedarfs in Deutschland*, Berlin: Gesellschaft für Innovationsforschung und Beratung GmbH.
- Becker, G. S. (1964). *Human Capital. A Theoretical and Empirical Analysis, with Special Reference to Education*, New York: NBER.
- Bills, D. B. (2003). "Credentials, signals, and screens: explaining the relationship between schooling and job assignment", *Review of Educational Research*, 73(4), 441–469.
- Blossfeld, H.-P., Golsch, K., and Rohwer, G. (2007). *Event History analysis with Stata*, London: Erlbaum, Taylor & Francis Group.
- Blossfeld, H.-P., Roßbach, H.-G., and Maurice, J. v. (2011). "Education as a lifelong process—the German National Educational Panel Study (NEPS)", *Zeitschrift für Erziehungswissenschaft*, 14(2).
- Bol, T., and van de Werfhorst, H. G. (2011). "Signals and closure by degrees: the education effect across 15 European countries", *Research in Social Stratification and Mobility*, 29(1), 119–132.
- Bol, T., and Weeden, K. A. (2014). "Occupational closure and wage inequality in Germany and the United Kingdom", *European Sociological Review*, 1–16.
- Bowman, M. J. (1966). "Human investment revolution in economic thought", *Sociology of Education*, 39(2), 111–137.
- Brauns, H. (1998). "Vocational education in Germany and France", *International Journal of Sociology*, 28(4), 57–98.
- Büchel, F., and Helberger, C. (1995). "Bildungsnachfrage als Versicherungsstrategie", *Mitteilungen aus der Arbeitsmarkt-und Berufsforschung*, 28(1), 32–42.
- Buchholz, S., and Kurz, K. (2008). "A new mobility regime in Germany? Young people's labour market entry and phase of establishment since the mid-1980s", in Blossfeld, H.-P. et al. (eds.), *Young Workers, Globalization and the Labor Market. Comparing Early Working Life in Eleven Countries*. Cheltenham, UK/Northampton: Edward Elgar, 51–75.
- Cox, D. R. (1972). "Regression models and life-tables", *Journal of the Royal Statistical Society*, 34(2), 187–220.
- Davies, R., and Elias, P. (2003). *Dropping Out: A Study of Early Leavers From Higher Education*, Department for Education and Skills (Research Report RR386).
- Flores-Lagunes, A., and Light, A. (2007). *Interpreting Sheepskin Effects in the Returns to Education*, Princeton: Princeton University.
- Flores-Lagunes, A., and Light, A. (2010). "Interpreting degree effects in the returns to education", *Journal of Human Resources*, 45(2), 439–467.
- Gangl, M. (2003). "The structure of labour market entry in Europe: a typological analysis", in W. Müller and M. Gangl (eds.), *Transitions from Education to Work in Europe: The Integration of Youth Into EU Labour Markets*, Oxford, New York: Oxford University Press, 107–128.

- Ganzeboom, H. B. G., de Graaf, P. M., and Treiman, D. J. (1992). "A standard international socio-economic index of occupational status", *Social Science Research*, 21(1), 1–56.
- Gebel, M. (2009). "Fixed-term contracts at labour market entry in West Germany: Implications for job search and first job quality", *European Sociological Review*, 25(6), 661–675.
- Griesbach, H., Lewin, K., and Schacher, M. (1977). *Studienverlauf und Beschäftigungssituation von Hochschulabsolventen und Studienabbrechern*, München: Hochschul-Informations-System.
- Groot, W., and Oosterbeek, H. (1994). "Earnings effects of different components of schooling—human capital versus screening", *Review of Economics and Statistics*, 76(2), 317–321.
- Grubb, W. N. (2002). "Learning and earning in the middle, Part I: National studies of pre-Baccalaureate education", *Economics of Education Review*, 21(4), 299–321.
- Hamilton, S. F., and Lempert, W. (1996). "The impact of apprenticeship on youth: a prospective analysis", *Journal of Research on Adolescence*, 6(4), 427–455.
- Hammen, A. (2011). *Mehrfachqualifikationen: Sprungbrett oder Umweg?*, München: Rainer Hampp Verlag.
- Heckman, J. J., and Rubinstein, Y. (2001). "The importance of non-cognitive skills: lessons from the GED testing program", *American Economic Review*, 91(2), 145–149.
- Hillmert, S., and Jacob, M. (2003). "Social inequality in higher education: Is vocational training a pathway leading to or away from university?", *European Sociological Review*, 19(3), 319–334.
- Hillmert, S., and Jacob, M. (2004). "Multiple episodes: training careers in a learning society", Bamberg: Otto-Friedrich University of Bamberg.
- Jacob, M. (2004). *Mehrfachausbildungen in Deutschland: Karriere, Collage, Kompensation?*, Wiesbaden: VS Verlag für Sozialwissenschaften.
- Jacob, M., Kleinert, C., and Kühhirt, M. (2013). "Trends in gender disparities at the transition from school to work: labour market entries of young men and women between 1984 and 2005 in West Germany", *Journal of Vocational Education & Training*, 65(1), 48–65.
- Johnes, J., and Taylor, J. (1991). "Non-completion of a degree course and its effect on the subsequent experience of non-completers in the labor market", *Studies in Higher Education*, 16(1), 73–80.
- Kane, T. J., and Rouse, C. E. (1995). "Labor-market returns to two- and four-year college", *The American Economic Review*, 85(3), 600–614.
- Kerckhoff, A. C. (2000). "Transition from school to work in comparative perspective", in M. T. Hallinan (ed.), *Handbook of the Sociology of Education*, New York: Kluwer Academic/Plenum Publ., 453–474.
- Kogan, I. (2011). "When informal is normal ... On the role of credentials and contacts for the job entry in Serbia", *Research in Social Stratification and Mobility*, 29(4), 445–458.
- Layard, R., and Psacharopoulos, G. (1974). "Screening hypothesis and returns to education", *Journal of Political Economy*, 82(5), 985–998.
- Leopold, T., Raab, M., and Skopek, J. (2013). *Starting cohort 6: Adult Education and Lifelong Learning (SC6). SUF version 1.0.0. Data manual. National Educational Panel Study*, Bamberg: University of Bamberg.
- Lewin, K., Heublein, U., Sommer, D., and Cordier, H. (1995). *Studienabbruch: Gründe und anschließende Tätigkeiten. Ergebnisse einer bundesweiten Befragung im Studienjahr 1993/94*, Hannover: Hochschul-Informations-System.

- Matković, T., and Kogan, I. (2014). "Relative worth of a bachelor degree Patterns of labour market integration among drop-outs and graduates in sequential and integrated tertiary education systems", *Acta Sociologica*, 57(2), 101–118.
- Matković, T., and Kogan, I. (2012). "All or nothing? The consequences of tertiary education non-completion in Croatia and Serbia", *European Sociological Review*, 28(6), 755–770.
- Mincer, J. (1958). "Investment in human-capital and personal income distribution", *Journal of Political Economy*, 66(4), 281–302.
- Mincer, J. (1989). "Human capital and the labor market: a review of current research", *Educational Researcher*, 18(4), 27–34.
- Müller, W., and Shavit, Y. (1998). "The institutional embeddedness of the stratification process: a comparative study of qualifications and occupations in thirteen countries", in Y. Shavit and W. Müller (eds.), *From School to Work*, Oxford: Oxford University Press, 1–48.
- Müller, W., Steinmann, S., and Ell, R. (1998). "Education and labour-market entry in Germany", in Y. Shavit and W. Müller (eds.), *From School to Work: A Comparative Study of Educational Qualifications and Occupational Destinations*, Oxford: Oxford University Press, 143–188.
- Noelke, C., Gebel, M., and Kogan, I. (2012). "Uniform inequalities—institutional differentiation and the transition from higher education to work in post-socialist Central and Eastern Europe", *European Sociological Review* 28(6), 704–716.
- Pilz, M. (2009). "Why Abiturienten do an apprenticeship before going to university: the role of 'double qualifications' in Germany", *Oxford Review of Education*, 35(2), 187–204.
- Reisel, L. (2013). "Is more always better? Early career returns to education in the United States and Norway", *Research in Social Stratification and Mobility*, 31(1), 1–20.
- Rosenbaum, J. E. (1986). "Institutional career structures and the social construction of ability", in J. G. Richardson (ed.), *Handbook of Theory and Research for the Sociology of Education*, New York: Greenwood, 139–171.
- Scherer, S. (2005). "Patterns of labour market entry—long wait or career instability? An empirical comparison of Italy, Great Britain and West Germany", *European Sociological Review*, 21(5), 427–440.
- Schimpl-Neimanns, B. (2004). "Zur Umsetzung des Internationalen Sozioökonomischen Index des beruflichen Status (ISEI)", *ZUMA-Nachrichten*, 54(28), 154–170.
- Schindler, S. (2014). *Wege zur Studienberechtigung—Wege ins Studium? Eine Analyse sozialer Inklusions- und Ablenkungsprozesse*, Wiesbaden: Springer VS.
- Schnepf, S. V. (2014). *Do Tertiary Dropout Students Really Not Succeed in European Labour Markets?*, Bonn: Institute for the Study of Labor (IZA Discussion Paper 8015).
- Schnepf, S. V. (2015). *University Dropouts and Labor Market Success. Dropping out of University Can Be More Advantageous Than Not Having Enrolled at All*, Bonn: IZA World of Labor 2015: 182.
- Schultz, T. W. (1962). "Reflections of investment in man", *Journal of Political Economy*, 70(5) (Part 2: Investment in Human Beings), 1–8.
- Shavit, Y., and Müller, W. (1998). *From School to Work: A Comparative Study of Educational Qualifications and Occupational Destinations*, Oxford: Oxford University Press.
- Shavit, Y., and Müller, W. (2000). "Vocational secondary education", *European Societies*, 2(1), 29–50.
- Skopek, J. (2013). *Starting cohort 6: Adult Education and Lifelong Learning (SC6). SUF version 3.0.1. Data manual. National Educational Panel Study*, Bamberg: University of Bamberg.

- Soskice, D. (1994). "Reconciling markets and institutions: The German apprentice system", in L. M. Lynch (ed.), *Training and the Private Sector*, Chicago and London: The University of Chicago Press, 25–60.
- Spence, M. (1973). "Job market signalling", *Quarterly Journal of Economics*, 87, 355–374.
- Stegmann, H., and Kraft, H. (1988). "Bestimmungsfaktoren für den Studienabbruch und Berufswege von Studienabbrechern", *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung*, 21(4), 498–511.
- Thurow, L. C. (1975). *Generating Inequality: Mechanisms of Distribution in the U.S. Economy*, New York: Basic Books.
- Tieben, N. (2016). *Studienverlauf, Verbleib und Berufsstatus von Studienabbrechern. LEAD-Expertise zum Datenreport des Bundesinstituts für Berufsbildung*, Bonn: BIBB.
- Tieben, N., and Rohrbach-Schmidt, D. (2014). "Die berufliche Höherqualifizierung in den Abschlussjahrgängen 1960-1999: Effekte der sozialen Herkunft und Folgen der Bildungsexpansion", *Sozialer Fortschritt*, 63(4/5), 117–123.
- van de Werfhorst, H. G. (2011). "Skill and education effects on earnings in 18 Countries: the role of national educational institutions", *Social Science Research*, 40(4), 1078–1090.
- Vanfossen, B. E., Jones, J. D., and Spade, J. Z. (1987). "Curriculum tracking and status maintenance", *Sociology of Education*, 60(2), 104–122.
- Walden, G., and Troltsch, K. (2011). "Apprenticeship training in Germany—still a future-oriented model for recruiting skilled workers?", *Journal of Vocational Education & Training*, 63(3), 305–322.
- White, I. R., Royston, P., and Wood, A. M. (2011). "Multiple imputation using chained equations: issues and guidance for practice", *Statistics in Medicine*, 30(4), 377–399.
- Wolbers, M. H. J. (2003). "Job mismatches and their labour-market effects among school-leavers in Europe", *European Sociological Review*, 19(3), 249–266.
- Wolbers, M. H. J. (2007). "Patterns of labour market entry: a comparative perspective on school-to-work transitions in 11 European countries", *Acta Sociologica*, 50(3), 189–210.