

Dropping out of Higher Education in Germany: Using Retrospective Life Course Data to Determine Dropout Rates and Destinations of Non-completers

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In recent years, the high rates of higher education dropout have raised attention of education research and policy makers in Germany. However, due to data privacy legislation, it remains challenging to obtain information about the individual progress of students through higher education and the destinations of non-completers. With conventional administrative or cross-sectional data, it is not possible to distinguish non-completion from dropout, so that it mostly has to remain unclear if non-completers reach graduation elsewhere. This contribution uses the retrospective life course data of the NEPS starting cohort 6 to empirically disentangle non-completion and dropout of full-time students in higher education. We discuss the methodological challenges of conventional approaches and show how the advantages of retrospective life course data can be exploited for higher education research. We furthermore examine the destinations of non-completers and dropouts as well as the labour market returns of dropouts, using sequence data analyses and multinomial logistic regressions. Our results show that conventional designs possibly are prone to overestimate dropout rates. Longitudinal analyses of destinations after dropout reveal that the permeability between vocational training and higher education is not unidirectional. Vocational training is a relevant absorber of higher education dropouts, but at the same time, vocational qualifications that were gained prior to higher education work as safety-net that buffers labour market risks of dropouts.

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1. Introduction

Dropping out of higher education gained increasing attention of education research and policy. The individual reasons for dropping out of higher education in Germany are fairly well-examined (for a recent overview see Neugebauer et al. (2019)). We nevertheless know little about the exact pathways into, through and out of higher education. Few studies suggest that dropouts do not seem to have problems entering the labour market (Becker et al. 2010; Schnepf 2017; Stegmann and Kraft 1988). Recent research reports that a vocational training certificate, which was gained prior to higher education, can act as a safety-net and prevent protracted transitions into the labour market (Scholten and Tieben 2017). Tieben (2020a) discusses the „paradoxical double buffer“ function of prior vocational training: A full qualification for the skilled labour market on the one hand can deliver skills, knowledge and experiences that are useful in higher education and prevent dropout (Tieben 2020b; Tieben and Knauf 2019). On the other hand, a full qualification can also act as pull-factor, because these students also have good alternatives in the skilled labour market, which may (for some) decrease the incentive to strive for a degree. Vocational training also seems to be an important absorbing state for students who dropped out of higher education (Daniel et al. 2019; Ebbinghaus et al. 2014; Heublein et al. 2018; Tieben 2016b). This illustrates how important it is to examine higher education dropout from a life course perspective and to consider previously acquired qualifications and destinations of students who leave higher education without a degree. Existing research largely ignores the complexity of the progression through the post-secondary education system. This is due to several reasons: First, the term ‘dropout’ is not defined in a consistent way throughout previous research, which may cause confusion regarding dropout and attrition rates. Second, life course-oriented dropout research calls for a particular data structure, which has not been available before the German National Education Panel Study (NEPS) was published.

This contribution will therefore start with a discussion of different methods of dropout and life course research and highlight some problems in the calculation of dropout rates with conventional data and methods. We then discuss how some of the issues can be tackled by using retrospective life course data, such as the NEPS starting cohort 6. This will be followed by data analyses that illustrate the application of such data for dropout research. The core research questions we aim to answer are the following:

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1. Which individual and institutional characteristics predict non-completion, re-entry and dropout of full time students?
 2. What are the short- and long-term destinations after non-completion and dropout?
 3. Which role do vocational qualifications play for non-completion and dropout?
 4. Which role do vocational qualifications play for the placement of dropouts in the labour market?

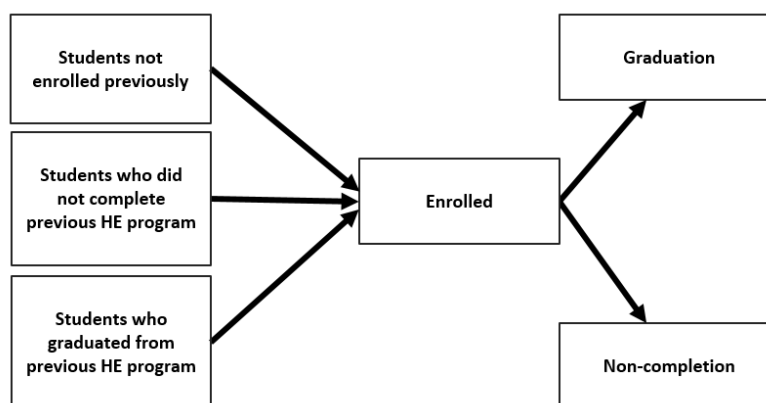
1.1. Definitions and methodological challenges

A program in higher education can be terminated with or without a graduation certificate. For this reason, dropout research often uses a binary (yes/no) dependent variable. However, when a course is terminated without graduation, this does not necessarily mean that the student leaves higher education without a degree. A considerable proportion remains in higher education or re-enters and transfers to another program or institution. This has led to conceptual ambiguities in the past and to the development of diverging terms, definitions, measurements and methodological approaches to determine dropout rates (Heublein et al. 2012; Hovdhaugen 2009; Ziegele 1997). Heublein et al. (2012) distinguish dropout and attrition rates: Following this definition, dropouts are students who entered higher education through matriculation but leave the higher education system without ever graduating. Students who transfer to another program or institution and students who enter a second course after having obtained a first degree, are excluded by the definition. The dropout rate hence is the ratio of students who entered and students who leave without degree. The attrition rate rather examines the outflow relative to a specific starting cohort, no matter if the starting cohort consists of genuine “freshmen”, students who transferred from another program or institution or of students who have gained a degree previously and entered a second course. Both definitions are legitimate and frequently used in higher education research. It is a question of the research objective, which of the measurements is adequate. For the decision, Schröder-Gronostay’s (1999) distinction between individual and institutional perspectives proved helpful, which will be summarized in the following section.

1.2. The institutional perspective (attrition)

From an institutional perspective it is primarily interesting, how many students who enrol in a particular program reach graduation in that program. These institutional graduation rates are relevant for program evaluation and quality management, but also for predictions of student in- and outflows and corresponding budget allocations (Klein and Stocké 2016; Tieben 2016a). From this perspective, the prior educational pathways and subsequent destinations of leaving students are of minor interest. For the calculation of institutional graduation rates, administrative data, collected by institutions, hence are suitable. Figure 1 shows how graduation rates and attrition rates can be calculated from the headcounts of enrolled students and those who graduated or not. The attrition rates reported by German official statistics are high and triggered initiatives to reduce student attrition in recent years. However, attrition rates do not always indicate institutional or individual problems. It is common practice to transfer to alternative programs or to enrol in comparable programs at alternative institutions during the course of higher education. This practice occurs often to gain access to particular programs with high admission restrictions, as it may be worthwhile to gain basic skills in similar, less restricted programs first and transfer after a while. For some students it pays off to enrol for gaining a student status, although they do not follow lessons or strive for a degree.

Figure 1. Calculation of attrition rates



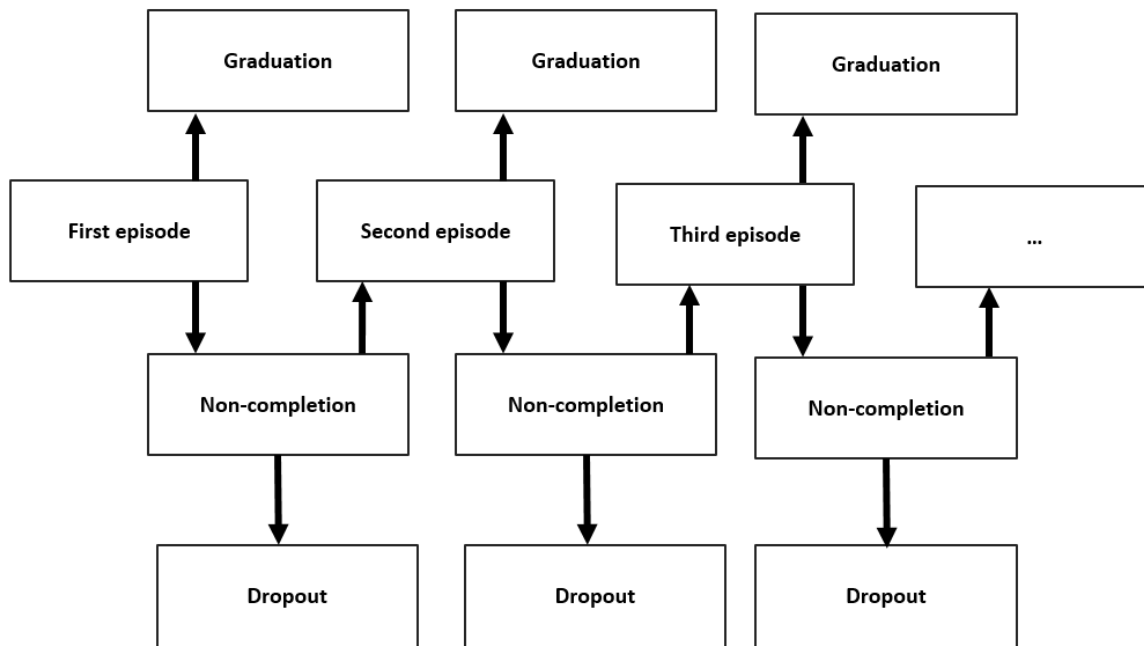
1.3. The individual life course perspective (dropout)

From an individual life course perspective, educational attainment is the result of a sequential decision process (Mare 1980). Following this logic, a higher education degree is the result of continuation decisions that also are made during enrolment (Goldrick-Rab and Pfeffer 2009; Haas and Hadjar 2020; Manski and Wise 1983; Tieben 2016a; 2020a). From this perspective,

pre-tertiary educational pathways, such as the type of the entrance certificate or vocational qualifications, gain relevance. Moreover, the sequential consideration of the progression through higher education allows the tracking of multiple study episodes, such as changes of field, type of degree or institution. The distinction between the institutional and the individual life course perspective allows us to distinguish (institutional) attrition rates from (individual) rates of non-completion and dropout. We also can identify relevant individual predictors of non-completion and dropout. Figure 2 shows the sequential progression through higher education. The first episode can result in graduation or non-completion. Whereas graduation is a final state, non-completion calls for a decision between continuing higher education in an alternative program (transfer) and dropping out. It is obvious that from this perspective the “dropout rate” deviates from the “attrition rate”. The same person can enrol, graduate and drop out more than once and these multiple episodes are aggregated for the calculation of attrition rates. The individual life course perspective takes the entire sequence of enrolment(s), non-completion and graduation into account and therefore allows a unique identification of the status as dropout¹. A major challenge in this approach is the definition of “transfer”: An increasing share of students does not complete the initially chosen program but transfers to the same type of program at another institution or to a different program within the same field of study. The diversification of study programmes and increasing student mobility hence can increase attrition and transfer rates even when the actual dropout rate remains stable. The application of clear definitions and detailed coding rules is of high importance (Tieben 2016a).

¹ In a strict sense, the status „dropout“ is a temporary one, because returning to higher education and graduation is possible throughout the entire life course.

Figure 2. Calculation of dropout rates



1.4. Research designs and data structures

In order to capture the complex higher education trajectories and the destinations after dropout, it is necessary to collect longitudinal data and to track students from enrolment until the final occupational placement. To this end, it is necessary that students receive a unique identifier at their first enrolment, which is transferred to all subsequent episodes in higher education. While this strategy is technically feasible and applied in most higher education systems, Germany implements a very strict data privacy protection legislation that did not allow the tracking of students across institutions until a reform that took effect in 2016. Currently, anonymized student trajectory data are only available for selected official reports of the federal statistical office. Scientific use files of student trajectory data are not available for research purposes and may not be merged with other individual data sources. It therefore is not possible to gain information about trajectories and destinations after exmatriculation from the centralized administrative data. In order to derive information about individual trajectories and dropout rates, it hence is necessary to use surveys. The following sections will briefly summarize different survey designs before we discuss the advantages of a retrospective life course survey, such as the NEPS Starting Cohort 6, for these purposes.

1.5. Exmatriculation surveys and prospective panel designs

In order to determine the destinations of students after non-completion, an exmatriculation survey can deliver valuable insights (Blüthmann et al. 2012; Heublein et al. 2017; Heublein et al. 2018; Schröder-Gronostay 2000), but in the German context, this method has two drawbacks. First, the samples of these surveys often are drawn from the administrative data of higher education institutions, but these deliver only contact information given by the students during administrative processes. Students who have left their institutions are hard to reach, because they are highly mobile and, in many cases, relocate to another address. Email-addresses and phone numbers are also unreliable, because of provider switches or because institutions assign internal email addresses that become invalid after exmatriculation. Moreover, these surveys come with all drawbacks of cross-sectional designs – researchers have to determine the field time and have only limited access to longitudinal information.

If we want to track the progression through higher education, including time-varying individual predictors of non-completion and dropout as well as the destinations after non-completion or dropout, we need a prospective panel design. The NEPS Starting Cohort 5 is an example for such a study: students were sampled and interviewed for the first time when they entered their first higher education episode in 2010/11 and yearly follow-ups ensure that the information is updated on a regular basis, even after graduation, non-completion or dropout. Such a prospective panel ideally would track the respondents for several years after leaving the educational system, so that labour market transition processes can be tracked until most respondents are placed in a stable employment. Such a panel is very comprehensive and flexible but has the disadvantage of being complex, time consuming and it comes with a high risk of panel attrition in the long run.

1.6. Retrospective life course data: NEPS Starting Cohort 6 as database for dropout research.

These drawbacks can be avoided with a retrospective life-course design. This design allows the collection of complete and detailed information about previous educational and occupational careers. A de facto cross-sectional design hence delivers longitudinal life course data of extended individual trajectories without the risk of massive panel attrition (Trahms et al. 2016). These data are particularly suitable to examine the long-term destinations of higher education dropouts. The NEPS Starting Cohort 6 applies such a retrospective life course design. Many of the respondents have left higher education several years ago, so that labour market transitions

as well as alternative qualification strategies can be traced. With these data, we are also able to identify transfers to different institutions or re-entries several years after non-completion (e.g., after episodes of family formation or labour market participation). The NEPS Starting Cohort 6 covers birth cohorts from 1944 to 1986, so that cohort comparisons can deliver insights into changes in the life courses of higher education non-completers across time. A possible problem often mentioned with regard to retrospective data is recall bias, but in case of objectifiable facts, such as educational and occupational life courses, the bias proved to be negligible (Dex 1995; Dürnberger et al. 2011; Reimer 2001).

2. Methods

2.1. Sample

The sample of NEPS SC6 (Blossfeld et al. 2011a) comprises approximately 12,000 German residents born between 1944 and 1986. The design combined a prospective panel with a yearly follow-up and a “retrospective module” as part of the first wave. In the retrospective module, respondents gave information about their past life course (education, occupation, partnership and family formation, etc.). Although the data of the retrospective module were collected in the first wave and therefore bear characteristics of a cross-sectional design, the information was recorded in longitudinal format. The life histories contain the start and end dates of each episode, so that a chronological structure of different life course transitions could be obtained (Blossfeld et al. 2011b). Our final sample was restricted to respondents who were enrolled in higher education at least once in their life course. This caused a sharp drop in sample size as only approximately one third of all respondents have ever enrolled in higher education. Students from universities of cooperative education (*Berufsakademie*), business academies (*Wirtschaftsakademien*) and academies of public administration (*Verwaltungsakademien*) were excluded from the sample. These institutions offer hybrid programs that cannot be clearly defined as full-time higher education. We excluded all students who have started the first higher education episode abroad or who have obtained their higher education entrance certificate in the German Democratic Republic² (former East Germany). The sample was restricted to respondents who were between 17 and 35 years old at the time of their first enrolment in higher

² The higher education system of the GDR followed planned economy principles in admission and graduation of students. Especially the selection of students was based on academic merits, but also on compliance with the socialist government values, which lead to a highly selected student population and low dropout rates. We do, however, include Eastern German citizens who entered higher education after the reunion.

education. We excluded older students because mature students in many cases have goal, motivations and time-use patterns that deviate from those of younger students. Our final dataset contained 4309 cases.

2.2. Analytical approach

In a first step, we examined the rates of non-completion, re-entrance and dropout across cohorts. We apply uni- and bivariate approaches to determine the distributions. As the main interest of this contribution is the destinations of non-completers and dropouts, we use the subpopulation of the non-completers and examine their rate of re-entry after the first non-completion. Multivariate binary logistic regressions will deliver an overview of individual and institutional predictors of non-completion, re-entrance and dropout.

In a second step, we exploit the longitudinal data structure and determine the destination throughout the first 10 years after non-completion and dropout. We will apply sequence analysis methods to gain an overview of the state distributions at certain points in time after non-completion and dropout. We apply this method on the total sample and on selected subgroups, such as education of parents and prior vocational qualifications.

A third step will show the qualification dynamics of the dropouts within 10 years of dropping out of higher education. State distribution plots will show year by year the share of dropouts who already entered higher education with a vocational qualification, who gained a vocational qualification after dropping out and of the dropouts who did not gain a vocational qualification within 10 years after dropping out.

Step four examines the labour market returns of the subgroup of the dropouts who entered employment within 5 years and within 10 years. For a general overview, we examine the skill-level of the current job (i.e., the skill-level that is usually necessary to enter the job) 5 and 10 years after dropout. In order to gain information about the association between formal qualifications and skill-level, we include the time-varying information on vocational qualifications before entering higher education and the current vocational qualification in year 5 and 10. We ran a set of additional multinomial logistic regression models to account for selected predictor/control variables.

2.3. Variables

Following the above definitions, we use three outcome variables to describe the individual pathway through higher education.

Non-completion consists of all respondents who did not complete their first higher education episode with a degree (N=1045). We count non-completion only once, although students can re-enter more than once and therefore all subsequent episodes may result in multiple non-completion. Around 12% of the sample enters a second episode after first non-completion but less than 1% of the sample re-enter more than once.

From the sub-sample of the non-completers, we select those who entered a second episode in higher education (N=541). The coding is insensitive regarding type of institution or field of study. Any change, either of type of institution or field of study or both, counts as re-entry.

The third outcome variable tells us whether the respondent ever graduated. This comprises those who graduated from the initially chosen program without transfers and those who transferred at least once but graduated from any of the subsequent episodes after re-entry.

For the descriptive analyses, we use two time indicators: the birth cohort and the elapsed time after non-completion. The elapsed time is taken from event history techniques and counts the months since the end of the first respectively the last higher education episode if this was not terminated with a degree.

The three outcome variables are used as dependent variables in the multivariate logistic regressions. In the regressions, we use the following variables as predictors/controls: Birth cohort (1944-1984, 10-year intervals), region of birth (West Germany, East Germany, abroad), sex, education of parents (at least one parent has gained a higher education degree yes/no), type of entrance certificate (full, restricted, second chance), vocational qualification (VQ) before first entry to higher education (yes/no), type of institution (university/university of applied sciences), field of study.

The destinations comprise NEET (not in education, employment or training), employment (irrespective of type or duration of employment), vocational training (only if the training leads to a full qualification for skilled employment), and higher education (university or university of applied sciences). NEET comprises registered unemployment, but also parental leave, vacation and gap years, travel abroad, sick leave and military/voluntary service.

See table 1 for a descriptive overview of the predictor variables and table 2 for distributions of the outcome variables. As destinations and skill-levels are time varying variables, we refer to the state distribution plots (figures 3-8) for a descriptive overview.

3. Results

3.1. Non-completion, re-entry and graduation

The left panel of table 2 shows that on average a quarter of all students do not reach graduation in their first higher education episode. This share increases across cohorts and reaches almost 30% in the youngest cohort. The middle panel shows how many of these non-completers entered a second higher education episode: More than half of them did so (this corresponds to 12% of the total sample). Entering a second higher education episode quite likely results in graduation, approximately 80% (not in table) of the non-completers who re-entered higher education, graduated later. The total graduation rate is displayed in the right panel of table 1. On average across all cohorts, 85.6% of all students reach a degree either in the initially chosen program or in an alternative program after first non-completion. This ratio has decreased from 90.7% since the oldest birth cohort, but, unlike the rate of non-completion, remained fairly stable since the 1955-64 cohort. Table 1 illustrates quite impressively, how misleading it may be not to distinguish between non-completion and dropout: Whereas the rate of non-completion in the youngest cohort has reached almost 30% of all beginning students, the actual dropout rate is considerably lower, at 15.4%.

Table 3 shows the results of three binary logistic regressions on non-completion, re-entry and dropout. The average marginal effects suggest that, except from birth cohort, socio-demographic characteristics of students are weak predictors of non-completion. Compared to a full entrance certificate, a restricted entrance certificate increases the risk of non-completion by 6 percentage points. A vocational qualification does neither increase nor decrease the risk of non-completion. Type of institution and field of study seem to be the most relevant predictors of non-completion.

Table 1. Distributions of predictor variables

	N	Mean	Std. Dev.	Min	Max
Birth cohort					
1944-54	878	0.20	0.40	0	1
1955-64	1424	0.33	0.47	0	1
1965-74	1095	0.25	0.44	0	1
1975-84	912	0.21	0.41	0	1
Place of birth					
West Germany	3315	0.77	0.42	0	1
East Germany	848	0.20	0.40	0	1
Abroad	146	0.03	0.18	0	1
Sex					
Male	2427	0.56	0.50	0	1
Female	1882	0.44	0.50	0	1
Age at first entry higher education	4309	21.54	2.70	17	35
Education parents					
No higher education degree	2767	0.64	0.48	0	1
Higher education degree	1542	0.36	0.48	0	1
Type of entrance certificate					
Full	3168	0.74	0.44	0	1
Restricted	477	0.11	0.31	0	1
Second chance	664	0.15	0.36	0	1
Vocational qualification (before first entry)					
No	2857	0.66	0.47	0	1
Yes	1452	0.34	0.47	0	1
Type of institution					
University of applied sciences	1473	0.34	0.47	0	1
University	2836	0.66	0.47	0	1
Field of study					
Education	661	0.15	0.36	0	1
Arts/humanities	405	0.09	0.29	0	1
Social/behavioural sciences	335	0.08	0.27	0	1
Business/admin./services	781	0.18	0.39	0	1
Natural sciences/mathematics/ict	555	0.13	0.34	0	1
Engineering/manufacture/construction	1096	0.25	0.44	0	1
Life sciences	476	0.11	0.31	0	1
Total	4309				

Source: NEPS SC 6 11-1-0, own calculations

Table 2. Rates of non-completion, re-entry and dropout by birth cohort

	Non-completion of first higher education episode (N=4309)			If non-completion: entered second higher education episode (N=1054)			Ever graduated (N=4309)		
	N	no	yes	N	no	yes	N	no	yes
1944-54	878	83.9	16.1	141	46.8	53.2	878	9.3	90.7
1955-64	1424	74.4	25.6	365	55.1	44.9	1424	16.9	83.2
1965-74	1095	74.7	25.3	277	46.2	53.8	1095	14.6	85.4
1975-84	912	70.3	29.7	271	43.5	56.5	912	15.4	84.7
Total		75.5	24.5		48.7	51.3		14.4	85.6
N		3255	1045		513	541		622	3687

Source: NEPS SC 6 11-1-0, own calculations

Table 3. Binary logistic regressions of non-completion, re-entry and dropout, average marginal effects.

	Non-completion of 1 st HE episode	If non-completion: started 2 nd HE episode	Dropout
Birth cohort			
1944-54 (ref.)			
1955-64	0.08***	-0.09*	0.07***
1965-74	0.08***	-0.01	0.05**
1975-84	0.13***	0.00	0.06***
Place of birth			
West Germany (ref.)			
East Germany	-0.03	-0.08	-0.01
Abroad	0.02	0.04	0.03
Sex			
Male (ref.)			
Female	0.00	-0.06*	0.01
Education parents			
No higher education degree (ref.)			
Higher education degree	-0.02	0.10**	-0.03**
Type of entrance certificate			
Full (ref.)			
Restricted	0.06*	0.01	0.05*
Second chance	-0.03	-0.01	-0.02
Vocational qualification (before first entry)			
No (ref.)			
Yes	0.01	-0.20***	0.04**
Type of institution			
University of applied sciences (ref.)			
University	0.12***	0.20***	0.05***
Field of study			
Education (ref.)			
Arts/humanities	0.12***	-0.03	0.07**
Social/behavioural sciences	0.17***	-0.03	0.11***
Business/admin./services	0.05*	-0.12*	0.05**
Natural sciences/mathematics/ict	0.11***	0.04	0.06**
Engineering/manufacture/construction	0.06**	0.03	0.04*
Life sciences	-0.05*	0.01	-0.02
N	4309	1054	4309

* p<0.05; ** p<0.01; *** p<0.001, HE = higher education

Source: NEPS SC 6 11-1-0, own calculations

Enrolling at a university increases the risk of non-completion by 12 percentage points, compared to enrolment at a university of applied sciences. The second column shows the average marginal effects for re-entry for the selected sample of the non-completers. Female non-completers re-enter slightly less often than male and having parents with a higher education degree increases the probability to re-enter by 10 percentage points. Non-completers with a vocational qualification are 20 percentage points less likely to re-enter than non-completers without such a qualification. This highlights the relevance of attractive alternative options for the choice between dropping out and re-entering (see Tieben (2020a) for a theoretical framework). Whereas the type of institution is a strong predictor, the initial field of study does not seem to be of much relevance. In column 3, the results for dropout are displayed. The dropout risk increases across cohorts, but less than the risk of non-completion. Place of birth and sex do not predict dropout, but students are 3 percentage points less likely to dropout when one of their parents has a higher education degree. The average marginal effects for prior vocational qualifications and type of institutions demonstrate how the probability of re-entry moderates the difference between non-completion and dropout.

3.2. Destinations after non-completion

The above analysis illustrates that alternative higher education programs are an important destination for non-completers but that approximately half of the non-completers leave higher education. This raises the question where non-completers (and dropouts) end up. Figure 3 shows that not only the “where?” question is important but that we also have to ask “when?”. It may be misleading to examine the destination only at one given timepoint after non-completion. Especially in the first 1-6 months after non-completion, a considerable proportion of the non-completers is not in employment, education or training (NEET). This proportion decreases to less than 20% after 12 months, so that we can assume that many do not enter alternative destinations immediately but take bridging episodes outside education and labour market. The figure also reveals that during the first three years after non-completion, only a quarter of the non-completers enter employment. Most non-completers seem to strive for a formal qualification, either in higher education or in vocational training. Sixty months after non-completion, 30% of the non-completers are enrolled in higher education, 4,8% are in vocational training and 50,7% are in employment. The share of over 30% in higher education after sixty months may suggest that these non-completers are “still” in higher education after five years, but the diagram does not show how many of these delayed the start of their second

higher education episode. Moreover, extended higher education episodes can also be explained by a high proportion of students who study part time. Figure 4 shows the destinations across time, separately by parental education. The proportions in NEET are comparable across the entire observation period of 10 years. We do, however, observe pronounced differences in the distribution of the other destinations. Non-completers from highly educated families are more likely to re-enter higher education and they are less likely to enter the labour market (as already suggested by the above logistic regressions). The group differences in the transition to vocational training are less pronounced. At first glance, these figures suggest that non-completers from lower educated families are more successful in finding a job after non-completion. There are, however, several explanations for this observation. First, these non-completers may not have sufficient financial resources to re-enter higher education. Germany offers generous (means-tested) student grants and loans, but these are conditional upon demonstrated progress in higher education. Those who do not rely on government financial support hence probably face lower financial constraints. This leads to the assumption that non-completers from lower educated backgrounds are diverted to vocational training. The “diversion thesis” is discussed in several studies examining social disparities in the transition from secondary education to higher education (Hillmert and Jacob 2003; Shavit and Müller 2000). Our results, however, suggest that the diversion thesis does not necessarily hold for non-completers: non-completers from higher educated families generally seem to be more inclined to invest in both types of education (vocational training and higher education), whereas non-completers from lower educated families more often enter the labour market directly. This might indicate that non-completers from lower backgrounds are diverted to immediate employment and therefore possibly have a higher risk of unfavourable labour market outcomes than non-completers from more privileged backgrounds who have more resources to invest in a degree or vocational qualification. However, we may speculate that non-completers from lower educated families are more likely to hold a vocational qualification already before entering higher education, so that this risk might be mitigated through qualifications gained previously.

Approximately one third of all students has entered higher education with a full qualification for the skilled labour market (vocational training certificate). In case of non-completion, their pressure to obtain another formal labour market qualification is low. We hence observe that their destinations deviate considerably from the destinations of non-completers without

vocational qualifications (Figure 5). There seems to be a certain interest to gain an academic degree, but only a small proportion of these non-completers chooses a second vocational training. Already in the first year, half of them has entered employment. We nevertheless observe that across time, the destination distributions converge and that the distributions after 120 months are comparable.

Figure 3. State distribution plot of non-completers, months 1-120 after non-completion of the first higher education episode (N=1045)

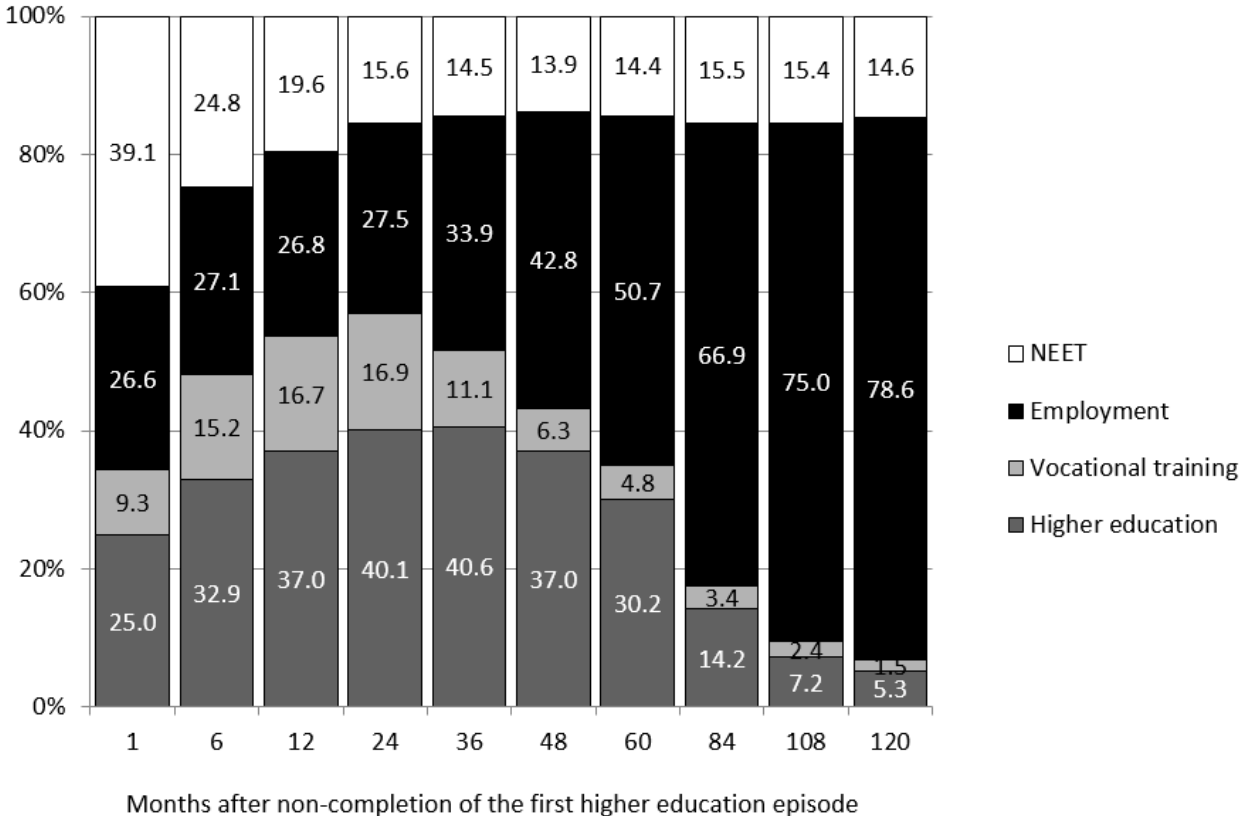


Figure 4. State distribution plots of non-completers, months 1-120 after first non-completion, by education of parents.

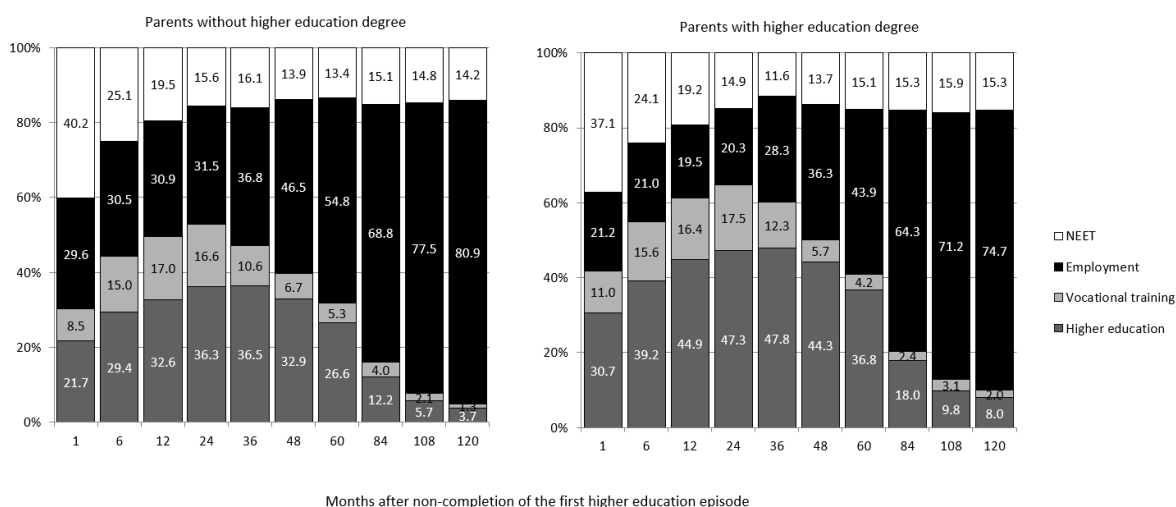
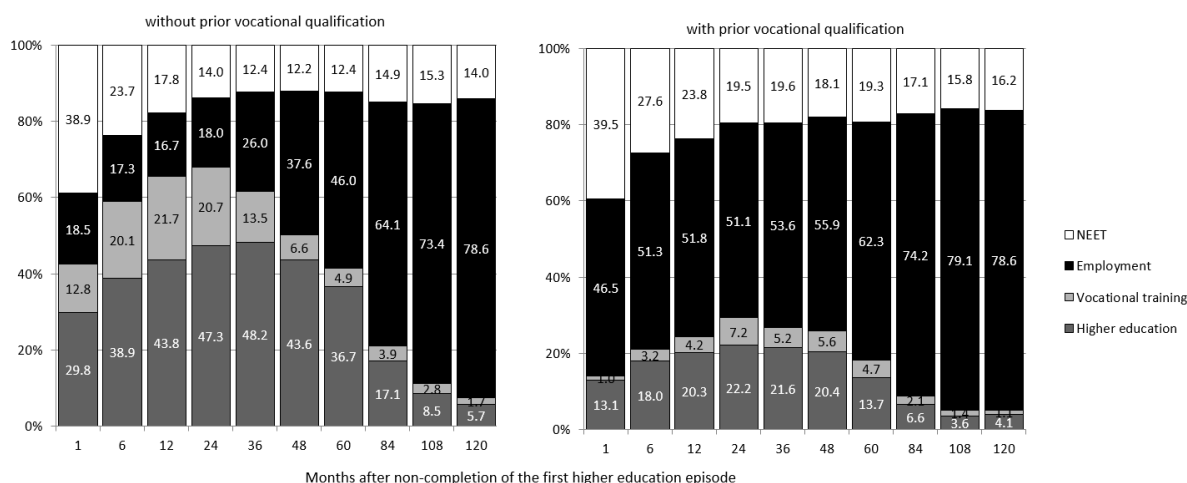


Figure 5. State distribution plots of non-completers, months 1-120 after first non-completion, by prior vocational qualification.



3.1. Destinations after dropout

In case of dropping out altogether, the destinations are vocational training, employment or NEET. Figure 6 shows the state distributions across ten years after dropping out for dropouts with and without prior vocational qualification. For dropouts, prior vocational qualifications seem to be helpful for the transition to the labour market. More than half of the dropouts with vocational qualifications enters the labour market immediately after leaving higher education, but only 26% of the dropouts without prior qualifications. This difference is not fully explained through a higher rate of transitions to vocational training, as we also observe that a larger

proportion of this group remains in NEET during the first two years after dropout. We nevertheless also observe that the state distributions of the two groups converge at the end of the observation period and that after 120 months, no pronounced differences occur. As a considerable proportion of the dropouts enters vocational training after leaving higher education, we examined the resulting qualification levels of the dropouts. Figure 7 shows the distribution of vocational qualifications, gained before or after dropping out, across 120 months after leaving higher education. A small proportion of respondents reports that they gained a vocational certificate within a year after dropping out. This is intuitively not possible as vocational training lasts at least two years. We nevertheless did not code these cases as mistakes because students are not obliged to sign out of their higher education program when they start vocational training. We may speculate that some actually remain enrolled in order to benefit from student status privileges (e.g., free public transport). Of all dropouts, almost 30% gain a vocational qualification within 120 months.

Regarding the type of employment of the dropouts who are in employment 60 months after leaving higher education (figure 8, left panel), we observe that a considerable proportion (14,1%) of the employed dropouts reports that they entered a degree-level occupation, 60,1% report that they entered a skilled occupation and 28,1% entered an un- or semi-skilled occupation. The skill-level, however, is highly dependent on the formal qualification, we therefore examine the skill-level for dropouts who never obtained a formal vocational qualification, who gained a formal vocational qualification before entering higher education and who gained a formal vocational qualification after dropping out of higher education. It is not surprising that those without a formal vocational qualification have the highest risk of entering un- or semi-skilled occupations. At the same time, this group is also most likely to enter a degree-level job. Given that the German labour market is considered as highly credentialistic, hence relying on formal qualifications, this is surprising: This group neither holds a higher education degree nor a vocational certificate. A possible explanation is that some students drop out of higher education because they have an attractive alternative in the labour market (see Scholten and Tieben (2017) for theoretical discussion). Dropouts who entered higher education with a vocational qualification are more likely than other groups to enter an advanced-level skilled occupation. They possibly can build upon their prior qualification and use the advanced level as an alternative to the initially planned degree-level career. Dropouts who entered higher education without a vocational qualification, but who obtained a vocational

qualification after leaving higher education are most likely to be in a skilled occupation after 60 months. Compared to those who already had a vocational qualification, this group possibly is at the beginning of their career development 60 months after leaving higher education, as they have to invest 2-3 additional years to obtain their vocational certificate. The right panel of figure 8 therefore shows the skill-level distribution after 120 months³. We observe a certain general dynamic, but also that the group that entered vocational training after dropout catches up to some extent. They nevertheless are least likely to be in degree-level and advanced-level skilled occupations at the end of the observation period. In order to test these results for significant group differences and to exclude some of the possible spurious effects, we replicate these analyses, using multinomial logistic regressions. Table 4 shows the average marginal effects of a binary model that includes the skill-level after 120 months as dependent variable and the formal qualification as predictor. The coefficients inform us about the percentage-point-difference between the test group and the reference group. Those who did not obtain a vocational qualification within 120 months after dropping out, are 14 percentage points more likely to be in an un- or semi-skilled occupation than those who obtained a vocational qualification after dropping out⁴. The average marginal effects validate the values from the bar chart (figure 8). However, the contrast ‘VQ before dropout versus VQ after dropout’ only results in significant group differences for entering skilled employment, which indicates that a vocational qualification gained before higher education is not necessarily a superior pathway into higher-status occupations. We nevertheless want to point out that – taken together – dropouts who gained a vocational qualification after dropout are significantly more likely to be in skilled employment than dropouts who gained their vocational qualification before entering higher education – but at the expense of higher ranked occupations rather than at the expense of un- or semi-skilled occupations.

Adding controls to the models does not alter the main conclusions drawn from the bivariate analysis. We nevertheless observe that women are 7 percentage points less likely to enter advanced-level skilled occupations than men. This may be due to the fact that these occupations often are in the male-dominated mechanical or industrial crafts sector. Dropouts from East Germany are less likely to be in un- or semi-skilled occupation, and more likely to be in skilled

³ Note that the left and right panel of figure 8 are based on slightly different samples due to fluctuation in the groups that are employed after 60 and 120 months.

⁴ We are aware that this information is redundant and can easily be calculated from the values given in figure 7. We added the regression for a convenient execution of a z-test on between-group differences.

occupations than dropouts from West Germany. This possibly is due to specific regional labour market structures in Germany. Neither the education of the parents nor a migration background seem to be relevant for the skill-level of dropouts. Moreover, the type of entrance certificate does not seem to be significantly associated with the skill-level. Note, however, that the sample is N=437 and that some sub-samples are small. Given that the average marginal effects indicate probability differences of up to 10 percentage points, it may be premature to conclude that there is no association at all.

Figure 6. State distribution plots of dropouts, months 1-120 after dropout, by prior vocational qualification.

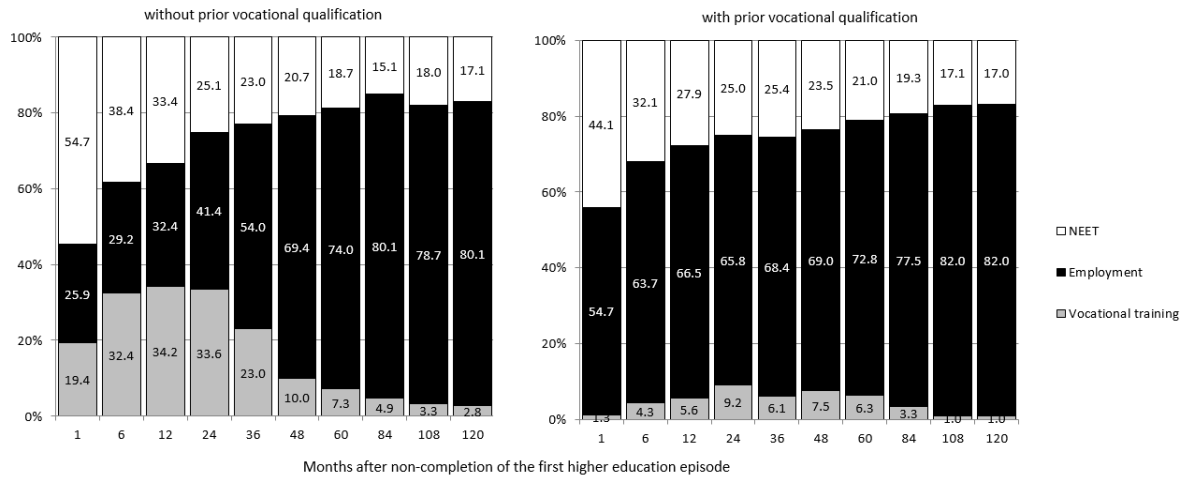


Figure 7. Qualification levels of dropouts, months 1-120 after dropout

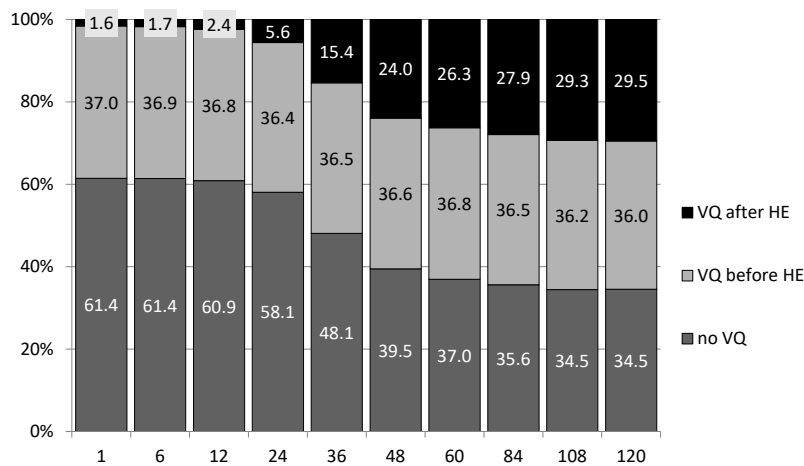


Figure 8. Skill-level of employed dropouts, 60 and 120 months after dropout

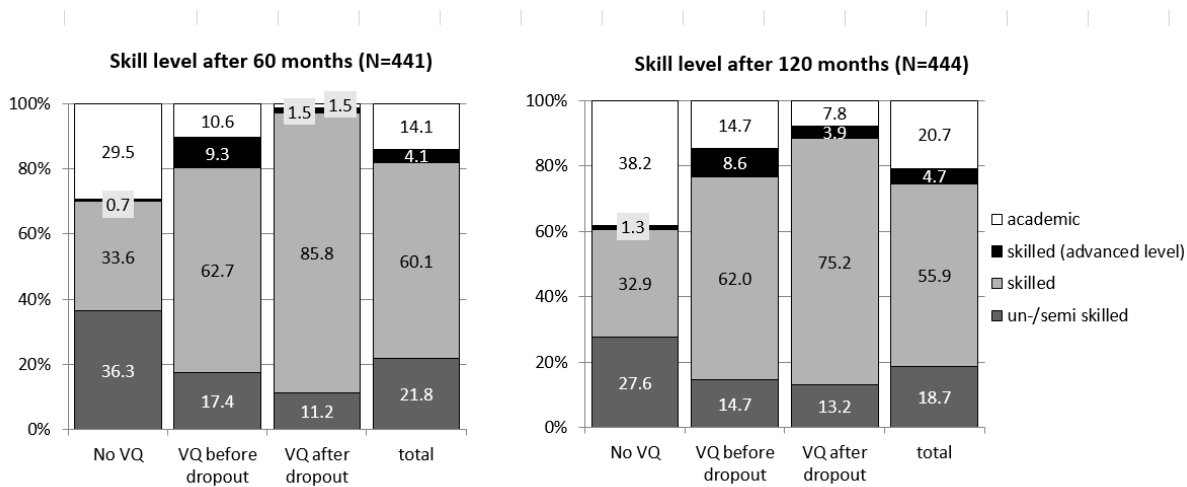


Table 4. Multinomial logistic regression on skill-level 120 months after dropout. Average marginal effects of bivariate model.

	Un-/semiskilled	Skilled	Skilled (Advanced level)	Academic
Vocational qualification				
no VQ vs. VQ after dropout	0.14**	-0.42***	-0.03	0.30***
no VQ vs. VQ before dropout	0.13**	-0.29***	-0.07**	0.23***
VQ before dropout vs. VQ after dropout	0.02	-0.13*	0.05	0.07
N	444	444	444	444

* p<0.05; ** p<0.01; *** p<0.001

Source: NEPS SC 6 11-1-0, own calculations

Table 5. Multinomial logistic regression on skill-level 120 months after dropout. Average marginal effects of full model.

	Un-/semiskilled	Skilled	Skilled (Advanced level)	Academic
Vocational qualification				
no VQ vs. VQ after dropout	0.13**	-0.40***	-0.04	0.30***
no VQ vs. VQ before dropout	0.09	-0.25***	-0.05*	0.21***
VQ before dropout vs. VQ after dropout	-0.04	0.15*	-0.02	-0.09*
Education parents				
No higher education degree (ref.)	-0.04	0.04	-0.01	0.00
Higher education degree				
Birth cohort				
1944-54 (ref.)				
1955-64	0.06	0.00	0.01	-0.07
1965-74	0.10	-0.03	0.01	-0.08
1975-84	0.00	0.01	-0.01	0.00
Sex				
Male (ref.)				
Female	-0.03	0.08	-0.07***	0.01
Place of birth				
West Germany (ref.)				
East Germany	-0.09*	0.13*	-0.03	-0.01
Abroad	-0.02	0.1	-0.01	-0.08
Type of entrance certificate				
Full (ref.)				
Restricted	-0.07	0.04	0.04	-0.01
Second chance	-0.04	0.08	0.01	-0.04
N	437	437	437	437

* p<0.05; ** p<0.01; *** p<0.001

Source: NEPS SC 6 11-1-0, own calculations

4. Conclusions and Discussion

The aim of this contribution was to examine the trajectories and destinations of higher education dropouts. We set out to disentangle the concepts of non-completion, re-entry and dropout of

higher education and to examine the destinations after non-completion and dropout. Using the Starting Cohort 6 of the National Education Panel Study (NEPS), we were able to exploit the advantages of the detailed retrospective life course data of respondents who have entered higher education at least once in their educational career. Prior research examining higher education dropout in Germany usually relied on exmatriculation surveys, on administrative data or on panel studies with shorter observation periods. These approaches have the disadvantage that non-completion and dropout cannot be disentangled and that a long-term observation of the destinations of non-completers and dropout is not possible. As a result, the share of students who do not reach graduation is often examined from an institutional perspective, which rather looks at attrition rates than at dropout rates. Our results show that attrition rates and dropout rates are not congruent, because approximately half of the non-completers transfers to an alternative program in higher education and has a certain probability to graduate later. We showed that rates of non-completion increased across cohorts and reach approximately 30% in the birth cohort 1975-84, but that the rate of re-entry also increased so that in the birth cohort 1975-84 only 15% leave higher education without a degree.

Apart from this methodological contribution, we aimed to present some applications of these data and answered the following research questions:

1. Which individual and institutional characteristics predict non-completion, re-entry and dropout?
2. What are the short- and long-term destinations after non-completion and dropout?
3. Which role do vocational qualifications play for non-completion and dropout?
4. Which role do vocational qualifications play for the placement of dropouts in the labour market?

Regarding the first question, we found that the institutional setting seems to matter most for non-completion. It highly depends on the field of study and on the type of institution if students graduate in the initially chosen program or not. We may speculate that non-completion in many cases rather is driven by institutional than individual characteristics and that highly selective programs benefit from an inflow of students with a low risk of non-completion. Moreover, the probability of non-completion increases across cohorts. This possibly is partly driven by a certain tendency to transfer to a similar program within the same field, which is further

enhanced by the increasing diversification of programmes (see Tieben (2016a) for a discussion). Individual predictors, such as sex, parental education and prior educational biographies do not play a pronounced role in non-completion, except from the type of entrance certificate. When it comes to re-entry, however, parental education and prior vocational qualifications are strong predictors. Having parents with a degree seems to increase the incentive to gain a degree for oneself, which is in line with previous research (Müller et al. 2017; Shavit et al. 2007). The positive effect of parental education also suggests that family resources also help to compensate failures or suboptimal initial choices. This finding, however, also suggests that students from lower status backgrounds are not necessarily more likely to have performance problems than students from higher backgrounds, but rather struggle with financial restrictions. This possibly is enhanced by the policy that the means-tested interest free student loans in Germany are granted only when students study without delays. Regarding prior vocational qualifications, we observe that a formal qualification for the skilled labour market increases the chances of non-completers to leave higher education instead of re-entering by 20 percentage points. As discussed by Tieben (2020a), vocational qualifications hence can be seen as ‘paradoxical double buffer’, which on the one hand may deliver skills that are helpful in higher education, but also work as pull-factor and draw non-completers into the labour market where vocational qualifications ensure access to skilled occupations.

After non-completion, the majority of non-completers chooses destinations that (potentially) result in a formal qualification, thus either an alternative program in higher education or vocational training. As suggested above, prior qualification plays an important role: Those who have entered higher education with a vocational qualification, largely do not consider vocational training as an option, but approximately 20% re-enters higher education. However, in this group, the labour market clearly is the preferred destination.

Our results regarding the labour market placement of dropouts are ambiguous. Dropouts who did not gain a vocational qualification before or after dropout have a high risk of entering un- or semi-skilled occupations, but at the same time, they have the highest probability of entering degree-level jobs. Apparently, some dropouts have good labour market prospects, so that for them further investment in formal qualification is not necessary. This probably applies to dropouts from certain fields of study, where the supply-demand-ratio works in favour of jobseekers. We also must bear in mind that dropping out of higher education becomes more likely when good alternatives are within reach. We therefore may speculate that some students

leave higher education despite being successful when they get an attractive job offer. This also can explain why students who did not enter higher education with a vocational qualification, but entered vocational training after dropout, seem to have a disadvantage in entering degree-level jobs: It is likely that certain selection mechanisms are at work here. Those who struggle to enter attractive jobs immediately, have high incentives to gain a vocational qualification in order to improve their labour market prospects.

Taken together, our contribution highlights the importance of applying long-term life course data to get an overview of the destinations of non-completers and dropouts. The transition to the labour market comprises additional qualification phases and career progression dynamics after labour market entry. These are not covered by conventional exmatriculation surveys as long-term follow ups are usually flawed by high sample attrition. This contribution also highlights that in the German educational system, vocational training and higher education are not mutually exclusive and that the conception of two separate pathways into the labour market (the ‘vocational pathway’ and the ‘academic pathway’) is not accurate. Educational careers are not set in stone after leaving secondary education. Students constantly revise their educational plans as they progress, and it is not a small minority in Germany who use the permeability between vocational training and higher education.

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