

A Decomposition of Local Labour-Market Conditions and Their Relevance for Inequalities in Transitions to Vocational Training

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Abstract

We investigate to what extent individual transitions to vocational training in Germany have been affected by local labour-market conditions. A statistical decomposition approach is developed and applied, allowing for a systematic differentiation between long-term change, short-term fluctuations, and structural regional differences in labour-market conditions. To study individual-level consequences for transitions to vocational training, regionalized labour-market data are merged with longitudinal data from the National Educational Panel Study, and multivariate transition-rate models are fitted. The results indicate that structural differences between regions have had significant effects on the transition behaviour of school leavers, whereas temporary crises have been of only minor relevance. Moreover, different groups have been affected to different degrees by varying labour-market conditions. We also highlight the usefulness of our decomposition approach for a broader set of applications.

Introduction

The successful completion of vocational or academic training has become a crucial determinant of opportunities for individuals in contemporary societies. The unequal distribution of opportunities for training represents an important mechanism of social inequality. It is a common sociological assumption that these opportunities are influenced not only by individual characteristics but also by the environment in which individuals live. While inter-individual differences in education and training have been repeatedly studied, comparatively less is known about the role of varying socio-economic contexts in the production and maintenance of these inequalities. Labour-market conditions are a major aspect of such contexts, and thus their effects on

individual opportunities for education and training are highly relevant in research on social inequality.

Regarding labour-market effects on vocational training, Germany provides a particularly interesting case. In the international discussion, the German system of vocational training has often served as a reference model, as it has been regarded to facilitate relatively smooth transitions to the labour market (Lynch, 1994). The case is also interesting in analytical terms as both the behaviours of individuals and employers can be expected to be sensitive to local contexts.

Conventional context analyses in training research have used (raw) local unemployment rates as a simple indicator of labour-market conditions. In contrast to that, we want to be much more specific about various aspects

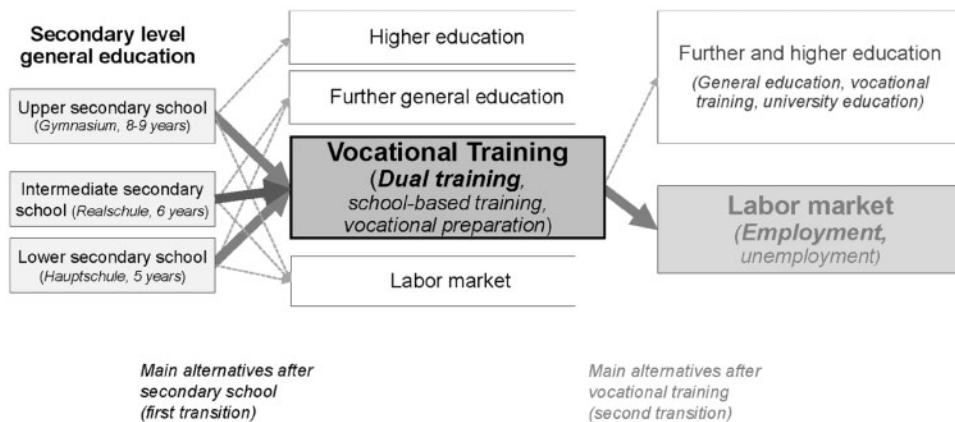


Figure 1. Alternatives after general secondary schooling and vocational training (two-stage transition model)

of these conditions. For example, a high level of local unemployment at a particular point in time may reflect a temporary crisis, but may also reflect a persistent regional disadvantage. We aim to separate these aspects and to assess their specific relevance for individual transitions to training. Developing and applying a method of statistical decomposition, we distinguish between components of the labour-market situation: long-term trends and short-term fluctuations as well as typical regional variation.

Institutional Structures and Trends in Vocational Training in Germany

In Germany, the process of transitioning to the labour market has traditionally been highly institutionalized with standardized routes of access. In particular, apprenticeships in the *dual vocational training system* have been regarded as the most important track to obtain occupational qualifications (cf. Shavit and Müller, 1998; Hillmert, 2002, 2008). Apprenticeships are a combination of school-based and firm-based training; their formal basis is a training contract with a company. This system may be rather sensitive to fluctuations in market conditions (Wagner, 1999) and, in particular, labour-market crises. Both school leavers (who decide from among various alternatives of education, training, and employment) and employers (who decide upon the provision of training positions and upon the recruitment of particular trainees) can be expected to adapt their decisions with respect to local labour-market conditions.

Various crises of both the labour and the training market have been the subject of public debate since the 1980s. Given the relevance of vocational training for individual opportunities, it is reasonable that the German public is relatively sensitive to problems concerning the

transitions associated with vocational training in general and dual training in particular. Imbalances in the training market, particularly in the early 1980s (Behringer and Ulrich, 1997), led to the government-aided provision of additional training opportunities. For example, firms were subsidized by the federal government to offer additional training places, and industry-wide vocational programs were established (Berger, 2003).

Typically, vocational training takes place subsequent to general secondary schooling. The secondary school tracks (two or three, depending on the federal state) form a hierarchy, and schooling in each of the tracks is completed with the attainment of a specific school leaving certificate (Figure 1). In 2011, 57 per cent of an age cohort began vocational training in the dual system, and about 10 per cent began school-based training after secondary school (Statistisches Bundesamt, 2013). The vocational tracks differ in their specialization: training for technical and commercial occupations (i.e. male-dominated occupations) is more likely to be in the dual system, and care and healthcare occupations (female-dominated occupations) are more strongly represented in school-based training. In the dual system, employers play an important role because they decide which applicant to recruit for an apprenticeship. This strong linkage between training and labour market makes it particularly interesting to investigate the relevance of labour-market conditions. In principle, all school leavers (even dropouts) have the possibility of entering apprenticeship training in the dual system. However, chances to enter training in a particular track or occupational field vary with respect to the obtained school-leaving certificate (Protsch and Solga, 2015). School-based vocational training is more strongly subject to institutional specificities, and an intermediate school degree is often a

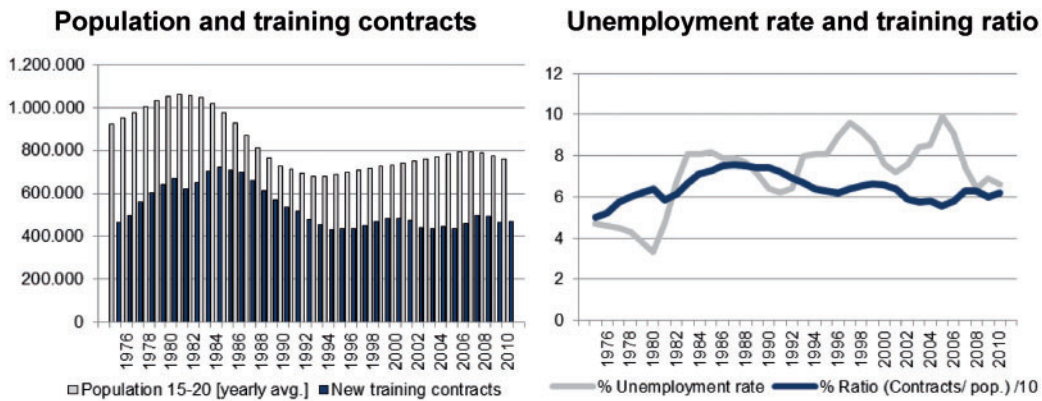


Figure 2. Apprenticeship training in West Germany, 1974–2011
 Source: Data: Statistisches Bundesamt (2014a); BMBF (2008); Federal Labor Office (2014).

minimum formal requirement. Both types of vocational training programs usually last for 2–3.5 years and lead to specific occupational qualifications. In addition to these fully qualifying options, a system of preparatory vocational training schemes has expanded significantly since the 1990s (Baethge, Solga, and Wieck, 2007).

In a stylized life-course perspective, we observe *two major transitions* associated with vocational training: transitions to the training system after general schooling and transitions after completion of training. We focus on school leavers' transitions to training. However, we will also take an additional look at transitions following the completion of vocational training because links between the two transitions are likely, and a qualitative assessment of the initial training placements may be inferred from their consequences later on, i.e. job placements after training. The main focus is on transitions related to the *dual vocational training system*. This specification is not only due to the quantitative dominance of this form of training. It can also be assumed that dual training is—compared with all other educational alternatives—most closely related to economic developments as the training positions are provided by companies, which are themselves actors in market situations.

A summary of the aggregate developments in dual training in Germany over the past decades—the observation period of the following empirical analyses—is presented in Figure 2. The absolute number of training contracts (left panel) has occasionally fluctuated but remained at a high level throughout the observation period. Beyond various trends and internal heterogeneity, this reflects the constantly high relevance of dual training for school leavers in Germany. The number of training contracts also follows the development of the population of young adults. When comparing the trend

of the training ratio in the population of young adults with the development of the labour market in general (indicated by the unemployment rate as a measure of labour-market balance/imbalance [right panel]), no persistent pattern can be found. During the 1970s and 1980s, the training ratio increased even in times of increasing unemployment, but this has not been the case since the 1990s. The pattern has apparently even reversed, but this conclusion would need to be quantified. It should be acknowledged that there has been a general upward trend in unemployment throughout the observation period.

Official statistics and aggregate studies may thus provide a first overview of the fundamental trends in the prevalence of dual vocational training, but they provide very little information regarding the relevance of socioeconomic context effects on training, especially with regard to their development, spatial variation, and consequences for social inequality. We therefore see the need for a more systematic approach when studying socioeconomic context effects.

Conceptual and Theoretical Considerations

Like the labour market, the market for dual training follows the principles of *supply and demand*. Successful participation in training is the result of a two-sided process involving the individual decisions of applicants and the provisions and selections made by training institutions (Dustmann and Schönberg, 2008). Hence, access to the dual system is a result of a bilateral matching process between applicants and companies. Both parties can be linked to labour-market conditions.

We follow a *rational decision* perspective with respect to both the school leavers' educational decisions and the

decisions of companies to provide training positions and to recruit particular individuals as trainees. Individual transitions after compulsory schooling are based on the evaluation of the anticipated (future) costs and benefits of each given alternative, i.e. various forms of vocational training, further or higher education, or direct transition to the labour market. Rational educational decisions vary according to specific individual characteristics, such as social origin (Boudon, 1974). However, there are also reasons to consider regional and institutional settings as factors that influence the cost–benefit perception (Erikson and Jonsson, 1996). We assume that individual perceptions of labour-market conditions shape expectations about individual chances of success and the perceived consequences of particular training alternatives, i.e. about the chances of getting into training and later becoming employed. In terms of training opportunities, in particular the company-based training positions provided within the dual system, it can be argued that their provision is closely linked to the current personnel requirements and budgetary restrictions of companies (Mühlemann and Wolter, 2011). Labour-market characteristics can therefore be expected to be associated with the training decisions of individuals and companies. Of course, empirical associations do not necessarily represent causal effects. However, we aim to further disentangle the relation between the (regional) labour-market situation and individual processes of school-to-work transitions. Therefore, the article provides a concept to differentiate the relevance of contextual conditions (e.g. unemployment) in terms of short-term developments (i.e. temporary economic crises), long-term trends (i.e. structural change over time), and regional heterogeneity (i.e. structural differences between regions).

Short-term Determinants of Transitions

Short-term developments on the training market can be traced back to two major determinants: (business-cycle) economic situation and demographic fluctuations. Due to the close linkage between labour and training market in Germany, the provision of training opportunities by employers and individual transitions to dual training will be positively associated with a favourable situation of the general labour market. Starting from the side of individuals, the central theoretical argument is that temporarily high unemployment tends to discourage school graduates from entering the labour market (Raffe and Willms, 1989; Micklewright, Pearson, and Smith, 1990). When the market situation is considered difficult, decisions for general (further) schooling or school-based vocational training appear to be more cost-efficient and less risky than dual

training, which is more closely related to the labour market. Hence, the supply of potential trainees can be expected to be tied to business-cycle developments. The majority of studies put forward arguments for such a positive impact of (local) unemployment on general education (Clark, 2011). However, there are also arguments for a reverse relation as the chance of being individually affected by unemployment is also higher. This could foster a stronger motivation for individuals to apply for dual training, as the individual transition to the labour market is then considered to be smoother (Micklewright, Pearson, and Smith, 1990). The demand for trainees on the employer side is again expected to be closely related to the temporary economic situation of the company. In general, firms can either provide training to invest in their future stock of human capital or they use apprentices as cheap labour, training above their demand (Neubäumer, 1993; Soskice, 1994). In times of economic crises, employers are less willing to provide training positions, as the need for skilled workers is considerably lower. Moreover, the greater availability of skilled workers makes them relatively more attractive and cheaper for employers. This also diminishes their demand for trainees (Wolter and Ryan, 2011). In both respects, economic downturns decrease the demand for apprentices. Besides such short-term business-cycle effects on the training market, however, forms of anti-cyclical behaviours that aim at securing human resources with a longer time horizon are also plausible. It is therefore not unexpected that available empirical evidence is far from consistent (Brunello, 2009).

The other important determinant of short-term changes in the training market is demographic developments. There is a well-established tradition of economic demography following Easterlin (1968), which focuses on the labour-market effects of demographic change. Short-term effects of the cohort size on the risk of being unemployed could be shown for Germany (Zimmermann, 1991). Applying these arguments to the market-oriented forms of allocation in the dual training system, the conclusion is that smaller cohorts of school leavers will have higher chances of transitioning than will larger cohorts, other things being equal (Maier and Walden, 2014).

It should also be noted that dual training in Germany has never been subject to unfettered market forces. Given the high level of public sensitivity, there have been various political initiatives to solve perceived imbalances in the vocational training market such as the introduction of vocational preparation (e.g. *Berufsvorbereitungsjahr*) in the late 1970s (Berger, 2003). If such interventions are successful, the short-term effects of market conditions tend to attenuate. However, political interventions regarding the expansion of training placements have been

reduced in recent years, so that market forces have again been strengthened in the training market.

Hypothesis 1a: We expect a (small) negative effect of temporary aggregate unemployment on the chances of transitioning to dual training.

Hypothesis 2a: We expect the size of relevant age cohorts to also negatively affect the chances of transitioning to dual training.

Hypothesis 1b/2b: We expect both effects to increase over time due to reduced political intervention.

Long-term Trends in Transition Behaviour

For cohorts born after World War II, the completion of an extended phase of formalized vocational training before starting employment has become the standard experience (Hillmert, 2008). Non-academic vocational training was traditionally the domain of school leavers with lower or intermediate secondary school degrees. However, school leavers with upper secondary degrees (*Abitur* or equivalents) have shown increasing participation since the mid-1970s as either an alternative to or as a training phase preceding academic studies (Hillmert and Jacob, 2003).

Again, these developments are a result of changes in both supply and demand. With regard to individuals, the most significant trend has been educational expansion towards higher levels of school qualifications. Upper-level school tracks have become increasingly accessible for non-traditional groups of students who do not necessarily have clear academic aspirations but express preferences for vocational training. Educational expansion may have also changed the composition of students in the various school tracks with regard to ability and other functional criteria as well as increased the potential for group stigmatization (Solga, 2002). This selectivity may account for trends in the relative chances of different groups of school leavers to enter dual training. With regard to employers, structural economic change towards services and increasing costs of training in skilled occupations have led to a decreasing share of employers that provide training starting in the 1990s (Busemeyer, 2009). Hence, relatively more school leavers with *Abitur* apply for vocational training and compete with lower-qualified school leavers for a relatively decreasing number of training places. As a consequence, lower-qualified school leavers may be displaced and find themselves increasingly further back within the 'queue' of applicants (Thurow, 1975).

Hypothesis 3: We expect that long-term trends in transitions to dual training are characterized by the decreasing opportunities for lower-qualified school leavers.

Relevance of Regional Differences in Labour-Market Conditions

Research on individuals' job and training searches and employers' candidate searches has indicated that these activities tend to be spatially limited to a particular local range (Rouwendal, 1999; Mühlemann and Wolter, 2011). Not least due to the age of applicants for training (typically being minors), they normally do not intend to move to a place far away. This means that also their information horizon concentrates on a particular proximate area. To a minor degree, such restrictions also apply to the recruiting behaviour of firms that provide vocational training positions; advertising for training places is typically local.

Previous empirical evidence on the relevance of unequal local labour-market conditions is not fully clear. In particular, empirical studies that include individual-level micro data are rare. With respect to the transition to training, a negative relation between regional unemployment and the chances of entering vocational training in Germany could be found (Kleinert and Jacob, 2013). However, in simple measures, the effects of regional variation may be conflated with trends.

Typical transition patterns will evolve in regions that consistently (structurally) show a specific economic performance. In particular, living in a region with high levels of unemployment should increase the likelihood of staying in school or choosing school-based vocational training; both options imply a lower probability of entering dual training. Besides direct effects, the unemployment rate may also be an indicator of other local economic problems relevant to the considered processes (e.g. a specific industry structure).

Hypothesis 4a: We expect a negative effect of regional unemployment on the chances of entering dual training.

Hypothesis 4b: We expect this effect to increase over time due to reduced political intervention.

Group-specific Effects of Labour-Market Conditions

Studies have found that the impact of local labour market conditions on post-compulsory enrolment differs considerably for specific individual-level factors such as skills, abilities, and age (Meschi, Swaffield, and Vignoles, 2011). However, inter-individual inequality will appear not only in group-specific levels of transition chances but also in group-specific sensitivity to varying labour-market conditions. We concentrate on the role of individual qualifications in terms of school leaving certificates. The German education system differentiates between lower, intermediate, and higher secondary certificates. Given

their higher average market value, the transition behaviour of higher-qualified school leavers will be affected to a minor extent by the labour market. They also continue to follow their own preferences in times of economic downturns and in economically underdeveloped regions, as they are typically preferred in the selection procedures. In contrast, the success of lower-qualified candidates will depend on the sufficient (local) supply of training opportunities, and their transition chances will be more likely to follow the cyclical developments.

Hypothesis 5: We expect the transition behaviour of lower-qualified school leavers to be particularly susceptible to differences in labour-market conditions.

Qualitative Changes and Life-Course Effects

A final aspect focuses on the *heterogeneous quality* of training placements and forms of selectivity. Not all training positions are equal with regard to the future career prospects. Even under favourable economic circumstances, firms might provide training positions to more apprentices than they expect to hire afterwards (training ‘above demand’: Neubäumer, 1993). Apprentices receive comparatively low wages and may be used to achieve short-term adaptations of the workforce during economic fluctuations. Moreover, unbalanced training markets have traditionally been subject to external interventions, leading to the provision of additional training placements, not least as the result of governmental initiatives due to public pressure (Berger, 2003). This reduces the degree of selection among applicants. However, the previously unscheduled, often rather rapidly created, additional positions might be of poorer quality. It can therefore be expected that the overall standard of training rather decreases due to this additional provision. The loss in average quality may have consequences for employment prospects of trainees. Going beyond an analysis of the transition to training, additional information about the quality of training may be gained from a look at the transition to employment after the completion of dual training. In case of significant selection during the first transition, it can be assumed that more selective, i.e. relatively smaller but on average ‘better’, training cohorts will have better chances at the transition to employment. If, on the other hand, the first transition to training is rather elastic to labour-market conditions, a lower quality of apprenticeships may lead to a more problematic situation at the second transition to employment. Note that the hypotheses about delayed effects are conditional on the results of the earlier transitions. Elasticity during the first

transition also depends on auxiliary measures. If state intervention has been reduced in recent years, such effects have become smaller in recent periods.

Hypothesis 6a: We expect labour-market conditions during the first transition to dual training to have a conditional, qualitative impact that is indicated by delayed effects on the second transition to employment. If transitions to training are not affected by temporary unemployment, negative delayed effects are more likely: the higher the level of unemployment in the year of the first transition, the lower, ceteris paribus, the chances of immediately finding a job during the second transition. If, on the other hand, there is marked selection during earlier transitions—indicated by a (negative) impact of temporary unemployment on the transitions to training—then the net delayed effect will be positive.

Hypothesis 6b: We expect these delayed effects to lose importance due to reduced state intervention in more recent years.

Data and Analytical Strategy

To test these hypotheses, we use *individual-level data* from the *National Educational Panel Study (NEPS)* (Blossfeld, Roßbach, and von Maurice, 2011)¹ and merge these with regional administrative data.

The *regional context data* have been drawn from various administrative data sources. These provide contextual information on the level of administrative districts (*Kreise*) from 1974 onwards for West Germany (they would not allow for an analysis on East Germany before 1996). The combined data set consists of 5,579 individual cases with non-missing regional information. Labour-market information has been provided by the *Federal Labor Office (2014)*, reporting the unemployment situation in administrative districts for each year of the observation period. Information on the age-specific population in the regions has been made available by the *Federal Statistical Office (Statistisches Bundesamt, 2014b)*. For empirical context analyses, it is important to decide where the relevant contexts are located and where their boundaries are. There is evidence in previous analyses on transitions to vocational training in Germany, that a specific aggregation of administrative districts (home districts and neighbouring districts) is a good approximation for mapping relevant training areas (Weßling, Hartung, and Hillmert, 2015). We use this operationalization in our article.

Unemployment rates representing imbalances in the local labour-market situation are our central independent variables. As indicators they are associated with

many other economic factors, therefore the measured effects of unemployment are not necessarily causal. Regionalized analyses over a longer period of time require a careful handling of various analytical problems such as non-stationary trends in relevant variables.

We propose an innovative approach that allows for an explicit distinction between longer-term (structural) developments, short-term deviations, and regional differences as potential predictors in micro-level analyses of transition behaviour. Rather than simply controlling for time (discontinuously) in the analytical model in the form of cohort groups—which is usually done to represent long-term structural developments—we model regional trends in the relevant variables. We introduce a *decomposition method* with which three components in unemployment rates for any of the yearly values in the regionalized time series can be distinguished (Figure 3, which illustrates the decomposition of local unemployment rates for a particular year):

Local unemployment rate (t) =

(1) *Common trend* (t) +

(2) *Typical (relative) regional situation* (t) +

(3) *Temporary deviation from typical regional situation* (t)

At least the Components (2) and (3) can also be negative. While the conceptual distinction between the components is definitional, we also need a specific operationalization when performing such decomposition. This operationalization is of course much more open to a methodological critique. There are various (partly competing) criteria of how to assess what is the most adequate trend specification. In particular, the specification of long-term trends should be simple,

consistent with the theoretical idea of a long-term trend, but it should also not interfere with other components (i.e. already include parts of shorter-term developments). We have in fact tested a variety of models (including logarithmic, polynomial, and local polynomial functions). The quadratic trend model seems to be the best compromise in our example.

In a first step, we perform a regression analysis of unemployment rates on calendar time. The predicted values represent the (quadratic) unemployment trend, and the respective residuals represent the de-trended unemployment for every regional area considered. In a second step, we calculate the deviations of the local unemployment trends from the national (West German) trend and the residuals. This differentiation allows us to decompose each region-specific level of unemployment in a particular year into three components:

Component 1 can be considered the long-term national or common trend. Structural developments over time are captured in this variable.

Component 2 is the deviation of the local unemployment trend from the national unemployment trend. It can be understood as the typical situation in a region compared with the overall situation in the country.

Component 3 is calculated as the deviation of the local unemployment rates from the local trend. It includes temporary fluctuations.

By using (selected) components as separate predictors in analytical models, the specific relevance of different aspects of unemployment for the transition to dual training (and the subsequent transition to the labour market) can be assessed.

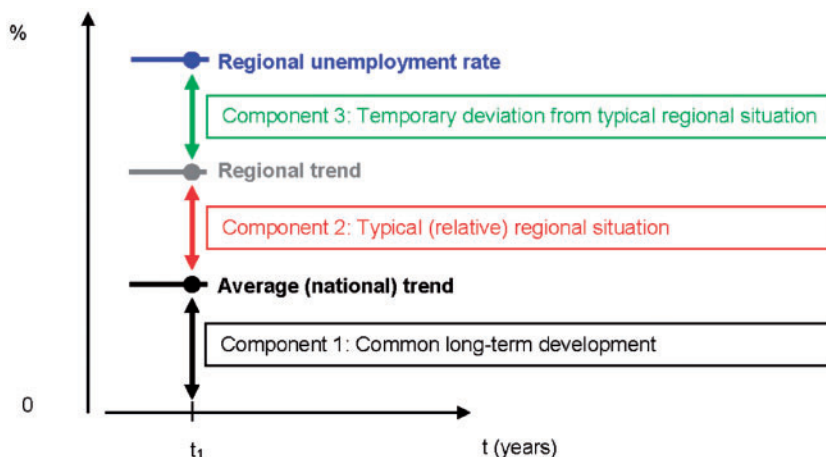


Figure 3. Decomposition of (regional) rates of unemployment

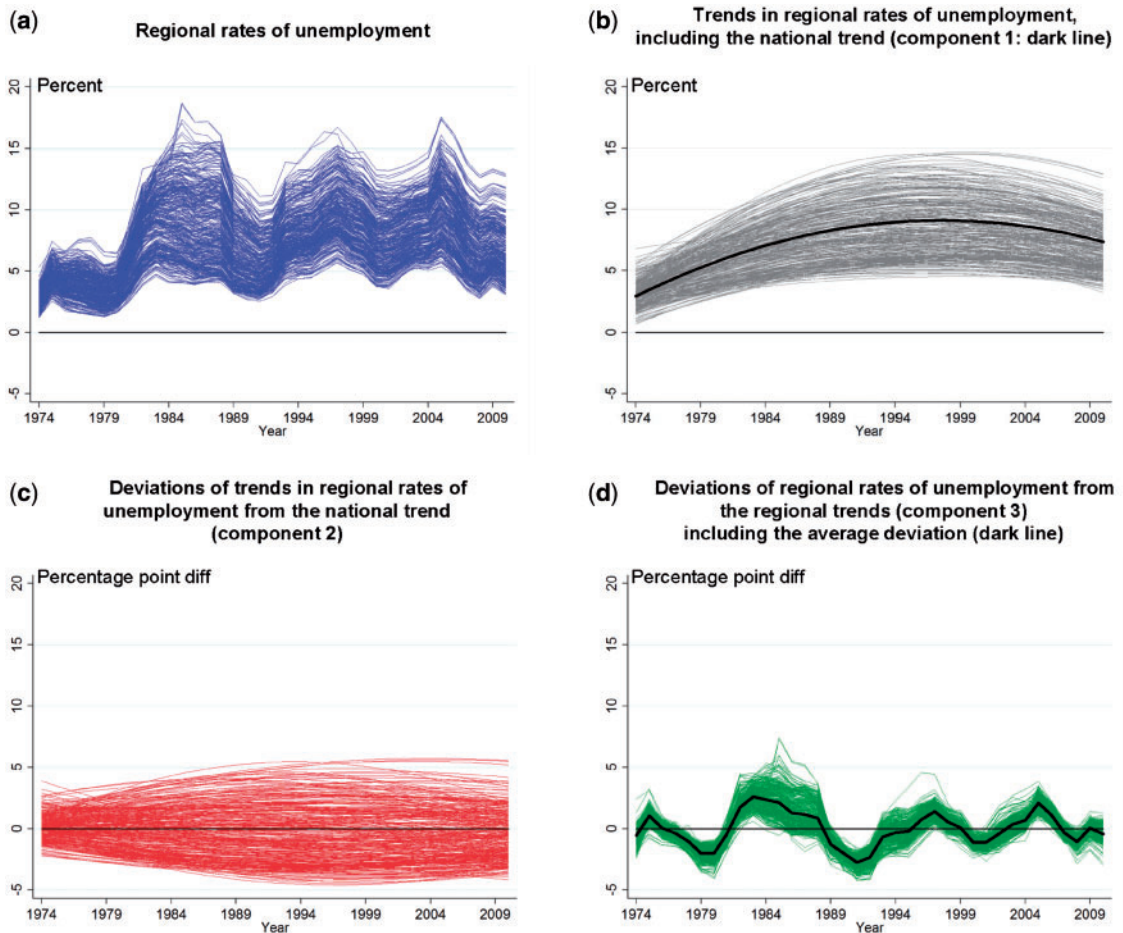


Figure 4. Unemployment rates (percentages/percentage point differences) in West Germany: regional time series (1974–2010) and decomposition

Note: West Germany without Berlin.

Source: Data: Federal Labor Office 2014, own calculations.

We apply this analytical approach to administrative time series data. The empirical distributions of unemployment in 325 regions (combined districts) in West Germany (Figure 4a) suggest that the developments in the regions have been highly synchronized, although the amplitude of fluctuations has been different. An application of the decomposition method results in the specified components (Panels b–d). The residuals in Panel (d) indicate a large degree of cyclical co-movement among the regional rates. To focus on this common cycle, we calculate the *averages* of the local deviations for inclusion in the models below as an indicator of *short-term fluctuations*. The substantive idea behind this is that the training system may temporarily account for difficult circumstances without making permanent adaptations.

However, a short-term adaptive capacity to ‘exceptional’ circumstances can reasonably apply to only a number of consecutive years: if such circumstances persist for a longer time, a substantive change in the dual training system has obviously become the rule rather than the exception, and it can no longer be considered as ‘temporary’. We therefore check the distribution of ‘temporary’ deviations from the modelled trend. With respect to the chosen trend specification, the quadratic trend, the average duration of deviations is no more than 7 years. This is in line with the theoretical understanding of temporary adaptations.

We represent additional determinants of competition by considering the size of relevant youth cohorts on the regional level (Figure A2).

Table 1. Descriptions of model variables

Variable	Category	Percentage/mean (standard deviation) [minimum–maximum]	N=
<i>Individual level</i>			
Dual training	Yes	39.28 per cent	5,579
	No	60.72 per cent	
Sex	Female	50.04 per cent	5,579
	Male	49.96 per cent	
School leaving certificate	Lower-level secondary	23.68 per cent	5,579
	Intermediate secondary	39.29 per cent	
	Upper-level secondary	37.03 per cent	
Parents' school leaving certificate (combined maximum)	Lower-level secondary	50.65 per cent	5,579
	Intermediate secondary	21.89 per cent	
	Upper-level secondary	27.46 per cent	
Parents' vocational education (combined maximum)	No vocational degree	6.33 per cent	5,579
	Vocational training	64.47 per cent	
	University degree	29.20 per cent	
Migration background	Natives	84.62 per cent	5,579
	Migration background	15.38 per cent	
<i>Macro level</i>			
Component 2: Typical regional unemployment	<i>Individual level</i>	−0.04 (1.90) [−4.52 to 5.56]	5,579
	<i>Aggregate level</i>	−0.32 (1.87) [−4.59 to 5.73]	325
Average Component 3: Temporary unemployment	<i>Individual level</i>	0.06 (1.49) [−2.75 to 2.62]	5,579
	<i>Aggregate level</i>	−0.001 (1.35) [−2.76 to 2.62]	325
Change in relevant population	<i>Individual level</i>	−0.59 (3.84) [−20.53 to 40.75]	5,579
	<i>Aggregate level</i>	−0.36 (3.66) [−42.55 to 48.64]	325
Year [observation period]		1988.8 (8.63) [1975 to 2011]	5,579

Note: Individual-level cases are located in 321 of the 325 West-German regional districts (without West Berlin).

Source: Data: NEPS-SC6, Federal Labor Office 2014, Statistisches Bundesamt, 2014a,b, own calculations.

The *individual-level data* originate from the NEPS *Starting Cohort 6—adults (NEPS-SC6)*. Individuals aged 18–65 years provide retrospectively information about their life course. On the basis of these longitudinal data, transitions to training can be constructed as the central dependent variable (Figure A1, left). Due to institutional guidelines, training positions are mostly available once a year. Therefore, we use a discrete-time event-history model and analyse the data on a yearly basis. We focus on the first 4 years after a first graduation from general (lower, intermediate, or higher) secondary school, including the year in which the school certificate was obtained. The model is implemented as a binary logit model.

To test the Hypotheses 6a and b, we additionally analyse the chances of finding a job after completing training in a second step. These later transitions represent the chances of entering full-time employment (lasting for at least 6 months) after dual training (Figure A1, right). Here, we use a continuous-time exponential event-history model.

Our models additionally control for characteristics on the individual level (Table 1).

To compare between models, average marginal effects (AMEs) of the predictors are calculated for the transition from school to vocational training (first model). Clustered standard errors for local units are reported in parentheses. To allow for an adequate interpretation of interaction effects (Norton, Wang, and Ai, 2004), AMEs at representative values are calculated and presented in effect plots (Williams, 2012).

Multivariate Results

We observe the transition from secondary school to dual training (within the first 4 years after school graduation) using a discrete-time event-history model. In Table 2, Model 1, the positive baseline variable indicates that school leavers are much more likely to make the transition to training in the year of school graduation than in the following years. Regarding the central independent variables of the regional context (highlighted), we expected (small) negative AMEs of (temporary) unemployment and structural regional unemployment (and cohort

size) on the chances of transitioning to vocational training. We do not consider Component 1 explicitly, but we include a time trend (year) which is directly related to our hypotheses. Both variables are highly correlated. The results are in line with our expectations. De-trended unemployment for regions—‘temporary component’ 3 has a negative impact on the chance of entering vocational training. However, this coefficient becomes insignificant when adding individual controls in Model 3. *Hypothesis 1a can only partly be confirmed.*

The effect of changes in the size of relevant youth cohorts is also negative and significant. *Hypothesis 2a can be confirmed.*

The deviation between regional-level unemployment and the national trend—‘structural component’ 2, which represents the typical regional situation—is significantly negative. The relatively clear impact of this component suggests that structural differences between regions are typically more relevant than the impact of de-trended unemployment (Component 3). This means that persistently high unemployment in one’s own living area decreases an individual’s chance of obtaining a dual training place. *Hypothesis 4a can be confirmed.*

We also expected these (negative) effects to grow over time. Model 2 therefore includes interactions between the context variables and time period. As the respective marginal effect plots (a) in Figure 5 indicate, the negative AMEs of both cohort size and structural regional unemployment have evolved during more recent historical periods, whereas for the component of temporary unemployment, no clear trend can be identified. *Hypothesis 1b cannot be confirmed, Hypothesis 2b can be confirmed, and Hypothesis 4b can also be confirmed.*

Model 3 includes indicators of the individuals’ previous educational career (as well as sex and migration background as controls). As expected, the level of the attained school leaving certificate is a central indicator for predicting training chances. The interaction between school level and time (see plots (b) in Figure 5) indicates that the chances of entering training have decreased over time for lower secondary school graduates. Though starting from a somewhat higher level, they fall below the training probability of intermediate school leavers during the observation period. The chances of school leavers from intermediate secondary schools remain rather constant and increase for graduates from upper-level secondary schools. This result most likely reflects the growing competition that tends to increasingly disadvantage students with lower school attainments. Low-qualified school leavers traditionally depend on dual training, whereas school leavers from intermediate and upper-level secondary schools have also other options

such as school-based training or, in case of the upper-level tracks, higher education. The results are in line with our expectations about long-term trends in transition behaviour. *Hypothesis 3 can be confirmed.*

We also expected that varying labour-market conditions affect different groups of school leavers differently. Therefore, Model 4 also includes interactions between individual characteristics and the unemployment indicators; see the plots (c) in Figure 5. While graduates from lower secondary tracks are negatively affected by high levels of unemployment in Component 2, the impact of the regional unemployment level is more moderate for school leavers from intermediate secondary schools and rather positive for school leavers from upper-level secondary schools. We can interpret the situation of lower-qualified school leavers as a consequence of increased competition due to a relative shortage of training opportunities under tense labour-market conditions. The transition behaviour of higher-qualified school leavers could be the result of more security-oriented strategies among upper-level secondary school students in a difficult economic environment who opt for the acquisition of practical vocational qualifications within a manageable time horizon. The impact of temporary unemployment is small for all qualification groups.

Hypothesis 5 can be confirmed with regard to regional differences, but not with regard to short-term labour-market developments.

To cover a more qualitative aspect of the training situation, the analyses now turn to the transition to employment after dual training. We add these analyses because the characteristics of later transitions may be indicators of selectivity during the earlier transitions we study. The 1,873 cases used for this analysis include individuals with an observed first transition and the completion of dual training. We use a simple exponential event-history model for the transition to employment. Episodes that result in further education and training are treated as right-censored. In this model we control for labour-market conditions at the time of entering training and at the time of training completion to account for delayed effects on the transition to training. Results concerning the second transition (effect coefficients) are presented in Table 3.

Not surprisingly, labour-market conditions at the time of training completion are associated with transitions to employment (Model 1). However, we also find some evidence of delayed effects. Adding indicators of the labour-market conditions at the time of earlier transitions (the temporary component of regional unemployment, Model 2 reveals a significant positive (net) effect

Table 2. Event-history models for the transition to vocational training in the dual system

	M1	M2	M3	M4
Baseline (year of school graduation) (<i>Reference years 1–4</i>)	0.225*** (0.005)	0.225*** (0.006)	0.204*** (0.005)	0.204*** (0.005)
Year	–0.002* (0.000)	–0.001* (0.000)	–0.001* (0.000)	–0.001* (0.000)
Sex (male)			0.009*** (0.004)	0.009*** (0.003)
Lower-level secondary degree (<i>Reference intermediate</i>)			0.039*** (0.004)	0.035*** (0.005)
Upper-level secondary degree (<i>Reference intermediate</i>)			–0.099*** (0.004)	–0.099*** (0.005)
Parent(s) lower/no secondary degree (<i>Reference intermediate</i>)			–0.006** (0.002)	–0.006** (0.002)
Parent(s) higher secondary degree (<i>Reference intermediate</i>)			–0.034*** (0.005)	–0.023*** (0.006)
Parent(s) have no vocational degree (<i>Reference VET</i>)			–0.016** (0.006)	–0.014* (0.006)
Parent(s) have university degree (<i>Reference VET</i>)			–0.014 (0.010)	–0.023 (0.010)
Migration background			–0.047*** (0.004)	–0.033*** (0.004)
<i>Context variables</i>				
Component 2: Typical regional unemployment	–0.003** (0.001)	–0.003* (0.000)	–0.002** (0.001)	–0.002* (0.001)
Average Component 3: Temporary unemployment	–0.001** (0.000)	–0.001 (0.001)	–0.001 (0.001)	–0.002 (0.001)
Change in previous year in relevant population	–0.002** (0.001)	–0.002** (0.001)	–0.002* (0.001)	–0.002* (0.001)
<i>Interaction terms</i>				
Lower-level secondary degree x year			–0.005** (0.001)	–0.004* (0.001)
Upper-level secondary degree x year			0.031** (0.010)	0.018** (0.007)
Component 2 x year		–0.002* (0.001)		
Average Component 3 x year		–0.001 (0.003)		
Change in previous year in relevant population x year		–0.002* (0.001)		–0.016 (0.010)
Lower-level secondary degree x Component 2				–0.005 (0.003)
Lower-level secondary degree x average Component 3				0.012** (0.004)
Upper-level secondary degree x Component 2				0.008** (0.002)
Upper-level secondary degree x average Component 3				
<i>Events</i>				
N = (persons)	2,662	2,662	2,662	2,662
N = (person years)	5,579	5,579	5,579	5,579
	22,237	22,237	22,237	22,237
Pseudo R ² (McFadden)	0.187	0.201	0.266	0.287

Note: Discrete-time event history model; presented are AMEs; significant values are in bold; significance level: * $P < 0.1$, ** $P < 0.05$, *** $P < 0.001$; clustered S.E. in parentheses. Source: (Micro-level) data: NEPS-SC6, own calculations.

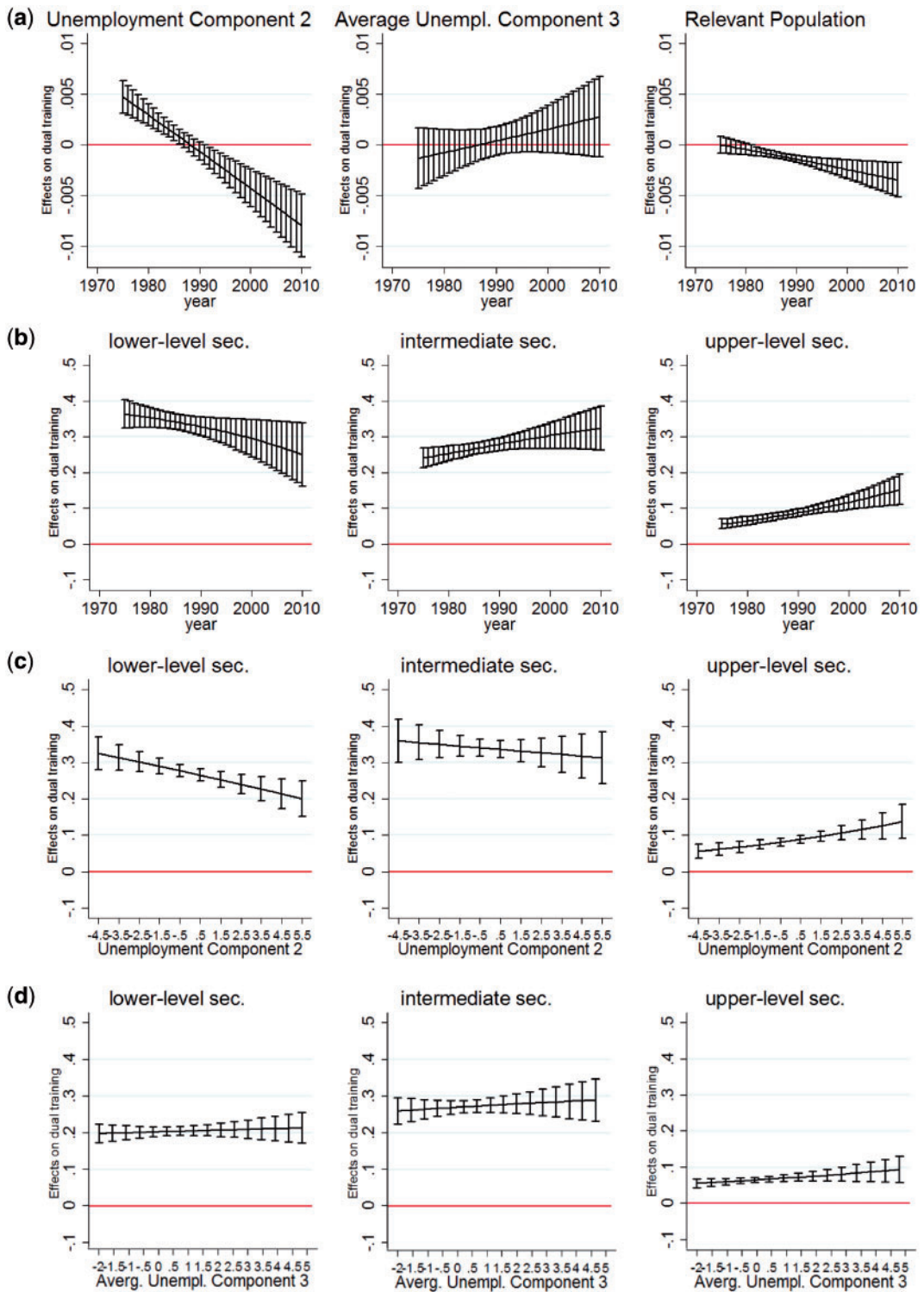


Figure 5. Selected marginal effects for the transition to vocational training in the dual system
 Source: (Micro-level) data: NEPS-SC6, own calculations.

Table 3. Event-history models for the transition to employment after the completion of training

	M1	M2	M3	M4
Baseline				
Year (end of training)	-12.444** (6.495)	-22.845*** (7.283)	-19.298*** (7.544)	-29.475*** (0.189)
Sex (male)	0.006** (0.002)	0.010*** (0.004)	0.010*** (0.004)	0.012*** (0.005)
Lower-level secondary degree (<i>Reference intermediate</i>)				-0.234*** (0.053)
Upper-level secondary degree (<i>Reference intermediate</i>)				0.214*** (0.057)
Parent(s) lower/no secondary degree (<i>Reference intermediate</i>)				-0.090 (0.089)
Parents higher secondary degree (<i>Reference intermediate</i>)				-0.176** (0.066)
Parent(s) have no vocational degree (<i>Reference VET</i>)				-0.293** (0.114)
Parent(s) have university degree (<i>Reference VET</i>)				-0.216 (0.180)
Migration background				-0.113 (0.108)
				-0.146** (0.071)
<i>Context variables</i>				
Component 2: Typical regional unemployment	-0.069* (0.020)	-0.033** (0.012)	-0.030** (0.011)	-0.055** (0.014)
Average Component 3: Temporary unemployment (<i>at the end of training</i>)	-0.022** (0.013)	-0.046** (0.016)	-0.045** (0.016)	-0.044** (0.018)
Average Component 3': Temporary unemployment (<i>at the beginning of training</i>)		0.041** (0.018)	10.479** (5.726)	0.055* (0.019)
Change in previous year in relevant population		-0.037*** (0.011)	-0.037*** (0.012)	-0.038*** (0.013)
<i>Interaction terms</i>				
Temporary unemployed (average Component 3') x year			-0.008** (0.003)	
<i>Events</i>	1,540	1,540	1,540	1,540
N = (<i>persons</i>)	1,873	1,873	1,873	1,873
LR χ^2	14.01	27.01	79.65	94.94

Note: Exponential event-history model; presented are model coefficients; significant values are in bold; significance level: * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$; S.E. in parentheses.
Source: (Micro-level) data: NEPS-SC6, own calculations.

on the transition rate. As we found at least a small (gross) effect of temporary unemployment on earlier transitions to vocational training, this result is in line with our expectations. *Our (conditional) Hypothesis 6a can be confirmed.* Cohort size has a negative impact on transitions to employment, but it is hard to tell whether this represents the conditions during the second transition or a delayed effect, since the cohort size remains almost unchanged from the first to the second transition.

In Model 3, there is an interaction between lagged short-term unemployment (Component 3) and the time trend. The respective effect is negative, suggesting that the relevance of lagged short-term unemployment decreases over time. This is in line with our expectation that such delayed effects lose importance due to reduced state intervention. *Hypothesis 6b can be confirmed.*

Our main results remain stable when controlling for individual-level characteristics (Model 4).

Summary and Conclusion

This article has investigated the extent to which individual transitions to training after compulsory schooling in West Germany have been affected by differences and changes in local labour-market conditions over recent decades. To dissect the distinct aspects of labour-market conditions, we have used regionalized administrative data, and we have decomposed local unemployment rates distinguishing between long-term change, short-term fluctuations, and structural regional differences. To study individual-level consequences, longitudinal data from the *National Educational Panel Study* have been merged with the aggregate information on labour-market conditions.

The results can be summarized as follows; with regard to *short-term developments*, we find some negative associations between a temporarily difficult local labour-market situation (unemployment levels) and transitions to dual training. We also find negative associations with the size of relevant cohorts. These results indicate both business-cycle and demographic influences on vocational training. However, these effects are rather small. Temporary crises on the labour market have obviously only to a limited degree resulted in crises on the training market. This seems to be in marked contrast to the perception in the German public, which has traditionally been sensitive about possible imbalances in the training market. Effects may cumulate across a number of disadvantaged cohorts, but our time series is too short to investigate such a pattern empirically. Also note that the empirical effects are measured *ex post*, i.e. after public discussion may have led to political activities and

adaptation by companies. Moreover, there are some indications that effects have become more important in recent years in a situation where the state is less capable or less willing to launch intervention programs. An additional *life-course* analysis suggests that transition chances at various biographical points in time are connected. The transition from training completion to employment was analysed to find out more about heterogeneity in quality that may lead to delayed effects of the local labour market situation, with relatively favourable employment prospects resulting from relatively adverse initial context conditions at the time of transition to training.

Concerning *long-term trends*, our analyses confirm shifts in the relative chances of entering vocational training for school leavers of different qualification levels. Low-qualified school leavers have found it increasingly difficult to access training positions in the dual system. In contrast to this, vocational training has been an increasingly attractive option for high-qualified school leavers. Looking at the *group-specific effects* of labour-market conditions, we have also found evidence for our expectation that low-qualified school leavers have been particularly susceptible to changes in labour-market conditions.

Concerning *regional variations*, there are marked effects of structural regional differences. These persistent context differences have obviously been more important for transitions to training than the consequences of short-term crises in the labour market. This means that the vocational training system in Germany has been affected less by the business cycle than by persistent differences in regional economic conditions. This spatial dimension of inequality has certainly been underestimated in educational policy and, in particular, in public discourse.

Though our detailed analyses have gone beyond conventional analyses of socio-economic context effects, open questions remain. In particular, we would also like to empirically distinguish between supply- and demand-side effects, i.e. effects on individuals' decisions vs. effects on companies' decisions, which are not separable with standard transition data. Irrespective of this, we can draw an important methodological conclusion; the heterogeneous effects of different components of unemployment cast some doubt on the conventional, undifferentiated use of economic context variables in general and (regional) unemployment rates as covariates in transition analyses in particular. Our decomposition shows that it may be misleading to interpret them as indicators of *changing* contexts rather than a persistent *differentiation* of contexts. Somewhat paradoxically, the risk for such a misconception seems to be particularly high when the figures are taken from time series data

and are used in a time-varying format, as this may suggest that they are *per se* indicators of change. A decomposition of various aspects of unemployment—or analogous context-level indicators—can be useful even for cross-sectional analyses. De-trending may improve the adequacy of context measures as it allows, e.g., for an identification of ‘purely’ structural components. We are therefore convinced that our decomposition approach is useful for a broad set of applications.

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Notes

1 This article uses data from the National Educational Panel Study (NEPS): Starting Cohort Adults, doi:10.5157/NEPS:SC6:7.0.0. From 2008 to 2013, NEPS data were collected as part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, NEPS is carried out by the Leibniz Institute for Educational Trajectories (LIfBi) at the University of Bamberg in cooperation with a nationwide network.

References

- Baethge, M., Solga, H. and Wieck, M. (2007). *Berufsbildung im Aufbruch: Signale eines überfälligen Aufbruchs*. Berlin: Friedrich-Ebert-Stiftung.
- Behringer, F. and Ulrich, J. G. (1997). Die Angebotsabhängigkeit der Nachfrage nach Ausbildungsstellen als Problem bei der Vorausschätzung der zukünftigen Nachfrage. *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung*, 30, 612–619.
- Berger, K. (2003). Was kostet den Staat die Ausbildungskrise? Umfang und Struktur staatlicher Ausgaben zur Ausbildungsförderung. *Berufsbildung in Wissenschaft und Praxis*, 32, 5–9.
- Blossfeld, H.-P., Roßbach, H.-G. and von Maurice, J. (Eds.) (2011). Education as a lifelong process—The German National Educational Panel Study (NEPS). *Zeitschrift für Erziehungswissenschaft*, Special Issue 14. Wiesbaden: Springer VS.
- Boudon, R. (1974). *Education, Opportunity and Social Inequality. Changing Prospects in Western Society*. New York, NY: Wiley.
- Brunello, G. (2009). The effect of economic downturns on apprenticeships and initial workplace training: a review of the evidence. *Empirical Research in Vocational Education and Training*, 1, 145–171.
- Bussemeyer, M. (2009). *Wandel trotz Reformstau. Die Politik der beruflichen Bildung*. Campus: Frankfurt/M.
- Clark, D. (2011). Do recessions keep students in school? The impact of youth unemployment on enrolment in post-compulsory education in England. *Economica*, 78, 523–545.
- Dustmann, C. and Schönberg, U. (2008). Why does the German apprenticeship system work? In Mayer, K. U. and Solga, H. (Eds.), *Interdisciplinary and Cross-national Perspectives on Skill Formation*. Cambridge: Cambridge University Press, pp 85–108.
- Easterlin, R. A. (1968). *Population, Labor Force and Long Swings in Economic Growth*. New York, NY: National Bureau of Economic Research.
- Erikson, R. and Jonsson, J. O. (Eds.) (1996). *Can Education be Equalized? The Swedish Case in Comparative Perspective*. Boulder: Westview Press.
- Federal Labor Office. (2014). Labor market statistics. Available from: <<http://statistik.arbeitsagentur.de/>> [accessed 4 August 2014].
- Hillmert, S. (2002). Labour-market integration and institutions: an Anglo-German comparison. *Work, Employment and Society*, 16, 675–701.
- Hillmert, S. (2008). When traditions change and virtues become obstacles: skill formation in Britain and Germany. In Mayer, K. U. and Solga, H. (Eds.), *Interdisciplinary and Cross-national Perspectives on Skill Formation*. Cambridge: Cambridge University Press, pp. 50–84.
- Hillmert, S. and Jacob, M. (2003). Social inequality in higher education: is vocational training a pathway leading to or away from university? *European Sociological Review*, 19, 319–334.
- Kleinert, C. and Jacob, M. (2013). Demographic changes, labor markets and their consequences on post-school-transitions in West Germany 1975–2005. *Research in Social Stratification and Mobility*, 32, 65–83.
- Lynch, L. M. (Ed.) (1994). *Training and the Private Sector. International Comparisons*. Chicago: University of Chicago Press.
- Maier, T. and Walden, G. (2014). The influence of demographic factors on the supply of company training places in Germany. *Empirical Research in Vocational Education and Training*, 6, 1–14.
- Meschi, E., Swaffield, J. K. and Vignoles, A. (2011). The relative importance of local labour-market conditions and pupil attainment on post-compulsory schooling decisions. *IZA Discussion Paper 6143*. Bonn. Available from: <<http://ftp.iza.org/dp6143.pdf>>.
- Micklewright, J., Pearson, M. and Smith, S. (1990). Unemployment and early school leaving. *The Economic Journal*, 100, 163–169.
- Mühlemann, S. and Wolter, S. C. (2011). Firm-sponsored training and poaching externalities in regional labor markets. *Regional Science and Urban Economics*, 41, 560–570.

- Neubäumer, R. (1993). Betriebliche Ausbildung “über Bedarf” – empirische Ergebnisse und ein humankapitaltheoretischer Ansatz. *Jahrbuch Für Sozialwissenschaft*, **44**, 104–131.
- Norton, E. C., Wang, H. and Ai, C. (2004). Computing interactions effects and standard errors in logit and probit models. *Stata Journal*, **4**, 154–167.
- Protsch, P. and Solga, H. (2015). The social stratification of the German VET system. *Journal of Education and Work*, **29**, 637–661, available from: <<http://dx.doi.org/10.1080/13639080.2015.1024643>>.
- Raffe, D. and Willms, J. D. (1989). Schooling the discouraged worker: local-labour-market effects on educational participation. *Sociology*, **23**, 559–581.
- Rouwendal, J. (1999). Spatial job search and commuting distances. *Regional Science and Urban Economics*, **29**, 491–517.
- Shavit, Y. and Müller, W. (Eds.) (1998). *From School to Work. A Comparative Study of Educational Qualifications and Occupational Destinations*. Oxford: Clarendon Press.
- Solga, H. (2002). ‘Stigmatization by negative selection’: explaining less-educated people’s decreasing employment opportunities. *European Sociological Review*, **18**, 159–178.
- Soskice, D. (1994). Reconciling markets and institutions: the German apprenticeship system. In Lynch, L. M. (Eds.), *Training and the Private Sector. International Comparisons*. Chicago: University of Chicago Press, pp. 25–60.
- Statistisches Bundesamt. (2013). *Berufsbildung auf einen Blick*. Wiesbaden: Statistisches Bundesamt.
- Statistisches Bundesamt. (2014a). *Fachserie 11, Reihe 3*. Wiesbaden: Statistisches Bundesamt.
- Statistisches Bundesamt. (2014b). *Genesis Data Retrieval System*. available from: <<https://www-genesis.destatis.de/genesis/online/data>> [Accessed 4 August 2014].
- Thurow, L. C. 1975. *Generating Inequality. Mechanisms of Distribution in the US Economy*. New York, NY: Basic Books.
- Wagner, K. (1999). The German apprenticeship system under strain. In Culpepper, P. D. and Finegold, D. (Eds.), *The German Skills Machine: Sustaining Comparative Advantage in a Global Economy*. New York, NY: Berghahn Books, pp. 37–76.
- Weßling, K., Hartung, A. and Hillmert, S. (2015). Spatial structure counts. The relevance of regional labour-market conditions for educational transitions after compulsory schooling. *Empirical Research in Vocational Education and Training*, **7**, 1–20.
- Williams, R. (2012). Using the margins command to estimate and interpret adjusted predictions and marginal effects. *The Stata Journal*, **12**, 308–331.
- Wolter, S. and Ryan, P. (2011). Apprenticeship. In Hanushek, E. A., Machin, S. and Wößmann, L. (Eds.), *Handbook of the Economics of Education*, Vol. 3. Amsterdam: Elsevier, pp. 521–576.
- Zimmermann, K. F. (1991). Ageing and the labor market: age structure, cohort size and unemployment. *Journal of Population Economics*, **4**, 177–200.
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Appendix

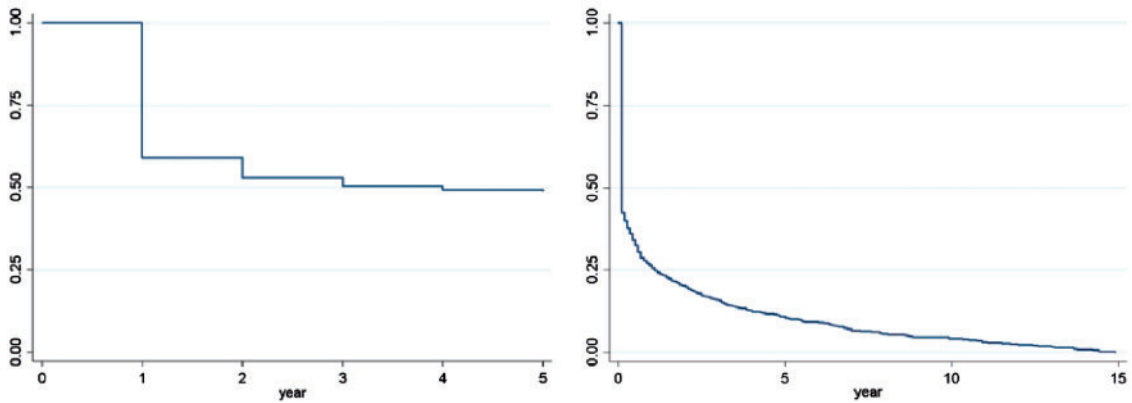


Figure A1. Duration (in years) between leaving school and entering dual training (*left*); duration between completing training and entering employment (*right*)—survivor functions

Source: Data: NEPS-SC6, own calculations.

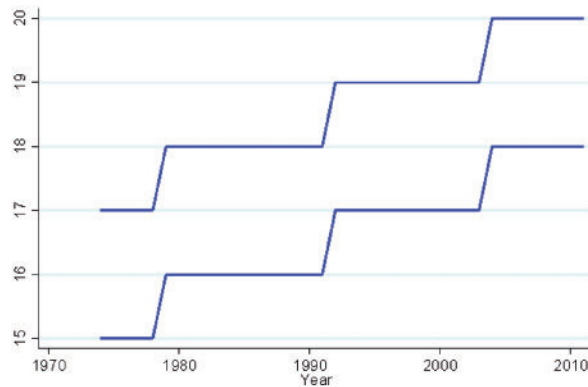


Figure A2. Range of ages 'relevant' for competition in the vocational training market, 1974–2010

Note: The 'relevant' entry cohorts are conceptualized to illustrate the competitive situation on the macro level, i.e. the primary pool of potential applicants who may compete against each other for apprenticeships. An analytical challenge here is that the relevant age group has obviously shifted over our relatively long observation period; the average age of trainees when beginning apprenticeships has increased significantly during the past three decades. We use official data from BIBB to implement a flexible definition of the core age group relevant for competition in the training market. On the basis of empirical information on the average age of apprentices in various years, we estimate a trend for the whole period of our analysis. A 2-year age band around this (rounded) estimate then defines the core of the 'relevant' age group for a particular year. In the transition analyses, we de-trend the variable of cohort size by using the first differences in the yearly time series on the local level.