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Smoother School-to-Work Trajectories in the Early 2010s? Evidence for School-Leavers With At Most Intermediate-Level Certificates and Regional Disparities in Germany

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Abstract: The study examines differences in the school-to-work trajectories (STWT) across time and federal states in Germany. It uses administrative data of school-leavers with at most intermediate-level certificates from 2009, 2011 and 2013. While the chances of a smooth STWT improved by increasingly favourable economic development after 2009, the relative disadvantage of school-leavers with low certificates continued. The probability of a problematic STWT remained unaffected and did not vary according to state differences in subsidized training schemes.

Keywords: School-to-work transition, short-term trends, subsidized training schemes, German federal states

Kontinuierlichere Übergänge Schule – Erwerbsleben in den frühen 2010er Jahren? Befunde für Schulabgänger:innen mit maximal Realschulabschluss und regionale Unterschiede in Deutschland

Zusammenfassung: Die Studie untersucht Unterschiede im Übergang von der Schule ins Erwerbsleben über die Zeit in den deutschen Bundesländern. Sie nutzt administrative Daten für Schulabgänger:innen mit maximal Realschulabschluss der Jahre 2009, 2011 und 2013. Trotz insgesamt besserer Chancen auf einen reibungslosen Übergang über die Zeit bestanden die relativen Nachteile von Schulabgänger:innen mit niedrigen Abschlüssen fort. Die Wahrscheinlichkeit eines problematischen Übergangs blieb unverändert und variierte nicht nach regionalen Unterschieden bei Übergangsmassnahmen.

Schlüsselwörter: Übergang Schule-Erwerbsleben, kurzfristiger Wandel, geförderte Übergangsmassnahmen, Bundesländer, Deutschland

Des transitions école-emploi plus lisses au début des années 2010 ? Constats sur les jeunes à certification faible ou moyen au niveau secondaire inférieur et différences régionales en Allemagne

Résumé : Cet article examine les différences dans les chances de transition au fil du temps et entre les Länder allemands. Il utilise des données administratives des jeunes sortant de l'école obligatoire en 2009, 2011 et 2013. Les chances d'une transition lisse se sont améliorées après 2009. Cependant, les désavantages relatifs aux jeunes sortant de filières à niveau bas et moyen ont persisté. La probabilité d'une transition problématique est restée inchangée et n'a pas varié en fonction des différences regionales entre les Länder.

Mots-clés : Transition école-emploi, changement à court terme, mesures de transition subventionnées, Länder allemands

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1 Introduction

The challenges faced by young people in the transition from school to working life depend, among other things, on the market and institutional conditions that young people find both in their local context and at the time of their leaving school (e. g., Hillmert et al. 2017). In Germany, labor market conditions have improved significantly since the mid-2000s. After an extended period of relatively high youth unemployment in the early 2000s, the unemployment rate began to decline after 2005, from a high of approximately 12 % to about 6 % in 2011. It then remained at a similar level before continuing to decline slightly from 2013 to 2019 (Statistics of the Federal Employment Agency 2022). Even the so-called Great Recession in the wake of the economic and financial crisis of 2008 and 2009 broke this trend only temporarily (Bell and Blanchflower 2011; Dietrich and Möller 2016).

Moreover, the German vocational education and training (VET) market has been marked by substantial changes since the early 2010s. Although training opportunities for young people have recently improved, young people interested in VET remain without training places, while, at the same time, training companies experience difficulties in filling their apprenticeship vacancies (BMBF 2015).

These developments in the VET market are perceived as alarming in political and public debates (e. g., BIBB 2016). The attractiveness of vocational training, the requirements of companies for trainees and the training interests of young people are at the core of the discussion. Trends toward academic education and – due to demographic changes – a declining number of youths contribute to complex shifts in the interests and opportunities of young people and companies. Against this background, the current debate focuses on strategies at the two ends of the education distribution, for raising the attractiveness of apprenticeships for students with *Abitur* (i.e., the German university entrance certificate) and for improving access to apprenticeships for students leaving school without or with low secondary school-leaving certificates (German *Hauptschulabschluss*). Students with an intermediate secondary school-leaving certificate (German *Realschulabschluss*) are often discussed as a reference group that meets the expected requirements in VET (e. g., Holtmann et al. 2019).

It remains unclear how the chances of young people with different school-leaving certificates are changing against the backdrop of the recent developments in the VET market. It has often been argued that school-leavers without or low certificates are most affected by changes in the opportunity structure (e. g., Jacob and Solga 2015), and accordingly may also benefit from the overall improved market situation with regard to their school-to-work transitions (STWT). In general, school-leavers without certificate or low certificates have been in the focus of the political debate because they are often forced to accept longer waiting periods until they find an apprenticeship. For young people who experience difficulties in the STWT, extensive subsidized training schemes exist. The schemes have been expanded, especially in

times of high youth unemployment. In the 2010s, the number of participants did decline, but not to an extent the overall improved economic conditions would lead us to expect (Euler and Nickolaus 2018). It is often argued that the schemes have become institutionally established as a constitutive pillar of German education policy (Jacob and Solga 2015; Kohlrausch and Islertas 2022) and are thus dependent on its federal structures. Although schemes are also provided by the German Federal Employment Agency (FEA), they are largely federal state programmes (Autorengruppe Bildungsberichterstattung 2010). The number and type of schemes vary across federal states, thus providing varying opportunity structures at the regional level (Kohlrausch and Islertas 2022).

In this paper, we investigate the disparities in the transition from school to working life between students with low and intermediate school-leaving certificates in Germany, and we examine whether these disparities vary by the opportunity structures according to time and location at which one leaves school. How did the chances of experiencing a smooth transition from school to working life change for school-leavers with school-leaving certificates at lower and intermediate levels in the early 2010s? Do trends differ depending on the volume of available training schemes in the federal states?

Using longitudinal administrative data on the STWT of school-leavers from 2009, 2011 and 2013, we examine transition trajectories over several years as outcomes, which allows us to understand differences in STWT from a holistic perspective. By doing so, we can distinguish the STWTs of young people who face no or only temporary transition problems from those with persistent difficulties. This approach is fruitful for describing the social and context characteristics relevant in the STWT and for discussing policy implications (e. g., Dorsett and Lucchino 2014).

Our study contributes to existing research in the following ways. First, it extends the research on social inequalities in the STWT in the late 2000s and early 2010s in Germany (e. g., Holtmann et al. 2019; Achatz et al. 2022; Busse 2020; Brzinsky-Fay 2022) which has not yet addressed changes in the period of changing opportunity structures in the VET market. By doing so, our study takes into account the importance of short-term trends that are often hotly debated in politics and public discussion (Hillmert et al. 2017). Second, our study builds on previous research regarding the importance of regional contexts in the STWT, mainly local labour market conditions, for moderating social inequalities (Weßling et al. 2015; Hillmert et al. 2017; Bacher et al. 2017; Eckelt and Schauer 2019). To date, little research has considered how regional differences in educational and labour market policies account for heterogeneity in the STWT (Bacher et al. 2017). Our study specifically focuses on differences in subsidized training schemes that are primarily regulated at the level of the German states (Länder), controlling for further local labour market conditions.

2 The German Context and Developments

2.1 Vocational Education and Training

In Germany, STWTs are shaped by a highly standardized and stratified VET system (Kleinert and Jacob 2019). Company-based apprenticeships constitute a major part, with approximately 500 000 new entrants each year (Autorengruppe Bildungsberichterstattung 2020). Apprenticeships provide 2.5 to 4 years of occupation-specific training, mainly in industries, crafts and trades. The acquisition of skills at the workplace, in combination with general education in schools, provides advantages in terms of prospects for qualified employment and career development within the training company (e. g., Franz and Zimmermann 2002). Moreover, approximately 200 000 young people take up full-time school-based VET programmes for largely intermediate-level white-collar occupations in the health, social, and media sectors.

Depending on the school-leaving certificate acquired in compulsory lower-secondary education[1], young people are allocated to different VET segments (Protsch and Solga 2016). Most full-time vocational schools formally require at least an intermediate-level school-leaving certificate, whereas access to company-based apprenticeships is not formally regulated. Here, companies act as gatekeepers with regard to applicant selection (see section 3.2).

The supply of apprenticeship positions by firms and the demand for positions from young people have changed in the early 2010s. In the wake of the Great Recession, supply increased from approximately 580 000 registered positions offered in 2009 to approximately 600 000 in 2011 and declined again thereafter (BIBB 2014). With regard to demand, fewer and fewer young people aspired to obtain apprenticeships over the years; the numbers declined from 653 000 VET applicants in 2009 to 614 000 in 2013 (BIBB 2014). One reason for this decline has been the decreasing number of students in low- and intermediate-level lower secondary schools. Moreover, an increasing number of young people are investing in academic education (Dionisius and Krekel 2014). The number of training positions that remain vacant at the beginning of the training year each September has increased significantly over the years, from 18 000 in 2009 to approximately 34 000 in 2013. At the same time, approximately 88 000 young people in 2009 and 84 000 in 2013, respectively, remained without an apprenticeship position (BIBB 2014). The figures illustrate the mismatch on the vocational training market.

1 Germany has a highly tracked school system. Students are usually separated into different tracks after 4th grade, in some states (German *Länder*) after 6th grade. At the end of lower secondary education, students leave compulsory school education with a low certificate (German *Hauptschulabschluss*) or an intermediate certificate (German *Realschulabschluss*). Some students leave school without a certificate. Formally, the certificates can be obtained at different types of schools.

2.2 Subsidized Training Schemes

Vocational preparation programmes and short-term training courses provided by vocational schools, companies and training providers are available for young people who experience problems finding apprenticeship positions. In sum, the schemes form the so-called transition segment of the German VET system, which is a term used in official reports to distinguish them from fully qualifying VET (e. g., Autorengruppe Bildungsberichterstattung 2010; 2018). The schemes intend to prepare school-leavers to take up regular apprenticeships and do not lead to a vocational qualification (BIBB 2018). Although the schemes differ in terms of objectives, target groups and design, Dionisius and Kreckel (2014) refer to three common key functions. First, young people are guided to training maturity by learning basic vocational skills and gaining vocational orientation. Second, young people are given the opportunity to complete a (lower secondary) school-leaving certificate. Third, the schemes provide a bridging opportunity for young people who are ready for training but have not found a training place in the current training year. Some programmes also cover compulsory education up to the age of 18.

The "transition segment" can also be defined more broadly if other alternatives to regular apprenticeships are considered (e. g., Ulrich 2008). These alternatives comprise out-of-company vocational training, as well as some full-time school-based programmes in occupations that apprenticeships usually train for (Lex and Geier 2010; Eckelt and Schauer 2019). These fully qualifying programmes are geared to young people who have dropped out of apprenticeships, including trainees affected by company insolvencies or the deterioration of the training market in the eastern states after the German reunification. In addition, depending on the general educational system of the federal states, specialized upper secondary schools, grammar schools or commercial schools can be alternatives to apprenticeships for young people with intermediate-level secondary school-leaving certificates (Ulrich 2008).

According to the definition of the "transition segment" applied in the official reports, in 2008, 34 percent of all new entrants into VET entered subsidized training schemes instead of fully qualifying apprenticeships or school-based programmes (Autorengruppe Bildungsberichterstattung 2010). The share of new entrants into the "transition segment" ranged from more than 40 % in Schleswig-Holstein, Lower-Saxony, and Baden-Württemberg to slightly above 20 % in Bavaria, Saxony-Anhalt and Saxony (Table 1) (Autorengruppe Bildungsberichterstattung 2010). From 2008 to 2012, the shares decreased in all states, but did so to varying degrees (Autorengruppe Bildungsberichterstattung 2010; 2014). For example, the decline is not consistently sharpest in the states with the highest shares in 2008 either. Overall, the ranking of the states according to shares of new entries into training schemes remains largely the same during the observation period.

Differences across the German federal states have arisen in response to regional economic conditions and structures in the VET market (Kohlrausch and Islertas 2022).

Table 1 Share of New Entrants into Subsidized Training Schemes in All Entrants into Vocational Training and Education*, 2008 and 2012

	2008 (in %)	2012 (in %)	Difference 2008–2012 (in percentage points)
Schleswig-Holstein	46.7	30.5	16.2
Lower-Saxony	42.6	34.1	8.5
Baden-Württemberg	40.3	37.2	3.1
Saarland	38.2	30.5	7.7
North Rhine-Westphalia	36.4	27.4	9.0
Rhineland-Palatinate	36.4	28.4	8.0
Hessen	32.4	25.1	7.3
Bremen	32.2	28.0	4.2
Mecklenburg-Vorpommern	27.9	15.9	12.0
Brandenburg	27.5	15.5	12.0
Hamburg	27.0	20.6	6.4
Berlin	25.7	18.9	6.8
Thuringia	24.6	15.8	8.8
Bavaria	23.7	15.5	8.2
Saxony-Anhalt	21.9	19.3	2.6
Saxony	21.6	14.5	7.1

*All young people who start either apprenticeships, fully qualified training in vocational schools or programmes in the "transition segment". Source: Autorengruppe Bildungsberichterstattung 2010; 2014.

Structures may remain stable over time when recurrent cooperation and interaction between central actors have become institutionalized (e. g., Martin and Sunley 2006). In the case of the subsidized training schemes, established structures exist as part of the educational planning of the federal states, as well as when providers of training schemes have established cooperations with the FEA or in regional educational networks. The importance of regional institutional cooperation, networking and coordination in Germany has been increasingly emphasized (e. g., BIBB 2009; Stöbe-Blossey et al. 2019).

3 Theoretical Perspectives

3.1 The Ideal Type of Smooth STWT and Variations

The life course approach stipulates that institutions of the welfare state and the labour market shape the course of individual lives (Kohli 1985). How the transition from school to working life evolves is particularly determined by the established vocational training programmes, their availability and their duration and regulations regarding access and content (see Section 2.1). They are also influential for young people's expectations and expectations of relevant others, such as teachers, career

counsellors or parents, as to when and which transitions are made (e. g., Heinz and Krüger 2001). From this perspective, the STWT process, as a series of single steps and decisions, is structured by opportunities shaped by the educational and vocational training system in the labour market (Meulemann 1990). The resulting transition patterns, or trajectories, reflect social structures in the STWT because groups of young people pass through similar stages at similar points in time (Sackmann and Wingens 2003) and because differences in the transition to VET have an impact on the later entry into the labour market (Blossfeld 1990).

In Germany, normative ideas about the ideal-typical linear STWT are particularly determined by the predominant role of apprenticeships (Heinz 1999) and social expectations with respect to the integrative power of a smooth transition from school to apprenticeships and thence to employment (e. g., Brzinsky-Fay 2007; Brzinsky-Fay and Solga 2016). Particularly for young people with lower secondary school-leaving certificates, apprenticeships are considered the "royal road" to employment, as, due to their low formalization of access rules, they are seen as the most accessible form of VET (Eckelt and Schauer 2019; Protsch and Solga 2016).

Although a large group of young people with low and intermediate school-leaving certificates still pass directly from school to apprenticeships and from apprenticeships to regular employment, recent analyses also illustrate the diversification of STWT (e. g., Hupka-Brunner et al. 2011; Geier 2013; Kohlrausch and Richter 2016; Holtmann et al. 2019; Autorengruppe Bildungsberichterstattung 2020; Busse 2020; Achatz et al. 2022; Brzinsky-Fay 2022). The results also show that the subsidized training schemes play a formative role in this. While some scheme participants take up regular vocational training, others face problematic trajectories in which access to VET is delayed by several years or never takes place. Thus, literature critically examines whether and for which young people the schemes are mere temporary alternatives or "waiting loops", and for which groups the measures build up qualifications and create or even improve opportunities (e. g., Lex and Geier 2010, Heinz 2014; Holtmann et al. 2019; Holtmann et al. 2021).

3.2 Disparities in Access to a Smooth STWT by School-Leaving Certificates

Theoretically, disparities in the STWT by school-leaving certificate arise from the competition for apprenticeships and the associated subsequent transition to gainful employment. School-leavers who are interested in apprenticeships must apply for VET positions and are then recruited by companies seeking trainees. Human capital theory explains differences in access to apprenticeships according to productivity differences that depend on educational investment (Becker 1993). Since the productivity of applicants for apprenticeships is not directly observable, school-leaving certificates are used in the recruitment process as easily observable signals (Spence 1973). Thus, companies prefer young people with higher school-leaving certificates to those with lower school-leaving certificates.

Thurow's (1979) job competition model further specifies that the relative position of the applicants in the job queue matters. This model assumes that employers rank the applicants according to their assumed trainability so that school-leavers with higher certificates are ranked higher. Employers recruit trainees from the queue until all vacant training positions are filled. Thus, school-leavers' chances to enter apprenticeship depend on the number of applicants as well as on the number of positions available.

Economic conditions play a role in this model. When companies provide more apprenticeship positions in times of economic upswing, such as in the early 2010s, more young applicants are recruited from the queue and can directly enter apprenticeship.

› Hypothesis 1: Young people leaving school in the years after 2009 are more likely to transition smoothly from school to work compared to school-leavers from 2009.

Trends toward higher education play a role in the relative ranking of school-leavers with lower school-leaving certificates. When more school-leavers with intermediate-level school-leaving certificates decide to continue in general education, school-leavers with no or low certificates consequently move ahead in the queue of applicants. Thus, it is assumed that school-leavers with no or low school-leaving certificates benefit more from the general economic trends post-2009. In fact, they may catch up with school-leavers holding intermediate-level certificates, leading to less inequality in the STWT between school-leavers with different certificates.

› Hypothesis 2a: Differences in the chances of a smooth STWT between school-leavers with no or low school-leaving certificates and school-leavers with intermediate-level certificates will decrease over the period of observation.

However, this expectation is dimmed by further evidence on discrediting and stigmatizing of school-leavers with at most low secondary school-leaving certificates as lacking the necessary skills and maturity to start VET. From this perspective, school-leavers with no or low school-leaving certificate may be excluded from the applicant queue altogether (e. g., Solga and Kohlrausch 2013). The disadvantageous situation of school-leavers with low certificates is exacerbated if they refrain from actively searching for VET training places because they expect to fail from the very start (e. g., Solga 2002; 2005).

› Hypothesis 2b: School-leavers with no or low school-leaving certificates have consistently high risks of a problematic STWT compared to those with intermediate-level certificates.

In addition to apprenticeships, the available subsidized training schemes provide opportunities for school-leavers, particularly low-qualified young people. Scheme

participation depends on institutional allocation processes, as well as on the educational choices of the school-leavers themselves (Rahn et al. 2016). The young people may choose the programmes as an alternative to regular training if they expect difficulties in finding an apprenticeship and decide to take the opportunity to catch up on or improve their school-leaving certificate (Lex and Geier 2010). Moreover, gatekeepers such as career counsellors assign young people to training schemes who are not considered "mature" enough for vocational training or those who cannot find an apprenticeship (e. g., Leuze et al. 2011).

The regional availabilities of training schemes are expected to feed into the preferences of young people when they emulate what their peers do after leaving school. This assumption has been spelled out with regard to the relation between regional occupational structures and occupational aspirations (e. g., Flohr et al. 2020), but may be of similar relevance for training programmes. If school-leavers know peers who are in subsidized training schemes, they may specifically search for these opportunities when it comes to decide what to do after school. Moreover, career counsellors and other relevant persons such as teachers can direct young people to available subsidized training schemes. Procedures for allocating scheme places are of relevance here. Allocation regimes of schools are based on fixed quotas as well as the purchase of scheme places from providers by the FEA. In sum, we assume that school-leavers without certificate or low certificate are more likely to be diverted from smooth STWTs via apprenticeships, if more alternatives to regular VET are available.

› Hypothesis 3: The larger the share of subsidized training schemes in all VET opportunities offered in the federal state is, the greater the differences between school-leavers with no or low certificates and intermediate-level certificates are with regard to their chances of a smooth transition (Hypothesis 3a), and the more stable the differences by school-leaving certificates are over time (Hypothesis 3b).

4 Data and Methods

4.1 Data

We use administrative data from the German FEA. First, we use data from the career counseling (CC) procedures and draw a 5 percent random sample of young people who were registered for CC in 2009, 2011 and 2013. The data cover all young people who were seeking advice from the CC service or who were searching for apprenticeships via the FEA. As not all students in Germany take up the services of the FEA, implying that the data do not represent all school-leavers in the selected years. The scarce evidence available regarding the take-up of CC in Germany suggests that CC is particularly promoted in low-track lower secondary schools (German

Hauptschulen), while take-up is hardly correlated with individual characteristics and parental background (Fitzenberger et al. 2020). With the official statistics at hand, we can see that the shares of students from low-track schools are slightly overrepresented in the CC data compared to their share among all school-leavers in Germany (Autorengruppe Bildungsberichterstattung 2010; see also Achatz and Schels 2020).

The CC data provide information on the school-leaving year, which is necessary to restrict the samples to school-leavers. As the CC data are available only for the period from 2008 onward, we have to limit the analysis to the selected years. The CC data also provide individual information such as gender, school-leaving certificate and nationality. We restrict the samples to those aged 21 or younger who completed a general education with a lower or intermediate school-leaving certificate. We add information drawn from the data of the occupational rehabilitation services.

The CC data are merged with data from the Integrated Employment Biographies (IEB) provided by the Institute for Employment Research (IAB) to obtain a longitudinal dataset for the post-compulsory school career. The IEB spell data provide individual information about periods of standard and marginal employment, apprenticeship, unemployment, receipt of unemployment insurance benefit, receipt of means-tested basic income support (welfare benefit), participation in training schemes and other active labour market programmes (Dorner et al. 2010). The information is confined to activities in the core business of the FEA. Thus, it should be mentioned here that the data do not contain information on periods in school-based vocational training, general education, subsidized schemes in programmes provided by the federal states or non-standard employment or non-employment (e. g., self-employment, civil servant or homemaker). The structure of the spell data allows us to precisely track the start and the end, though not the type of these unreported activities.

The data for the analysis comprise information on the labour market biographies of 31 643 individuals, namely, 10 502 school-leavers from 2009, 10 361 from 2011 and 10 780 from 2013. To cover the formative period of vocational education and entry into working life, we observe 66 consecutive months beginning in July of the year of leaving school for each individual.

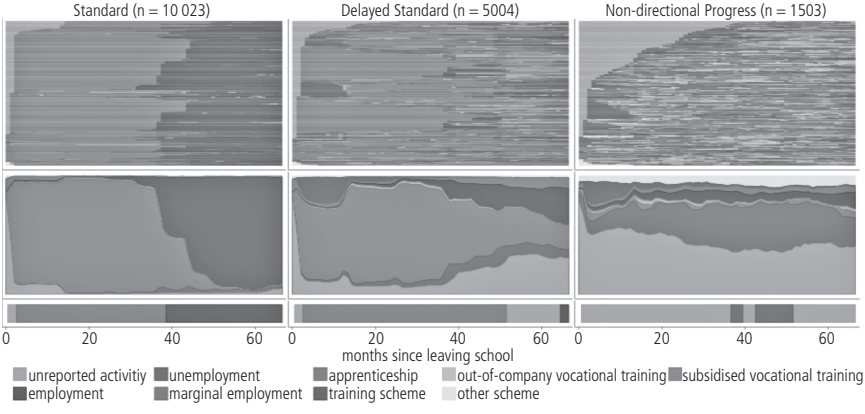
The individual data are combined with regional context data. Information on the participants in subsidized training measures by federal states is available from the Integrated Reporting on Education and Training (iABE) (Dionisius and Krekel 2014) as reported in the National Educational Reports (Autorengruppe Bildungsberichterstattung 2010) and the Federal Statistical Office. Further information on regional unemployment and school-leaving cohorts is measured at the level of administrative districts (German *Kreise*), made available by the Federal Statistical Office.

4.2 Operationalization

Dependent variables

We examine differences in the STW trajectories by applying sequence analysis and cluster analysis. In the longitudinal data, we assign one of nine unique labour market states to each month after leaving school (see Table A1, online appendix[2]). We apply the optimal matching algorithm to measure the (dis)similarity of the individual STWT sequences (Elzinga 2003), and we fix the costs of insertion and deletion operations at the value of 1 and substitution costs at the value of 2. The resulting distance matrix is used in a hierarchical Ward cluster analysis to group similar sequences into clusters of ideal-typical transition patterns. This procedure is a replication of our analysis for a single school-leaver cohort from 2008 (Achatz et al. 2022). For the school-leavers in 2009, 2011, and 2013, we find a comparable fine-grained cluster solution. The identified nine clusters show the heterogeneity of the STWT. For reasons of clarity, we restrict the following analysis to three selected trajectories.[3] Figure 1 displays the selected trajectories as sequences of all the individuals in each pattern (upper plot), aggregate monthly distribution of labour market states (middle plot), and the most frequent status per month (lower plot).

Figure 1 School-to-Work Trajectories (Sequence Index Plot, Status Proportion Plot, Modal Plot)



Note: Pooled number of observations for school-leavers of school leaving years 2009, 2011, and 2013, sequence index plots (upper panel) are plotted for randomly selected 500 individuals each. Source: Career counseling data, Integrated Employment Biographies.

2 Additional material is available online under https://doi.org/10.6084/m9.figshare.23592795.v1.
3 Table A2, online appendix, reports the distribution of all nine STW trajectories.

- Standard transition: the school-leavers are in an apprenticeship for an average of three years before entering regular employment until the end of the observation period.
- Delayed standard transition: the school-leavers pass from an apprenticeship to employment, but experience periods of scheme participation or unreported activities before entering an apprenticeship and short periods of unemployment mainly at the transition into employment. The overall transition is delayed.
- Non-directional progress: the school-leavers flounder between diverse labour market states (Vuolo et al. 2014), including repeated unemployment and participation in active labour market programmes, such as training schemes.

The three trajectories represent the relevant variation in the complexity and diversity of the transition processes. In the smooth standard trajectory, the socially expected activities of apprenticeship and employment follow one another almost without an interruption (see also Brzinsky-Fay 2007). The delayed standard trajectory is marked by temporary breaks before and after apprenticeship. The non-directional progress trajectory is highly problematic, as young people do not experience stable apprenticeships or employment during the entire observation period. The three patterns can be clearly interpreted based on our data and are not blurred by long periods with other activities that are not reported in the administrative data used.[4]

Independent variables

Our main independent variables of interest are the year of leaving school (2009, 2011, 2013) and the type of school-leaving certificate at the end of lower secondary education. We differentiate between school-leavers with intermediate certificates (German *Realschulabschluss*) and school-leavers with low certificates who left school either without any certificate or a German *Hauptschulabschluss*. We control for welfare receipt in the household, gender, foreign nationality and participation in vocational rehabilitation, a scheme for people with disabilities and therefore an indicator for special needs. These are well-known factors influencing the STWT (e. g., Achatz et al. 2022; Reims and Schels 2022).

We use several indicators for differences in the overall opportunity structures at the federal state level. We are particularly interested in the share of new entrants into subsidized training schemes among all entrants into VET. In order to capture the ranking between the states (see Section 2.2), we calculated the average of the shares from 2008, 2010 and 2012 for each state. As school-leavers' alternatives to apprenticeships depend on the educational system in their federal state (see Section 2.2), we use two further indicators as context controls. First, we consider the

4 It should be noted that variants of smooth standard transitions via vocational schools and general education may remain hidden in other clusters where the data report no entries either for a longer period or for the whole observation period (see Figure A1, online appendix, see also Achatz et al. 2022).

Table 2 Independent Variables, Description

Individual level Variable	%	
School-leaving year		
2009	33.2	
2011	32.7	
2013	34.1	
Low-level school-leaving certificate (Ref: intermediate)	38.9	
Welfare receipt in the three years before leaving school		
no receipt	77.6	
up to 23 months	14.7	
24 months and longer	7.8	
Non-German nationality (Ref.: German)	10.4	
Female (Ref.: male)	45.9	
Person in vocational rehabilitation (Ref.: no)	5.5	
total	100.0	(n = 31643)

Regional level Variable	Level	mean	std. dev.	n
Share of new entrants into transition segment	individual	0.27	0.08	31643
	federal state	0.27	0.08	16
Share of students in school-based alternatives	individual	0.05	0.04	31643
	federal state	0.06	0.05	16
Ratio of students in general vs. vocational education at upper secondary level	individual	0.65	0.14	31643
	federal state	0.60	0.16	16
Local unemployment rate	individual	0.08	0.04	31643
	administrative district	0.08	0.04	402
Local share of school-leavers with university entrance diploma among all school-leavers	individual	0.33	0.10	31643
	administrative district	0.33	0.10	402

Source: Career counseling data, Integrated Employment Biographies, Federal Statistical Office.

availability of school-based alternatives as indicated by the share of participants in school-based vocational training among all new entrants in fully qualifying vocational training courses. Second, we account for the availability of alternatives in general education indicated by the ratio of students in upper secondary general education compared to VET. We use further indicators to control for the local situation in the vocational training market (e. g., Hillmert et al. 2017). We control for unemployment rates as an indicator for the economic situation. We also use the regional share of school-leavers with a German Abitur among all school-leavers, which is an indicator for competition between school-leavers (Kleinert and Kruppe 2012).

For the multivariate analysis, all context-level variables are z-standardized. To specify possible nonlinear associations, the squared terms of the variables are also included in the models. Table 2 provides an overview of all independent variables.

4.3 Methods

We estimate multilevel models that consider the hierarchical data structure where individuals (level 1) are nested in regional labour markets at the level of administrative districts (level 2) and in federal state contexts (level 3). We specify linear probability models (LPMs) to estimate the probabilities of passing trajectories using the Stata command mixed (see Bacher et al. 2017; Rabe-Hesketh and Skrondal 2008 for further information).[5] We separately estimate several models for each of the three selected trajectories. We estimate a model with school-leaving year as the only covariate to disentangle the variance at the individual level and federal state level beyond trends (Model 0) and a model with the defined set of individual and context covariates (Model 1). Of particular interest for the investigation of trends in disparities by school-leaving certificates is a model with interaction effects between school-leaving certificate and school-leaving year (Model 2). We specify Model 3 with a cross-level triple interaction of school-leaving certificate, school-leaving year and share of new entrants into subsidized training schemes at the federal state level to model how trends differ across regional contexts. We graphically present the results of the models with interaction terms by predicting the probability of being in a specific transition pattern according to school leaving year and level of school-leaving certificate.

5 Results

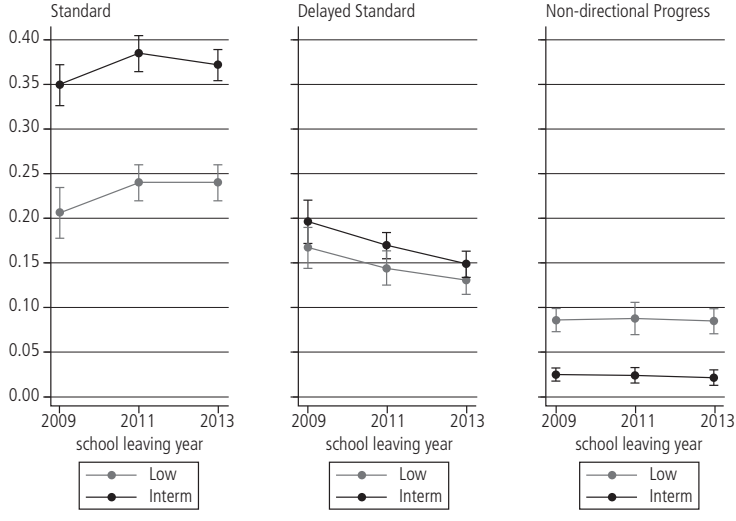
First, we explore how the chances of experiencing a smooth transition have developed overall across the school-leavers of different years (see also Table A2, online appendix). In our sample of school-leavers with low and intermediate certificates, the standard STWT is the largest cluster. 30 percent of the school-leavers in 2009 passed a standard STWT, compared to 32 % of the school-leavers in 2011 and 33 % of those in 2013. At the same time, the share of young people in the delayed standard transition declined; 18 % of the school-leavers of 2009 are to be found in this transition pattern, compared to 16 % of the school-leavers of 2011 and 14 % in 2013. The findings support Hypothesis 1 that the chances for a smooth STWT improved for young people who left school in the economic upswing that occurred after 2009. In contrast, the shares of school-leavers who are in the problematic

5 Even though multinomial logistic regressions would be an appropriate alternative for the dependent variable, LPM eases both the interpretation of the results, particularly the interaction terms, and comparison across different model specifications.

trajectory of non-directional progress hardly change over time. The share is 5 % among the school-leavers in 2009 and 2011 and 4 % among the school-leavers in 2013. The findings of linear multilevel regression models support the trends (see Model 0, Tables A3 [standard transition], A4 [delayed standard transition] and A5 [non-directional progress], online appendix).[6]

Next, we ask how the transition chances of school-leavers with low and intermediate certificates vary by school leaving year, as addressed in Hypotheses 2a and 2b. Figure 2 presents the predicted probabilities for the selected trajectories estimated from the models with interaction terms between school-leaving year and certificate

Figure 2 Predicted Probabilities of Experiencing School-to-Work Trajectories by School-Leaving Year and School-leaving Certificate (n = 31 643)



Notes. The results from separate multilevel linear probability models for each outcome, 95% confidence intervals, prediction from Model 2 (see Tables A3 [standard transition], A4 [delayed standard transition] and A5 [non-directional progress], online appendix). Control variables on individual level: gender, German nationality, welfare receipt in the family, participant in vocational rehabilitation; control variables at regional level: share of new entrants into transition segment, share of students in school-based alternatives, ratio of students in general/vocational education, local unemployment rate, share of school-leavers with university entrance diploma. Source: Career counseling data, Integrated Employment Biographies, Federal Statistical Office.

6 The multilevel linear probability models with school-leaving year as the only covariate (Model 0) allow us to capture the share of variance in the outcomes at the federal state level and regional level (see Tables A3, A4, A5, online appendix). We find rather minor differences in the probability of engaging in a specific trajectory between federal states and regions, conditioned only on the school leaving year. As discussed in previous research on regional differences in STWT (Bacher et al. 2017), this is also due to models with binary outcome variables and rather large variance at the individual level. We are still able to identify significant context variable effects. Including further covariates in Models 1–3 reduces the remaining state-level and region-level variance.

(Model 2). The trends over school-leaving years, as previously described, are almost parallel for school-leavers with low school-leaving certificate and intermediate-level certificate. Both groups face a higher probability of making a standard transition when leaving school in 2011 or 2013 compared to 2009 and a lower probability of experiencing a delayed standard transition. Compared to their peers with intermediate-level certificates, school-leavers with low certificates stably face an approximately 12 percentage points lower predicted probability of experiencing a smooth standard transition and an approximately 3 percentage point lower predicted probability of experiencing a delayed standard transition. Contrariwise, the predicted probability of non-directional progress is consistently approximately 6 percentage points higher among school-leavers with low certificates than among their peers with intermediate-level certificate. Thus, we find no evidence for Hypothesis 2a that school-leavers with low certificates have particularly benefited from the overall better conditions in the period of observation. The social differences have not been reduced over time. However, with regard to the probability of non-directional transitions, there is support for Hypothesis 2b. There is a subgroup of low-qualified school-leavers who have consistently high risks, regardless of the overall improving conditions for others.

Finally, we examine whether the trends in disparities by school-leaving certificate vary by the context conditions, as defined by the available training schemes in the federal states. Figure 3 shows the findings from Model 3, with a three-way interaction between school-leaving year, school-leaving certificate, and average share of new entrants in the "transition segment" at the state level. The probabilities of making a smooth standard transition (Figure 3a), a delayed standard transition (Figure 3b) or non-directional progress (Figure 3c) are predicted at the mean ("average") and one standard deviation ("below average" and "above average") of the distribution of the "transition segment's" size.

The probability of experiencing a smooth standard transition is highest overall for the school-leavers in the federal states with a smaller-than-average number of available training schemes. We also see that there are few differences in the probability of making a smooth standard transition between states with an average or larger-than-average "transition segment". Moreover, the *difference* between school-leavers with low or intermediate-level school-leaving certificates in the probability of making a standard transition is significantly more pronounced in the states with a smaller-than-average number of entries into training schemes (14 percentage points compared to 9 percentage points in the other federal states). Across the observed variations by federal state, school-leavers with low and intermediate certificates have equally benefited from the developments in the school-leaving years since 2009, as seen in the overall parallel trends.

Regarding the probability that school-leavers experience a delayed standard transition, we find rather similar patterns across the state-level differences in the "transition segment". The disparities between school-leavers with low and intermediate certifi-

Figure 3 Predicted Probabilities of Experiencing School-to-Work Trajectories by School-Leaving Year and School-leaving Certificate, Variation by Size of Subsidized Training Schemes at the Federal State Level (n = 31 643)

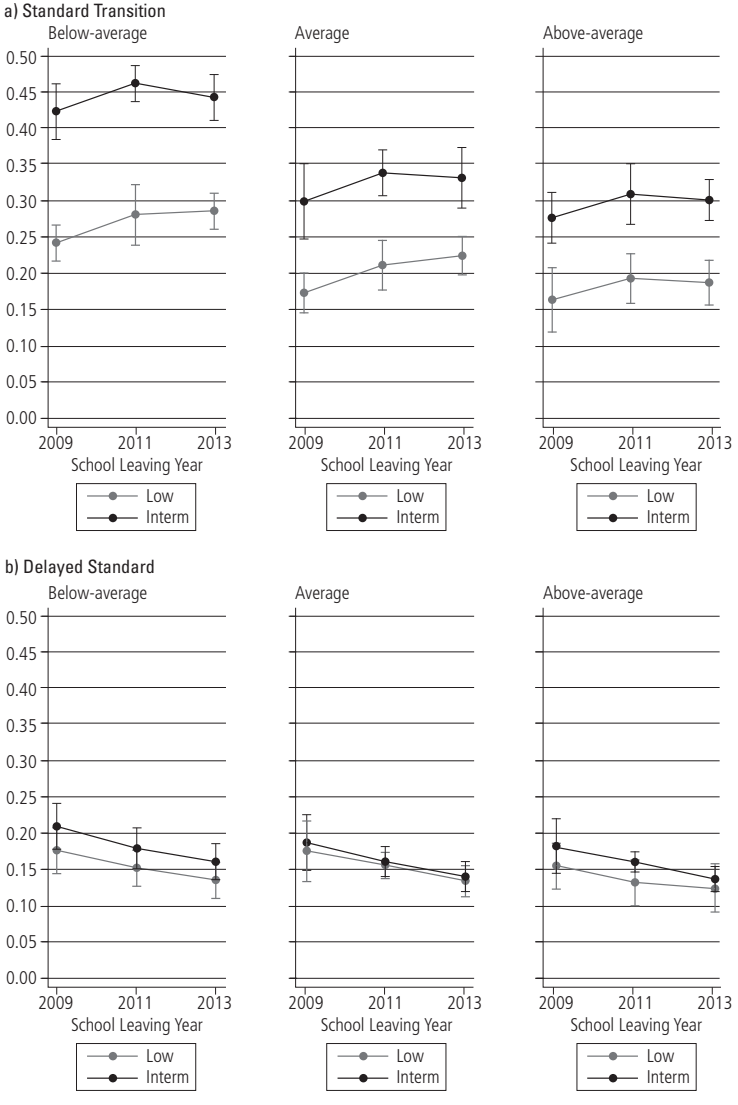
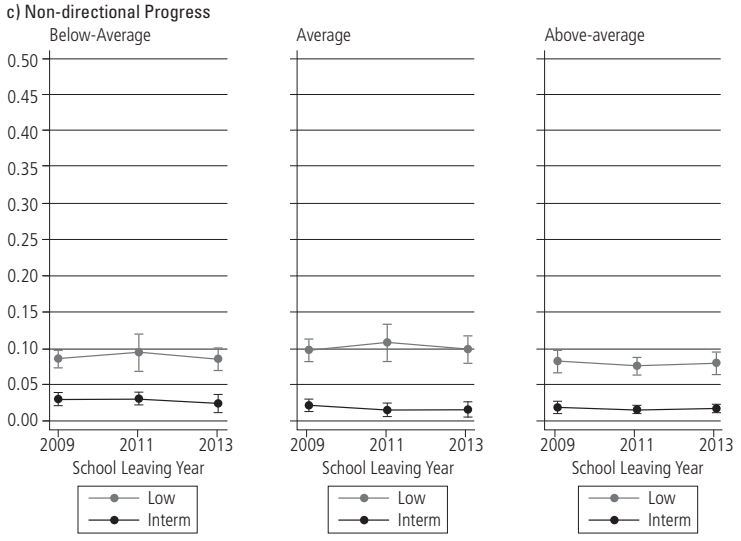


Figure 3 continues on the next page.

Continuation of Figure 3.



Notes: The results from separate multilevel linear probability models for each outcome, 95 % confidence intervals, prediction from Model 3 (see Tables A3 [standard transition], A4 [delayed standard transition] and A5 [non-directional progress], online appendix). Control variables on individual level: gender, German nationality, welfare receipt in the family, participant in vocational rehabilitation; control variables at regional level: share of new entrants into transition segment, share of students in school-based alternatives, ratio of students in general/vocational education, local unemployment rate, share of school-leavers with university entrance diploma. Source: Career counseling data, Integrated Employment Biographies, Federal Statistical Office.

cates seem to be weaker in federal states with an average-sized "transition segment", but they are not significantly different compared to those found in other state-level contexts. Additionally, the hinted-at decline in the disparities by school-leaving certificate in federal states with an above-average-sized "transition segment" over time is not significant. Thus, the differences in the probability of making a delayed standard transition between school-leavers with low school-leaving certificates and those with intermediate-level certificates and the parallel decline over time are similar over all surveyed state-level contexts.

Finally, the probability of experiencing non-directional progress is also similar and occurs by similar margins for school-leavers with certificates of both levels across state-level differences in the "transition segment". In states with an average-sized "transition segment", the school-leavers with low certificates seem to face a somewhat higher probability of non-directional progress after leaving school compared to the intermediate-qualified school-leavers. However, the difference is not significantly different from that in other federal states.

Overall, we find no evidence for the hypothesis that the more extensive the "transition segment" is, the stronger the differences in STWT between school-leavers

with low and intermediate-level certificates are (Hypothesis 3a), and the more stable the differences by school-leaving certificates are over school-leaving years (Hypothesis 3b).

6 Discussion

This study of Germany investigates whether and how the chances for a smooth STWT of school-leavers with low or intermediate certificates changed during the early 2010s, which were marked by an economic upswing. To examine this question, we make use of a holistic perspective on STWTs to evaluate differences in progression within the five years after leaving school based on a large administrative dataset.

The first key finding of the study is that school-leavers from the early 2010s find improved chances of a smooth standard transition compared to school-leavers from the year 2009, who left school during the time of the so-called Great Recession; this improvement is evidenced by a higher probability of following the "royal route" via apprenticeship into employment and a lower probability of making a delayed transition. These trends emerge clearly, even if changes range within a few percentage points during the short observation period. We can conclude that STWTs are more or less smooth depending on the situation in the vocational training market, but frictions in economically slack times can be partly compensated by the German VET system (see also Brzinsky-Fay and Solga 2016). The observed trends are similar for school-leavers with low and intermediate-level school-leaving certificates. Both groups are shown to have equally benefited from the improving market conditions in the early 2010s, which translates into an "elevator effect". The relative disadvantages of school-leavers with low certificates in making a smooth transition have persisted throughout the period of observation. They could not catch up with their peers with intermediate certificates.

Second, we observe a group of school-leavers with severe problems in the STWT who fail to gain access to both apprenticeship and employment. This group remained untouched by the economic upswing during the period of observation. This evidence is in line with previous research, which points to groups of young people that are more permanently detached from the labour and vocational training market (Eckelt and Schauer 2019). This may be either because they are labelled as not trainable or employable or because they themselves withdraw from important steps of vocational training and employment. The concept of "cooling out" with regard to motivation and ambition suggests that both processes mutually reinforce each other (Solga 2002; 2011).

Third, although there are remarkable differences across the German federal states with regard to the share of young people entering subsidized training schemes for so-called disadvantaged youth every year, this hardly makes any between-state differences in transition chances. It is particularly noteworthy that the risk of mak-

ing a non-directional transition does not differ by the size of the so-called transition segment. This means that the at-risk group among the school-leavers is not reached by the existing training schemes. We can still see that the availability of training schemes and market opportunities are linked; i. e., in federal states with a below average-sized "transition segment", school-leavers in general are more likely to experience a standard transition. This association is not to be interpreted causally. If companies who provide a large number of apprenticeships are located in a federal state, then fewer subsidized training schemes must be established. This interplay between the market and the "transition segment" may constitute regional differences in the context conditions for individual transition opportunities. One reason for the presence of only slight differences at the federal state level may be that the types of available training schemes are more important than the relative size of the "transition segment". We capture further variations at the federal state level by using indicators for school-based vocational training alternatives and alternatives in general education as control variables. This approach may still only scratch the surface of when federal state policies weigh schemes for different target groups. The development of further context indicators remains on the agenda for future research.

This brings us to the limitations of our study. We have to take into account that the period of observation from 2009 to 2013, although considered as years of upheaval in the vocational training market, represents only a short period in time. The situation on the labour market in Germany has been easing since 2005; however, the career counseling data used in this study were first set up for 2008. We therefore cannot take into account further years back. Future research will also have to address how track-specific disparities in the STW trajectories have developed more recently with regard to the COVID-19 crisis or a possibly upcoming energy crisis.

A further limitation is that the administrative dataset only contains information on selected labour market activities. Information on episodes in general education, school-based vocational training, training schemes not funded by the Federal Employment Agency, or non-employment, such as parental leave, are lacking. The dataset only records the start and end dates of these unreported activities in the timeline of the STWT. Thus, the selected trajectories may not represent the overall variety of transition patterns, particularly standard transitions via school-based training (Autorengruppe Bildungsberichterstattung 2020; Holtmann et al. 2019). Based on this, the data are less suitable to analysing possible changes in the gendered structures of STWTs. In Germany, higher shares of male school-leavers aspire to occupations trained in apprenticeships, while higher shares of female school-leavers opt for school-based vocational training in health and social professions (e. g., BIBB 2016; Autorengruppe Bildungsberichterstattung 2018). Likewise, parenthood is likely to affect the STWT of young females and males differently. However, we consider the latter to be a minor problem in the present analysis, as most young people examined were aged between 17 and 23 years.

Moreover, our study is a description of disparities in the STWT by school-leaving certificates over time and place. However, there is little individual information available in the administrative data, particularly no information on individual agency or ambitions (e. g., Holtmann et al. 2017). Future research has to examine the mechanisms why negative processes of (self-)selection are not undermined even in good economic times and by the available training schemes.

Finally, we have to mention that we assessed qualitative differences in the STWT based on notions of linearity in the trajectories and smoothness. However, this is only one facet by which to distinguish successful from less successful STWTs. Further insights into trends of social inequality may emerge when, for example, placement in different occupational segments or social status achieved in young adulthood are considered (e. g., Brzinsky-Fay and Solga 2016).

Despite these limitations, we have been able to map STW trajectories with the present study, including selected subsidized training measures and unemployment, both in great detail and for a large number of young people across several years of school leaving. In particular, the pattern of problematic non-directional progress can be clearly contrasted with transitions via apprenticeships, which are still predominant in Germany. Against this background, our findings provide important information that is relevant for public debate. The focus of the debate is often on the economic conditions in the vocational training and labour market. As the STWT process depends on far more complex factors (see also Kohlrausch and Islertas 2022), the debate must go beyond. Regardless of time and local context, the questions remain how to reduce disparities in the STWT between school-leavers with low and intermediate certificates and how to reach the at-risk group of young people who do not get a foothold in the labour market.

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