
The influence of socio-spatial contexts
on transitions from school to vocational and
academic training in Germany

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ABSTRACT

Among the most important individual outcomes in contemporary societies is the acquisition of a certified professional qualification. The path to a professional qualification can be understood as a sequence of successive educational and occupational decisions. Social inequality in the process of educational and occupational attainment has theoretically and empirically been widely examined. Individuals are embedded in various contexts, such as families, classrooms or schools that are known to explain educational inequality, but differences between individuals even exist when these conditions are comparable. Remaining educational disparities might be due to varying local or regional residential environments.

The aim of this dissertation is to understand how mechanisms that can be traced back to socio-structural and socio-economic characteristics of the residential contexts contribute towards explaining social disparities in the later educational career; i.e. how they are associated with educational transitions from school to vocational and academic training.

Existing concepts of residential settings, such as neighbourhoods, local labour markets, and the local educational landscape are enhanced in terms of a more flexible conceptualisation of spatiality with the aim to gain a deeper understanding of *where* relevant effects of contextual characteristics can be localised. This systematic conceptualisation of socio-spatial contexts and their interrelation with other explanatory contexts (e.g. familial origin and school context) is theoretically discussed and empirically

applied in this dissertation. The focus is on later educational stages because they are most likely to be affected by a greater variety of the socio-economic and socio-structural characteristics of the residential context. Moreover, individual residential mobility becomes relevant at an age when the general school career is about to be completed.

In three empirical studies administrative time-series data on characteristics of local and regional contexts from various sources is combined with data from two large scale surveys. In the first and third study the main focus is on the transition from secondary education to vocational training in the dual system. Moreover, in the third study the transition from dual training to the labour market is additionally discussed. In the second study, the transition from upper-secondary school to university is analysed. Here, the chances of entering university are linked with the decision to move away from the parental home after school graduation.

The overall findings suggest that local socio-economic and socio-structural conditions –particularly regional unemployment but also the composition of the population, and the local provision with educational infrastructure – influence the transitions to vocational and academic training. Moreover, the different indicators of socio-spatial contexts vary in their relevance to educational transition chances. Beyond that, analyses over a long observation period show that the same indicator can imply different ramifications; the impact of labour-market conditions can be dissected into structural differences between regions, effects of temporal fluctuations, and long-term changes.

On the whole, the studies confirm that it is promising to take the spatial structure of indicators into account as it can be demonstrated that contextual effects have a specific spatial extension and fixed administrative units do not adequately represent the relevant spatial context. Particularly relevant for questions on social inequality and stratification, the results point out that socio-spatial contextual opportunities and constraints are not equally relevant for different social groups (e.g. students from different social class origin).

The dissertation includes theoretical developments in the field of decision-making research by focusing on the spatiality of contextual effects. These conceptual considerations can be applied beyond the scope of research on educational decisions and transitions. By adapting spatial analysis techniques on studying educational inequality the dissertation aims to contribute to advances in a recent research discussion and can provide suitable ideas for a broader set of applications. Regarding the relevance of local socio-economic and socio-structural contexts the results can be of relevance for policy makers, economic decision-makers (e.g. companies providing training), as well as for education professionals.

ZUSAMMENFASSUNG

Der Erwerb einer zertifizierten Berufsqualifikation zählt heutzutage zu einer zentralen individuellen Determinante gesellschaftlicher Teilhabe. Der Weg in die berufliche Qualifizierung kann als Resultat einer Folge sukzessiver Bildungs- und Berufsentscheidungen verstanden werden. Soziale Ungleichheit im Verlauf ebendieses Bildungserwerbsprozesses stellt ein sowohl theoretisch wie auch empirisch vielfach diskutiertes und untersuchtes Themenfeld dar. Kontexte, in die Individuen eingebettet sind, wie etwa das familiäre Umfeld, aber auch die Schule und die Schulklasse markieren hierbei relevante Bestimmungsfaktoren der Ungleichheit im Bildungserwerbsprozess. Individuelle Disparitäten bestehen allerdings auch über die genannten Determinanten hinaus. Eine mögliche Erklärung für verbleibende Bildungsdisparitäten stellen Bedingungen im lokalen oder regionalen Wohn- und Lebensumfeld dar.

Ziel dieser Dissertation ist es Mechanismen des lokalen sozialstrukturellen und sozioökonomischen Wohn- und Lebensumfelds herauszuarbeiten, und zu analysieren inwiefern diese einen Beitrag zur Erklärung sozialer Ungleichheiten im späteren Bildungsverlauf, d.h. dem Übergang von der Schule in die berufliche und akademische Ausbildung, leisten. Hierbei soll ein tieferes Verständnis davon erlangt werden *wo* sich relevante Kontexteffekte lokalisieren lassen. Dies erfordert eine flexible Analyse sozialräumlicher Kontexte. Zu diesem Zweck werden bestehende Analysekonzepte des lokalen oder regionalen

Wohnumfelds, wie etwa Nachbarschaften, lokale Arbeitsmärkte oder die regionale Bildungslandschaft um eine räumlich flexible Konzeptualisierung erweitert. Der Einfluss der so konzeptualisierten sozialräumlichen Kontexte wird theoretisch diskutiert und empirisch analysiert. Ferner werden sozialräumliche Kontextbedingungen hinsichtlich ihrer Wechselbeziehung mit bekannten bildungsrelevanten Kontexten, wie dem familialen Umfeld und dem Schulkontext untersucht. Der Schwerpunkt dieser Dissertation liegt in der Auseinandersetzung mit Übergängen im späteren Bildungsverlauf, da anzunehmen ist, dass diese deutlich von sozioökonomischen und soziostrukturellen Bedingungen des Wohnumfelds beeinflusst werden, insbesondere auch, weil individuelle räumliche Mobilität in einem Alter relevant wird, in dem das Ende der allgemein bildenden Schulkarriere unmittelbar bevorsteht.

Im Rahmen der drei empirischen Studien dieser Dissertation werden Kontextdaten auf Basis administrativer Einheiten im Zeitreihenformat mit Daten aus zwei großen Längsschnitterhebungen zusammengeführt. In der ersten und dritten empirischen Studie wird auf den Übergang von der allgemein bildenden Schule in die duale Berufsausbildung fokussiert. Darüber hinaus erfolgt in der dritten Studie eine nähere Betrachtung des Übergangs von der dualen Ausbildung in den Arbeitsmarkt. Der Fokus der zweiten Studie liegt hingegen auf dem Übergang von der Sekundarstufe in das Hochschulstudium. Die Chancen des Zugangs zu universitärer Bildung werden hier mit der Umzugsentscheidung nach dem Abschluss der Schule verknüpft.

Die empirischen Befunde weisen darauf hin, dass lokale sozioökonomische und soziostrukturelle Kontextfaktoren – insbesondere die Arbeitslosigkeit, aber auch die Bevölkerungszusammensetzung und die Bildungsinfrastruktur – Einfluss auf Übergänge in die berufliche und akademische Ausbildung nehmen. Die verschiedenen sozialräumlichen Kontextindikatoren sind dabei nicht gleichermaßen relevant. Zudem zeigen Analysen über längere Zeiträume, dass der gleiche Indikator über unterschiedliche Implikationen verfügt: So wird der Einfluss von Arbeitsmarktbedingungen auf den Übergang in die berufliche Ausbildung in strukturelle Unterschiede zwischen Regionen, kurzfristige konjunkturelle Schwankungen und langfristige Veränderungen auf dem Arbeits- und Ausbildungsmarkt differenziert. Darüber hinaus zeigt sich, dass Kontexteffekte eine spezifische räumliche Struktur und Ausdehnung aufweisen, die mittels fixer administrativer Einheiten nur unzureichend abgebildet werden können. Mit Blick auf ungleichheitsrelevante Fragestellungen von besonderer Bedeutung ist, dass sozialräumliche Kontextbedingungen für verschiedene soziale Gruppen (z.B. nach elterlichem Sozialstatus oder schulischer Vorbildung) nicht gleichermaßen bedeutsam sind. Mit der Integration von Aspekten der Räumlichkeit kontextueller Effekte in entscheidungstheoretische Modelle zeigt die Dissertation theoretische Möglichkeiten auf, die über das Thema der Bildungsentscheidungen und Bildungsübergänge hinaus Anwendung finden können. Daneben partizipiert die Arbeit an einer hochaktuellen empirischen Forschungsdebatte, die sich mit der Verwendung räumlicher Analyseverfahren im Zusammenhang

mit Modellen zur Analyse von (Bildungs-)Ungleichheit befasst. Auch hier ist die Übertragbarkeit auf ein breiteres Spektrum empirischer Fragestellungen denkbar. Die zentralen Befunde zum Einfluss sozioökonomischer und soziostruktureller Kontexte auf Bildungschancen können als relevant für politische und wirtschaftliche Entscheidungsträger (z.B. Personalverantwortliche in Ausbildungsbetrieben) sowie für Fachpersonal im Bildungswesen erachtet werden.

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A. THEORETICAL AND CONCEPTUAL FRAMEWORK

In the Ghetto

*As the snow flies
On a cold and gray Chicago
mornin'
A poor little baby child is born
In the ghetto*

*And his mama cries
'Cause if there's one thing that
she don't need
It's another hungry mouth to feed
In the ghetto*

*People, don't you understand
The child needs a helping hand
Or he'll grow to be an angry
young man some day
Take a look at you and me,
Are we too blind to see?
Do we simply turn our heads and
look the other way?*

*Well, the world turns
And a hungry little boy with a
runny nose
Plays in the street as the cold
wind blows
In the ghetto*

*And his hunger burns
So he starts to roam the streets
at night
And he learns how to steal, and
he learns how to fight
In the ghetto*

*Then one night in desperation
The young man breaks away
He buys a gun,
Steals a car,
Tries to run,
But he don't get far
And his mama cries*

*As a crowd gathers 'round an
angry young man
Face down on the street with a
gun in his hand
In the ghetto*

*And as her young man dies,
On a cold and gray Chicago
mornin',
Another little baby child is born
In the ghetto*

And his mama cries

In the Ghetto, performed by Elvis Presley, 1969, originally
written by Scott 'Mac' Davis, 1969

1 GENERAL INTRODUCTION

In 1969, Elvis Presley – often referred to as the *King of Rock and Roll* – released the song ‘*In the Ghetto*’. The story of the song revolves around a boy who is born, lives, and dies in a poor Chicago neighbourhood. It was Elvis Presley’s first ‘*social-comment number*’ (Webb 2009) and his only number one hit single in Germany (Lindhorst 2013). The song, written by Texan country musician Scott ‘Mac’ Davis, was originally titled ‘*the vicious circle*’ (Webb 2009). In a nutshell, this almost 50-year-old song represents some of the most pressing and still valid questions of research on neighbourhood influences, urbanisation processes, and regional inequality. From a sociological point of view, it can be argued that this piece of popular music addresses the relevance of contextual conditions; it unfolds the relation between a deprived residential area and an individual’s life chances. It even refers to the link between macro and micro level by indicating that the contextual living circumstances *in the ghetto* (macro) impact and even destroy the fate of one individual (micro).

It can be argued that, in the song as well as in social research, adolescence marks the stage in life in which *the ghetto* seems to be particularly relevant. Numerous studies in various countries illustrate the relations between local and regional contextual conditions and determinants of social inequality, such as criminal activities, health implications, employment

prospects, and educational chances. The vast majority of these studies gives particular attention to adolescents and explicitly considers the transitional phase from childhood to adulthood (*for the European context see*: Toft & Ljunggren 2015, Wicht & Ludwig-Mayerhofer 2014, Tumino & Taylor 2015, Meschi, Swaffield & Vignoles 2011, Sykes & Musterd 2010, Brännström 2008, Kauppinen 2008, Oberwittler 2007, Di Pietro 2005, Clark 2002, Lauer 2002, Rice 1999; *for the U.S. see*: Ahern et al.2013, Beattie 2002, Pickett & Pearl 2000, Ellen & Turner 1997, Elliot et al. 1996, Betts & McFarland 1995, Brooks-Gunn et al. 1993, Mayer & Jencks 1989 etc.). Adolescence is considered a time in the life course during which multiple and simultaneous decisions and transitions occur. In particular, the detachment from the parental home presupposes intensified external contacts (e.g. with peers). These external contacts are most likely to be found – even in the so-called internet age – in an accessible spatial area (e.g. the school or school class context, the neighbourhood, the community or city (Axhausen 2015)).

Choosing an occupational field and accessing and completing vocational training or university education can be considered some of the most critical events that occur during adolescence. It can be assumed that local and regional contexts have an influence on adolescents' educational and occupational attainment processes. Individuals are embedded in specific local and regional settings, and this regional distribution has consequences that might influence individuals' attitudes, preferences, opportunities, actions, and

life chances because these contexts are not equal in terms of socio-economic and socio-cultural structure. Living in a prosperous economic region has been shown to facilitate the labour market entry; mass media and political debates, for instance, often refer to the still existing regional economic differences between East and West Germany that affect the career and employment prospects of young adults. Beyond regions, other contextual settings, such as differences between countries also play a major role. For example, the high youth unemployment rates in southern European countries are a constant matter of public debate. Moreover, it could be argued that communities and cities matter too; growing up and living in a city (e.g. Stuttgart) with a well-known company (Porsche) that produces popular products (sports cars) could affect not only career chances but also career choices. Also, it might be the case that a nearby university with a long tradition and excellent reputation (e.g. Eberhard-Karls Universität (Tübingen, Germany), Yale University (New Haven, USA)) or with a specialised professional orientation (e.g. colleges of art and music) could impact study choices. Moreover, one can imagine that personal contact and exchanges with neighbours might arouse the individual interest in a specific occupation. These are of course just a few anecdotal examples, but they give an initial insight on the idea how contexts matter and that they do so in various ways. The aim of this dissertation is to gain a systematic understanding of the mechanisms that refer to socio-spatial

contexts that influence disparities in adolescents' chances of transitioning to vocational or academic training.

One could ask the perhaps heretical question: what makes research on the impact of residential contextual characteristics in the year 2016 necessary when even popular music in the 1960s was already aware that contextual conditions have an impact on individual life chances? One answer is as easy as it is obvious: not least the above-mentioned examples indicate that the consequences for individual life chances with regard to residential living conditions are an issue of unbroken relevance. A second answer arises from a review on theory and empiricism on contextual effects in the social sciences that will be discussed in the following. Although research that links local and regional contexts with individual inequality draws upon a long tradition, a large number of questions still remained unanswered. Particularly the spatial aspect of contextual characteristics with regard to individual consequences, such as educational chances is relatively new to social research. Moreover, research on the relevance of local and regional contexts for education sank into oblivion for a long time – particularly in Germany – and is only now on the rise. Third, this *renaissance* of, most specifically, empirical contextual effect research can be associated with advances in analytical techniques and the availability of data (Elvis was neither engaged in multi-level nor in spatial analysis techniques) that allow individual survey information to be linked with spatially flexible contextual characteristics. It is only recently that sociologists and economists have

become empirically interested in questions about the scale and structure of contextual characteristics and subsequently in adapting spatial analysis techniques to conventional analyses.

In summary, the main goal of this dissertation is to create a deeper understanding of the impact of contextual characteristics and their spatiality. Hereby, I will focus on inequalities in post-compulsory educational transitions, namely, transitions from general secondary school to vocational training and university. I will utilise the case of Germany. Due to institutional specifications of the education system Germany provides a particularly interesting case as it includes a variety of vertically as well as hierarchically structured tracks among which adolescents can choose after school graduation. Data on socio-spatial contextual characteristics are in a flexible way attached to two large scale survey data sets to empirically investigate to what extent spatially structured contexts actually do matter with regard to the transitioning processes to vocational and academic training.

In the following introductory chapter, I will outline the most important insights in research on the relations of local and regional contexts with educational behaviour and educational transitions.

1.1 Socio-spatial contexts and educational inequality – Previous research and respective gaps

The Chicago School of sociology and social ecology

It might not be by chance that Elvis Presley's song is set in a Chicago ghetto because the city of Chicago was not only the epicentre of urbanisation but also the place where these developments and social processes were systematically and empirically studied for the first time. Chicago '*emerged as an instant metropolis*' (Lutters & Ackermann 1996: 2) in the early 20th century. This circumstance created an awareness of matters of urbanisation, city life, and local living environments in the social sciences. Scholars of the so-called Chicago School of Sociology – predominantly between 1915 and 1945 – were the first to empirically deal with the fact that social life has a geographical location. At the same time, trends towards a formalisation of sociology emerged and enforced the systematic collection of empirical data (Lutters & Ackermann 1996). The overall aim of the Chicago School scholars was '*...to define a point of view and to indicate a program for the study of urban life: its physical organization, its occupation, and its culture*' (Park, Burgess & McKenzie 1925: 3). In *The city*, Park, Burgess, and McKenzie described their specific research agenda as follows: '*We want to know of these neighborhoods, racial communities [...]: What are the relative permanence and stability of their population? What about the age, sex, and social condition of the people? [...]*

What are the social rituals? What must one do in the neighborhood?' (Park, Burgess & McKenzie 1925: 11) The Chicago School was highly progressive in discussing the relevance of *contextuality* (Abbott 1997). Evolving from biological ecology, the idea of social ecology was aimed at describing urban life as a whole. Therefore, the theoretical claim of Chicago scholars was to illustrate a comprehensive picture of living circumstances in a particular local unit, i.e. the neighbourhood, the community, or the city.

Rather than providing a comprehensive description of such a particular local unit like the Chicago School researchers had in mind, the present dissertation is aimed at identifying the specific contribution that particular socio-structural characteristics of the local and regional context make in explaining individual inequalities in educational transitioning processes. Nevertheless, the Chicago school and the social ecology studies provided substantial groundwork. These approaches created awareness for the relevance of local and regional contexts and they, at least implicitly, integrated a general spatial perspective into social empirical research. In this regard, the relevant contribution of the Chicago School scholars to sociological theory will be discussed in more detail in a subsequent chapter.

With respect to the aforementioned difference between identifying specific effects of characteristics that have a spatial location and the overall description of particular regional units, an important distinction has to be made between *contextual effects* and *compositional effects*.

Compositional effects refer to differences in regional outcomes that vary by different distributions of relevant characteristics in the population in that particular region; contextual effects, in turn, describe the influences that can be traced back to attributes of the contextual characteristics as such. Peter Blau (1960) rather refers to the ‘*social structure*’ instead of speaking of contextual effects, but his work is among the first to explicitly address the impact that social structure or contextual characteristics have on individuals’ value formation, norms, and social relations (Manski 1993, Erbring & Young 1979, Blau 1960). Context or social structure is hereby not necessarily related to aspects of space. On the contrary, in empirical research it is even more the case that the spatial character of social structures goes very often unconsidered.

Regional educational infrastructure

Research that links contexts and education follows a long tradition of studies that refer to the description of compositional effects. Such studies were concerned with the socio-cultural and socio-economic composition of the regional population (Sixt 2010, Block & Klemm 2005, Hansen 1993, Ditton 1992, Bertram & Dannenbeck 1990, Eirnbter 1977, Meulemann & Weishaupt 1976). Moreover, research was concerned with the relevance of the infrastructural concentration of educational institutions (Peisert 1967, Eirnbter 1977). These early studies shaped the

ideal-typical icon of multiple educational disadvantages by speaking of the *catholic working-class girl from the countryside* (Peisert 1967: 99, Dahrendorf 1965: 48, Carnap & Edding 1962). Particularly before the educational expansion took place, disparities that could be traced back to a region's ability to provide educational institutions used to play a vital role because they actually accounted for significant differences between urban and rural areas (Geipel 1965, Peisert 1967, Bargel & Kuthe 1992, Kuthe et al. 1979). Such research on the provision with educational facilities has already indicated that contextual characteristics, such as the school infrastructure are not equally relevant for different social groups because the problem of the absence of educational infrastructure in rather rural areas is more likely to be solved by parents with a higher level of education being more willing to commute long distances (Ditton 2008). As the providing of school infrastructures was extended in the 1970s and 1980s, disparities due to variations in the supply became less important. Subsequently, the relation between education and region received less research attention – particularly in Germany.

School-effectiveness studies that explicitly linked '*inequalities of educational opportunities*' (Coleman 1966) with contextual effects were predominantly concerned with the impact of the institutional context, i.e. the context of the school or the school class and they proved to be most relevant for explaining educational chances and performance differences. These studies stand in a long tradition and are

still of relevance in research literature (*for an overview: Teddlie & Reynolds. 2000*).

Beyond that, more recent studies aim at capturing the impact of socio-economic and socio-structural contextual conditions on individual educational outcomes. The most prominent characteristics of context that these studies focus on are *educational infrastructure* and *local labour-market conditions*. Moreover, characteristics of the *neighbourhood context* are identified as being relevant in terms of educational outcomes.

Regional educational infrastructure is frequently considered in research on the participation in higher education. The regional provision of higher education infrastructure is associated with the accessibility and reachability of universities. Therefore, empirically it is often referred to the distance to the next college or university. A considerable number of rather recent studies can show that the larger the distance to the next university or college is, the less likely young adults will be to participate in a college or university education (e.g. Frenette 2004, 2006, Sá, Florax & Rietveld 2004, Spieß & Wrohlich 2010, Tinto 1973). Again, group-specific differences occur as school graduates with lower family socio-economic status and lower-ability students seem to be particularly disadvantaged by distance (Cullinan et al. 2013, Eliasson 2006, Frenette 2006). The distance approach fails to capture qualitative differences (e.g. fields of study offered, number of universities available, and reputation of universities) in the accessibility of university education. There

is almost no research that has aimed to integrate spatial accessibility and qualitative aspects of colleges or universities (Turley 2009).

Regional labour market conditions

Another strand of empirical research that explicitly refers to the impact of contextual characteristics on individual educational outcomes focuses on labour market characteristics and the question of expected returns to education. This research predominantly involves educational decisions at the end of compulsory and secondary schooling because labour market conditions are assumed to have an increasing importance the more closely the educational decision is associated with an individual's labour market entry. The largest number of studies dealing with labour market returns to education can be found in the economic field of research, where – on the basis of the human capital model – the reduction of unemployment risks due to a higher level of educational qualifications is supposed to have a positive influence on enrolment in higher education. Those with more education may be less affected by (rises in) (local) unemployment (Lauer 2002, Micklewright, Pearson & Smith 1990, Raffe & Wilms 1989). A supplementary argument for a positive relation between unemployment and enrolment in further education is that high unemployment tends to discourage young adults from quickly entering the labour market (*discouraged worker effect*; e.g. Micklewright,

Pearson & Smith 1990, Raffe & Willms 1989). Staying in the educational system during times of unemployment and in regions of high unemployment prevents individuals from becoming unemployed at least in the short run. While the aforementioned arguments postulate a positive relation between high or increasing unemployment and further educational investments, it is also argued that such labour market conditions might accelerate a fast entry into the labour market. As high unemployment increases the likelihood of a household being affected by unemployment, individuals might enter the labour force to compensate for anticipated losses in the household or family income (Micklewright, Pearson & Smith 1990).

The focus of empirical studies in this field lies on local and regional labour market conditions as well as on cyclical developments in the labour market. Most studies assume more or less profoundly that particularly young adults at the end of their compulsory schooling are rather limited to a specific local and regional setting. Empirical evidence that combines individual information on participation in post-compulsory education with macro-level information on the local and regional labour market is rather ambiguous: some studies have failed to find any influence (*ibid.*), whereas others have found a weak impact of local labour-market conditions on post-compulsory participation (Tumino 2013, Meschi, Swaffield & Vignoles 2011, Rice 1999, Rephann 2002). Some studies have confirmed group-specific variations in the effect of local labour-market contexts (e.g. Meschi,

Swaffield & Vignoles 2011, Clark 2011). One explanation for differing findings in this research area can result from the measurement of regional labour-market conditions. Depending on the study, regional contexts refer to very different levels of aggregation (e.g. communities, districts, or federal states). Thus, interpretations in terms of the relevance of local and regional contexts and comparisons between findings are rather difficult. Beyond that, it is not clear whether the impact of unemployment on participation in vocational and academic training can be attributed to local conditions or to cyclical fluctuations in the (national) labour market. Relevant contributions to this field of research can be made by explicitly focusing on an adequate conceptualisation of the spatial extension of local labour markets and by disentangling the potential relevance of distinct aspects of labour-market conditions for educational transitioning processes.

Neighbourhoods and living environments

Beyond the relation between specific environmental indicators, such as educational infrastructure, labour-market conditions and educational decisions and transitions, research has suggested that there is a link between conditions in the neighbourhood area and educational attainment. Most studies use neighbourhood characteristics that indicate the average degree of socio-economic deprivation or affluence. For this purpose, they often combine information about labour-market

conditions with indicators of the level of educational attainment in the neighbourhood population (Garner & Raudenbush 1991, Ellen & Turner 1997, Sewell & Armer 1966). Neighbourhood studies are deeply rooted in the tradition of the Chicago school and have predominantly been intensively researched in the US context. Compared to the contextual influences of the educational infrastructure and the local labour market, neighbourhood effects refer not to one specific indicator but to a set of information that characterise a specific spatial or administrative unit, namely, the neighbourhood.

For the US context, direct negative effects of unfavourable neighbourhood conditions on broad aspects of educational outcomes (e.g. educational performance, transition chances and educational aspirations) have been shown repeatedly (Ainsworth 2002, Aaronson 1998, Brooks-Gunn 1993). Aside from socio-economic and socio-cultural environments, contexts directly related to educational institutions (e.g. classrooms or schools) are known to have an influence on educational attainment. Research has demonstrated that both the institutional setting of schools and the composition of school classes have an impact on education (Neumann et al. 2007, Jencks & Mayer 1990, Reynolds et al. 2000, Coleman 1966). Especially in educational systems with early tracking into separate, rather homogeneous school types as in Germany, effects of school- or class-related characteristics have been receiving increasing attention (Tiedemann & Billmann-Mahecha 2004, Baumert, Köller & Schnabel 1999).

School and neighbourhood contexts are related to one another as they tend to overlap (Brännström 2008, Kauppinen 2008). The impact of neighbourhood conditions on educational outcomes in the European context is less studied but it seems to be weaker and not equally consistent (Wicht & Ludwig-Mayerhofer 2014, Helbig 2010, Sykes & Musterd, 2010, Brännström, 2008, Kauppinen, 2008, Garner & Raudenbush 1991). It has been argued that social welfare systems might reduce the differences in neighbourhood conditions (Friedrichs, Galster & Musterd 2003, Ellen & Turner 1997) and that these programmes could reduce the tendency towards selective residential choices (Helbig 2010, Häußermann & Siebel 2004). The lack of neighbourhood research – particularly in the German context – is at least in part due to a lack of data on residential areas.

In short, neighbourhood studies follow the Chicago School tradition and characterise one particular local unit in detail to assess which impact this unit's characteristics have on individuals. Here, the focus is on a particular and fixed local setting. Combinations of several characteristics make up the neighbourhood. In empirical research with a focus on single characteristics (e.g. educational infrastructure and labour market characteristics) relatively little attention is given to the spatial units as such. Although, neighbourhood characteristics are analysed in combination with school and school class characteristics, there is only very few research that connects several contextual units (e.g. cities and neighbourhoods) with one another (Hedberg & Tammaru 2013). But even when

units are considered simultaneously, it could be argued that the question on the impact of contextual characteristics should be much less a question of units and separate indicators or variables than one of mechanisms and their spatial structure: Under the assumption that, for instance, local labour-market conditions determine the number of training places available and subsequently influence adolescents' chances to find a training place it seems reasonable to argue that the spatial extent of this *local* labour market lies in a distance that is suitable to reach on a daily basis. Under the assumption that local labour market conditions influence adolescents' training interests, or their level of knowledge on job contents in specific occupations it seems more realistic to argue that these perceptions on training are affected by parents, peers, and neighbours and that subsequently the spatial frame is related to direct and personal contacts. In both cases, individual chances to enter vocational training are affected. Moreover, in both cases the relevant explanatory indicator is assumed to be the (local) labour market, but the mechanisms by which the effect is obtained are quite different and, as a consequence the meaning of what is referred to as local seems to be rather different, too.

In summary, this brief overview over the state of the art on the relation between contexts and educational attainment processes shows that there are several but rather unconnected lines of empirical research that play a role in identifying the influence of socio-spatial contextual characteristics on

individual educational outcomes. Most of these studies either focus on particular socio-spatial characteristics without paying much attention to their spatial structure or extension, while other studies – in particular the earlier ones – are predominantly concerned with a characterisation of specific spatial rural or urban area. It is a major issue of this dissertation to theoretically discuss and empirical test the relevance of particular socio-economic or socio-structural contextual characteristics, to differentiate aspects of these characteristics, and to relate them to a spatial extension and structure in which they are most likely to influence educational transitioning processes. The aim, the central research questions, and the structure of the theoretical and empirical chapters of this dissertation are described in greater detail in the following section.

1.2 Aim and structure of the dissertation

Selections to, out of, and within the education system are usually taking place at institutionally-defined intersections. An important transitional step occurs when a first general school qualification is obtained. Here, the path to professional qualification is typically entered. Decisions and transitions are consequential because they are most likely to determine the occupational career. It is well-known and widely discussed that educational chances are unequally distributed among individuals. These inequalities are particularly visible at

intersections in individuals' educational careers. It is at the end of secondary school when one school graduate enters university, another one takes up vocational training, and yet another one leaves the education system and enters the workforce. The overarching question of this dissertation matches a highly important issue in research on inequality and stratification: *why are there differences between individuals in educational transition chances?* Among the most prominent factors that influence educational decisions and transition after a first graduation from general school in the literature are the familial context in terms of social class origin (e.g. Schindler 2015, Hillmert & Weßling 2014, Neugebauer & Schindler 2012, Lörz 2012, Tieben & Wolbers 2010, Becker & Hecken 2008, Hillmert & Jacob 2010, Holm & Jæger 2008, Becker & Lauterbach 2007). Moreover, ethnic origin and gender are of relevance, and of course the previous educational career that proceeds along institutionally defined tracks in the education system (e.g. Biewen & Tapalaga 2016, Diehl, Hunkler & Kristen 2016, Fleischmann & Kristen 2014, Granato 2010, Eberhard 2012, Hupka-Brunner, Sacchi & Stalder 2010, Hillmert 2004). But even when controlling for these indicators, inequality in educational chances is not fully explained.

The general underlying assumption of this dissertation is that local and regional contextual characteristics can contribute to explaining remaining differences in individuals' chances of transitioning to vocational and academic training. The particular contribution of this dissertation in the discussion of

educational inequalities and stratification is to identify the particular relevance that spatially structured contextual conditions make in explaining unequal education chances. Therefore, the following four research questions are addressed:

- 1) *Which are the underlying mechanisms at work regarding the impact of socio-spatial contextual characteristics on inequalities in individuals' chances of transitioning to vocational or academic training?*
- 2) *Where are relevant socio-spatial contextual characteristics located? (How large or small is the adequate spatial extension?)*
- 3) *Are different socio-spatial contextual characteristics interrelated regarding individuals' chances of transitioning to vocational or academic training?*
- 4) *Are socio-spatial contextual characteristics related to individual characteristics such as social origin or individuals' previous educational performance regarding the chances of transitioning to vocational or academic training?*

To pursue these questions, the dissertation is structured as follows. In the next chapter, I will introduce central terminology and theoretical concepts. The aim of chapter 2 is to develop a theoretical framework that integrates the relevance of socio-spatial contextual characteristics with explanations on inequalities in educational attainment. A

theoretical model on educational decision making and educational inequality is integrated into a general life-course framework. This is followed by a theoretical discussion on contextual effects and on the relevance of space and place. Thus, the developed approach tries to link spatiality to contextual effects to illuminate their relevance for inequalities in educational transition processes in a life-course perspective.

Thereafter, I will briefly describe the German education system and provide an overview of the data that are suitable for analysing educational transitions to vocational and academic training for the case of Germany. I will also explain the local and regional structure of Germany and present the available data for capturing flexible local and regional contexts.

The theoretical chapter is followed by three empirical studies that analyse the relevance of the socio-spatial contextual conditions in educational transitioning chances. The first empirical study is concerned with the transition from lower and intermediate secondary education to vocational training in the dual system. The research interest is to assess the relevance of characteristics of the socio-economic spatial context on this transition. One goal of the study is to learn more about the spatial radius or scale in which contextual conditions are important. The question is on the *where* of the observed contextual effects. Therefore, an approach for analysing the spatial extension of regional socio-economic contextual settings that young adults are embedded in is

conceptualised. This approach is applied to assess the impact of unemployment in the local context on the transition to vocational education and training (VET). Data from the German Socio-Economic Panel Study (GSOEP) is merged with time series data on regional administrative districts. The analyses capture the period between 1999 and 2012. Geocodes, which represent the mapping of the description of an administrative unit to geographical coordinates for the purpose of computer-aided evaluation of location-based social data (e.g. Geographical Information Systems (GIS)) are attached to the administrative districts to allow for a flexible aggregation of these administrative districts. The flexible operationalisation allows capturing the spatial scale of the local socio-economic context that is relevant for the transition to vocational training.

The analyses in the second and third study are both based on micro-level data from the National Educational Panel Study (NEPS). In the second study, the transition from upper-secondary school to university is analysed. The chances of entering university are linked with the decision to move away from the parental home after upper-secondary school graduation. The driving questions are whether and which aspects of the local socio-structural context can be found to play a role in explaining inequalities in individuals' chances of transitioning to university. The subsequent decision to move when entering university is analysed against the background of these contextual conditions. Similar to the first study, a major goal is to learn more about the optimal spatial

extension of contextual conditions that are relevant for the processes of transitioning to university. Therefore, geocodes on local contexts are used to flexibly aggregate socio-structural characteristics within travel-time radii. For this purpose, the individual longitudinal data is merged with macro-level information on the local university infrastructure and socio-economic characteristics. The combined data set of contextual and individual data cover a time span of 24 years from 1986 to 2010.

Compared with the first two studies, the focus of the third study is less on the *where* (i.e. localisation) of contextual effects than on the *what*. In the study, the extent to which individual transitions to vocational training are affected by several aspects of labour-market conditions is investigated. To systematically identify and separate aspects of labour-market conditions, a statistical decomposition approach that allows for a differentiation between long-term developments, short-term fluctuations, and structural differences between regions in labour-market conditions is developed and applied. The time frame in these analyses comprises from 1975 to 2010. To study individual-level consequences for transitions to vocational training, regionalised labour-market data is merged with longitudinal data, and multivariate transition-rate models are applied.

In the last chapter, the main findings are summarised, the relevance of the present research work is reflected against the background of more general trends in research on contextual conditions on the one hand; on the other hand, the relevance

of this dissertation in terms of research on educational inequality is discussed. Also, I will point to further advancements in research on socio-spatial contexts and individual inequalities. The dissertation concludes with practical implications. In *Table 1.1* an overview of the status of the chapters and empirical studies in the dissertation and a detailed description of the contribution of the co-authored material is given.

Table 1.1: Overview of chapters comprising the dissertation, status and contribution in co-authored material

Title	Authors	Contribution of authors	First author	Single author	Status
Theoretical and conceptual framework	Weßling, Katarina (KW)		-	yes	-
Study 1: Spatial structure counts: The relevance of regional labour-market conditions for educational transitions to vocational training	Weßling, Katarina, Hartung, Andreas (AH) & Steffen Hillmert (SH)	<ul style="list-style-type: none"> ▪ literature research (KW, AH) ▪ development of research idea & strategy (KW) ▪ preparation of individual data (KW) ▪ collection of context data (KW) ▪ preparation of context data (KW, AH) ▪ statistical analyses (KW) ▪ interpretation results (KW, AH, SH) ▪ text writing and editing (KW, AH, SH) 	yes	no	Published in <i>Empirical Research in Vocational Education and Training</i> , 7(12), 2015
Study 2: Transitions to university – How much and for whom does spatial context matter?	Weßling, Katarina & Nora Bechler (NB)	<ul style="list-style-type: none"> ▪ literature research (KW, NB) ▪ development of research idea & strategy (KW) ▪ preparation of individual data (KW) ▪ collection of context data (NB) ▪ preparation of context data (KW, NB) ▪ statistical analyses (KW) ▪ interpretation results (KW) ▪ text writing and editing (KW, NB) 	yes	no	First part of study submitted to <i>Higher Education</i>
Paper 3: Structural Change, Temporary Crises, and Regional Differences: A Decomposition Analysis of Labour-Market Conditions and Their Relevance for School-to-work Transitions	Hillmert, Steffen, Hartung, Andreas & Katarina Weßling	<ul style="list-style-type: none"> ▪ literature research (KW, SH) ▪ development of research idea & strategy (SH) ▪ preparation of individual data (KW) ▪ collection of context data (KW) ▪ preparation of context data (AH, KW) ▪ statistical analyses (KW) ▪ interpretation results (KW, SH) ▪ text writing and editing (SH, KW) 	no	no	Revise & Resubmit <i>European Sociological Review</i>
Conclusion and Outlook	Weßling, Katarina		-	yes	-

2 THEORETICAL FRAMEWORK – THE IMPACT OF SOCIO- SPATIAL CONTEXTUAL CHARACTERISTICS ON EDUCATIONAL TRANSITIONS

2.1 Theorising educational transitions

‘The most crucial linkage in the social stratification process is between educational attainment and occupational placement’ (Kerckhoff 2000: 453)

The life-course paradigm

The fact that ‘*time matters*’ (Abbott 2001) has been well-established in the social sciences. The life-course perspective is a core paradigm and ‘*perhaps the pre-eminent theoretical orientation in the study of lives*’ (Elder, Johnson & Crosnoe 2003: 3). It elaborates on the relevance of time in the relations between the individual on the one hand, and institutions, culture, and social structure on the other. The Chicago School study by Thomas and Znaniecki on ‘*The Polish Peasant in Europe and America (1918-1920)*’ can be considered the pioneering work in life course research, and William I. Thomas was among the first to explicitly address the relevance of studying individuals from a longitudinal perspective and to collect respective information on them

(Elder, Johnson & Crosnoe 2003). A systematic life course approach was developed and established in the 1960s as a consequence of experiences of disruptive social events and major social and cultural changes (e.g. Second World War, immigration waves, and demographic change). As a result, the collection and analysis of large survey data (particularly in the US) enabled researchers to empirically analyse the embeddedness of individual pathways in historical time and place (Elder 2009). The life-course paradigm was developed with the aim of understanding social pathways, effects of development, and the relation between personal and socio-historical conditions across the life-span. Conceptually, the life course is referred to as ‘*a sequence of socially defined events and roles that the individual enacts over time*’ (Giele & Elder 1998: 22).

Rather than a coherent body of theory, the life-course paradigm represents a theoretical orientation or ‘*tool kit*’ (Mayer 2009: 12) that provides guidance for empirically testable models. The following criteria summarise the five general principles of the life-course perspective (Mayer 2004, Elder, Johnson & Crosnoe 2003: 11ff., Elder 2003):

- (1) Human development and ageing are processes that extend across the entire life-span (*life-span development*).
- (2) Under the given circumstantial constraints and opportunities, individuals’ choices and actions structure and construct their life courses (*agency*).

- (3) Individuals' life courses are structured and shaped by historical time and geographic place (*time and place*).
- (4) Prerequisites and consequences of transitions and events in the life course are subject to the timing of transitions and events within the life course (*timing*).
- (5) Lives are not lived independently but are rather linked by networks and relationships. Hence, historical circumstance can be experienced through interdependence with others (*linked lives*).

The aim of this dissertation is to investigate transitions from general school to vocational and academic training. Against the background of this general research interest, the second and third principles of the life-course paradigm are most relevant to my research. Upon completion of their school career, school graduates face the decision of which occupational career path to choose. This choice is made against the background of specific constraints and opportunities. Previous investments and previous success in one's school career determine one's study and occupation choices and chances (cf. above). The choice of a specific vocational training or study programme subsequent to the general school career, in turn, has significant consequences for the future occupational career.

As educational transitions represent the central explanandum in this dissertation, I apply a general life-course perspective and make use of the life course research '*tool kit*' for

conceptual purposes. The structure of individual life courses includes the timing, ordering, and duration of events across the life-span. *Trajectories* and *transitions* form key objectives to be explained in life course research. They refer to both, the long and the short view on individual lives. Trajectories are life course dynamics of a particular duration (Elder 1985). The term *career* is usually used when focusing on work- but also education-related trajectories (Kerckhoff 1993). These dynamics are formed and structured by beginnings and endings, namely transitions. Transitions are shorter in duration than trajectories and are associated with a change in status (Macmillan 2005). Transitions and trajectories should not be regarded as separate events in the life course. The ordering of transitions and trajectories implies that previous experiences have to be considered as relevant preconditions for current and future ones (Elder 1985).

Transitions and trajectories are embedded in social and institutional structures. Education is institutionally organised, and the structure of the educational system shapes trajectories and transitions (Hillmert 2004). The German educational system is characterised by a large number of transition steps and selections to different educational tracks at an early age¹. Transitions take place in an orderly progression, particularly with regard to education; the age of school enrolment is institutionally set at the age between six and seven years; the

¹ An overview of the German education system will be provided in chapter 3.

duration of schooling is regulated and preconditioned so that a student will enter university education upon successfully completing his/her high school career. Educational outcomes are defined as the result of an accumulation of transitions that are made across the educational career (Mare 1980).

According to the third paradigm of the life course approach transitions are embedded in specific historical and geographical contexts. The individual is embedded in a macro-level social structure that is defined by socio-economic and socio-structural conditions (particular: Elder (1974) *Children of the Great Depression*). Individual actions and choices interact with these social and economic settings (Settersten & Gannon 2009). Thus, individuals actively conceptualise their life choices and actions within socio-structural boundaries, which are defined by the institutional, structural, economic, and historic context. In this sense, individuals' actions and social structures are interrelated (Giddens 1984).

Today, time as a relevant dimension in the social sciences is well-established in terms of theoretical approaches, the structure of research and survey data (e.g. panel and retrospective surveys), and analytical methods (e.g. event history analysis). Although time and place represent constituting elements of the principles of the life course approach, '*the main idea that social facts are located facts [...], is a strange one in contemporary sociology*' (Abbott 1997: 1153). Compared with time, much less attention has

been given to place in social research. This dissertation aims to contribute to this field of empirical research by contextualising the educational behaviour of individuals not only in a temporal but in addition to that in a spatial frame. Therefore, young adults at the end of their school career are observed over time and in a specific location. In this context, attention has to be drawn to a further and major concern in theoretical and empirical life course research; the *age–period–cohort* (APC) *conundrum* refers to the confounding of age effects with either period or cohort effects (O’Brien 2014, Yang & Land 2013, Mayer & Huinink 1990, Riley 1973). *Cohort effects* refer to the historical circumstances that are experienced by individuals born around the same year. It is argued that distinctive developmental experiences shared by individuals born around the same time are important in an individual’s life course (Alwin & McCammon 2004, Ryder 1965, Mannheim 1952). To be differentiated from cohort effects, *period effects* are influences that vary across time. They are the response to widespread historical changes and events (e.g. war, economic depression). *Age effects* describe the consequences of the process of ageing over time. Separating these effects empirically is not easy as they are linearly dependent. Various models have been proposed to overcome this problem (e.g. Bell & Jones 2015, Yang & Land 2013). The conceptual differentiation between cohorts and periods is particularly relevant with regard to the third empirical study in this dissertation. This study is concerned

with simultaneously focusing on periods and cohorts with the aim of examining the influence of temporal fluctuations and structural differences in labour-market conditions on individuals' educational behaviour over a time span of 35 years (1975-2010).

Educational transitions are of relevance when focusing on social stratification. Inequalities in education accumulate over the life course and have a strong influence on the occupational placement and the social positioning. *The American Occupational Structure* by Blau and Duncan (1967) was path-breaking in empirically drawing attention to the issue of intergenerational social mobility. The authors were concerned with quantifying and explaining the link between social origin and social destination. Theoretical models with an intergenerational perspective such as the Wisconsin model of status attainment (Sewell, Haller & Straus 1957, Sewell, Haller & Portes 1969) became increasingly important. A critical remark concerning in particular the Wisconsin model involved its failure to adequately account for the structural or institutional context in which transitions across the educational career are embedded. Kerckhoff (1976) gave rise to the contextuality of educational transitions across the life course. He focused on the question whether the status attainment model could profitably be viewed as a theory of allocation as well as a theory of socialization (Pallas 2003).

In terms of educational inequality and processes of social stratification it is relevant to understand the final educational

outcome as the result of the accumulation of transitions made across the educational career (Mare 1980, Boudon 1974). Transitions represent steps at which educational decisions and selection become visible. Therefore, educational inequality is argued to be the result of an accumulation of these decisions (Breen & Goldthorpe 1997: 299). From a life-course perspective, the previous educational stages play a particularly important role when focusing on transitions in the later educational career (Breen & Jonsson 2005). In Robert Mare's (1980) general model, educational transitions involve the binary decision to continue in or to leave the educational system. But in a diversified educational system the model is insufficient because it does not capture multiple and unordered educational possibilities. Extensions of the Mare model offer alternatives that allow students' trajectories to be differentiated to various educational tracks and reflect how educational transitions are path-dependent (Holm & Jæger 2008, Hillmert & Jacob 2003 Breen & Jonsson 2005, Cameron & Heckman 1998). At each of the institutionally anchored intersections in the education system, individuals need to make decisions that are consequential for the upcoming educational pathway. In order to theoretically explain inequalities in transitions to vocational and academic training, educational decision-making processes need to be discussed.

Inequality in educational decisions

Rational-choice theories are the dominant conceptual framework that is used to explain individuals' decisions. Human capital theory (Becker 1993, Mincer 1958) argues that investments in human capital – comparable to mechanisms that are at work in other forms of capital investments – are based on the evaluation of costs and benefits. Investments in human capital, particularly investments in education and training, increase productivity by increasing the level of knowledge and skills. Direct and indirect monetary and psychic costs (e.g. tuition for education, forgone earnings, additional effort in learning and education) are compared with the monetary and psychic returns (e.g. future earnings, occupational prestige, aspects of self-fulfilment) that come with a further investment in education (Becker 1993: 174, Helberger & Palamidis 1992: 205). The rational decision is the calculation of the costs and benefits that would maximise the utility of a particular individual. Differences in the investment in further education result from variations in abilities and opportunities. High-ability students are more likely to be more motivated to invest in further education, to benefit from their education, and to receive scholarships. Also, such opportunities increase the chance of further educational investments. Moreover, abilities and opportunities explain variations in educational investments between individuals from different social class origin. Students from a higher social class origin have more

(monetary) resources, which increase their abilities and opportunities. This economic approach on investments in human capital has been applied widely in empirical research and has experienced a large number of amendments over time (Hanushek & Wößmann 2009, Cameron & Heckman 1998, 2001, *for an overview*: Goldin 2016).

Sociological theory adopted the general presuppositions of the human capital approach that rational individuals are driven by the maximisation of utility. The core principle has been extended in at least three ways:

- (1) Individual decisions are embedded in social contexts, and the preconditions for and consequences of investments in education have not only economic (e.g. earnings, job positions) but also social implications (Morgan 2005, Breen & Goldthorpe 1997).
- (2) Uncertainty in educational decision-making plays a more explicit role as returns to education are not expected to be effective (monetary) returns but rather *expected* returns (Jæger 2007).
- (3) The subjective probability of successfully completing a particular educational programme is explicitly integrated in the concepts (Gambetta 1987, Boudon 1974).

Social origin is – with regard to one of the most influential extensions of the human capital approach proposed by Raymond Boudon (1974) – the main explanatory factor in terms of inequality in educational opportunity (IEO) (Boudon 1974: 22ff.). Boudon distinguished between the chances of

being (un-)successful in a particular educational programme due to performance differences (*primary effects*) and disparities in educational decision making (*secondary effects*). The primary effects of social origin involve differences that result from extracurricular conditions of socialisation, especially in the familial context. Thus, students from different social origin enter the educational system with different starting conditions. Children from a higher social origin are equipped with more educationally relevant objects in the household (e.g. the number of books). Moreover, they are brought up with a particular motivation for learning. Also, their parents are to a larger extent able to actively support and finance their educational career (e.g. private tutoring, private boarding schools). Thus, performance or ability differences that can be traced back to the social origin are referred to as primary effects.

Secondary effects, in turn, involve the socially selective evaluation of costs and benefits even when students do not differ in their educational performance (primary effects). In line with the concept of human capital, educational decisions are investment decisions that are based on rational criteria. According to Boudon, educational aspirations or goals are formed in the context of the parents' educational tradition. Whereas human capital theory argues that equal investments in education result in equal returns, Boudon argues that educational returns are class-specific. The desired educational degree is evaluated against the background of the familial

educational traditions and social positions. The calculation of educational costs and benefits is based on the social distance between the familial educational status and the educational programme that the student attends. Boudon's model represents the foundation of sociological rational-choice-based explanations about inequality in educational opportunities. Combining social stratification explanations that highlight the relevance of economic, social, and cultural resources (Bourdieu 1977) and aspects of rational class-specific decision making can be attributed to him. Several extensions and more formalised versions of Boudon's general idea were developed (e.g. Gambetta 1987, Breen & Goldthorpe 1997, Erikson & Jonson 1996, Esser 1999, Morgan 2005).

A first formalisation of the model was introduced by Erikson and Jonson (1996). They postulate that the utility (U_v) of an educational programme (e.g. vocational training compared to other alternatives) is influenced by the benefits (B_v) and the costs (C_v) of training, as well as the expected probability to successfully complete the vocational training (P_v).

$$U_v = (B_v - C_v)P_v - C_v(1 - P_v) \Leftrightarrow U_v = P_v B_v - C_v \quad (1)$$

They argue that depending on the expected success probability that is driven by risk aversion or respectively affinity, different educational alternatives can provide the same utility ($P_v B_v = P_a B_a$ if $P_v < P_a$ & $B_v > B_a$).

Especially the concept of risk aversion and the relation to class-specific educational destinations is more precisely elaborated by Breen and Goldthorpe (1997). With the concept of *relative risk aversion*, they argue that individuals' educational decisions are motivated by the desire to avoid downward social mobility with respect to their parents' educational and social status. A further assumption that follows the human capital approach is that individuals view their investment in education prospectively and use education to avoid downward mobility. As a consequence, differences in educational decisions result from the class-specific evaluation of educational decisions. The threshold at which the costs of further education outweigh the benefits is class-specific. The distance that lower-class students have to overcome to attain high levels of education is greater than for students from a higher social origin. Hence, students from a lower social origin have to have higher initial educational preferences or aspirations, they have to invest more resources, and they have to face greater investment risks to obtain the same educational degree compared with students from a higher social origin.

A further development of these considerations is the *subjective expected utility theory* (SEU) proposed by Hartmut Esser (1999: 266ff.). This theoretical approach has a much broader action-theoretical claim than explaining differences in

educational decisions². Esser made an important contribution by generalising and formalising explanations that account for inequalities (in educational opportunities). The idea of the subjectively expected value theory is that alternatives in action are weighted with regard to their individual subjective utility. The individual utility function is shaped by assessments and expectations. These weights represent the value expectation. Individuals choose the alternative with the highest weight. (Esser 1999: 248). With respect to a specific educational decision the mode can be formalised as follows: The expected utility weight is denoted as U . After a graduation from secondary school an individual can in the simplest case choose among entering vocational training (A_v) or leaving the education system (A_a)³. Participating in vocational training includes costs ($-C$). Differences between classes depend on the relative risk of a loss of status ($-SV$). Individual expectations depend on the probability (p) to successfully obtain a vocational degree. Also, expectations are influenced by the potential loss of status by renouncing the vocational training opportunity (c).

² In the following chapter on the relevance of contextual effects, I will briefly discuss Harmut Esser's broader action-theoretical model and also refer to the model of frame selection (MFS) (e.g. Esser & Kroneberg 2015).

³ The German education system offers a much larger variety of vocational and academic tracks than just staying on versus leaving. For an illustration of the expected utility model I chose this simplification.

If individuals vote against a vocational training the expected utility function is:

$$SU (A_a) = c(-SV) \quad (2)$$

The decision in favour of a vocational training is defined as:

$$SU (A_v) = pU + (1 - p) c (-SV) - C \quad (3)$$

The utility of a vocational training programme is weighted by the probability of success. Negative components in the equation are costs. The probability of not being successful is weighted by the loss of status that is associated with failing (cf. Esser 1999: 266ff.). In line with the previously discussed approaches, the expected utility theory assumes that social classes differ with regard to educational ability, resources, and their evaluation of costs and benefits.

In addition to the previously discussed theories, differences in educational attainment can be seen as a consequence of class-specific forms of socialisation that form educational norms. Gambetta (1987) pointed out the importance of variations in the absolute weights that individuals from different social class origins assign to education. He argued in favour of educational preferences and norms as an additional explanation for inequalities in educational opportunities (cf. Gambetta 1987: 173). The notion of a '*normativist-culturalist perspective*' (cf. Kroneberg, Stocké & Yaish 2006: 24) is

employed in the Wisconsin model of status attainment. The model explains the emergence of educational *aspirations* as a result of the social status origin (Sewell, Haller & Portes 1969). Aspirations consist of a *realistic* component, which describes individuals' expected educational goals given their constraints, and an *idealistic* component, which refers to educational desires regardless of the possibility of their realisation (Haller 1968). Particularly the concept of idealistic aspirations supports the idea of normative expectations regarding educational goals.

In general, educational aspirations can be represented by various preferences and outcomes, such as a final educational degree, good grades on an exam, reaching the next educational step, or by the idea of an occupation that is associated with a particular educational level (e.g. a university degree is required to become a medical doctor). Important for the dissertation is that these normative expectations regarding educational goals are assumed to be influenced via processes of socialisation. Here, the familial and the school context are particularly relevant, but also the living environment can be assumed to be important in shaping achievement motivations. A further explanation for educational inequalities turns to more structural indicators: At the institutional level, inequalities are perpetuated through the influence that responsible persons exert over the curriculum taught in educational institutions. Their habits and traditions influence the content of the material that is taught and result in a

structural discrimination against students from lower social origin (Bourdieu & Passeron 1971).

In summary, choices and actions structure the life course. They are influenced by historical time and geographical place. Transitions and trajectories are key objectives in life course research and reflect particular choices and actions. Moreover, they are embedded in social and institutional structures. Transitions in the education system are determined by institutional specifications, and at each transitional step, an individual is required to make a decision. Educational decisions are based on an evaluation of costs and benefits and the expected probability of success. Decisions vary with the individual's social class origin. As a consequence, educational inequalities occur. These inequalities gradually increase over the life course as individuals face multiple successive transitional steps.

At this point, it is important to explicitly point out that the process of educational attainment cannot simply be subsumed under the header of educational transitions. There is a relevant difference between individuals' *aspirations*, *decisions*, and subsequent *transitions* that should be addressed – at least theoretically. The terms are often used interchangeably or not clearly differentiated in empirical research. Transition is a term that is rooted in the tradition of the life-course paradigm, while decision is originated from rational-choice theory, and educational aspirations have their roots in the Wisconsin model on intergenerational status attainment. Transitions are

associated with a change in status, whereas decisions and aspirations can be continuously present with and without observable changes. One might argue that the daily routine of going to school or university is a decision through which a specific aspiration is pursued. In this case the aspiration is achieved by preserving the status quo, but a decision becomes particularly noticeable when a change in status – a transition – occurs.

Moreover, a transition can be the result of one or more decisions. From the school graduate's perspective, a transition could be an unintended consequence (Esser 1999: 456) because the transition to training or education is a two-sided process that involves the decisions of institutional actors or employers on the one hand and applicants on the other. The empirical research perspective in this dissertation is focused on school graduates. Note that in this situation, the behaviour of institutions and employers can be analysed only implicitly. This differentiation between components and perspectives of the educational attainment process creates problems for empirical investigations because outcomes of analyses are not least due to data availability predominantly the observable results of educational transitions. The distinctions are conceptually relevant and call attention to a careful interpretation of empirical results, particularly when research is concerned with the impact of contextual characteristics on disparities in the educational attainment process.

However, it can be argued that aspirations, decisions, and transitions describe related concepts and it can be expected that effects (of contextual characteristics) on disparities in components of the educational attainment process most likely point in the same direction (Becker 2000).

Disparities in the educational attainment process have been theoretically discussed and empirically researched in great detail (cf. above). The question now is, how can factors of influence beyond ‘the usual suspects’, such as social and ethnic origin or gender be integrated into this explanatory framework? As discussed in the introductory chapter, there is empirical evidence for the relevance of contextual settings. The subsequent chapter aims to theoretically broaden the spectrum of determinants that impact educational decisions and transitions. Attention will be given to models that explicitly focus on the influence of *contextual* conditions on individuals’ attitudes and actions.

2.2 The relevance of contexts

*‘Thus the functioning of society as well as the engine of social change could be grounded in the purposive actions of individuals, taken in particular institutional and structural settings that shaped the incentives and thus the action.’
(Coleman 1986: 1310)*

The Micro-macro-micro model

At least since Max Weber’s *The Protestant Ethic and the Spirit of Capitalism* (Weber 1995 [1920]), in which he put forth the idea that the Calvinist ethic influenced the development of modern capitalism, the relation between the individual and the collective has been considered a fundamental issue in sociological theory. Weber’s initial idea was followed by numerous discussions on the relevance of context for individuals’ perception and on the relevance of individuals’ subsequent action for collective phenomena.

In general, social contexts can be viewed as structural influences on individuals (Blau 1960). Contexts are represented by material, institutional, and cultural environments that individuals are embedded in. These environments shape and structure expectations and actions (Becker & Schulze 2013: 2, Esser 1999: 443). Individuals are embedded in various contextual settings simultaneously. The

relevance of these contexts differs for specific individual outcomes, also their relevance changes across the life course. As mentioned in the beginning, it was the Chicago School that, for the first time, empirically studied the contextuality of living conditions. The Chicago School researchers gained a great deal of attention for their empirical work, the collection of data, and the focus on processes of urbanisation, living conditions in the city, the community, and the neighbourhood. By contrast, however, their theoretical contribution has not been noticed much, but nevertheless provides some important basic ideas that are particularly relevant for the present dissertation (Abbott 1997). Not only did the Chicago School emphasise the idea that social facts are temporal (cf. above), but they also promoted the idea that social phenomena have a spatial character. Theoretically, the Chicago School pursued a holistic-descriptive approach. Evolving from biological ecology, the idea of social ecology was aimed at describing urban life as a whole. The structure of and life in the city was studied ‘*as it were, under a microscope*’ (Park 1928: 890). A renowned concept that was developed during that time is illustrated in *Figure 2.1*, the concentric zone model by Ernest Burgess.

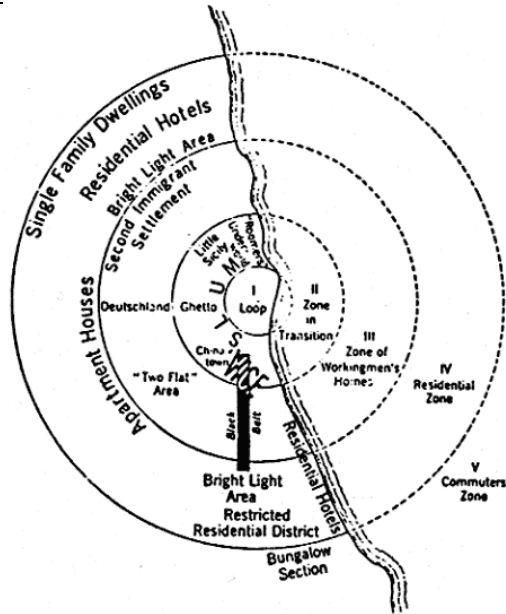


Figure 2.1: Concentric zone model (Park, Burgess & McKenzie 1925: 55)

The model became a standard concept in describing different territorial features in cities, beginning with commercial centres and moving to the outer regions of the city. By focusing on processes of urbanisation, they had already captured the dynamic character of the city; moreover, they broached the issue that spaces and places change over time. These early empirical investigations illustrated that social processes have a spatial structure and that the particular feature of the local environment is relevant to living circumstances.

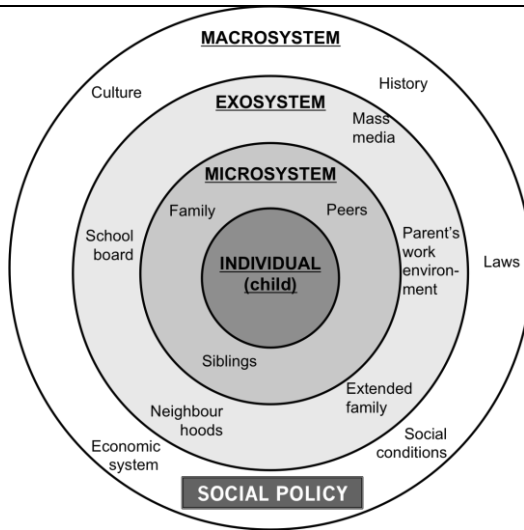


Figure 2.2: Social ecological rings (Bronfenbrenner 1979: 214).

The idea of social ecology is related to a prominent approach in developmental psychology that was created by Urie Bronfenbrenner (see *Figure 2.2*). In contrast, to the Chicago School the focus here is on the individual and not on a description of the city area. Again, the perspective is a holistic and systemic one with the aim of capturing *all* of the factors that are relevant in the process of socialisation. Bronfenbrenner argued that the only way to completely understand human development is to understand all parts in relation to the whole (Bronfenbrenner 1979). In developmental psychology this concept was further developed

and empirically investigated (Lerner, Bornstein & Leventhal 2015, Bronfenbrenner 2005).

Although the Chicago concepts and the idea of social ecology do not specify the causal relation between particular contextual settings and individual outcomes in an explicit theory, but rather focus on describing different levels or units, I argue that they provide at least three basic ideas that are of relevance for this dissertation: *First*, by focusing on local and regional contexts as explicit units of examination, attention is drawn to the fact that spatial contexts offer specific opportunities and constraints (Park, Burgess & McKenzie 1925). *Second*, with the illustration of their concept in rings, social ecological research implies that all kinds of social interactions, relations, and structures have a spatial quality and that individuals are embedded in multiple contextual settings simultaneously. *Third*, studies that focus on differences between local units, as well as on the structure and relevance of borders between local units, and on the relevance of being an *insider* or *outsider* in a specific region (Wirth 1928, Zorobaugh 1929) take into account the possibility that it is not only the local context (place) that shapes living conditions but also that the structure of and relation between locations (space) plays a central role⁴.

Coleman (1986) argued that a shift in social research ‘*from explaining the functioning of social systems (e.g.*

⁴ The distinction between place and space and a discussion on the spatiality of contexts will be addressed in the subsequent chapter.

communities) to accounting for individual behavior' (Coleman 1986: 1319) resulted from a social change towards a more individualistic society. With the actor as the subject of interest, the explicit question of how individuals are influenced by their specific context received growing attention. Subsequent discussions ensued regarding the relation between micro and macro level and how they could be explained and empirically analysed. Among the first to focus on this were Lazarsfeld and Menzel (1961). They developed a typology of indicators and distinguished between characteristics of individual and collective properties. Three characteristics of collective properties can be differentiated, the '*analytical*', the '*structural*', and the '*global*' component (Lazarsfeld & Menzel 1961: 503ff). Analytical properties refer to information about individuals within a collective unit, structural characteristics describe relations between individuals on an aggregated level, and only the global aspects describe pure macro-level characteristics. This differentiation represents substantive groundwork for modern contextual-effect and multi-level analyses.

Coleman himself proposed one of the most prominent meta-theoretical schemes to relate the macro and micro levels in a rational-choice framework. A graphical illustration can be found in *Figure 2.3*. With the macro-micro-macro model – usually referred to as the micro-macro model for better intelligibility – it is argued that the social situation on the macro level influences the micro level in terms of

opportunities and constraints for individuals. Following rational-choice assumptions, individuals choose among the available actions that maximize their utility. The aggregation of individual actions leads to an outcome on the macro level.⁵

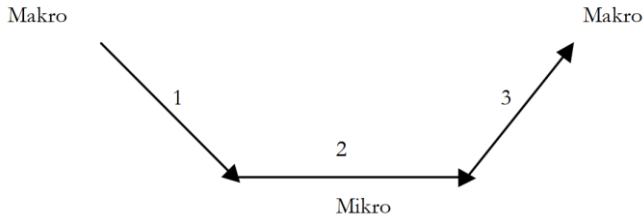


Figure 2.3: The basic macro-micro-macro model (Esser 1993: 98, Coleman 1990: 6ff., McClelland 1961: 47)

According to Coleman, the shortcomings of a purely macro-theoretical orientation is that it ‘*offers no explanation or understanding of why one relation holds rather than another*’ (Coleman 1986: 1322). Moreover, Coleman stated that pure macro relations are empirically problematic because there is simply not enough variation in one social system over time or in a comparative perspective to provide empirical evidence for the assumed relations. Thus, according to Coleman’s methodological individualism, it is necessary to move from the macro to the micro level of individuals’ perception and action and back to the macro level in order to test relations empirically and to causally explain social phenomena (ibid).

⁵ Coleman described the type-3 relation (*Figure 2.3*), the step from micro back to the macro level, as the most difficult and largely ignored one that includes several serious problems. For a detailed discussion, see Coleman 1986: 1324ff. and 1990: 119ff..

Coleman exemplified these circumstances by reconstructing Weber's *The Protestant Ethic and the Spirit of Capitalism*. He argued that the Protestant doctrine influences individual value formation. As a consequence, individuals act accordingly, and their actions are reflected in their economic behaviour. Individuals' economic behaviour, in turn, promoted the advancement of a capitalist economic system.

Hartmut Esser (1993: 98ff.)⁶ extended Coleman's general theoretical scheme. He argued that a social situation on the macro level has an impact on an individual's definition of the situation on the micro level. The macro-level condition structures and shapes the possible courses of action that individuals can take. He systematically integrated the so-called '*bridge assumption*' (Esser 1993: 120, Lindenberg 1990), which links concrete objective possibilities and situational constraints (a – the *logic of the situation*) on the macro level with individuals' subjective interpretations and expectations on the micro level. Individuals choose the action alternative that maximises their utility, referred to as the *logic of selection* (b). The aggregation of actions subsequently leads to an aggregated outcome (c – the *logic of aggregation*) (Esser 1993: 120ff.). This general theoretical scheme illustrated in *Figure 2.4* is well-established and has been further developed and empirically deployed.

⁶ Several approaches and visual representation comparable to the 'bath tub' were developed. The basic structure of the micro-macro model introduced by Esser follows these other approaches, among which are Boudon 1980, Lindenberg & Wippler 1978, Coleman 1986, 1990, McClelland 1966.

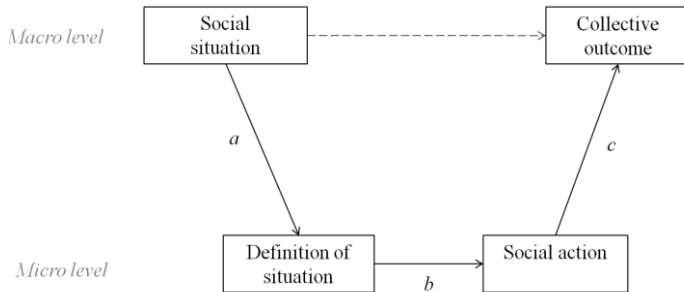


Figure 2.4: Macro-micro model of social action (Esser 1993: 98)

Coleman was among the first to empirically relate the influence of macro-level conditions directly to educational attainment processes. Beyond the familial context, the macro-level conditions in Coleman’s empirical work were predominantly represented by the institutional or school context, and they proved to be most relevant for explaining ‘inequalities of educational opportunities’ (Coleman 1966). He investigated differences between public and private schools and the relevance of communities, and he focused on various educational outcomes (e.g. Coleman & Hoffer 1987, Coleman, Hoffer & Kilgore 1982).

Following the empirical findings of Coleman and his colleagues on educational attainment processes, Becker and Schulze (2013) illustrated an example of the micro-macro model that provided a specific exemplification of the relation between contexts and educational attainment processes (see

Figure 2.5). The authors included an additional meso level that represents school- and classroom-specific conditions (Becker & Schulze 2013: 8 and 11).

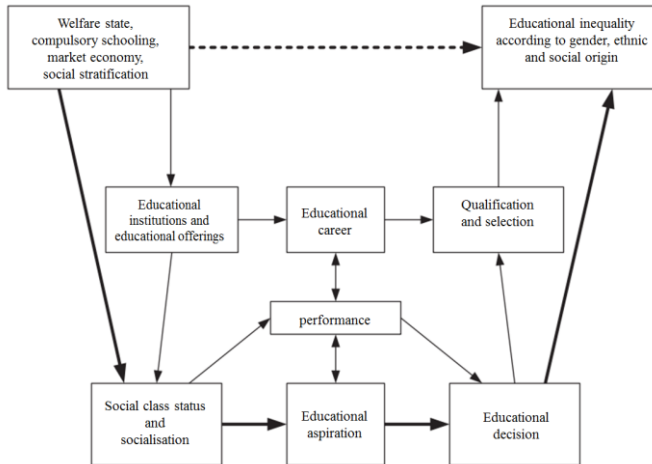


Figure 2.5: Heuristic model of multi-level explanations of educational inequality (Becker & Schulze 2013:11)

A general concept of contextual characteristics (e.g. welfare state, market economy) on the macro level is assumed to influence social class status and socialisation processes. This assumption indicates that individuals in a specific familial environment respond differently to the situation on the macro level. The macro level is also directly important for institutional specifications (meso level). These factors are assumed to influence the rather complex educational attainment process that involves the development of competencies and performance in the education system,

educational aspirations, and subsequently educational decisions. Aspirations in this micro-macro model represent the logic of selection that transfers normative convictions or preferences into educational decisions. Decisions lead to specific levels of qualifications and selections within the educational system. Following the logic of aggregation, specific educational disparities are the result on the macro level.

The general micro-macro approach illustrates how individual actions can be related to conditions on the macro level in a systematic way. Particularly the logic of the situation and the logic of selection determine the influence of the context on the individual. The general micro-macro approach is widespread, and a methodological consequence of this separation between micro and macro are multi-level techniques, which can be considered a standard approach in the social sciences and are widely used in educational research (e.g. Snijders & Bosker 2011, Hox 2010). There are applications of the micro-macro model such as the one by Becker and Schulze that directly refers to the educational attainment process. In these models, the initial macro-level components are described very broadly and can be viewed as a general scheme. However, if the goal is to learn more about the *why* and the *how* of the impact of particular contextual characteristics on educational decisions and subsequent transitions, further theoretical considerations are required. To

explain these relations in greater detail, the definition of specific social mechanisms is essential.

Social mechanisms

In general, social mechanisms are concepts for explaining and understanding causal and regular processes that result in social phenomena. There are several competing definitions of social mechanisms. A large number of concepts on social mechanisms are in line with methodological or structural individualism and represent extensions of the micro-macro model with the general goal of uncovering intermediate steps – often referred to as the ‘black box’ – and identifying the precise causes and consequences between them (*for an overview*: Tranow, Beckers & Becker 2016, Hedström & Ylikoski 2010, Hedström 2005, Hedström & Swedberg 1998). Gambetta (1998) provided a definition from which potential mechanisms concerning the present research interest can be derived: *‘Mechanisms have the form, ‘Given certain conditions K, an agent will do x because of M with probability p.’ M refers either to forms of reasoning governing decision making (of which rational choice models are a subset) or to subintentional processes that affect action both directly (as impulsiveness) or by shaping preferences or beliefs’* (Gambetta 1998: 102). Following Gambetta, it is crucial to separate individual action into a rational and rather active component, and a subintentional and rather unconscious component.

This differentiation is largely in line with the *model of frame selection* (MFS) introduced by Esser (1996, 2001), Kroneberg (2007, 2011), and Esser and Kroneberg (2015). Here, two modes of situational definition (a – the *logic of the situation*, in *Figure 2.4*) and subsequent action are differentiated, the automatic-spontaneous (as), which refers to subconscious perception and action, and the reflecting-calculating (rc) mode. The subjective expected utility theory (SEU) (cf. above) explains the decision-making process in the rc-mode. Individuals' definition of a situation and individuals' actions are split up into (1) *frame selection*, (2) *script selection*, and (3) *action selection* (Esser & Kroneberg 2015). Each of these selection steps can be either (as) automatic and spontaneous or (rc) guided by reflected and rational considerations. It is assumed that most decisions and actions are automatic and spontaneous (cf. Esser 2001: 294). In a first step, the frame selection describes an overall classification of a situation given its specific context; the individual *frames* the situation. A frame refers to the specific characterisation of a situation. The script selection relates to a rather concrete selection to additionally reduce the complexity of alternatives. Hereby, individuals, again, either rely on *habitualised* routines, norms, and values (as) or make an active decision on the basis of a rational evaluation of (rc) alternatives. In the third step, the actual action can again be carried out on the basis of either rc- or as-mode.

Mechanisms that influence individual decision-making processes are based on the selection mode. Regarding educational decisions, a normative perspective and a rational-choice perspective disagree about the main causes of educational decisions (cf. Kroneberg, Stocké & Yaish 2006: 24). On the one hand, educational norms are transmitted via processes of socialisation; on the other hand, rational decisions vary with respect to a class-specific evaluation of cost, benefits, and success probability (cf. above). In both perspectives, disparities in educational decisions and subsequent transitions can be attributed to the context that individuals are embedded in. Empirical support can be found for both perspectives (ibid.). Therefore, contextual effects that elucidate inequalities in educational transitioning via norm-based mechanisms should be observable and so should effects that relate to the cost-benefit calculation of educational decision making.

Research that draws attention towards the influence of contexts on a local and regional level with a focus on social mechanisms is prevalently subsumed under the heading of *neighbourhood effect* research. Beyond neighbourhood effect research, there is research that discusses the relevance of educational infrastructure and labour-market conditions on educational outcomes (see chapter 1.1 of this dissertation). *Table 2.1* summarises the neighbourhood and contextual effects that are discussed in empirical studies and review articles.

Neighbourhood effect research usually investigates the relation between several characteristics of the small-scale residential living area on individual outcomes such as deviant behaviour, educational performance and outcomes, or health issues. Neighbourhood effects refer to a wide and sometimes jumbled set of effects. Even review articles that group and summarise neighbourhood effects draw divergent conclusions; Galster (2010) detected 15 mechanism of the neighbourhood and grouped them into four broad categories; Galster (2008) employed a solution introduced by Manski (1993), here, he differentiated the very same 15 mechanisms into three categories. Sampson, Morenoff, and Rowley (2002), in turn, determined four groups of neighbourhood effects, and Friedrichs and Nonnenmacher (2014) differentiated between direct effects that refer to the neighbourhood as such and indirect effects that are observable in the neighbourhood but do not causally refer to it.

Beyond neighbourhood effects, research that assesses the impact of local or regional conditions predominantly argues that socio-economic and socio-structural conditions represent opportunities. These opportunities structure and shape the individual decision-making behaviour. Moreover, it is argued that regional structures foster a '*college-going predisposition*' (Turley 2009: 130). Furthermore, the '*discouraged-worker effect*' (Micklewright, Pearson & Smith 1990, Raffe & Willms 1989) refers to poor labour-market conditions that are supposed to keep young adults in education. They are

discouraged from applying for employment and aim to prolong their general educational career to (temporarily) avoid entering a precarious labour market.

Instead of discussing all (groups of) effects separately, I will review them systematically, because I believe that it is hardly possible to clearly separate what is referred to as mechanism, effect, outcome (that result from specific effects), or a transmission channel (through which mechanisms operate). Moreover, an empirical differentiation is (almost) impossible. Following the listing, the question is, how many independent mechanisms are useful theoretical constructs that provide independent explanations for the impact of local contexts on educational outcomes and are, beyond that, empirically testable?

Table 2.1: Differentiation of neighbourhood and regional effects in selected studies

Group of contextual effects	Contextual effects	Authors
Direct effects	<ul style="list-style-type: none"> ▪ Local resources ▪ Collective socialisation & role models 	Friedrichs & Nonnenmacher (2014)
Indirect effects	<ul style="list-style-type: none"> ▪ Contagion effect ▪ Social networks ▪ Institutions 	
Social-interactive mechanisms	<ul style="list-style-type: none"> ▪ Social contagion ▪ Collective socialisation ▪ Social networks ▪ Social cohesion & control ▪ Competition ▪ Relative deprivation ▪ Parental mediation 	Galster (2010)
Environmental	<ul style="list-style-type: none"> ▪ Exposure to violence ▪ Physical surroundings ▪ Toxic exposure 	
Geographical	<ul style="list-style-type: none"> ▪ Spatial mismatch ▪ Public services 	
Institutional	<ul style="list-style-type: none"> ▪ Stigmatisation ▪ Local resources ▪ Local market actors ▪ 	
	<ul style="list-style-type: none"> ▪ Social ties / interactions, ▪ Norms and collective efficacy ▪ Institutional resources ▪ Routine activities 	Sampson & Morenoff & Gannon-Rowley (2002)
Endogenous effects	<ul style="list-style-type: none"> ▪ Socialisation ▪ Epidemic & social norms ▪ Selective socialisation ▪ Social networks ▪ Competition ▪ Relative deprivation ▪ Stigmatisation 	Manski (1993), Galster (2008)

Correlated effects	▪ Exposure to violence	
	▪ Economic development spill-overs	
	▪ Spatial mismatch	
	▪ Local institutional resources	
	▪ Public services	
	▪ External stigma	
Exogenous (contextual) effects	▪ Pollution & contamination of environment	
	▪ Social cohesion	
▪ Exposure to crime and violence	Ellen &	
▪ Social networks	Turner (1997)	
▪ Socialisation by adults		
▪ Peer influences		
▪ Physical distance		
▪ Quality of service		
Discouraged worker/trainee effect	Mickelwright, Pearson, Smith (1990), Raffe & Willms (1989)	
College-going predisposition	Turley (2009)	

With respect to the impact on educational decisions and subsequent transitions, I argue that the list of effects should be reduced to two modes of influence: *preferences* and *opportunities*. In the social sciences, a variety of expressions are used to characterise what individuals want. I argue that wants, wishes, goals, desires, preferences, aspirations, beliefs, orientations, and purposes with respect to educational goals are terms that represent one mode through which contextual conditions affect educational outcomes⁷.

The path that adolescents choose after graduating from general school is a selection among institutionally defined alternatives. *Preference* is a suitable term because it relates alternatives: ‘*We desire things in their own right, but we prefer things to other things. We can desire both X and Y and still prefer X to Y [...] Preferences thus become an especially sensible term of art if one regards the world as full of trade-offs and regards actors as wanting many things (and a pony, too!) but only being able to obtain some of them* (Freese 2009: 95).

⁷ According to the DBO-theory of social mechanism proposed by Hedström (2005) individual action can be traced back to **D**esires, **B**eliefs and **O**pportunities. Hereby, a desire is a wish or want, while a belief represents a proposition of the world held to be true. I argue that in the present dissertation – particularly with regard to an empirically testable model – the differentiation between opportunities and preferences is sufficient. In that sense, preferences are meant to represent educational wishes or desires that are largely based on attitudes towards education, which are formed via processes of socialisation, the impact of role models, and social norms.

The idea of preferences for an educational alternative (e.g. attending university vs. enrolling for vocational training) corresponds with the concept of aspirations and subsequently – at least in terms of idealistic aspirations – with the concept of automatic-spontaneous (as-mode) decision making proposed by Esser and Kroneberg (e.g. Esser & Kroneberg 2015). Preferences can be understood ‘*as making reference to the alternative that would be selected in a counterfactual situation of abstract, hypothetical choice*⁸. *To say an actor prefers vanilla to chocolate is to say that either the actor will choose vanilla over chocolate or there will be some reason(s) – drawing upon other preferences, beliefs, or circumstances – the actor does not. A statement of an abstract preference of X over Y bears affinities to an idea of a ‘default setting’ in computer science or an ‘unmarked form’ in linguistics.*’ (Freese 2009: 97f.). In the present case, the idea of the *default setting* implies that individuals’ educational preferences take on a particular structure. This preference is *internal* and somewhat subintentional. I argue, that it is affected by residential contextual characteristics; with regard to neighbourhood and contextual effects, I expect that aspects of (*collective*) *socialisation, peer influences, social networks*, but also *social norms, role models, social cohesion* and *control*, and the *contagion effect* refer to the formation of educational preferences (see *Table 2.1*). They relate either to channels of transmission or effects that raise the issue of how

⁸ Presented in italics in the original.

education and individual educational goals are perceived and pursued. Moreover, the *college-going predisposition* (Turley 2009) clearly and directly represents a preference for education.

Local resources, institutions, but also physical distance, and environmental aspects in a broader sense (see Table 2.1), are associated with opportunities. Opportunities represent the possible choices that are available, taking relevant constraints into account (Petersen 2009). Education and training opportunities are in particular determined by institutional offerings and local socio-economic resources. However, not all effects and mechanisms etc. listed above can be clearly assigned to either preferences or opportunities; social networks, for instance, can influence educational opportunities if an acquaintance who is an employer can directly offer a vocational training position. Apart from this idea, social networks in terms of peer-group effects can influence career interests and performances, and therewith preferences for specific academic or vocational training programmes. The same applies for the *discouraged-worker effect*; on the one hand, young adults adjust their preferences due to the discouragement; on the other hand, the effect is related to actual shortages on the labour and training market that limit opportunities. It can therefore be argued that opportunities are relevant for educational transition chances in addition to preferences, but beyond that, opportunities can

be expected to affect preferences: ‘*The core idea is that given the agent’s preferences and available opportunities she will choose the opportunity that best satisfies her preferences.*’ (Petersen 2009: 117).

Opportunities are usually understood as being out of the individual’s control, as *external* constraints. ‘*But, [...] equality of opportunity does not guarantee equality of outcomes [...] simply because people differ in their talents, preferences, and the constraints they face, and these considerations enter into analysis of inequality as well.*’ (Petersen 2009: 115). This means, similar local or regional opportunities can result in different educational decisions given the individual situation of a school graduate (e.g. social origin).

Beyond that, classifications such as *stigmatisation* but also *relative deprivation* refer to unequal opportunities on the basis of practices of discrimination. It could be argued that young adolescents who come from a socio-economically poor residential area (e.g. a neighbourhood stigmatised as a *ghetto*) are denied access to a vocational training place. This can be expected to be more likely when employers and not institutions make the recruitment decisions.

In summary, ever since Max Weber’s work, the relation between the individual and the collective has been a fundamental issue in sociological theory. Contexts are considered to have structural influences on individuals (Blau

1960). The Chicago School scholars gave rise to the thought that individuals are embedded in various contexts simultaneously. The introduction of the ring model can be considered an early representation of the spatiality of contexts because it includes the spatial structure of the city and the relation between different local units (Park, Burgess & McKenzie 1925). The widely discussed macro-micro scheme brought '*man back in*' (Homans 1964) by emphasising the relevance of contexts for individual value formation and action. There are various applications of the micro-macro model directly related to education. They are relevant to the present dissertation for two reasons; first, they illustrate once more that the process of educational attainment is a complex sequence that involves educational performance but moreover, aspirations, competencies, and decisions (and subsequent transitions). These components are not independent of each other. Second, the micro-macro model of educational attainment illuminates the idea that macro characteristics have an independent influence on the components of the educational attainment process. To determine particular modes of influence of socio-spatial contextual characteristics, concrete social mechanisms have to be specified. The frame selection model provides a relevant extension of the general rational-decision model on the basis of the micro-macro scheme. It enables researchers to differentiate between rational and rather subintentional decision-making behaviour. The decision components are

linked to contextual social mechanisms that are relevant for education (Kroneberg, Stocké & Yaish 2006). Neighbourhood effect research and research on regional contexts offer a wide set of ideas about social mechanisms through which the residential context influences individual outcomes. I argue that the impact of socio-spatial contexts can be summarised as either opportunity-based or preference-based. Opportunities are not independent of the formation of educational preferences but influence them. Beyond that, preferences are not necessarily equal even when opportunities are comparable because different social groups might respond differently to contextual characteristics.

Whereas the micro-macro model and particularly its typical illustration – Coleman’s *boat* or *bath tub* – indicate a dichotomous differentiation between macro and micro level, the early Chicago School’s ring model as well as topical neighbourhood research (Sharkey & Faber 2014) indicate that contexts are continuously structured, by taking spatial features into account.

One of the major research questions in this dissertation is how to integrate the space and place of contexts into the theoretical concepts discussed so far. The following chapter is concerned with a theoretical discussion of space and place in the social sciences with the aim to learn more about *where* contextual characteristics that impact educational preferences and opportunities are located.

2.3 The spatiality of contexts

‘So fragen wir im Interesse der Ergründung der Vergesellschaftungsformen nach der Bedeutung, die die Raumbedingungen einer Vergesellschaftung für ihre sonstige Bestimmtheit und Entwicklungen in soziologischer Hinsicht besitzen.’ (Simmel 1995 [1908]: 134)

Defining space and place

When discussing the relevance of local and regional contexts, the focus is on the *where* of things. In this context, it seems necessary to refer to the terms of *space* and *place*. The distinction between these terms is essential for a deeper understanding of their relevance in sociological theory and, thus, in empirically testable models derived from that theory. An everyday understanding indicates that space is wider and larger than place and that it is somehow transcendent. Space is associated with the universe, whereas a place is related to concretely objectified locations such as the market place, the town square, or one’s favourite pub.

The Oxford English Dictionary provides more than two pages of definitions for both space and place. The definitions illustrate that the semantic content of the terms goes beyond a geographical meaning. For example, both place and space capture a temporal component as in *‘when does something*

take place’ or in *‘the space of time’*. Furthermore, place represents an ordering component as in *‘First, second, third place’* or even implies stratification as in one’s *‘place in society’*. In these senses, place and space seem to depict a framing for time and position. Place in a geographical sense is, *inter alia*, defined as: *‘space that can be occupied’* or *‘a particularly region of space; a physical locality...’* as well as *‘the amount or quantity of space actually occupied by a person or thing’*. Space and place can even be used synonymously as place is also defined as *‘Space (esp. as contrasted with time); continuous or unbounded extension in every direction, extension in space’* (‘place, n.1’ OED online 2016).

Space in turn is defined as *‘Linear distance’*, *‘Physical extent or area’*, *‘The physical expanse which surrounds something; extent in all directions from a given place or object’* (‘space, n.1’ OED online 2016). The two terms are closely related insofar as place is described as a specification of space. Moreover, the term space stresses a dynamic component. Space is a dimension, whereas place is spatially fixed. Places are concrete locations that are reachable through space.

The scientific discipline most concerned with discussions about place and space, is of course geography, which *‘has even been defined the ‘science of place’*’ (Agnew 2011: 316). The dictionary of human geography defines place as *‘...a geographical locale of any size or configuration, comparable to equally generic meanings of area, region or location. [...].’*

For many geographers, place and the differences between places are the very stuff of geography [...]. But the potential interchangeability of place with other concepts is a sticking point. Place, region, area and so on all can denote a unit of space that has discrete boundaries, shared internal characteristics, and that changes over time and interacts with other similar units’ (Henderson 2009: 539).

While the definition of space indicates that *‘the production of geographical knowledge has always involved claims to know ‘space’ in particular ways. [...] special importance has been attached to the power to fix the locations of events, places, people and phenomena on the surface of the Earth and to represent these on maps. Extensions of these capacities involved a series of instrumental, mathematical and geographical advances’ (Gregory 2009: 707).* This definition suggests that places are a concrete manifestation of or rather in a more general space. Moreover, space seems to refer to a relative geographical concept by relating places to one another. Further, the definition of space stresses a technical and practical meaning, rather than a theoretical one. Human geography can look back on a long tradition in discussing the relevance of place compared with space. The meaning and relevance of the two terms have changed over time with the discussion still ongoing (Agnew 2011).

In sociology, space and place are important if and when they become relevant for social actions or visible through and necessary in social actions. Hence, discussions in sociological

and in economic theories are concerned with the question of whether geographical units and dimensions can be considered meaningful in terms of socially relevant outcomes or whether spaces and places should instead be considered empty shells that become relevant only through the social (inter)actions that take place in space and at places. A first sociological discussion in this regard is found in Simmel (2009). German sociologist Georg Simmel refers to Immanuel Kant's understanding of space by arguing: '*Kant defines space simply as 'the possibility of being together' – this then is sociological; interaction makes the formerly empty and null into something for us; it fills it, in that it makes it possible'*' (Simmel 2009 [1908]: 545). By focusing on the spatial prerequisites for interactions, Simmel extended this view and referred to space as a category '*beyond human thought and action'*' (Glauser 2006: 250).

An explicit attempt to differentiate between the terms of space and place with regard to a sociologically relevant discussion can be found in Gieryn (2000). He describes places through three major attributes; they have a specific *geographical location*, they have a *material form*, and they are *meaningful* (e.g. places have specific names, they are of unique value). Space is in turn '*what place becomes when the unique gathering of things, meanings and values are sucked out'*' (Gieryn 2000: 465). Thus, Gieryn's differentiation of place and space reflects the outlined discussion of the meaning of space and place in Simmel's theory. Regarding

the aspects of location and form, as the meaningfulness of places cannot be considered beyond human actions, Gieryn argues for an absolute relevance of place, whereas space represents an empty vessel in the Kantian sense. Logan (2012) contradicts ‘*Gieryn [...] who dismisses space as ‘what place becomes when the unique gathering of things, meanings and values are sucked out’*’, and argues instead: ‘*In fact, places are not only geographically located and material, as Gieryn (2000) points out, but they are also spatial, and their spatiality gives rise to fruitful questions. [...] Spatial thinking is the consideration of the relative locations of social phenomena, the causes of the locational pattern, and the pattern’s consequences’* (Logan 2012: 509). Logan’s perception of space and place is relational and refers to spatial structuring, which represents a central idea in this dissertation.

Socio-spatial contexts as dimensions of social inequality

A crucial question is the relevance of space and place for social actions, relations, and for matters of inequality. Simmel argues that ‘*social interaction among human beings is – apart from everything else – also experienced as a realisation of space’* (Simmel 2009 [1908]: 545). Social (inter)actions proceed in spatial settings; individuals, groups, and institutions have a specific spatial setting as well. Simmel’s theoretical thoughts imply that everywhere is a place, and

everything has a space. He describes five basic features of space:

(1) Space is characterised by *exclusivity* for individuals or groups insofar as each person lives his or her life in a specific space. Physical attributes and objects within a certain space determine spatial exclusivity. With respect to the discussion of terminology, I argue that this particular feature of space refers to place as one aspect of space. Furthermore, the exclusivity of each space is established by a specific geography and culture.

(2) Boundaries and *spatial division*: Simmel argues in *the Social Boundary*: ‘Each border is a psychological, or more precisely, a sociological occurrence. But through its investment as a line in space, this reciprocal relationship achieves clarity and security through its positive and negative aspects’ (Simmel 1995b [1903]: 258). Boundaries create a spatial division that facilitates and restricts social contact and interaction. This idea of spatial division is applied in empirical studies by the Chicago School that deal with neighbourhoods and racial or social inequalities (e.g. Park, Burgess & McKenzie 1925). Also, it refers to the effect of social structuring and spatial relations between contexts.

(3) Locally or spatially *fixed contents*: Houses, the order of buildings, or the structure of streets are fixed in space; and through this fixed appearance, they have an influence on individuals. This aspect of space, again, refers to place.

However, technologies and transportation opportunities have softened the binding character of fixed contents in space.

(4) *Proximity and distance*: Especially in *The Metropolis and Mental Life*⁹ (Simmel 1995a [1903]), Simmel concerns himself with questions about how types of settlements (e.g. growing metropolises versus rural areas) affect the mental life of an individual. He describes the ‘urban personality’ and the fact that an increasing personal isolation is accompanied by an increasing number of people living together in more proximate contexts. This idea is particularly interesting as it illustrates the potential discrepancy between social and geographical proximity/distance. In accordance with Simmel, one can deduce that the often-cited ‘*Tobler’s law of geography*’, which suggests that ‘*everything is related to everything else, but near things are more related than distant things*’ (Tobler 1970), does not hold true in general. Considering, for example, the coverage and perception of (national and international) media, the nearest context is not per se the most relevant one. The spatial extension of contextual influences can vary substantially in accordance with the social process under consideration (Hillmert 2016).

(5) The possibility of being *mobile*: Simmel addresses questions on immigration and integration. The opportunity to leave a specific spatial setting creates an awareness of different contextual conditions. Moreover, mobility is, again, associated with the mismatch between social and spatial

⁹ Originally: Die Großstädte und das Geistesleben

distance/proximity. A consequence of overcoming spatial distance, for example, by immigrating to a foreign country is not equal to creating social nearness to the native population. Simmel's spatial concept is not free of contradictions. On the one hand, it has been argued that he follows Kant in defining spatial contexts as empty vessels that become relevant only through individuals (inter)acting in that context. On the other hand, Simmel explicitly refers to the existence of a socially relevant space as such (Löw 2001). In both senses, space is perceived as absolute and exogenous with respect to social action. On the contrary, Glauser (2006) argues against this understanding of Simmel's concept as absolute. She believes that space in Simmel's sense is not obligatorily tied to universal principles. In her understanding, Simmel perceives geometric principles such as Euclidean geometry as rather ideal-typical. They are valid as long as the ordering of spatial impressions, made by individuals is best described by them (Glauser 2006: 254). Simmel argues that space is relative to historical and cultural circumstances. His interest concerns the influence of space for processes of socialisation and social action. Thus, aspects of space that are *perceived* as such by social actors are relevant for social action. In that sense, space and spatial principles can be understood as comparable to normative convictions regarding their relevance for individuals in society. Simmel's understanding of spatial structure constitutes a link between space and the theoretical discussion about social mechanisms, particularly regarding

the *situational* mechanisms that cover the macro-to-micro relation (Coleman 1990). Simmel's notion of space can be related to the mechanism that links contextual structures to the formation of preferences by addressing the relevance of space for processes of socialisation (Simmel 1995c [1903]).

However, Simmel himself argued that space is a pre-modern form of socialisation processes that can and will be overcome in modern societies. As a consequence, Simmel is paradoxically one of the first and most important theoreticians to focus on space in social life. At the same time, he diminished the meaning of space for sociological thinking. Hereinafter, space as a topic was not given much attention in sociology for quite a long time. The '*blindness for space*' in sociology [Raumblindheit] (Dangschat 1994: 341) lasted until the 1980s when various authors argued in favour of a *spatial turn* in sociological theory (e.g. Löw 2001, Foucault 1992, Lefebvre 1991, Giddens 1984).

Some theoretical discussions that are attributed to the spatial turn are based on an understanding of space and place that does not directly refer to geographical features, but space and place are rather referred to in a positional sense. With respectively varying perspectives, theoretical considerations by Henri Lefebvre (1991, 1974), Pierre Bourdieu (1991), Anthony Giddens (1979) and others aim to explain the social structuring and maintenance of social structures as being produced, reproduced, and reflected in spatial structures. Interpersonal relations, networks, and social positions are the

constituting elements of the social space (Rau 2013, Bourdieu 1991, Giddens 1979).

Bourdieu's approach emphasises the commonalities between physical and social space. Thus, space is rather used as an analogy to the physical or geographical structure that represents the social structure. Bourdieu indicates an explicit understanding of physical space insofar as he also refers positioning in the social space back to the physical space. It is argued that, social relations and actions are always spatial. The theory indicates that the geographical structure represents an objectification of the social structure. Spatial structuring becomes relevant for matters of inequality because living conditions represent the social structure, and hereby, the geographical space establishes and reproduces social inequalities (Bourdieu 1991).

Similar to Bourdieu, Giddens' *theory of structuration* (1979) is aimed at mediating between structure and action. Space and time are dimensions that frame the scope of action. These dimensions are not necessarily immutable but can be (re)produced by social actors. Giddens refers to that process of production of space as *spacing*. Although later approaches on space in the social sciences refer to Giddens' concept of spacing, his theory cannot be considered a flexible one that refers to spatial structuring and spatial extension. He is concerned only with fixed places and with localising social actions. From this perspective, it seems reasonable that he

would state that relevance of space in globalised societies is declining.

Lefebvre (1991) provides a more comprehensive concept of space. In *The Production of Space*, he argues that space is a social product or a complex social construction (based on values and the social production of meanings of space). This social product influences perceptions and social practices in space. He suggests a triadic division of space into (1) perceived space, (2) conceived space, and (3) spaces of representation: *'the schism between subjects' perceived and lived spaces of activity and objective scientific-technological spatial structures is bridged by 'ideologies of space'*. [...] *These ideologies articulate science with everyday life, render spatial practices coherent, guarantee the functioning of everyday life and prescribe modes of life'* (Ronneberger 2008: 137). Lefebvre's arguments imply a shift in research perspective from consequences of space – in the focus of the dissertation – to the processes of its production. Space is viewed as multiplicity that is socially produced and made productive in social practices. As a Marxist theorist, Lefebvre argues that this social production of urban space is fundamental to the reproduction of society and hence of capitalism itself.

A main aim of the space-theoretical concept by Martina Löw (2001) is to overcome the divide between absolute and relative concepts of space. Löw establishes the idea of a *'relational'* space (Löw 2001: 33) by focusing on the order of

objects and individuals in space. Löw applies Giddens idea of the ‘*duality of structure*’ on a ‘*duality of space*’. In line with Giddens (1979) and also with Bourdieu’s concepts of the habitus as a ‘*structuring structure*’ (Bourdieu 1977), she argues that spatial conditions represent opportunities and constraints in individual action, but at the same time, spatial structures are the outcome of individual action. Two basic processes of the constitution of/through space are ‘*spacing*’, which means the building and construction of things and individuals; and ‘*synthesis*’, which means that individuals and objects constitute spatiality ‘*through processes of perception, ideation, or recall*’ (Löw 2001: 35). Spacing refers to the positioning of actors and objects, while synthesis is the connection between objects and actors that are positioned in space. Spacing is related to the placement of individuals and objects in space (place); synthesis indicates the notion of relational flexibility (space). Löw’s theory makes explicit the idea that each and everything is equipped with a place and a space. This spatiality is associated with prerequisites for the construction of space and individuals in space as well as with consequences that result from the perception and ideation of space.

Although the dissertation is not concerned with the social construction of space but with individual consequences resulting from the placement in a socio-spatial context, the presented theoretical considerations are of relevance: *First*, the relational character of space, most explicitly introduced

by Löw, draws attention to the spatiality of supposedly *nonspatial* objects. In line with Löw's theory, it can be argued that space is important not only when referring to local and regional units such as a city, a community, or a neighbourhood, but the relational approach gives rise to the thought that all socially relevant properties have a spatial side to them; an individual has a particular radius of (inter-)action. This radius might vary in accordance with specific matters. For instance, a person usually searches for a job in a range that is commutable by car or public transport, while one might prefer to go to a bakery that is in walking distance. Thus, beyond the relevance of the contextual characteristics of a fixed location or place, the structuring and extension of socially relevant contextual characteristics in space and the relation between them should be considered relevant to individuals' educational transitions.

Second, according to Bourdieu and other authors in the tradition of the spatial turn, geographical structuring becomes relevant in terms of social inequality. It is argued that the geographical structure represents an objectification of the social structure. This argumentation relates to the *opportunity-mode* discussed in the chapter 2.2. In addition, it is pointed out that space is a social product which influences perceptions and social practices in space, which implicitly can be transferred to the relevance of context in the formation of *preferences* (also discussed chapter 2.2).

However, despite their theoretical relevance, the outlined theories offer no strong empirical application orientation, particularly in terms of research on social inequality. Hillmert (2016) addresses the issue of scaling of local contexts and advocates for an empirical conceptualisation and operationalisation of contexts in accordance with their theoretically assumed relevance for individual outcomes. He argues that a specification of the scale and extension of contextual characteristics is a major concern in empirical research that has so far received little attention. He incorporates a life-course perspective and argues that scale and structure of relevant local contexts follow non-monotonic patterns and vary during the course of life (ibid.). Moreover, spatial contexts that are relevant for individual perception and action do not necessarily follow administrative boundaries. They should empirically be oriented along the individual radius of action, referred to as *egohood* or egocentric neighbourhood (Hillmert 2016, Andersson & Malmberg 2015). Thus, individually relevant contexts can be overlapping, differ in size, and also differ for specific social groups (e.g. immigrant background, social status or gender (Hillmert 2016: 16ff.)). In addition, it can be argued that residential contexts can become socially relevant in terms of interdependencies (e.g. interrelation between different socio-structural and socio-economic characteristics with respect to an individual outcome), and in terms of the duration that an individual is exposed to a specific socio-spatial context

(Sharkey & Faber 2014, Logan 2012, Logan, Zhang & Xu 2010).

In summary, place refers to a discrete category. In sociological theory, it plays a role in terms of spatial heterogeneities; differences in living conditions between places are in the focus. However, the concept of place falls short of the mark when it comes to relative components of spatial settings. Individuals are embedded in several places. Each place of relevance has a specific spatial structuring. Furthermore, places are spatially related to one another. It is the notion of space that refers to spatial dependencies and spatial structuring (Fotheringham & Rogerson 2009) that are relevant for social actions and entail discussions and analyses of the dynamic relevance of spatial contexts for individual social action. The socialisational relevance of space is already pointed out by Georg Simmel, who can be considered the pioneer in integrating the notion of space into sociologically relevant questions. The theoretical concepts in the tradition of the spatial turn are, on the one hand, interested in linking spatial conditions with individual action; on the other hand, they address the question of how space is socially constructed. They are of importance because they stress the ubiquity of spatiality in social life, and moreover point out that spatial structure is relevant in terms of social stratification and inequality. These primarily theoretical discussions are further developed and transferred to

empirically testable concepts (e.g. Hillmert 2016, Sharkey & Faber 2014, Logan 2012), with the aim to adequately conceptualise socio-spatial contexts that are relevant for individual outcomes such as educational transitions.

2.4 The relevance of flexible socio-spatial contexts on educational transitions to vocational and academic training

The aim of the theoretical chapter is to lay the foundation for systematic explanations of the overall assumption of this dissertation, which is that spatially flexible conceptualised context characteristics can contribute to explaining differences in individuals' chances of transitioning to vocational and academic training. In this section I will summarise the presented theoretical approaches, whereby the theories must not be considered of equal rank; while some concepts represent meta-theoretical schemes (e.g. life-course paradigm, micro-macro model), others can be considered empirically testable concepts (e.g. educational-decision model, scaling of local contexts). The theoretical aim is to systematically combine them to derive testable hypotheses on the relation between socio-spatial contextual characteristics and educational transitions.

Altogether, a life-course perspective is obtained to theoretically embed the central explanandum in a broader perspective. The main objects of investigation are educational transition chances. Therefore, a rational-choice approach on inequalities in educational decisions and subsequent transitions is applied. The general rational-choice perspective is expanded by additionally drawing attention to rather norm-based explanations for educational disparities. Moreover, the

theoretical discussion on micro-macro relations between contexts and individual outcomes (and subsequently societal consequences) is illustrated. The relation between micro and macro level is specified with regard to the explanandum by including assumptions from the model of frame selection and concepts of social mechanisms. The socio-economic and socio-structural contextual effects that are assumed to be relevant for explaining inequalities in educational transitions are summarised into two modes; namely preferences and opportunities. Considerations on the relevance of spatiality support a conceptualisation of contextual characteristics that involve their spatial features and capture their adequate spatial extension. In *Table 2.2* the theoretical approaches are summarised.

*Table 2.2: Overview of theoretical approaches and central terminology*¹⁰

Theoretical approach	Important terminology / concepts	Important Representatives
Life-course paradigm	<ul style="list-style-type: none"> ▪ Educational transitions & trajectories ▪ Historical time, geographical place ▪ Institutional settings ▪ Sequence of decisions → final educational outcome 	Mayer (2004), Pallas (2003), Kerckhoff (1976, 2000), Elder (1985, 2009)
Educational decision theory	<ul style="list-style-type: none"> ▪ Educational decisions = f (costs, benefits, success probability) ▪ Primary and secondary effects ▪ Relative risk aversion ▪ Subjectively expected value ▪ Educational aspirations, educational decisions and educational transitions → educational outcome 	Esser (1999), Breen & Goldthorpe (1997), Mare (1980), Gambetta (1987), Boudon (1974), Sewell, Haller & Portes (1969)
Context effect research	<ul style="list-style-type: none"> ▪ Concentric zone model ▪ Macro-micro model ▪ Bridge assumptions ▪ Frame selection model ▪ Social mechanisms of neighbourhood & regional effects → opportunities & preferences 	Freese (2009), Petersen (2009), Kroneberg (2007, 2011), Gambetta (1998), Esser (1993, 2001), Coleman (1986), Park, Burgess & McKenzie (1925)
Spatiality of contexts	<ul style="list-style-type: none"> ▪ Space ▪ Place ▪ Boundaries & spatial division ▪ Proximity & distance ▪ Mobility ▪ Spatial scale ▪ Spatial structuring /dependencies ▪ Duration of exposure ▪ Group-specific variations in impact of spatial contexts 	Hillmert (2016), Logan (2012), Sharkey & Faber (2014), Agnew (2011), Löw (2001), Gieryn (2000), Simmel (2009, 1995)

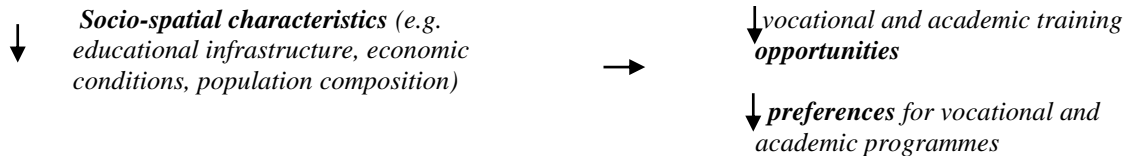
¹⁰ Concepts that are of primary importance are highlighted in bold.

Until now little is known about the spatiality of contextual effects that impact educational transition chances. The dissertation aims to contribute to bridging this gap in research with (1) a systematic differentiation of social mechanisms and specific contextual characteristics (e.g. labour-market characteristics, educational landscape, population composition), (2) considering the spatial scale of contextual effects, (3) considering the interrelation between contexts, and (4) focusing on the specific relevance of socio-spatial characteristics for different social groups.

By systematically relating the presented theoretical concepts, the following four overarching research hypotheses (see *Table 2.3*) are derived. The hypotheses follow the structure of the initially stated research questions that represent the common thread of the dissertation.

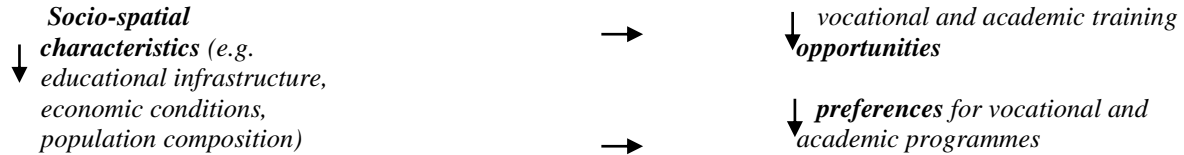
(1) (GENERAL) MECHANISMS

Linking theoretical approaches on the relevance of macro conditions for individual outcomes (e.g. Becker & Schulze 2013, Esser 1993, 1999, Coleman 1986) with conceptual considerations on social mechanisms (e.g. Freese 2009, Petersen 2009, Kroneberg, Stocké & Yaish 2006, Gambetta 1998), I argue that residential contexts become relevant for educational transition chances in terms of preferences and opportunities. I expect both to be affected by local socio-structural and socio-economic characteristics; poor overall socio-spatial conditions reduce the provision with vocational and academic training *opportunities* in the local context. Moreover, the possibility of social interactions and contact with people that affect the formation of educational *preferences* is reduced.

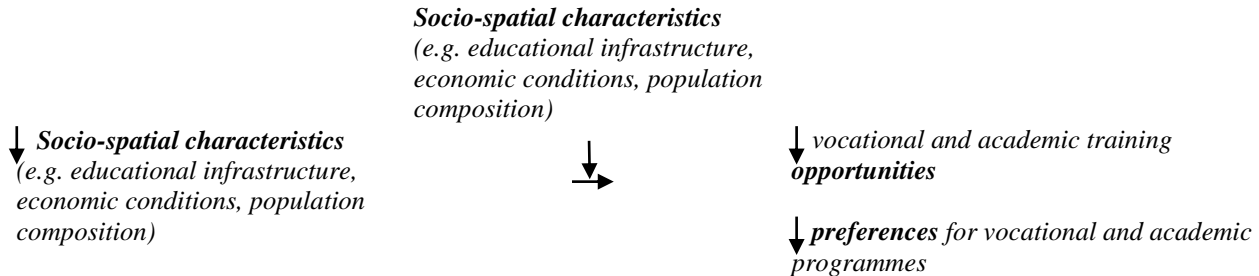


(2) (INTER)RELATION OF CONTEXTUAL CHARACTERISTICS

Theories on educational inequality (e.g. Breen & Goldthorpe 1997, Boudon 1974) and research on local contextual effects (e.g. Sharkey & Faber 2014, Friedrichs, Galster & Musterd 2003, Sampson, Morenoff & Gannon-Rowley 2002, Jencks & Mayer 1990) suggest that educational transition chances are influenced by various (residential) contextual characteristics. By bringing together the social mechanisms that are discussed in research on neighbourhood effects, regional labour-markets, and the educational infrastructure (see *Table 2.1*), I expect various characteristics to be of additional relevance for educational transition chances because different characteristics can refer to a particular (opportunity- or preference-related) mechanisms. Moreover, even the same characteristic can be assumed to refer to different mechanisms (e.g. Poor labour-market conditions can, on the one hand, reduce opportunities and discourage adolescents from applying for particular educational programmes on the other hand.).

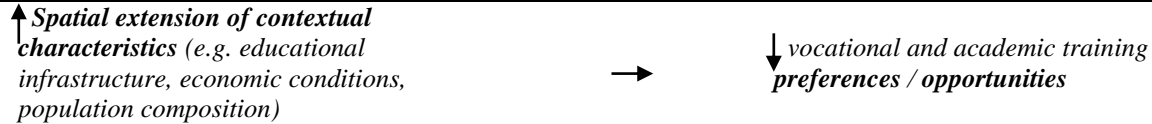


Moreover, I expect different contextual characteristics to be interrelated. They can be assumed to either reinforce or reduce the effect of other contextual characteristics.



(3) SPATIAL SCALE

In consideration of the central features of space – particularly *distance* and *proximity* as well as the *spatial division* – that were first introduced by Simmel (Simmel 2009, 1995) and established in empirically oriented approaches (e.g. Hillmert 2016, Logan 2012), I argue that the spatial structure should be considered when analysing the impact of contextual characteristics on individual outcomes. The overall hypothesis is that the spatial extension of contextual effects on chances to enter vocational and academic training varies in accordance with the underlying mechanisms. In general, the effect of socio-spatial characteristics is expected to decrease with an increasing spatial extension because contextual influences are transmitted either by direct interactions with individuals in the residential area (e.g. peer group influences, social role models, and norms) or by actual, and thus, reachable opportunities.



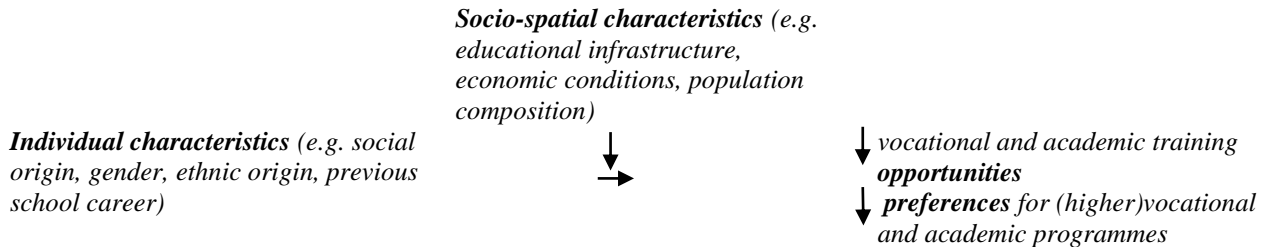
I assume that socio-spatial characteristics influencing the formation of preferences are located in the small-scale residential living area because they are transmitted via interaction (e.g. peer group influences, social role models, and norms). Socio-spatial characteristics that are expected to influence training and study opportunities are located in a commutable spatial range in which opportunities can be physically reached. Hence, the spatial extension of opportunity-based contextual characteristics is expected to be larger than the spatial extension of contextual effects that refer to preferences.

Spatial extension of context relevant for opportunities
 >
Spatial extension of context relevant for preferences

Moreover, the same characteristic can be expected to represent different mechanisms depending on the respective spatial scale (e.g. Poor labour-market conditions can, on the one hand, reduce opportunities in an accessible area, on the other hand, they can create a negative climate in the residential area and discourage adolescents on the basis of interactions with parents, peers or neighbours from applying for particular vocational or educational programmes.).

(4) GROUP-SPECIFIC DIFFERENCES

Research on social inequality and stratification repeatedly revealed that social and ethnic origin, gender, the previous educational career, and other characteristics are of crucial relevance in explaining inequality in educational transition chances (cf. chapter 1.2). Particularly with regard to the possibility of being exposed to specific local conditions and the chance of being mobile (e.g. Sharkey & Faber 2014, Logan 2012, Simmel 1995, Wagner 1989), I expect socio-spatial contextual characteristics to be not equally relevant for different social groups (e.g. Poor labour-market conditions can be particularly relevant for adolescents of lower social origin because they are less likely to afford moving out from the parental home and leave a disadvantageous regional context.).



Considering flexible spatial contexts casts some doubt on the strict and dichotomous separation between micro and macro level, particularly regarding its empirical implementation, the conventional multi-level analysis. The impact of contextual characteristics on educational preferences and opportunities can be expected to have a specific spatial scale or structure. Spatial structuring is based on concepts such as proximity or contiguity that cannot necessarily be reconciled with general multi-level assumptions. I argue that it seems relevant to rethink the strict separation between macro and micro level in terms of both, theory and empirical analyses. I opt for a flexible understanding of context that takes the individuals spatial scope of action into account.

Empirically, the goal is to address these conceptual considerations in the three studies comprising the dissertation at least in part. By taking into account the relation between a regional unit and adjacent units when predicting the chances of transitioning to vocational training, the first study aims at assessing the spatial scale of and interrelation between relevant contexts. The simultaneous and intermediating relevance of different characteristics of contextual settings in flexible spatial extents is analysed with regard to the chance to enrol to university in the second study. In the third study the focus is on a dissection of contextual effects; a regional, a temporal, and a long-term component of the socio-economic context are differentiated. In addition, in the second and third

study a main focus is on group-specific variations of contextual influences.

To facilitate the three empirical studies, specific data is required; on the one hand, information on contexts that allow for a flexible spatial aggregation is necessary, on the other hand, data on individuals' transition behaviour from general school to academic and vocational training is of need.

3 DATA REQUIREMENTS AND DATA STRUCTURE

Although the present research is primarily aimed at analysing the transition to vocational and academic training – particularly to dual training and university education (highlighted in *Figure 3.1*) – it is important to consider the alternatives provided by the educational and vocational training system. In the following, I will briefly describe the German education system and the requirements for data concerning the analyses of educational transitions. The individual data sets that are utilised will be presented. These data sets are combined with geospatial information on socio-structural contexts from administrative sources. Thus, I will describe the regional administrative classification of Germany and provide an overview of the data that are used in the empirical analyses.

3.1 The German education system

Strictly speaking, it is not appropriate to refer to *the* German education system because each of the 16 federal states is responsible for its own specific educational structure. Although there are differences between the 16 systems which represent a topic of ongoing public debates and research (e.g. PISA-Konsortium 2003), there are general and comparable institutional specifications that are relevant for all of the 16 federal states. In general, compulsory schooling is entered

between ages 6 and 7. From the first to the fourth grade – in some federal states up to grade 6 – children attend primary school. Education is – either in the general school system or in a vocational programme in most federal states – compulsory up to the age of 18.

A central characteristic of the German system of general education is early tracking into three different types of secondary schools, usually after elementary schooling. The secondary school tracks are hierarchically structured, and schooling in each of these tracks is completed with a specific school leaving certificate.

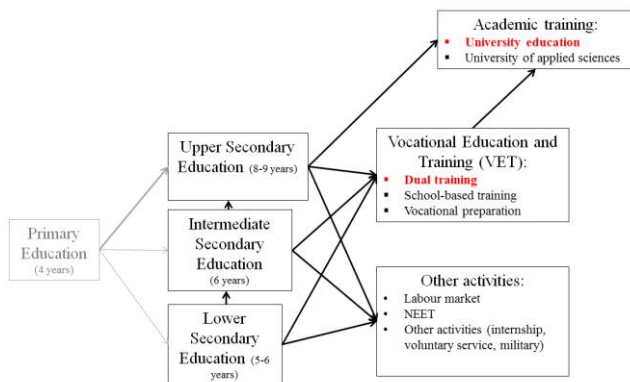


Figure 3.1: Important tracks in the German education system

Degrees are differentiated into a lower-secondary degree (*Hauptschulabschluss*), an intermediate-secondary degree (*Realschulabschluss*), and an upper-secondary degree (*Abitur/Fachabitur*). The available alternatives that follow general compulsory schooling vary considerably with respect to the obtained degree. In principle, all school leavers – even

those who dropped out of school – have the opportunity to enter the vocational training system. Whereas lower- and intermediate-secondary school graduates typically enter vocational training programmes, academic training programmes can be attended by upper-secondary school graduates only, although upper-secondary school graduates' participation in VET-programmes has increased over the last decades (Kleinert & Jacob 2013, *Study 3* in this dissertation). The German VET-system is well-developed and offers a variety of training programmes. It can be divided into full-qualifying and partial or non-qualifying (transition system) training courses. The full-qualifying vocational training tracks are subdivided into full-time school-based training (*vollzeitschulische Ausbildung*) and apprenticeships in the dual system (*duale Ausbildung*). The latter one integrates work-based and school-based learning. In the dual system, employers play an important role because they decide which applicant to recruit for an apprenticeship. Full-time school-based training provides the possibility to obtain a vocational qualification without on-the-job-training. Compared with the dual system, it is much more strongly subject to institutional specifications. An intermediate school degree often represents the minimum requirement for entering school-based training (Dobischat 2010). Further differences between the two full-qualifying training opportunities exist with respect to the occupations that can be learned. Whereas industrial, technical, and commercial occupations are more likely to be trained in the dual system (male-dominated occupations), care and

healthcare professions (female-dominated occupations) are more strongly represented in the full-time school-based training. In addition to the full-qualifying training options, the German VET-system offers several vocational preparation tracks within the framework of the so-called transition system (BMBF 2011: 40). The courses usually last for 1 or 2 years and do not lead to a vocational qualification; instead, the transition measures prepare individuals to start vocational training. They are implemented to bridge the gap for those school leavers who could not obtain a vocational training position and to improve the educational standards of unsuccessful applicants. In fact, the participation rates have been declining since 2006, but the general high share of youths in the transition system remains a problematic and controversial issue of the VET-system (Severing 2010, Baethge, Solga & Wieck 2007). Beyond vocational training, all school leavers except those with the *Abitur* have the opportunity to attend further general schooling. In general, *Abitur* is required to enter the higher or tertiary education programmes. A person with a vocational certificate at the level of a master craftsman or similar with a particular amount of work experience has the opportunity to enrol for university in specific academic fields (Kultusministerkonferenz 2009).

In Germany, there are around 387 higher education institutions that are identified as universities (*Universitäten*), universities of applied sciences (*Fachhochschulen*), or universities of art or music (*Kunst- und Musikhochschulen*).

Whereas the 110 universities offer a broad range of disciplines, aim at a theoretical and research-based education, and have the right to confer doctoral degrees, the 220 universities of applied sciences offer more practice-oriented training and concentrate on specific disciplines (Hochschulrektorenkonferenz 2016).

Another option that generally stands open to all school graduates is entering the labour market directly after general schooling without any vocational or academic qualification. Empirical evidence shows that this choice is rather unlikely particularly due to the well-established VET-system (BMBF 2012).

3.2 Individual-level data

A central concern of this dissertation is the collection, selection, and preparation of data that are appropriate for the analytical purposes. *First*, the data should be based on personal surveys to cover individual decisions and transitions in the education system. *Second*, a data set that is utilised to analyse educational pathways should contain comprehensive information about the education system and should differentiate precisely between educational tracks and programmes (cf. above). *Third*, the data need to be longitudinal to capture the educational transitioning processes across the life course, thus either retrospective information or panel data are required. A *fourth* issue concerns the integration of socio-spatial contextual characteristics; the individual data set must contain substantive information about the local residential context and geospatial information about these residential contexts to flexibly operate with spatial units. If this is not the case, at least information about the place of residence (e.g. administrative district codes, postal codes) should be provided. These would allow individual data to be combined with administrative and geospatial information from commercial and administrative sources. Moreover, residential information – particularly when working with retrospective survey data – is required for specific stages in the life course – and not only for the time of the interview. In the present case, residential information

must be available specifically for the time during which the respondents completed their secondary school and made decisions about their further vocational or academic education. *Fifth*, detailed information about individual characteristics (e.g. social and ethnic origin, gender) and information about individuals' previous school careers are needed.

Two individual data sets that meet the described requirements for the case of Germany as far as possible are the German Socioeconomic Panel Study (GSOEP)¹¹ and the National Educational Panel Study-Starting Cohort 6-Adults (NEPS-SC6)¹² (Blossfeld, Roßbach & von Maurice 2011). Both data sets are utilised in the following empirical analyses.

The GSOEP is a panel study that has been surveying private households since 1984. The survey provides information about households and individuals. Household members aged 17 and older are directly interviewed on a yearly basis. In addition, information about other household members (e.g. younger children, disabled persons) are captured indirectly. The study collects information about living conditions, the

11 Socio-Economic Panel Study (SOEP), 1984-2012, version 29, doi:10.5684/soep.v29

12 This dissertation uses data from the National Educational Panel Study (NEPS): Starting Cohort Adults, doi:10.5157/NEPS:SC6:5.1.0. From 2008 to 2013, NEPS data was 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.

economic situations of individuals and households, and the educational careers of individuals. It also contains information about values and attitudes. The main questionnaire is a yearly standardised instrument for individuals and households that focuses on the current living situation. A biographical questionnaire is additionally administered once during the first interview. Individual biographies up to the date of the first interview are recorded. For the present analyses, the so-called youth questionnaire is particularly relevant. Since 2000, young adults residing in households that are part of the survey have been interviewed about their school career and career plans as a part of this special youth questionnaire. They are first interviewed at the age of 16 or 17 (Schupp & Frühling 2007: 149ff.). Between the ages of 15 and 17, adolescents in lower- and intermediate-secondary school usually graduate from school. In combination with the survey that is conducted yearly, the youth questionnaire provides precise information about the school track and school performance. The panel structure enables researchers to track participants' educational careers in subsequent years. Information about the familial context is of high quality in the GSOEP, as this information is not (only) given by the school graduates because the parents or at least the household members are also part of the GSOEP. A drawback of the GSOEP is the difficulty in distinguishing precisely between the different vocational programmes because the categories are rather broad. Also, drop outs and training changes throughout the year are not necessarily

observable because the survey takes place only on a yearly basis and does not capture participants' exact training status for the entire observation from 2000 to 2012. These issues have been improved and recent panel waves are suitable for analyses on participation in vocational training.

Respondents cannot be directly localised via addresses or geocodes, but the GSOEP provides opportunities to include information about local and regional contexts. For each respondent in the data set, an area code (e.g. administrative district code or postal code) on the different levels of territorial aggregation is available.¹³ This makes it possible to link information about regional or local contexts with the GSOEP. In addition, the GSOEP contains a selection of information about regional and local contextual characteristics.

The only regional information available via download is the federal state that the respondents live in. Due to data protection guidelines, smaller levels of aggregation (e.g. administrative units, municipalities, and postal codes) are available only via online access or at the Research Data Center at DIW (German Institute for Economic Research), the research institute that hosts the GSOEP. In the first empirical study, it is made use of this opportunity and data on the level of administrative districts are linked with individual survey data from the GSOEP.

¹³ For an overview of the administrative structure of Germany, see the following chapter.

Particularly in the third empirical study the focus is on the relation between regional and temporal contextual conditions in terms of educational chances. Therefore, a longer time series was needed. Regional information for an observation period that ranged from 1986 to 2011 (*Study 2*) and from 1975 to 2010 (*Study 3*) were linked to the individual data of the NEPS-SC6. NEPS-SC6 is a retrospective questionnaire of adults that provides extensive information about educational and occupational pathways and transitions across the life course. At the time of the interview, the respondents are between 18 and 65 years of age. The NEPS study focuses particularly on educational activities (*for an overview of the complete anthology: Blossfeld, Roßbach & von Maurice 2011*), and therefore, the categories in the educational variables are very precise. The retrospective data structure enables NEPS to capture changes in status and the duration of episodes across the life course on a monthly basis. The first wave of the adult survey was conducted in 2007/2008 by the Institute for Employment Research (IAB) under the title *Working and Learning in a Changing World (ALWA)*. The adult survey continued to be carried out within the framework of NEPS from 2009 onwards. Until now, there have been five survey waves of which three waves contain retrospective information. Two waves are panel waves.

Study 2 and *3* in this dissertation use the waves from 2007/2008 (ALWA), 2009/2010, and 2012/2013. The NEPS-SC6 contains retrospective information about the residential history of the respondents. This information enables

researchers to link contextual information not only to the place of residence at the time of the interview but also to places of residence at specific points across the respondents' life course. Contextual characteristics are linked to the place of residence where respondents lived when they graduated from general school. The residential history information is available only for the first wave. For the other two waves, the location of the school is available and is used instead. In the second study, information on the regional level of municipalities is linked to the NEPS-SC6. In the third study administrative district codes are utilised. Smaller territorial units are not available within the NEPS.

3.3 The German regional administrative structure

The contextual data that is utilised in the three empirical studies comprising the dissertation is originated from administrative sources and organised according to Germany's regional administrative structure.

Municipalities or communities represent the lowest level of regional administrative units. They correspond with the international classification of LAU-2 (local administrative units) set up by Eurostat. Municipalities differ significantly in size and population. At the end of 2011, there were 11,366 municipalities in Germany of which the most populated one was the city of Berlin, with more than 3.4 million inhabitants. The least populated municipality in 2011 was Gröde (on the island of Pellworm in Schleswig-Holstein) with 5 inhabitants (Eurostat 2014, BBSR 2013).

Administrative districts (*Kreise/Landkreise*) comprise an intermediate level of administrative units between the level of states (*Länder*) and the level of municipal districts (*Gemeinden*). They correspond to the administrative units of NUTS-3 (*Nomenclature of Territorial Units for Statistics*). At the end of 2011, the total number of districts was 402, of which 295 were rural areas (*Landkreise*) and 107 were independent cities (*kreisfreie Städte*). Again, the number of inhabitants varies greatly between approximately 50,000 (*Landkreis Lüchow-Dannenberg*) up to 1.1 million (*Region Hannover*) for rural areas and between 33,800 (*Zweibrücken*)

and 3.5 million (*Berlin*) for cities. The largest territorial units in the administrative classification are federal states. A number of the (larger) federal states are also subdivided into governmental districts. For an overview of the administrative structure see *Figure 3.2*.

Administrative units have a number sequence for identification; the so-called municipality key (*Amtlicher Gemeindeschlüssel*), which consists of eight digits. The first two digits identify the federal state. The third number is designated to the governmental district, and the fourth and fifth number identify the administrative district. The last four digits represent the municipality.

Apart from the administration-based system, several alternative classifications have been developed for analytical purposes. These include labour-market regions, classifications of rural and urban areas, or economic centres (cf. BBSR 2013). These regional concepts are often based on empirical quantities such as commuter flows and economic activities. Some of them follow administrative borders, whereas others overlap but do not directly match the official structures.

Smaller levels of aggregations such as postal codes are conceptualised by the company *Deutsche Post* and are therefore not part of the administrative structure.¹⁴

¹⁴ For a more detailed overview, see Hillmert, Hartung & Weßling 2016.

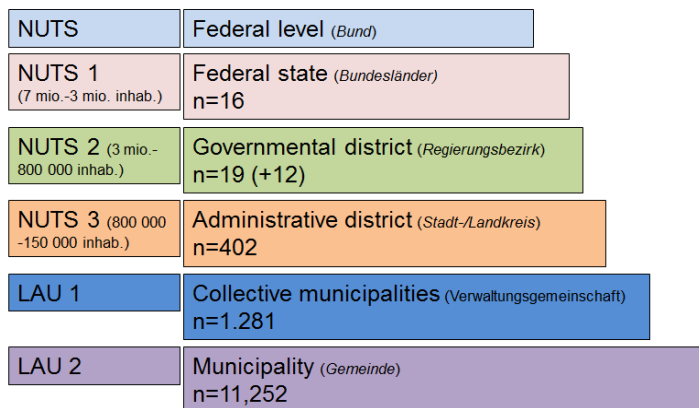


Figure 3.2: Administrative regional classification (Hillmert, Hartung & Weßling 2016)¹⁵

¹⁵ The local and regional European classification system by Eurostat, NUTS: Nomenclature des unites territoriales statistiques, LAU: local administrative unit.

3.4 Context-level data

Contextual data that are used in the analyses of the present dissertation are collected and prepared from various administrative sources. For an overview of the data sources, see *Table 3.1*. The utilised data sets contain information about the educational infrastructure, the composition of the population, and the socio-economic structure. All information is collected and prepared either at the level of municipalities or administrative districts.

Information about the university infrastructure is collected for all German universities and aggregated on the level of municipalities (LAU-2). This is particularly relevant when a municipality (e.g. Berlin, München) hosts more than one university.

Table 3.1 Socio-spatial contextual characteristics

Data source	Information	Time frame	Admin. unit
Federal Statistical Office (GENESIS online, kommunale Bildungsdatenbank)	▪ Number of universities	1986-2011	LAU-2
	▪ Age-specific population	1975-2010 & 1999-2012	NUTS-3
German Council of Science and Humanities	▪ Fields of study	1986-2011	LAU-2
BBSR ¹⁶	▪ School leaver cohorts	1986-2011	LAU-2
Federal Employment Office & BBSR	Unemployment	1975-2010 & 1999-2012	NUTS-3
Federal Agency for Cartography and Geodesy	Georeferenced area codes	2011	NUTS-3, LAU-2

To capture the long observation periods in the three empirical studies that allow for comparisons between cohorts and for capturing developments over time, the contextual characteristics are prepared in time-series format. This presents difficulties because area codes (e.g. administrative district or municipality code) can change over time. Moreover, area codes in surveys are quite often only available

¹⁶ Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR)

for one particular territorial status. In the NEPS, they are available only for the territorial status of the year 2003. For instance, when a respondent provides information about where s/he lived in 1975, then the area code available in the NEPS corresponds to the area's territorial status in 2003. Territorial reforms in terms of a merger or dissolution of municipalities or districts due to population developments or regional restructuring occur quite often. This can cause various problems in the preparation of consistent regional time series data sets (Weßling & Wicht 2015, BBSR 2013, 2011).

Each municipality and each district can be spatially represented on a map by making use of their respective geocodes. Geocodes are also necessary to apply spatial analysis techniques and GIS-applications. Georeferences for territorial units are provided by the Federal Agency for Cartography and Geodesy. The georeferences allow for a flexible aggregation of administrative units.

Information on the level of municipalities and administrative districts is linked to data from the NEPS and the GSOEP. The information originates from several sources and represent socio-economic information on the local context (e.g. unemployment), information on the local educational infrastructure (e.g. number of universities), and compositional information on the population (e.g. age-specific population). This information on socio-structural and socio-economic contexts is prepared in time-series format, moreover they are

flexibly aggregated to allow to test the overall hypotheses illustrated in chapter 2.4.

The second part of the dissertation consists of three empirical studies. All three pursue the goal to analyse *how* and *where* socio-spatial contextual characteristics impact the transitioning process from school to vocational and academic training. In *Table 3.2* an overview of the utilisation of context and survey information in the three empirical studies is provided. Moreover, the table summarises the respective central research focus, hypotheses, and methods that will be discussed in detail in the subsequent empirical part.

Table 3.2: Overview of the three studies comprising the dissertation

	Study 1: Spatial structure and transitions to VET	Study 2: Spatial structure and transitions to higher education	Study 3: Decomposition of unemployment
Research focus	Impact of socio-spatial conditions (unemployment) on transition to VET, focus on spatial structure and spatial extension of effect	Impact of socio-spatial conditions (education infrastructure and unemployment) on transition to university and on chance to study in home region	Impact socio-spatial conditions (unemployment) on transitions to VET and employment, focus on decomposition of unemployment
Central hypotheses	(1) Mechanisms, (2) Interrelation of contexts, (3) Spatial scale	(1) Mechanisms, (2) Interrelation of contexts, (3) Spatial scale, (4) Group-specific variations	(1) Mechanisms, (2) Interrelation of contexts, (4) Group-specific variations
Observation period	1999-2012	1986-2011	1975-2010
Individual data source	SOEP (v29)	NEPS SC6:5.1.0	NEPS SC6:5.1.0
Contextual data source	Federal Employment Office, Federal Statistical Office, Federal Agency for Cartography and Geodesy, BBSR	Federal Employment Office, Federal Statistical Office, Federal Agency for Cartography and Geodesy, BBSR, German Council of Science and Humanities	Federal Employment Office, Federal Statistical Office, Federal Agency for Cartography and Geodesy, BBSR
(lowest) Level of aggregation	Administrative districts, NUTS-3	Municipalities, LAU-2	Administrative districts, NUTS3
Methods	<ul style="list-style-type: none"> ▪ Spatial-weighting matrix ▪ Discrete event history model 	<ul style="list-style-type: none"> ▪ Confirmatory factor analysis (CFA) ▪ Calculation of travel time matrices ▪ Discrete-time event history model ▪ Logistic regression model 	<ul style="list-style-type: none"> ▪ Linear regression model (decomposition) ▪ Discrete-time event history model ▪ Event history model
Dep. variable(s)	Transition to VET within 4 years after lower or intermediate secondary school	(1) Transition to university within 6 years after graduation from upper-sec. school (2) Attending university in home region	(1) Transition from school to VET (1 st transition) (2) Transition from VET to labour market (2 nd transition)
Main indep. variable(s) of interest	<ul style="list-style-type: none"> ▪ Unemployment rate (in the home, 1st and 2nd neighbouring districts) 	<ul style="list-style-type: none"> ▪ Supply with higher education infrastructure ▪ Traditional university climate ▪ Unemployment rate 	<ul style="list-style-type: none"> ▪ Decomposed unemployment components (typical regional situation (comp.2), temporal trend (comp.3)) ▪ Changes in age-specific population
Sample size	<ul style="list-style-type: none"> ▪ n (persons) = 2,144, N (person years) = 3,970, Events = 1,286 	<ul style="list-style-type: none"> ▪ Transition to university: n (persons) = 1,792, N (person years) = 3,380, Events = 1,037 ▪ Study in home region: n (persons) = 954, Events = 489 	<ul style="list-style-type: none"> ▪ 1st transition: n (persons) = 5,640, N (person years) = 18,457, Events = 2,781 ▪ 2nd transition: n (persons) = 2,696

B. EMPIRICAL STUDIES

4 STUDY 1 – SPATIAL STRUCTURE COUNTS: THE RELEVANCE OF REGIONAL LABOUR-MARKET CONDITIONS FOR EDUCATIONAL TRANSITIONS TO DUAL TRAINING¹⁷

4.1 Introduction

Acquiring vocational qualifications is a central determinant for individual life chances in many contemporary societies. Vocational training opportunities are provided and shaped by the structure of the specific education and training system. In research on school-to-work transitions a great deal of attention is given to questions that deal with differential chances of entering VET. It is well-known that social contexts in which individuals are embedded have a strong impact on educational decision-making behaviour and actual transition chances. Contexts that are known to have an impact in these terms are families, classrooms or schools, but educational differences between individuals even exist when these conditions are comparable. An additional source of

¹⁷ This study is the result of collaborative work together with Andreas Hartung and Steffen Hillmert and published under: Weßling, Katarina, Hartung, Andreas & Steffen Hillmert (2015): *Spatial Structure Counts. The Relevance of Regional Labour-market Conditions for Educational Transitions after Compulsory Schooling*. In: Empirical Research in Vocational Education and Training 7(12):1–20.

explanation for these disparities can be varying regional context conditions representing, e.g. the local labour-market situation. This paper focuses on the relevance of regional labour-market conditions for transitions to vocational training. We address two main conceptual issues and illustrate them empirically for the case of Germany: *First*, previous research argues that high unemployment discourages young adults from entering the labour market but encourages them to extend their general educational career instead. It is, so far, an open question if this assumption holds true for transitions from school to vocational training. In countries with well-developed apprenticeship programmes and a strong linkage between training and labour market (e.g. Germany, the Netherlands, Switzerland) this question is highly relevant. *Second*, we focus on conceptualising *local* labour markets in terms of their spatial extension. The crucial question here is: *Where* is the regional labour market *located* that is assumed to influence young adults' chances of obtaining a training position?

The paper is structured as follows; In the second section, post-compulsory education and training alternatives in Germany are illustrated. In section three we provide a literature review focusing on disparities in education and training chances and the impact of local labour markets. Subsequently, we describe our theoretical model that combines a flexible spatial concept with models on educational transition chances. We further explicate how we

prepare aggregated time-series data on labour-market conditions in administrative districts and neighbouring and surrounding districts. The time-series data is merged with individual panel data of the German Socio-Economic Panel Study (GSOEP). We then discuss descriptive findings and analytical results. In our conclusion we draw attention to practical implications following our results and to potentials for further research.

4.2 Education and training alternatives after compulsory schooling

The German VET-system offers a well-developed apprenticeship programme with strongly emphasising on-the-job experiences in the so called dual system. The dual training is the most important track for obtaining an occupational qualification in Germany: In 2011, 57% of an age cohort started training in the dual system (Statistisches Bundesamt 2013: 8). Beyond that, the VET-system offers school-based training programmes in specific occupations. These two full-qualifying training programmes usually last for 2 to 3.5 years and lead to specific occupational qualifications. In addition to the full-qualifying opportunities, the German VET-system offers several preparatory tracks (BMBF 2012: 40). These courses are aimed to bridge the gap for unsuccessful

applicants to improve their level of educational qualification. Beyond vocational training opportunities, all school leavers – except those with the highest possible school-leaving certificate (*Abitur*) – have the opportunity to attend further general schooling. Another option is to enter the labour market directly without any vocational qualification. Due to the strongly developed VET-system and the obligation to stay in education up to a certain age this decision is rather unlikely in Germany.

Chances of entering one of the possible educational alternatives subsequent to general compulsory schooling vary considerably depending on the previously attended school track. In principle, all school leavers (even dropouts) have the possibility to enter dual training. In the dual system, employers decide the recruiting of apprentices. Hence, access to the dual system results from a bilateral matching process between applicant and employer. With respect to the recruitment mechanisms, entering an apprenticeship is therefore comparable to labour market entry. Compared to the dual system, full-time school-based vocational training is far more subject to institutional specificities: An intermediate school degree often represents the minimum requirement (Dobischat 2010). Due to the strong ties between labour market and dual training, the dual training market and subsequently the entire VET-system is strongly linked to socio-economic characteristics and developments.

4.3 Training prospects and regional socio-economic conditions

Previous research on transitions after compulsory schooling made the following observations: Chances in post-school transitions, especially entering a vocational training track in the dual system, differ strongly according to previous school achievements. But gender differences can also be found along with disparities due to the social and ethnic origin (e.g. BMBF 2012, Bernardi & Requena 2010). These effects are not separate, but are mutually linked to one another: Differences in previous school achievements are strongly influenced by social background (e.g. Beicht 2012, Müller & Haun 1994). These social disparities in the process of educational attainment are usually explained by differences in the parental social status. On the other hand, individual chances of entering vocational training differ considerably due to the familial background even when controlling for previous education (Hupka-Brunner, Sacchi & Stalder 2010), which – following status reproduction assumptions – can be interpreted as secondary effect (Boudon 1974) and a direct influence of social background on educational decisions in the later educational career (Hillmert & Weßling 2014). Beyond that, immigrant youth are to a greater extent concerned with aspects of social origin, especially the large group of migrant

labourers in Germany has a below average educational level. Further independent impacts of immigrant background on training chances are caused by an undersupply of social and cultural capital, e.g. lack of language capital or information on the educational system of the host country (e.g. Kalter 2006).

We argue that regional socio-economic conditions contribute – in addition to, but also interacting with the set of individual aspects – to the explanation of inequality in education and training chances. The competitive pressure in search for a vocational training position has increased in recent years, especially for students with no or lower school certificates (Kleinert & Jacob 2012). Focusing on competition draws attention to macro-level factors that determine the demand of vocational training opportunities, e.g. population development, labour-market conditions and economic characteristics of a region.

Research that explicitly links aspects of education and regional diversity draws upon a long tradition of descriptive studies. The main focus here lies on the infrastructural concentration of educational institutions on the one hand and dimensions of socio-structural composition of the population on the other (Ditton 2008, Eirimbter 1977, Meulemann & Weishaupt 1976). A remarkable body of international economic research has dealt with the role of labour-market expectancies for an investment in (further) general education. In empirical terms, these studies focus on the labour market

entry. The relevance of regional labour-market conditions for an investment in vocational education and training in countries with a strongly developed VET-system remains an open question. In theoretical terms, previous studies argue that investments in education depend on the expected returns to education. These expectancies are shaped by the individual perception of labour-market conditions (Carmeci & Chies 2002, Peraita & Pastor 2000, Betts & McFarland 1995). A central argument for a positive relation between unemployment and the enrolment in further education is that high unemployment tends to discourage young adults from quickly entering the labour market (*discouraged worker effect*; e.g. Micklewright, Pearson & Smith 1990, Raffé & Willms 1989). In that sense, higher education is used as an ‘escape’ from unemployment. This relationship also applies when economic conditions improve: Young adults lack incentives to stay in the general school system and are more likely to enter the labour market (*warehouse hypothesis*; e.g. Walters 1984, Grubb & Lazerson 1982). The majority of studies put forward arguments for a positive impact of (local) unemployment on further general education, empirical evidence is less clear. Studies that make use of aggregated data find a significant impact of local unemployment on participation rates in further general schooling. These studies mainly confirm the assumption of a positive effect (Clark 2011). Research using aggregate data that directly focuses on vocational training provides empirical evidence for regional

differences in participation rates in vocational training depending on regional unemployment and cohort size in Germany (Heineck, Kleinert & Vosseler 2011). Differences in participation rates are particularly visible between East and West Germany (Ulrich 2013). Furthermore, cyclical developments and demographic change have direct impacts on the number of apprenticeship programmes offered by firms (Wolter & Ryan 2011, Muehlemann, Wolter & Wüest 2009).

However, empirical evidence that combines individual micro-data with macro information is less frequent and more ambiguous: Some studies fail to find any influence (Micklewright, Pearson, & Smith 1990), while others find a weak impact of local labour-market conditions on post-secondary participation (Meschi, Swaffield & Vignoles 2011, Rice 1999). Some studies that find an impact also show that the effect of unemployment differs with respect to individual characteristics. Especially low-qualified male graduates are positively influenced to enrol in further education when unemployment is high (Meschi, Swaffield & Vignoles 2011, Rice 1999, Pissarides 1981). A major problem in these studies is that *regional* labour-market conditions are measured on different levels of aggregation – counties, districts or federal states – which makes interpretations and comparisons difficult. So far, it is an only partly resolved issue in social research to adequately conceptualise and determine the spatial extension of contextual settings individuals are embedded in (Weller 2008). This paper aims to contribute to the ongoing

discussions in two ways: First, we analyse the impact of local labour-market conditions for transitions chances to vocational training. Second, by means of spatial analysis techniques our purpose is to assess the geographic extension of this *local* labour market.

4.4 Theoretical considerations

The transition to training is a two-sided process depending on the graduates' educational decisions on the one hand and on the demand for trainees on the training market on the other. With respect to educational decisions we understand the processes of educational attainment as an accumulated result of educational decisions (Mare 1980, Boudon 1974), being based on the evaluation of three crucial factors: costs, utility and (perceived) success probability. This theoretical perspective integrates the motive of status maintenance as a cost-benefit component into a more general framework of rational decision making. Educational inequality with respect to the parents' social status results, to a significant degree, from the wish of retaining this status over generations (Breen & Goldthorpe 1997). The cost-benefit calculation varies by social class origin, so that the subjectively expected utility determines educational decisions and accordant social inequalities. Aggregated socio-economic characteristics, such

as regional unemployment, can additionally affect the perception of costs and benefits (Card & Lemieux 2001). Contextual settings such as local labour-market conditions supplement institutional characteristics that can be understood as a framework defining and limiting the scope of action (Hillmert 2004). Experiencing poor economic conditions diminishes the expected chances of successfully entering the labour market – in our case the training market – and hence the subjectively anticipated benefits of leaving general education.

Independent of the graduates' preferences, the availability of training places may be influenced by the general labour-market situation. Economic fluctuations can have two potential influences on employers' decisions. On the one hand employers might be reluctant to invest in training as their need for additional skilled workers is uncertain and budgets tend to be tight. In times of economic downturns recruitment costs sink, so that even if firms train apprentices instead of employing skilled workers, the latter become relatively more attractive to employers. In both instances, poor labour-market conditions lead to a decreasing demand for apprentices (Wolter & Ryan 2011). These effects primarily refer to economic developments over time but they can in part be assumed to hold true for regional differences, too. In addition to that previous research that directly refers to regional differences could show that firms are less willing to train in

more isolated and poor labour market regions (Muehleemann & Wolter 2011).

To capture this two-folded transition process, we define two mechanisms through which regional unemployment might have an effect on young adults' chances of entering vocational training:

Opportunities: *Effective chances* of beginning a dual training after compulsory schooling are structured by labour-market conditions. Poor labour-market conditions can entail shortages in the demand for trainees. In addition, the number of applicants in an age cohort which is primarily a function of demographic development constitutes another determinant of competition on the training market.

Preferences: *Individual perception* of unemployment influences the evaluation of educational and occupational chances and shapes the perceived returns to education.

Although it is difficult to empirically differentiate between the two mechanisms when only analysing the outcome of an educational transitions, it seems crucial to theoretically distinguish between them as the conceptual differentiation of effects might be one explanation for the contradicting results on the impact of regional unemployment found in the literature.

4.5 Analytical concept and hypotheses

Previous research argues that high unemployment discourages young adults from quickly entering the labour market. By transferring the discussion on the impact of local unemployment on returns to education to an institutional context with a well-developed training system (e.g. Germany, the Netherlands, Switzerland) we expect – regarding this training system – the following general relationship between regional unemployment and post-compulsory educational transitions:

Hypothesis 1a: The higher the level of unemployment in the relevant regional unit(s), the lower the individual chance of entering a vocational training in the dual system compared to other educational alternatives (staying in school, vocational preparation or school-based vocational training).

Regarding the two outlined mechanisms we assume that effects of regional unemployment point in the same direction: The effect for the demand for apprentices refers to the availability of dual training. High unemployment should lead to limitations for employers and subsequently to a shortage in training opportunities. The second effect of unemployment refers to the individual perception of unemployment. High unemployment discourages graduates from starting a dual training and rather keeps students in more general tracks of education (general school or school-based vocational training). Beyond a general hypothesis on the effective

direction, we assume that the impact of regional unemployment is different for different social groups:

Hypothesis 1b: This negative impact of unemployment is higher for drop-outs and school graduates with a lower secondary (Hauptschule) degree compared with an intermediate secondary (Realschule) certificate.

With higher unemployment and fewer training places the competitive pressure in search for training is particularly high for students with no or lower school certificates (Kleinert & Jacob 2012, Hillmert 2001). Therefore, we argue that their chances decrease when higher unemployment is present.

The main aim of this paper is to capture the spatial extension of the impact of these regional labour-market conditions on training chances. It is a typical observation in spatial context research that political borders are often not sufficient to define relevant areas (Hillmert 2016). In particular, research on *the modifiable area unit problem* (MAUP) has shown that the definition of areas affects the results, even when the same variables are analysed (Andersson & Malmberg 2014, Kwan 2012, Fotheringham & Wong 1991). As previous macro-level research suggest that regional training and labour markets differ in size, extension and accessibility, it is appropriate to include spatial measurements such as contiguities as well as commuting or travel time distances (e.g. Sforzi 2012, Heineck, Kleinert, & Vosseler 2011, Eckey, Schwengerl & Türk 2007). Muehlemann and Wolter (2011) for example find evidence for the influence of regional labour-market

conditions on the willingness of employers to train only when regional labour markets are conceptualised on the basis of travel time, but not when taking political borders into account. Therefore, we integrate concepts of spatial analysis (e.g. Elhorst 2014, Anselin 1995) into a conventional analytical model. We try to overcome the fixed limitations of administrative boundaries by constructing *concentric rings* of neighbouring territorial units of NUTS-3-regions (administrative districts (*Kreise*)). To capture the spatial extension of a labour-market region and to analyse *where* unemployment has an influence on the transition to training, we make use of the administrative district where young adults live, as well as the first-order and the second-order neighbouring districts. The spatial units are taken into account separately (see *Figure 4.1*). The neighbouring rings are identified by calculating contiguity matrices (e.g. Drukker, Pruchar & Raciborski 2001) for the 412 (referring to the year 2009) NUTS-3-regions on the basis of geo-referred area codes.

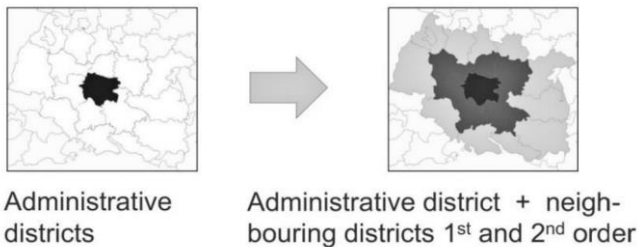


Figure 4.1: Administrative district and 1st and 2nd neighbouring districts

The concentric *ring model* is considered particularly appropriate because it partly rules out the problem of multicollinearity by calculating the context indicators for the surrounding spatial districts, while excluding the already controlled contexts of lower order. This concept enables one to specify the overall effect of the regional contexts as an additive or a mediating effect. For the latter, interaction effects or effect thresholds have to be specified.

Hypothesis 2: The impact of unemployment on chances of entering dual training is higher for the regional unit of residence and the direct neighbouring regional units compared with the impact of the second-order neighbouring regional units.

Regarding the spatial extension of the effect of unemployment it can be argued that the supply of training positions increases continuously: The larger the spatial ring, the more training opportunities available. Focusing on the individual demand for training the accessibility plays an important role. This refers to the spatial structure of job or training search behaviour and commuting distances. From previous research on job search behaviour it is known that workers are willing to accept lower wages in order to avoid additional travel distances (Manning & Petrongolo 2013, Rouwendal 1999). Daily work-related commuting distances in Germany vary according to regional differences, ranging between 15 and over 30 kilometres on average and are steadily increasing (Einig & Pütz 2007). Previous research

shows that regional disparities in the demand for trainees, corresponds with the commuting activity of young adults (Bogai, Seibert, & Wiethölder 2008). In general, it can be assumed that the commuting radius of under-aged workers is more restricted because they need public transport systems. By calculating distance matrices from the centre of every administrative district to the centre of the neighbouring districts we find that the distances are on average about 34 kilometres. Due to the limitation of the search radius by the reachability of training places the demand for training should be higher in closer ranges. Regarding the spatial structure of the impact of local unemployment on training chances we expect the following:

Hypothesis 3: The impact of unemployment in the first- and second-order neighbouring regional units on the chance of entering training in the dual system is higher when unemployment is high in the regional unit of residence.

We argue that the neighbouring rings are of particular relevance when training chances are low in the home district because young adults in search for a training position focus on areas further afield (i.e. the first and second neighbouring rings) when unemployment is high and subsequently chances of entering dual training are low in the close range. We test this hypothesis by introducing interaction terms between the unemployment rates of the different spatial units.

4.6 Data and methods

The *individual-level data* is from the German Socio Economic Panel (GSOEP)¹⁸. The GSOEP is a household panel that has been carried out since 1984. Since 2000 young adults who live in households that are part of the survey are interviewed regarding their school career and career plans as a part of a special youth questionnaire. They are first interviewed at the age of 16 or 17 (Schupp & Fröhling 2007: 149ff.). For the years 2000 to 2012, individual-level data is available for 4,190 young adults containing information on their place of residence which enables us to merge contextual information about the local labour-market situation to the data set. The number of cases is reduced to 2,778 because young adults who are still in school at the time of the interview are excluded. School graduates with the highest school leaving certificate (*Abitur*) are not included in the sample because the focus of this paper lies on educational alternatives after compulsory schooling. This includes the opportunity of further general school attendance as an alternative to an apprenticeship in the dual system. Following our research hypotheses, we argue that attending further schooling represents an opportunity to avoid or postpone the labour market entry in a poor labour-market region. However, the decision situation changes fundamentally once the highest

¹⁸ Socio-Economic Panel Study (SOEP), 1984-2012, version 29, doi:10.5684/soep.v29

school-leaving certificate is obtained. Further schooling does no longer represent an educational option for young adults with *Abitur*. A more practical argument deals with regional mobility behaviour: The majority of lower- and intermediate secondary school graduates is still underage and it is likely that they stay in the local area where they obtained their school leaving certificate, a fact that reduces the complexity of our model. Subsequently the number of cases is reduced to 2,778. The sample is also adjusted with respect to young adults who answered the GSOEP youth questionnaire but not the yearly conducted individual questionnaire and vice versa. Information from both questionnaires is necessary to make use of the panel information. Eventually cases with missing information in the independent variables are excluded. A description of the model variables can be found in *Table A 1* in the appendix.

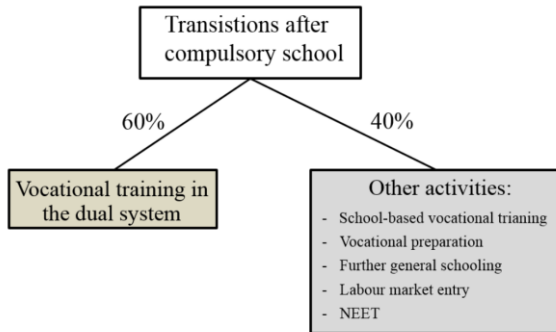


Figure 4.2: Binary outcome variable: Observed transitions from lower and intermediate schooling within the first three years after leaving school. Data: GSOEP, 2012

2,144 individuals (3,970 person years) are available for our analysis. The potential educational alternatives (see *Figure 4.2*) are summarised into a binary variable that differentiates between entering vocational training in the dual system within the first three years after leaving school versus the other educational alternatives. We choose this operationalisation because the impact of socio-economic conditions is assumed to be particularly important for the chances of starting vocational education in the dual training track due to close linkage to the labour market.

Important independent variables on the individual level are school-leaving certificate, gender as well as parents' school qualification and parents' vocational qualification. Immigrant background is also included in the analyses.

The *context data* originates from the *Federal Employment Agency* and the *Federal Statistical Office*, it allows considering labour-market information on the level of NUTS-3-regions (administrative districts (*Kreise*)) from 1999 onwards. Districts are administrative units that consist either of an association of small municipalities or of one larger district town. They vary considerably with regard to the number of inhabitants and their spatial extent, which is why age-specific population is included in our analysis. This measure of population is not only integrated so to capture the differences in population between the districts but also to illustrate the competitive situation on the training market.

The administrative districts can be matched to survey data by district codes. These identifiers change over time due to reforms within the administrative districts (Weßling & Wicht 2015). With an adjusted time, series format, a data set of unemployment rates and age-specific population from 1999 to 2011 on the level of districts is constructed.

A graphical representation of unemployment rates in administrative districts can be seen in *Figure 4.3*. Unemployment rates are displayed in six groups. The illustration shows that overall labour-market conditions were relatively tense during the mid-2000s and eased only in the last years of the observation period. We aim to analyse the impact that these spatial patterns of unemployment have on the transition from school to training.

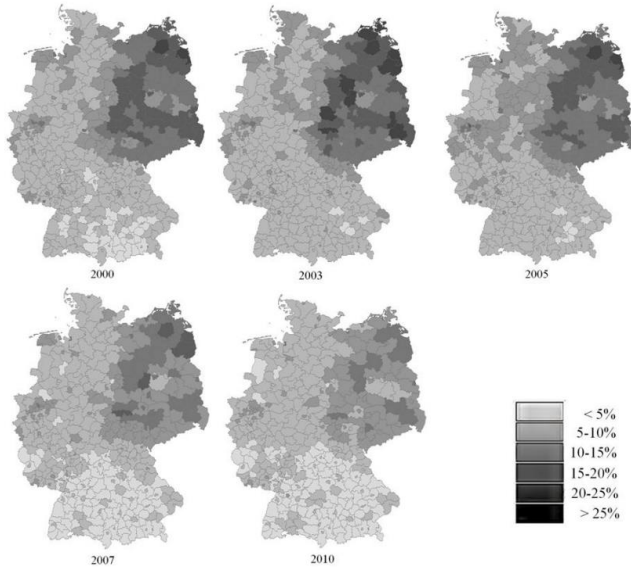


Figure 4.3: District-specific unemployment rate for selected years of the observation period, Data: Federal Employment Office, 2014

As the GSOEP provides only yearly observations and the beginning of vocational training courses is institutionally predefined to take place once a year (in September), we apply a discrete-time survival analysis (Yamaguchi 1991, Allison 1982). Discrete-time survival models treat time not as a continuous variable, but as being divided into discrete units. We analyse transitions using binary logistic regression, focusing on the first three years after leaving lower or intermediate secondary school. The model estimates the probability h_j of entering dual training at a discrete point in

time (t). Unlike in a cross-sectional logit model the discrete time survival model contains a baseline variable $\beta_0(t)$ for the observed time points. Our observation period starts with the year when general schooling ends for the first time and ends after three years. The most important independent variables are the unemployment rate in the home district at the time when the individual graduates from general compulsory schooling ($\beta_a x_j(t)$), the first-order neighbouring ($\beta_b x_j(t)$) districts and the second-order neighbouring districts ($\beta_c x_j(t)$). We include several control variables – e.g. school leaving certificate ($\beta_z x_j(t)$) – in the model.

$$\begin{aligned} \text{logit}[h_j(t)] = \log \left[\frac{h_j(t)}{1-h_j(t)} \right] = & \beta_0(t) + \beta_a x_j(t) + \beta_b x_j(t) + \beta_c x_j(t) + \dots + \beta_z x_j(t) + \\ & \beta_a x_j(t) * \beta_b x_j(t) + \\ & \beta_a x_j(t) * \beta_b x_j(t) * \beta_c x_j(t) + \\ & \beta_a x_j(t) * \beta_z x_j(t) + \beta_b x_j(t) * \beta_z x_j(t) + \\ & \beta_a x_j(t) * \beta_b x_j(t) * \beta_z x_j(t) \end{aligned}$$

A central component of our models are interaction terms: In addition to the additive effects of unemployment, we include

interaction terms between unemployment rates in the home and first neighbouring region and a three-way interaction between home, first and second neighbouring regions. The interaction terms between the unemployment rates on the different regional levels represent the assumption that a specific unemployment situation in the home district changes the effects of unemployment in the first- and second-order neighbouring districts on the chance of entering dual training. In hypotheses *1b* it is assumed that young adults with lower previous school performance are to a larger extent affected by higher unemployment. To test this hypothesis, interactions between the unemployment rates on several regional levels and the school leaving certificates are included. As we observe the individuals repeatedly, the models are calculated with robust standard errors to account for clustering on the individual level. In models with categorical or binary dependent variables, unobserved heterogeneity can be a major problem because the coefficients (and subsequently odds ratios) are not only determined by the relation between the dependent and the independent variables, but also by the variances in the unobserved heterogeneity. This causes problems especially when comparing between different models. As the comparison between models is highly relevant in our analysis, Average Marginal Effects (AMEs) are calculated (cf. Mood 2010). AMEs can be interpreted as the average change in the probability that dual training will be entered if the independent variable increases by one unit,

holding all other independent variables in the model constant. To allow for an adequate interpretation of the interactions effects in the models, we additionally calculate conditional marginal effects and marginal effect plots for continuous predictors (Royston 2013).

4.7 Results and discussion

In model 1 (see *Table 4.1*) the socio-economic situation is controlled by the unemployment rate and the age-specific population in the administrative district. Population is measured as the change in the share of 15 to 18-year-olds between previous and present year. The variable is included to account for population differences between districts but also to capture the age-specific competitive situation. In model 2 and 3 unemployment rates and population in the two surrounding *rings* of neighbouring districts and interactions between unemployment rates on the different spatial levels are included stepwise. In model 4 we calculated interaction effects between unemployment on regional levels and previously attend school tracks.

In the first model we find a highly significant negative effect of unemployment in the home district on the chance of entering dual training. An increase in the unemployment rate in the home district by 1 percentage point decreases the probability of entering an apprenticeship by approximately 1

percent. Also, an increase in the share of age-specific population decreases the training chances of school leavers. These contextual effects exist even when controlling for individual indicators that are known to have an impact on the chances of entering training. This result meets the argument in our first rather general hypothesis: School leavers in regions with higher unemployment have lower chances of finding a position in the dual training system.

Table 4.1: Discrete time event history model for the transition to vocational training in the dual system (observed within the first 3 years after school)

	Model1	Model2	Model3	Model4
Baseline1 year of school leaving (ref. 3 rd year after school)	0.082*** (0.015)	0.082*** (0.018)	0.082*** (0.017)	0.081*** (0.018)
Baseline2 1 st year after school leaving (ref. 3 rd year after school)	0.062** (0.021)	0.062*** (0.024)	0.062*** (0.023)	0.064*** (0.024)
Baseline3 2 nd year after school leaving (ref. 3 rd year after school)	0.015 (0.035)	0.015 (0.039)	0.014 (0.039)	0.017 (0.044)
<i>Unemployment information on regional level(s)</i>				
Unemployment rate (district)	-0.010*** (0.002)	-0.016*** (0.003)	-0.009*** (0.004)	-0.016*** (0.005)
Average unemployment (1 st neighbour districts)		-0.008** (0.004)	-0.017** (0.002)	-0.013** (0.004)
Average unemployment (2 nd neighbour districts)			0.004 (0.001)	
<i>Age-specific population information on regional level(s)</i>				
Change in 15-18 year olds (district)	-0.007*** (0.007)	-0.008** (0.007)	-0.006* (0.004)	-0.007* (0.005)
Change in 15-18 year olds (1 st neighbour district)		-0.004 (0.015)	0.001 (0.016)	0.004 (0.021)
Change in 15-18 year olds (2 nd neighbour district)			-0.008	
Year (1999-2006) (ref. 2007-2011)	-0.019*** (0.023)	-0.019*** (0.022)	-0.014*** (0.022)	-0.017*** (0.022)
Sex (Male)	0.117*** (0.016)	0.119*** (0.016)	0.114*** (0.016)	0.114*** (0.017)
Dropout without certif. (ref. lower sec.)	-0.046* (0.026)	-0.052** (0.027)	-0.055** (0.028)	-0.053** (0.028)
Intermediate secondary certif. (ref. lower sec.)	0.108*** (0.018)	0.107*** (0.017)	0.108*** (0.017)	0.109*** (0.018)
<i>Social and ethnic background information</i>				
Parents have intermediate school degree (ref. no/lower school degree)	0.068*** (0.021)	0.073*** (0.021)	0.078*** (0.021)	0.073*** (0.023)
Parents have university entrance diploma (ref. no/lower school degree)	-0.130*** (0.022)	-0.129*** (0.021)	-0.127*** (0.024)	-0.127*** (0.025)
Parents have vocational training degree (ref. no voc. degree)	0.061*** (0.022)	0.063*** (0.021)	0.058** (0.021)	0.060** (0.022)
Parents have university degree (ref. no voc. degree)	0.002 (0.037)	0.000 (0.040)	-0.001 (0.041)	-0.000 (0.041)
Immigrant background	-0.034*** (0.014)	-0.037** (0.015)	-0.040** (0.014)	-0.034** (0.015)
Unempl. home district * Unempl. 1 st neighb. district		0.001** (0.000)	0.001* (0.001)	0.001** (0.001)
Unempl. home district * Unempl.1 st neighb. * Unempl. 2 nd neighb. district			0.000 (0.001)	
Unempl. home district * dropout				-0.002 (0.001)
Unempl. home district * intermed. school cert.				0.002 (0.002)
Unempl. 1 st neighb. district * dropout				0.011 (0.014)
Unempl. 1 st neighb. district * intermed. school cert.				0.016** (0.005)
Unempl. home district * Unempl.1 st neighb. district * dropout				0.004 (0.022)
Unempl. home district * Unempl.1 st neighb. district * intermed. school cert.				-0.005* (0.002)
(Mc Fadden's) Pseudo R ² / LR	0.1547 / 1726.07	0.1571 / 1783.76	0.1581 / 1794.33	0.1688 / 1810.38
N person years (n persons)	3,970 (2,144)	3,970 (2,144)	3,970 (2,144)	3,970 (2,144)

Data: GSOEP 2012, Federal Employment Office 2014, Federal Statistical Office 2014, own calculations; presented are average marginal effects (AMEs); clustered standard errors in parentheses; significance level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

When including the average level of unemployment measured in the first-order neighbouring districts (model 2), the effect of unemployment in the home district even increases. The average unemployment rate in the adjacent districts also has a significant negative impact on the probability of entering dual training. Beyond controlling for additional effects of the spatial levels we include interactions between the levels to describe a joint effect of regional unemployment. As a single AME is only valid if the covariates are held constant for all cases, it is not possible to simply sum up the interaction coefficients linearly (Norton, Wang, and Ai 2004). To give a precise interpretation, marginal effect plots are calculated. *Figure 4.4* is based on model 2 and shows AMEs for the impact of the average unemployment rate in the first neighbouring districts for specific plausible values of the unemployment rate in the home district. We find that a higher unemployment rate in the home region leads to an increase in the effect of the unemployment rate of the first neighbouring region.

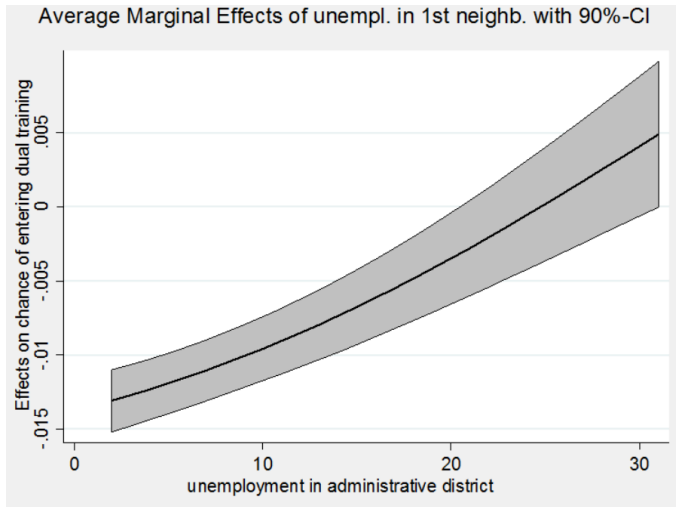


Figure 4.4: AMEs (model 2) of unemployment rate in 1st neighbouring districts on the relative chance of entering dual training for specific values of unemployment in home district (with 90%-CIs), Data: GSOEP, Federal Employment Office, Federal Statistical Office

The observed interaction effect provides clear evidence for a variation in the search radius for dual training with respect to varying contextual conditions: In line with our third hypothesis we find that the impact of local unemployment in the home district is moderated by the unemployment rate in the neighbouring ring of districts. The higher the unemployment in the home district the more positive the effect of unemployment in the neighbouring districts. The effect of unemployment of the first neighbouring districts becomes insignificant when the unemployment rate in the home district exceeds 20 percent. It can be argued that the observed interaction effect refers to the discouragement of

young adults: When unemployment is increasing in their own region, the effect of unemployment in their surroundings is decreasing because educational alternatives – alternatives to an apprenticeship in the dual system – become more and more relevant. In addition, districts with unemployment rates higher than 20 percent – within the observation period between 1999 and 2011 – are found exclusively in East-Germany. Due to a low population density these districts are often larger than districts in West-Germany. In these large and rather rural districts with high rates of unemployment the commuting distances can be considered very large, so that, again, rather than finding a training position in the home district young adults opt for other educational alternatives, e.g. school-based vocational training, or further general schooling.

In a next step controls for unemployment in the second-order neighbouring district and a three-way interaction between unemployment in home district and first and second neighbouring ring are included in model 3 to further explore the spatial structure of the unemployment effect. This specification represents the idea of a stepwise extension of the search radius for a training position when the conditions in the close-range area are poor. While results for the home, the first neighbouring districts and the interaction between them remain almost unchanged compared with model 2, we find that the second neighbouring level does not provide significant results (*Figure 4.5*). Changes in the unemployment rate in home or first-order neighbouring districts do not

impact the influence of unemployment in the second-order neighbouring districts on the relative chance of entering dual training. The conditional effects are almost zero and not significant. The spatial extension that impacts on the transition chances seems to be on average limited to the home and the direct neighbouring districts. Unemployment in further remote areas has no impact on the transition to training.

Beyond unemployment effects we find negative effects of the population variable for the home district. We argue that an increasing number of young adults of the same age increases the competitive pressure and decreases training chances. Also, we find significant effect for the time variable. This can be interpreted as additional indirect evidence for the importance of the macro-economic situation for individual chances of entering training.

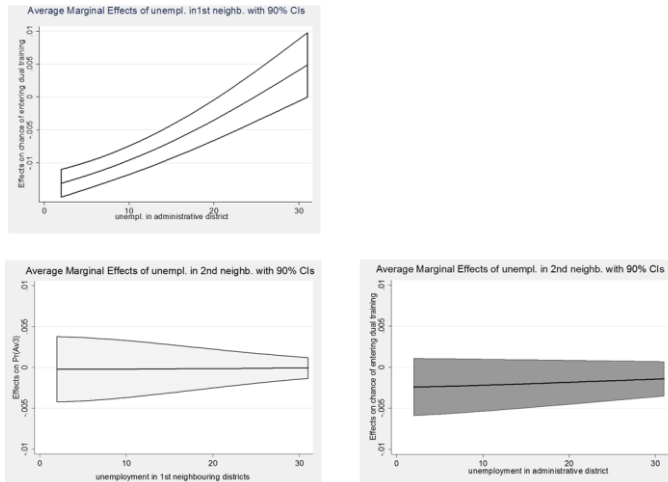


Figure 4.5: AMEs (model 3) of unemployment rate in the 2nd neighbouring districts on the chance of entering dual training for specific values of unemployment rate in home district (left) and 1st neighbour districts (right) (with 90%-CIs), Data: GSOEP, Federal Employment Office, Federal Statistical Office

One explanation for the time effect is the general relaxation of the labour and training market in recent years. These cyclical trends lead to an increasing total net supply of training positions (BMBF 2012). The time effect remains significant even when controlling for unemployment on several levels, suggesting that there might be more indicators than just regional unemployment as predictors for the economic situation.

With respect to the individual control variables the findings are consistent with previous research: Chances of entering dual training are considerably higher for graduates with an intermediate certificate compared with a lower secondary

certificate. Dropouts have the lowest chances of entering an apprenticeship programme. We find that school leavers of immigrant origin have lower chances of entering dual training. In line with the argument of status reproduction we find that chances are higher when parents have an intermediate school certificate and are at occupational qualification level. In our second hypothesis we argue that the impact of unemployment on the chance of obtaining a training position is not equal to these personal variables. Especially young adults with low or no school certificates are expected to be more strongly influenced by poor regional conditions. Model 4 includes interaction effects between unemployment rates and school leaving certificates.

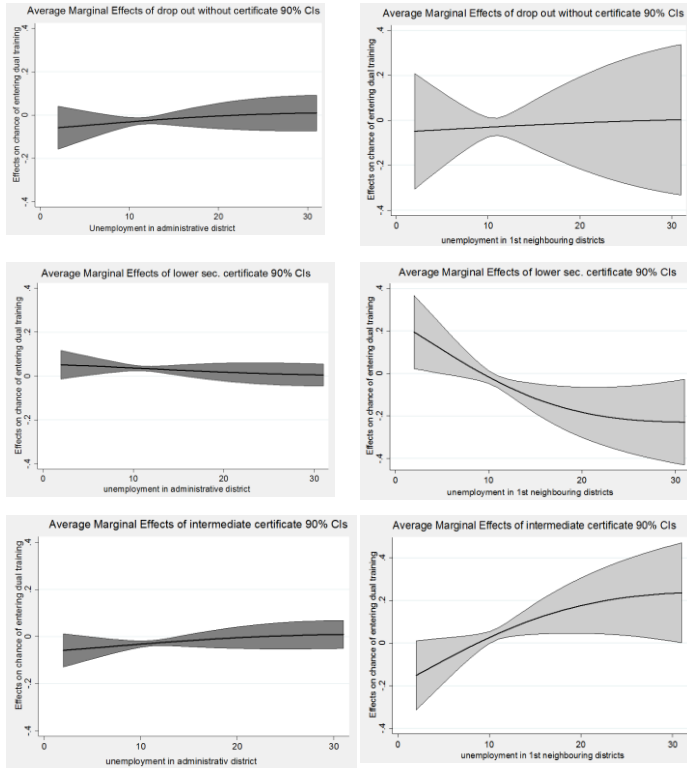


Figure 4.6: AMEs (model 4) of school leaving certificate (drop out without certificate (first row), lower secondary certificate (second row), intermediate secondary certificate (third row)) for specific values of unemployment in the home and the 1st neighbouring districts (with 90%-CIs), Data: GSOEP, Federal Employment Office, Federal Statistical Office

As our results on the relevant spatial extension of the socio-economic context indicate that the second-order neighbouring districts have no impact on training chances, model 4 only focuses on home and first-order neighbouring districts. To illustrate the results, we provided marginal effect plots for the three different types of school leavers – dropouts and graduates with lower or intermediate secondary degree – for specific values of unemployment in home and first neighbouring districts (see *Figure 4.6*). Unemployment rates in the neighbouring districts especially interact with school leaving certificates. While graduates with lower secondary (*Hauptschule*) certificates experience decreasing chances with increasing unemployment in adjacent districts, intermediate (*Realschule*) graduates' relative chances to enter dual training increase with higher unemployment. The interaction between school certificates and the unemployment rate in the home district point in the same direction but are weaker. Contrary to our expectations we do not find these effects for dropouts. Potential explanations are that catching up on a school qualification is the most important educational alternative for dropouts and direct transitions to training are generally highly unlikely. Results could also be underestimated due to the small number of cases in this category. As expected students with lower certificates are negatively influenced by high unemployment on regional level(s) and intermediate graduates have comparably better chances when unemployment is high. We argue that shortages in dual training opportunities are caused by poor economic

conditions in the region that lead to increased competitive pressure for training positions. Lower qualified students are particularly affected by this.

4.8 Conclusion

On the basis of contiguity matrices, we calculated concentric rings of administrative districts to illustrate the contextual radius that impacts young adults' vocational training chances. We have applied this flexible concept of spatial modelling to analyse the impact of unemployment on transitions to dual training after lower and intermediate secondary schooling in Germany. In terms of the educational outcome we could show that it is not sufficient to only focus on the political districts where youngsters live in. Regional unemployment on several levels of aggregation – district and neighbouring districts – has a negative impact on the chance of entering the dual system. Our findings clearly suggest that it is promising to take the spatial structure of indicators that are assumed to influence individual life events into account. We find that fixed administrative units, e.g. the districts where the respondents live do not adequately represent the spatial context where unemployment effects on the transitions to training should be measured. The radius in which labour-market conditions influence training chances includes the home district as well as the directly adjacent districts. In

contrast to this, the second-order neighbouring districts seem to be too remote to affect transition chances.

Moreover, the spatial units interact with one another; the higher the unemployment rate in the home district the lower the impact of unemployment in the surrounding districts. This finding can be interpreted as a reduction of the search radius when unemployment is high in the close-range area, which can be traced back to the discouragement of young adults in search for vocational training: Due to the poor economic situation in a region and the insufficient provision of training places, school graduates' rather opt for educational and vocational alternatives (e.g. school-based training or further schooling), instead of extending their search radius. Also, we see that regional unemployment increases the competitive pressure among training applicants, which leads to lower chances for low-qualified graduates when unemployment on the regional level(s) is high.

Especially with respect to the fact that the transition to vocational training in the dual system is a two-folded process including both applicants' and employers' decisions, additional research steps should engage in disentangling the two sides of the decision-making process: It is known that the (regional) economic situation has an impact on employers' needs for apprentices. But rather than on the impact of contexts on employers' willingness to train, our focus is on the decision-making process of young school leavers and on the question of how and where contextual settings influence these decision and transition processes. It is argued that

graduates' educational decisions – their evaluation of success probability, costs and benefits – are shaped in a rather close-range by peers, parents and neighbours etc. Moreover, the perception of labour-market chances is influenced by media coverage, which can be located in a rather wide spatial range. The provision of training places, on the other hand, is located in a commutable area. We argue that the two sides of the assumed effects point in the same direction and we can generally confirm that higher local unemployment leads to lower transition chances. Focusing on the impact of regional labour-market conditions on school graduates' aspirations and wishes before the actual transition takes place is one way of separating supply- from demand-side effects. This would further explain the effect that contextual settings have on individuals' transitions to vocational training.

Another issue for future research is to analyse to what extent unemployment effects can be traced back to cyclical fluctuations rather than structural differences between regions (see *Study 3*). While controlling for the regional conditions we still find that the time in which a transition takes place influences training chances. This finding suggests that there are not only regionally effects but also temporally distributed effects of demand and supply. Moreover, direct effects of unemployment on individual transitions can be assumed to have greater relevance with the approaching individual labour-market entry. This implies that increased attention should be given to the consequences of labour-market

conditions when studying the labour-market entry of adolescents finishing VET, also in terms of spatial patterns.

To conclude, the spatial reference of contextual characteristics is a relevant subject for sociological research that has so far received little attention. Our results implicate that research on the impact of contextual settings on individual life events should not be limited to a fixed structure of proximate contexts. It is of relevance to theoretically raise and discuss the question of *where* to locate a relevant contextual setting with respect to the theoretical mechanisms. It seems useful to empirically overcome spatial limitations of fixed aggregation units by introducing advanced spatial measurement techniques and adequate data sources. Practically, our results implicate that training advertisements and the allocation of supply and demand of training positions can and should not be limited to individual requirements and administrative structures but should instead be much more tailored to specific local situations.

5 STUDY 2 – TRANSITIONS TO UNIVERSITY EDUCATION: HOW MUCH AND FOR WHOM DOES SPATIAL CONTEXT MATTER?¹⁹

5.1 Introduction

Among the most important individual outcomes in contemporary societies are access to education and the completion of an educational career. Inequality of educational opportunities has theoretically and empirically been widely examined. Individuals are embedded in various contexts that are known to be of relevance for educational opportunities.

Local or regional contexts, e.g. neighbourhoods, cities, or countries, are not equal regarding their socio-economic structure. The selection of individuals into particular contexts is consequential as it can affect individual action and life chances. A large body of research shows that central spheres of life such as health outcomes, criminal activity, but also educational and occupational chances are affected by the residential contexts (e.g. Ellen & Turner 1997, Mayer & Jencks 1989).

¹⁹ Parts of this study are the result of collaborative work together with Nora Bechler and are under review at *Higher Education*.

Effects of residential contexts can be assumed to refer to a specific spatial structuring (Sharkey & Faber 2014). Theoretically, it can be argued that the spatial reference of a contextual effect depends upon the social mechanism(s) through which local context conditions operate. Empirically, very little is known about the relation between the geographic scale of residential contexts and individual outcomes; research that explicitly links geographical applications with established sociological research is scarce. We even find that existing research on the impact of local socio-structural characteristics often points in different directions. One explanation for ambiguous findings could be in the conceptualisation of local contexts. Due to data availability analyses are predominantly limited to administrative units (e.g. zip-code areas, administrative districts or federal states), which makes comparison difficult.

The aim of this paper is to rule out some of these problems by investigate the relation between socio-spatial context characteristics and transitioning processes to university. We focus on the transition from upper-secondary school to university and on the decision to move versus studying in the home region that is associated with the transition to university. Information on labour-market conditions and the university infrastructure in the local context is flexibly aggregated to illustrate the spatial extension of contextual effects.

5.2 The German system of general and higher education

We utilise the case of Germany as the education system is an interesting case. The strongly developed VET-system provides relevant alternatives to studying at a university and it can be assumed that choosing between training and studying is particularly subject to structural and economic conditions in the residential context.

Education in Germany is organised in a federal system, with each of the 16 federal states responsible for specifying the educational structure in their respective states. A common characteristic of most federal states is early tracking into different types of secondary schools, typically after four years of elementary school. These secondary school types are hierarchically structured. In most cases, attendance at an upper-secondary school (*Gymnasium*) and obtaining a university entrance diploma (*Abitur*) are required to enter an institution of higher education (see *Figure 5.1*)²⁰. The *Abitur* is obtained after 12 or 13 years of schooling depending on the federal state.

²⁰ Universities also offer opportunities for individuals without *Abitur* to enrol to university education, e.g., individuals with a vocational certificate at the level of a master craftsman or similar with a particular amount of work experience have the opportunity to enrol (Kultusministerkonferenz 2015).

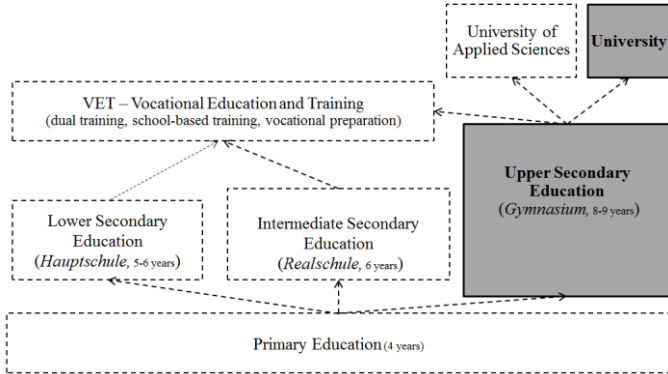


Figure 5.1: Illustration of important tracks in the German education system

At present, there are 387 higher education institutions in Germany. Within the higher education system, a distinction is made between universities (*Universitäten*), universities of applied sciences (*Fachhochschulen*) and universities of art or music (*Kunst- und Musikhochschulen*). While the 110 universities offer a broad range of disciplines, aim at a theoretical and research-based education, and have the right to confer doctoral degrees, the 220 universities of applied sciences offer more practice-oriented training and concentrate on specific disciplines, e.g. engineering, business administration, social work, and design. The colleges of art or music provide educational programmes for those interested in pursuing artistic careers (Hochschulrektorenkonferenz 2016). If they choose not to enter a higher education programme, graduates can start a vocational training programme or directly enter the labour market without an occupational

qualification. In Germany vocational training programmes particularly on-the-job training in the dual training system represent a relevant alternative for graduates with a high school degree (*Abitur*). In 2010, approximately 20% of high school graduates began a vocational training programme after graduation, while 74% entered a higher education institution (*Universität* or *Fachhochschule*) (Autorengruppe Bildungsberichterstattung 2012). Thus, university education represents the most common but not the only opportunity to obtain a professional qualification following upper-secondary school.

5.3 Local contexts and the transition to university

The transition from secondary school to university or vocational training marks a crucial point in the individual life course and it is known that students' chances of entering university are not equally distributed. Enrolment chances are influenced by previous education; better school performance increases a student's probability of attending university (e.g. Müller et al. 2009, Heine & Lörz 2007). However, even when students perform equally, enrolment in higher education largely depends upon social class origin. Higher parental education and occupational status increase the probability of entering higher education, whereas students from lower class origin are more likely to attend vocational training

programmes instead (Watermann, Daniel & Maaz 2014, Lörz 2012, Müller et al. 2009, Becker & Hecken 2008, Lauer 2002). Aside from social class origin, previous research indicates that women respond more strongly to institutional and contextual characteristics and changes (Lörz 2013, Helbig et al. 2011). Despite their lower school performance, students of immigrant origin are more likely to enter higher education as they are highly motivated to succeed in the receiving country (Kristen, Reimer & Kogan 2008).

Research that explicitly focuses on the influence of regional contexts on the transition to university is predominantly concentrated on two groups of explanatory variables: characteristics of *regional labour markets* and the *regional supply of higher education institutions*. While analyses of enrolment rates typically find a positive effect of regional unemployment (e.g. Hillman & Orians 2013, Betts & McFarland 1995), results for individual level data are less clear cut. Higher regional youth unemployment seems to increase students' chances of entering university (Giannelli & Monfardini 2003, Rizzica 2013, Flannery & O' Donoghue 2009, Albert 2000). It would appear that general unemployment rates have a positive impact on individuals' participation in higher education (Lauer 2002). However, other studies find no significant effect (Becker & Hadjar 2013 for Eastern Germany, Rephann 2002) or the results indicate that enrolment is comparably high where unemployment rates are low (Helbig, Jähnen & Marczuk 2015, Becker & Hadjar

2013 for Western Germany, Heine & Lörz 2007). Fernández and Shoji (2001) argue that these ambiguous findings are caused by different unemployment effects. Unemployment influences the costs of and returns to higher education (*investment effect*), i.e. high unemployment decreases the costs of higher or further education. On the other hand, unemployment also influences parental wealth and intergenerational transfers (*wealth effect*), which makes investments in further or higher education less likely when unemployment is high. Results indicate that both effects are present (Fernandez & Shoji 2001, Micklewright, Pearson & Smith 1990).

Another potential explanation of differing results refers the *modifiable areal unit problem* (MAUP). This describes the sensitivity of analytical results to the definition of spatial units. It could repeatedly be shown that different spatial units can lead to differences in results even when the same indicators are used (e.g. Fotheringham & Wong 1991).

Moreover, research suggests that the influence of regional unemployment on enrolment in university is group-specific. Students with low social status are particularly affected, while there is no significant impact on the enrolment decisions of students from a higher social class origin (Sievertsen 2014, Bozick 2009, Beattie 2002). Reimer (2011) finds that this holds true only for the enrolment of women from lower social class origin, whereas other authors conclude that men are more strongly influenced by labour-market characteristics

(Bruckmeier, Fischer & Wigger 2013, Casarico, Profeta & Pronzato 2012, Beattie 2002).

A second line of research on the impact of regional contextual conditions focuses on the role of the regional supply with higher education institutions (Reimer 2013). This supply is typically operationalised as distance to college or university. The underlying theoretical assumption is that distance influences the monetary and emotional costs of higher education. Monetary costs relate to expenses for transportation or renting. Emotional costs evolve from the distance to peers, parents and the familiar living environment. A large number of studies for various countries conclude that distance has a negative effect on enrolment chances (e.g. Spieß & Wrohlich 2010, Frenette 2004, 2006, Sá, Florax & Rietveld 2004, Rouse 1995, Tinto 1973). Moreover, distance also affects the type of college or university attended (Gibbons & Vignoles 2012, Ordovensky 1995, Rouse 1995). Students with a lower social class origin and lower-ability students seem to be particularly disadvantaged by distance (Cullinan et al. 2013, Eliasson 2006, Frenette 2006). The same seems to apply to women (Helbig, Jähnen & Marczuk 2015, Heine & Lörz 2007). Turley (2009) criticises the distance approach for not taking the number of colleges in proximity into account as a greater selection should increase the chances of finding a college that matches one's individual interests. Her findings show that each additional college within commuting distance has a positive effect.

Beyond quantitative aspects of the university infrastructure (e.g. distance and number of accessible universities) aspects of quality should play a role. Research on university rankings suggests that the perceived quality of a university is of relevance in educational decision-making (Weiss, Schindler & Gerth 2015). This line of research does, in turn, not take regional contexts and the accessibility of universities into account.

Further problems might be caused by factors which influence the choice of residence and higher education decisions simultaneously (*residential sorting*, Gibbons & Vignoles 2012). To avoid this problem, some research focuses on the expansion of higher education (Rizzica 2013) and the founding of new universities in a specific regional context (Frenette 2009). The results suggest that the distance effect is indeed causal.

5.4 Opportunity structure and preference formation

Our general theoretical outline is based on a rational-choice model of educational decision making. We understand the process of educational attainment as an accumulated result of educational decisions (Mare 1980, Boudon 1974) based on the evaluation of costs, utility and the probability of success. This perspective integrates the notion of status maintenance as a cost-benefit component into a more general framework of

rational decision making. Educational inequality with respect to families' social status results from the intention to avoid downward mobility (Breen & Goldthorpe 1997). This cost-benefit calculation varies by social class origin, with subjectively expected utility (Esser 1999) determining educational decisions and subsequent social inequalities.

Socio-cultural contextual characteristics can additionally affect the perception of costs and benefits (Card & Lemieux 2001). The process of transitioning to university encompasses several decisions; the decisions of whether or not to begin university studies, what to study and where to do it. These three aspects of the decision-making process determine young adults' occupational career prospects. They are strongly related to one another, particularly when focusing on the relevance of local contexts. To reduce complexity and because the number of empirical cases is limited we decided to not capture the decision on what to study, but we combine the decision to study with the decision to move. Ideally, we consider the spatial mobility decision, to be a consequence of the decision to attend university at all.

Regarding the relevance of contexts, we focus on three basic research questions: (1) What are relevant aspects of socio-structural spatial contextual conditions that influence the processes of transitioning to university? (2) Are there variations in the effect of socio-structural contexts with regard to graduates' social class origin? (3) What is the most

appropriate spatial scale for considering the specific socio-structural effects?

Summarising the theoretical mechanisms in the research literature on contexts, such as neighbourhood effects or effects of local educational infrastructure and socio-economic contexts, we derive a general differentiation between two modes of influence:

Opportunities: Opportunities represent the possible choices available taking relevant constraints into account (Petersen 2009). Our aim is to assess the contribution that the local labour market situation and the university infrastructure in the local area make in explaining transition chances to university education. The provision with university infrastructure such as the offered study courses represents education opportunities. These opportunities are related to transaction costs (Becker 1993). The costs of a university education and of subsequently leaving the parental home include actual financial costs associated with tuition fees and materials as well as renting or commuting costs but also indirect financial costs in terms of foregone earnings. Leaving a familiar social environment involves additional emotional and social costs (Turley 2006, 2009, Spieß & Wrohlich 2010, Lörz 2008).

We can therefore expect that the more extensive the supply of university education opportunities in the local context is, the more likely it is that students enter university education (Hypothesis 1a) and the more likely it is that they enter

university education in their home region (without spatial relocation) (Hypothesis 1b).

Moreover, a prominent discussion refers to the ‘*discouraged worker effect*’ (Micklewright, Pearson & Smith 1990, Raffe & Willms 1989). Poor labour-market conditions are supposed to keep young adults in (general) education. Graduates tend to prolong their general educational careers and (temporarily) avoid entering vocational training or the labour market when unemployment is high. In countries with a strong focus on VET in on-the-job programmes the number of offerings is closely linked to local labour-market conditions because training is provided by companies. Thus, training opportunities are reduced and young adults are discouraged from directly applying for training when labour-market conditions are poor. It can for two reasons be assumed that young adults rather extend their general educational career; first, to avoid the labour market at times or in regions with high unemployment, and second, to raise their general human capital level to improve their overall prospects on the labour market.

We therefore hypothesize that the poorer the labour market context – in terms of high unemployment – the more attractive it is to invest in a university education as the expected returns of university education are higher and the costs are comparably lower (Hypothesis 2).

Formation of preferences: Terms like wants, wishes, goals, desires, preferences, aspirations, orientations, and purposes

towards education represent a second mode of influence. Preference is the term that has made the most use of in the social sciences because it relates alternatives to one another (Freese 2009: 95). The local educational infrastructure can be assumed to relate to a more norm-based mode of influence (Kroneberg, Stocké & Yaish 2006, Gambetta 1987); the formation of educational preferences. If universities are more present in daily life, they might become more relevant when considering educational choices. Living in a specific local setting may '*help to foster a college-going predisposition*' (cf. Turley 2009: 130) among young adults. This predisposition can result in the formation of preferences for specific education and training programmes. This line of argumentation is closely linked to the literature on neighbourhood effects; Social norms (e.g. on value of university education) are implemented, and relevant information (e.g. on educational opportunities) is transmitted via social ties and social interrelations as well as via processes of socialisation and collective efficacy (Galster 2008, Friedrichs, Galster & Musterd 2003, Sampson, Morenoff & Gannon-Rowley 2002, Jencks & Mayer 1990). We argue that social interactions with people affiliated with a university such as students or employees become more likely in a local context with a university in proximate range. University education as episode in the life course is more *visible* and more established, and information on universities and study courses is more easily available.

It is assumed that a *traditional university climate* as in a classic university or student town²¹ creates a specific perception of university studies as a social norm. Moreover, high *visibility* and *traditionality* of universities in the local context may represent an indicator for qualitative information on universities that is comparable to university rankings. It is known from previous research that university rankings affect educational decisions and it can be argued that the degree of name recognition and the image of a university could have comparable indications.

We therefore expect that the higher the visibility and traditionality of universities in the local context the more likely it is that graduates have a stronger preference for university education and subsequently enter university (Hypothesis 3a) and the more likely it is that they enter university education in their home region (Hypothesis 3b) because visibility and traditionality of universities can be assumed to be perceived indicators for the quality of universities.

In summary, we differentiate between two aspects of socio-spatial contextual characteristics; labour-market information and university infrastructure. A particular labour market structure and a particular university infrastructure are present

²¹ Classic student towns are usually characterized by an old and renowned university with a long tradition in classic academic subjects (e.g., medical sciences, law). These universities are often located in smaller cities with a high density of students in the population. For instance, Heidelberg, Freiburg, Marburg, Göttingen, and Tübingen can be considered traditional German student towns.

at the same time and place; a poor local labour market can be accompanied by a high density of traditional and high-quality universities and vice versa. Therefore, it is crucial to not only consider these two aspects of socio-spatial contexts in addition to one another but also in interrelation. If these contextual conditions represent relevant opportunity structures and influence the formation of preferences, they are most likely interrelated with regard to the individual transitioning processes to university and the likelihood to attend university in one's home region.

We hypothesize that the poorer the local labour-market conditions are the stronger is the positive effect of the university infrastructure – in terms of both opportunities and preferences – (Hypothesis 4a) on the chance to enter university. Moreover, we expect that the poorer the local labour-market conditions are the weaker is the positive effect of university infrastructure on the chance to enter university education in the home region (Hypothesis 4b).

If chances on the labour and training market are comparably poor a favourable university infrastructure is of even greater importance regarding the individual chance to enter university because when alternatives are scarce the local supply with study opportunities should be of greater importance, particularly when moving is not affordable.

Although, local labour-market conditions are not directly associated with the decisions to spatially relocate, we expect the labour-market conditions to be indirectly of importance

due to a general tendency to leave unattractive labour market regions. In addition, the moving decision can imply prospective labour market chances after graduation from university. In summary, we assume that poor local labour-market conditions strengthen the effect of a beneficial university infrastructure with regard to the decision to study at all and weaken the effect of a beneficial university infrastructure with regard to the decision to spatially relocate.

Group-specific differences: Finally, a crucial aspect of this paper deals with group-specific variations in the effects of socio-spatial contextual conditions. The most prominent explanation for the unequal distribution of educational prospects focuses on class differences (e.g. Boudon 1974, Breen & Goldthorpe 1997, Erikson & Jonsson 1996, Esser 1999: 266ff., Gambetta 1987, Holm & Jæger 2008). The concept of *primary* and *secondary* effects of social origin indicates that educational performance on the one hand is socially selective due to the learning environment at home (primary effects). On the other hand, educational decisions are known to be group-specific (secondary effects). Costs, benefits and one's likelihood of success in a given educational track are perceived differently by different social groups (Boudon 1974, Breen & Goldthorpe 1997). It is well-documented that the effects of social class origin are still at work during transitioning processes at later educational stages, such as the transition to university (e.g. Lörz 2013, Müller et al. 2009, Watermann, Daniel & Maaz 2014).

Following the idea of status maintenance, it can be argued that secondary effects vary with regard to social origin. Students from high social origin are to a weaker extent – or even not at all – affected by conditions of the socio-spatial context because they are expected to attend university on any account to secure their status position. Students from educationally disadvantaged families are much more subject to the local opportunities. Their sources of information on higher education are more strongly based on an educational infrastructure outside the parental home. If this information is more easily available through a favourable educational environment positive effects regarding the individual participation in higher education should be expected. Also, the perception of and change in educational norms is shaped by the visibility of local educational infrastructure. Subsequently, the local supply with regard to university infrastructure is of particular importance for students of lower social class origin.

We argued previously that poor labour-market conditions increase the overall participation in higher or further education (*Hypothesis 2a*). We expect this to hold true the higher the graduates' social origin. In countries with a strongly developed VET-system, students of lower social origin are in general more likely to be 'distracted' from university education due to their need to reach financial independence earlier. Vocational training represents an attractive alternative (Hillmert & Jacob 2003). We expect this

distraction to be particularly relevant when labour-market conditions are poor. Although, we argued that higher local unemployment decreases the costs of higher education, we also know from previous research that it influences parental wealth and intergenerational transfers. As a consequence, high school graduates from lower social class origin should be more likely to avoid the risky and costly investment in university education in more challenging labour market settings and opt for vocational training instead. Entering the VET-system is comparably easy for upper-secondary school graduates as they compete with lower qualified school leavers (see the *Study 3* in this dissertation). These alternatives to university education are particularly interesting for students from lower social origin because they can preserve the families' social status without attending university.

We therefore expect that, the lower the graduates' social origin, the more likely they are to study when educational opportunities are favourable (Hypothesis 5a) and visibility and traditionality of universities are higher in the local context (Hypothesis 5c). Moreover, we hypothesise that the lower a student's social class origin, the less likely they are to enter university when local labour-market conditions are poor (Hypothesis 5b).

A more general research question deals with the specific spatial structure and scale of contextual settings. The discussed mechanisms relate, to actual educational opportunities that high school graduates can apply for. Here,

we expect the strongest influence in a commutable spatial range because this represents the search radius of physically reachable university offerings. Furthermore, the possibility to commute leads to an immense cost reduction when moving out of the parental home is not required to enter university. Also, social and information costs are lower when university is accessible in the accustomed living environment.

Therefore, we assume that the spatial scale of the influence of local opportunities (supply of higher education opportunities and labour-market conditions) on individuals' probability of entering university and of doing so in their home region will be strongest in a commutable spatial range (Hypothesis 6a).

Contextual settings that influence individuals' formation of educational preferences are assumed to be strongest in a considerably smaller spatial scale. A predisposition for university education can be assumed to be transmitted via social contacts and interactions with persons affiliated with a university. We argue that direct contact is most likely in a small-scale local context with a university in close range.

Hence, we assume that the spatial scale of the influence of local characteristics (traditional university climate) on individuals' probability of entering university and of doing so in one's home region will be strongest in a small-scale area (Hypothesis 6b).

The hypothesised relationships between socio-spatial contextual characteristics and the chance to enter university and spatial mobility decisions are summarised in *Table 5.1*.

Table 5.1: Summary of research hypotheses

Hypotheses	Independent Variables		Mediation		Dependent Variable(s)	Mechanism	Hypotheses: spatial scale
<i>H 1 (H6)</i>	↑University education opportunities	→			↑ (a) Transition to university ↑(b) Studying in home region	Opportunities	Commutable <i>H6a</i>
<i>H 2 (H6)</i>	↓Labour market	→			↑Transition to university	Opportunities	Commutable <i>H6a</i>
<i>H 3</i>	↑University climate	→			↑(a) Transition to university ↑ (b) Studying in home region	Preferences	Small-scale <i>H6b</i>
<i>H 4</i>	↑University education opportunities / University climate	→	↑Labour market	→	↑(a) Transition to university ↑ (b) Studying in home region	Opportunities / Preferences	-
<i>H 5a</i>	↑University education opportunities	→	↓Social class origin	→	↑(a) Transition to university	Opportunities	-
<i>H 5b</i>	↓Labour market	→	↓Social class origin	→	↓(b) Transition to university	Opportunities	-
<i>H 5c</i>	↑University climate	→	↓Social class origin	→	↑(b) Transition to university	Preferences	-

5.5 Data and methods

Individual-level data

To test the outlined hypotheses, this paper uses individual data from the National Educational Panel Study NEPS (Blossfeld, Roßbach & von Maurice 2011). NEPS Starting Cohort 6 – Adults (NEPS-SC6) is a retrospective questionnaire that provides extensive information on educational and occupational pathways and transitions along individuals' life courses. At time of interview, respondents

were between 18 and 65 years old. Our two dependent variables are the transition from high school to university versus other alternatives such as entering vocational training or studying at a university of applied sciences or entering the labour market. In a second step we analyse the chance to spatially relocate under the condition that a respondent entered university education. Our sample is limited to high school graduates. We are mainly concerned with questions about residential settings; therefore, information on where respondents obtained their high school diploma and where they entered university is required. This information is only available for the first and third wave. In addition to the dependent variables several control variables on the individual level are included in the models. The most important variable is parents' social status, as we expect group-specific variations in the influence of local context characteristics. The NEPS-SC6 is a retrospective questionnaire and information on parents is given by the respondents (the children) at the time of interview. We conceptualise a social status variable on the basis of information that is less likely to vary over time; we combine information on the highest level of education and the highest vocational certification of both parents and do not consider their occupational status.

A set of macro-level variables is linked to the individual data. Excluding missing information on the macro and micro level, the combined data set consists of 1,297 individual cases for

the analysis of the probability of entering university. 954 of the 1,297 respondents entered university within the 5-year-observation period. For those respondents we analyse the chance to attend university in one's home region versus moving away to study. The connecting information between macro level and individual data is the municipality key. The macro-level information is matched with the place of residence where the respondents lived at the time of graduation from upper-secondary school. The analysis is restricted to students who lived in that same residential context for at least three years to ensure that they were exposed to the local setting during their final years of schooling, when decision-making about the occupational future usually takes place.

Contextual data

The most important independent variables are information on university infrastructure and labour-market conditions. We collected and prepared regional time-series data from the *Federal Employment Agency*, the *Federal Statistical Office*, and *German Council of Science and Humanities* at the municipality level, which represents the lowest administrative level of aggregation. We limit our analysis to West Germany because regional administrative data for East Germany is not available before 1996. The context data set contains

information from 1986 onwards for 8,581 municipalities in West Germany. Unemployment figures are included in the analyses to illustrate the labour market situation. To capture the educational infrastructure, we make use of information on whether a municipality is a classic student town, the proportion of university students in the population, and the range of fields of study offered. Regarding the range of fields of study, we have information on the number on university entrants and the total number of students in the fields of law and social sciences, medical sciences, mathematics and sciences, cultural studies, engineering and linguistics. All these indicators provide a number of opportunities for analysing the relevance of educational infrastructure for individual transitions and also they are highly correlated with one another. To obtain the two theoretical assumed aspects of university infrastructure we calculated a confirmatory factor analysis (CFA). On the one hand, we expect actual *study opportunities* to impact adolescents' transitions. On the other hand, we assume *preferences for university* education are influenced by a traditional and visible university climate. In addition to the unemployment and the two factors on university infrastructure we control for the share of high school graduates in the local context in the respective age cohort to control for the potential competitive situation. The descriptions of the model variables can be found in the appendix (see *Table A 2* and *Table A 3*).

Confirmatory factor analysis

To operationalise the dimensions of educational infrastructure that represent opportunities and preferences for university education, we carried out a confirmatory factor analysis (CFA) (Kolenikov 2009, Bollen 1989) and derived two factors. The first dimension (opportunities) is represented by the range of fields of study; the second one is represented by a high share of university students in the population and by classic university towns (preference formation) (see *Figure 5.2*). For an overview over the methodological background and the results of the CFA see *Table A 4* in the appendix.

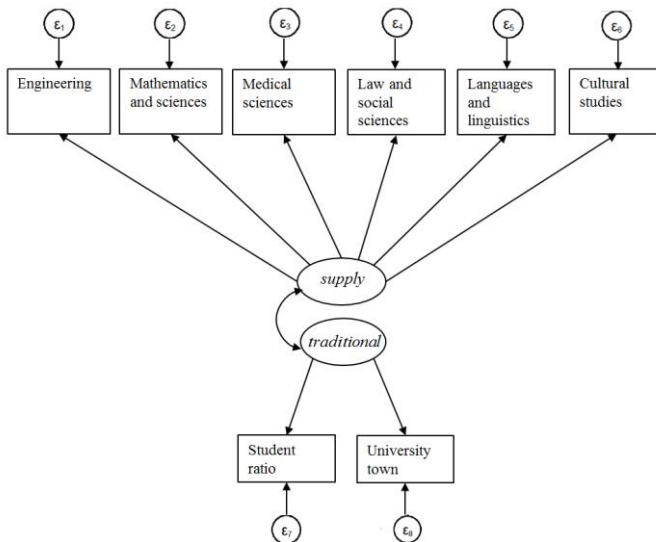


Figure 5.2: Path diagram with the two factors for educational infrastructure

Conceptualisation of spatial scale

To test the hypotheses (6a and b) on the appropriate spatial scale, it is necessary to flexibly aggregate contextual settings. For this purpose, we obtained a travel time matrix from the *Federal Institute for Research on Building, Urban Affairs and Spatial Development* (BBSR). This matrix provides information on travel time by car²² between all German municipalities. Contextual information is aggregated within these travel time radii. Our analyses are due to data availability limited to municipalities in West Germany. Between all of these 8,851 municipalities travel time radii of 15, 30, 45, 60, 90 and 120 minutes are calculated (for a simplified and stylized illustration see *Figure 5.3*). In a second step, we re-calculated the available macro-level variables for each of the six travel time distances (relative to the population size in the respective travel time radius) so that our unit of analysis are not municipalities but areas defined by travel time that are centred around the municipality of respondents' residences and reflect the accessibility of space. The unemployment rate in this radius is, for instance,

²² It could be argued that students are more likely to take public transportation into account when assessing the reachability of potential study places. Unfortunately, public transportation travel time is not freely available. To at least account for potential biases in the results we tested the correlation between travel time by car and travel time via public transport system for a random selection of 100 municipalities by making use of Google Maps requests. We found a correlation between travel time by car and by public transportation of 0.78. For further information on public and private transport see *Figure A3* in the appendix.

computed by summing up the number of unemployed persons in all municipalities that are reachable within 30 minutes divided by the labour force in these municipalities. The indicators used to conceptualise the two factors on educational infrastructure were calculated separately for each of the travel time radii.

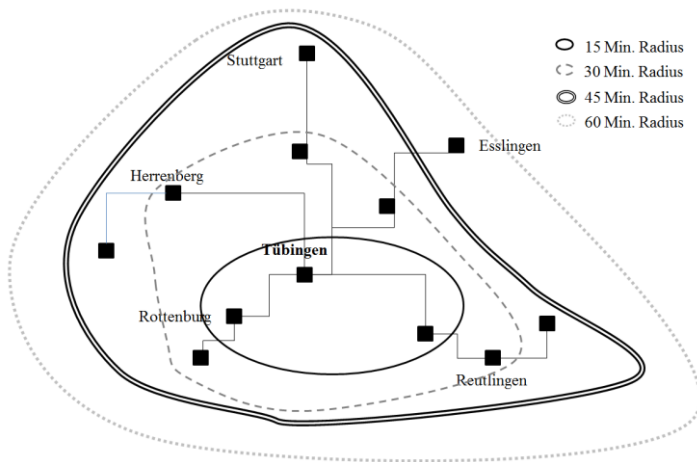


Figure 5.3: Stylized illustration of travel time radii

Analytical strategy

To analyse the process of transitioning to university, we apply a conditional approach: First, a discrete-time event history model, implemented as a binary logit model (Yamaguchi 1991, Allison 1982), was calculated to answer the question of whether local context conditions impact a person's (1) probability of entering university within the first five years

after graduation from upper-secondary school. Due to institutional regulations, the transition to university can only take place once, sometimes twice, a year. Therefore, we chose a discrete-time survival model over a conventional event history model as it treats time not as a continuous but as a discrete variable. The discrete-time survival model contains a baseline variable for the yearly observed time points (t). The model estimates the probability h_j of entering university. The discrete-time survival model contains a baseline variable $\beta_0(t)$ for the observed time points. Our observation period starts with the year when the upper-secondary school certificate is obtained and ends after five years. The relevant independent variables include the unemployment rate in the home district at the time when the individual graduates from general compulsory schooling ($\beta_a x_j(t)$), the factor on the supply with university education options ($\beta_b x_j(t)$), and the factor on a traditional university infrastructure ($\beta_c x_j(t)$). We include several control variables such as social class origin ($\beta_z x_j(t)$) in the model. Due to the repeated observations of individuals in up to five years (observation period) standard errors are clustered.

$$\text{logit}[h_j(t)] = \log \left[\frac{h_j(t)}{1 - h_j(t)} \right] = \beta_0(t) + \beta_a x_j(t) + \beta_b x_j(t) + \beta_c x_j(t) + \dots +$$

The decision to spatially relocate is considered a crucial component of the process of transitioning from secondary school to higher or further education, especially when focusing on the relevance of regional characteristics. Therefore, we analyse in a second step the probability of spatial relocation under the condition that a person entered university. We argue that the transitioning process to university captures in a first step the choice to study and in a second the decision on where to do so. We consider the spatial relocation a study-related mobility decision and apply a binary conditional logit model to analyse the probability to study in the home region $p(X)$. We include the same independent variables to test the effect of local characteristics on the mobility decision associated with entering university.

$$\text{logit} = \log \left[\frac{p(X)}{1 - p(X)} \right] = \beta_0 + \beta_a x_j + \beta_b x_j + \beta_c x_j + \dots + \beta_z x_j$$

To test the hypotheses on the adequate spatial scale of contextual information, we calculate the models for all travel time radii between 15 and 120 minutes. Moreover, we calculate the models for different combinations of travel time radii. We expect the results to be most suitable for unemployment rate and university offerings in a commutable spatial range, which corresponds with a travel time radius of 30 to 45 minutes. The effect for the traditional university infrastructure in the local context is expected to be strongest in the smallest spatial range (15 minutes of travel time).

To obtain analytical results that are easily comprehensible, we calculated *Average Marginal Effects* (AMEs) (cf. Mood 2010). AMEs can be interpreted as the average change in the probability that (1) individuals enter university and (2) remain in the home region to study if the independent variable increases by one unit, holding all other independent variables in the model constant. For an easy interpretation of the specified interaction effects conditional marginal effect plots are illustrated. This allows us to capture the impact of a specific predictor given selected realistic values of another predictor (Royston 2013, Williams 2012).

5.6 Results and discussion

In the first model, we focus on the probability of entering university compared to other vocational and educational alternatives in the first five years after graduation from upper-secondary school (*Gymnasium*). The results of the discrete-time event history model are presented *Table 5.2*. In the first model we only include the baseline and the contextual variables. The second model additionally contains individual control variables. The contextual variables are presented within the *optimal spatial* scale. We calculated all models for all spatial radii and combinations. The results for all travel time radii and with this the identified optimal spatial scale are presented in *Table 5.4* and *5.5*.

The negative baseline indicates that graduates are less likely to make the transition to university in the year of graduation than in the following years. It is important to note that factor scores as independent variables in a model involve uncertainty as they are estimates and not observations. Moreover, they do not support a straightforward interpretation of the effects. In model 1.1 we find that an increase of one standard deviation of the factor that represents the supply with higher education opportunities (factor 1) increases the chance to enter university by 2.5%. Nevertheless, the transition to university is positively affected by both factors. Also, higher local unemployment increases the chance to enter university. The positive and stable unemployment effect points to the fact that a higher local unemployment rate decreases the costs of higher education and increases the probability that individuals prolong their educational careers to avoid a tight training and labour market (*discouraged worker effect*). The unemployment effect is highly significant and indicates that a positive change of 1% in unemployment increases the probability of university enrolment by 0.9% (*Hypothesis 2a*). Local unemployment and the first factor have a stable and highly significant impact even when controlling for additional individual variables (model 1.2). The results on the second factor indicate that a local setting with a highly visible and traditional university infrastructure encourages individuals' predisposition for university education, giving them a higher probability of actually

enrolling in university (*Hypothesis 3a*). Although the hypothesis can be confirmed, the effect decreases considerably under control of individual indicators (model 1.2) and gets less significant. Overall the *Hypotheses 1a, 2a* and *3a* can be confirmed.

Model 1.2 includes additional control variables on the individual level. In accordance with the research literature, we find the strongest positive effects on the probability of entering university for parents' social status and previous educational performance (Becker & Hecken 2008, Lauer 2002, Lörz 2012, Müller et al. 2009, Watermann, Daniel & Maaz 2014). Graduates with immigrant background and females have a higher probability of entering university (Helbig et al. 2011, Kristen, Reimer & Kogan 2008).

Table 5.2: Event history model on the probability of entering university within first five years after graduation for optimal travel time radii

Individual level	<i>Model 1.1</i>	<i>Model 2.1</i>
Baseline (year of school graduation) (<i>Ref. year 1-5</i>)	-0.058 (0.015)	-0.087 (0.015)
Parents' social status (combined max.) intermed (<i>Ref. low</i>)		0.043** (0.018)
Parents' social status (combined max.) high (<i>Ref. low</i>)		0.124*** (0.020)
Migration background		0.034** (0.018)
Sex (male)		-0.083*** (0.015)
Year [1986-2011]		0.002 (0.124)
Final grade		0.199*** (0.017)
Context level		
Supply of HE opportunities (<i>factor 1</i>) (45 min. travel time)	0.025*** (0.008)	0.024*** (0.007)
Traditional university climate (<i>factor2</i>) (15 min. travel time)	0.035*** (0.009)	0.014** (0.004)
Unemployment rate (15 min. travel time radius)	0.009*** (0.003)	0.009*** (0.003)
High school graduates in 30 min. travel time radius	0.006** (0.003)	0.006* (0.003)
McFadden's Pseudo R ²	0.1054	0.1777
N person years (persons)	3,380 (1,792)	3,380 (1,792)

presented are average marginal effects (AMEs); clustered S.E. in parentheses, significance level: *p<0.05, **p<0.005, ***p<0.001, data: NEPS-SC6, Federal Employment Agency, the Federal Statistical Office, German Council of Science and Humanities, BBSR

Theoretically, we assume that students first make a general choice about whether they want to attend university or not.

We further argue that if a school graduate decides to attend university, s/he has to choose in a subsequent step where to do that. This second step is implemented within the framework of a conditional binary logit model. Results are presented in *Table 5.3*. We analyse the probability of not leaving the home region after school graduation under the condition that the individuals took up studies.

Table 5.3: Logit model on the probability of attending university in one's home region for optimal travel time radii

<i>Individual level</i>	<i>Model 2.1</i>	<i>Model 2.2</i>
Parents' social status (combined max.) interm. (<i>Ref. low</i>)		-0.032 (0.048)
Parents' social status (combined max.) high (<i>Ref. low</i>)		-0.045 (0.046)
Migration background		-0.037* (0.014)
Sex (male)		-0.020 (0.033)
Year [1986-2011]		-0.019*** (0.003)
Final grade		0.021 (0.035)
<i>Context level</i>		
Supply of HE opportunities (<i>factor 1</i>) (15 min. travel time)	0.125*** (0.004)	0.111*** (0.016)
Traditional university climate (<i>factor2</i>) (15 min. travel time)	0.024*** (0.007)	0.051*** (0.018)
Unemployment rate (45 min. travel time radius)	-0.044*** (0.007)	-0.047*** (0.007)
High school graduates in 30 min. travel time radius	-0.005 (0.003)	-0.004 (0.003)
McFadden's Pseudo R ²	0.1017	0.1587
N person years (persons)	(954)	(954)

presented are average marginal effects (AMEs); clustered S.E. in parentheses, significance level: *p<0.05, **p<0.005, ***p<0.001, data: NEPS-SC6, Federal Employment Agency, the Federal Statistical Office, German Council of Science and Humanities, BBSR

The model is additionally limited to individuals that can reach at least one university within 60 minutes of travel time. This limitation is necessary to avoid the rather tautological conclusion that students without a realistic chance of entering a university within their home region move away to take up studies. Again, the first model only contains the contextual variables. In line with our hypotheses, we find strong context-level effects. The probability of moving away for study-related reasons is lower when the number of higher education opportunities offered is high and when the local context is characterised by a traditional university climate (*Hypotheses 1b* and *3b*). The contextual effects are much stronger than in model on the chance to enter university at all. This seems reasonable the individual decision on spatial relocation can be considered to be much stronger subject characteristics of the spatial context. Individual control variables, in turn, are much less relevant. We find no differences with regard to parents' social status, gender, and previous school performance; only graduates from immigrant origin are less likely to move. The weak individual effects can predominantly be explained by the fact that the model is conditional on making the decision to attend university. Particularly in terms of parental social status we know that students who enter university are a positive selection compared with all high school graduates, which makes it reasonable to argue that they have more resources that allow for a study-related spatial relocation. However, in light of moving costs, we would have expected

parents' social status to also have an independent effect. It could be assumed that we do not find this effect due to residential sorting of more highly educated parents (Gibbons & Vignoles 2012, Rizzica 2013).

In *Hypothesis 4a* and *b* we assumed that the contextual conditions are interrelated with regard to the chance to enrol to university. To illustrate the interaction effect, the results are presented in marginal plots (*Figure 5.4*). These plots show the effect of factor 1 and 2 on the chance to enrol to university for specific across the distribution of unemployment on the local level. In line with our hypothesis we find an increase in the effect of the supply with university offerings (factor 1), on the chance to enter university the higher the local unemployment is (see *Figure 5.4a*, right column). The effect is significant, but we find very large confidence intervals for high values of unemployment, which can partly be explained by short number of local contexts with very high unemployment rates (above 12%). The effect of traditional infrastructure does, in turn, not increase or decrease for specific values of local unemployment (see *Figure 5.4a*, left column). Thus, *Hypothesis 4a* can only partly be confirmed. We find that the supply with university infrastructure becomes increasingly important when local labour-market conditions are poor, but we do not find that the effect of the traditional university climate is moderated by the local labour-market situation.

In addition, we find that both factors of university infrastructure become less important for the chance to study in the home region the higher the unemployment. Although, local labour-market conditions are not directly associated with the decisions to spatially relocate for study purposes, we expected the labour-market conditions to be indirectly of importance due to a general tendency to leave unattractive labour market regions.

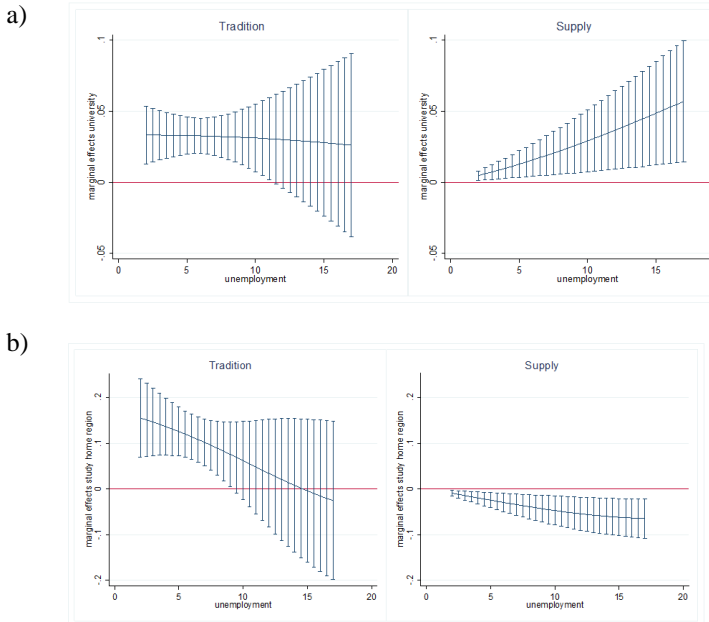


Figure 5.4: Selected marginal effects a) to enter university and b) on the chance to study in home region by university infrastructure factors for selected values of unemployment
Hypothesis 4b can be confirmed. Although, it has to be admitted that the effect of traditional climate becomes

insignificant for higher values of local unemployment (*Figure 5.4b*, left column).

We expected graduates from different social origins to be differently affected by varying socio-structural contextual conditions. To test this, interaction terms were calculated and illustrated in *Figure 5.5*. The marginal effect plots show the effect of parents' social status on the probability of entering university for selected factor scores for university offerings (factor 1), and traditional university climate (factor 2), as well as for c) unemployment.

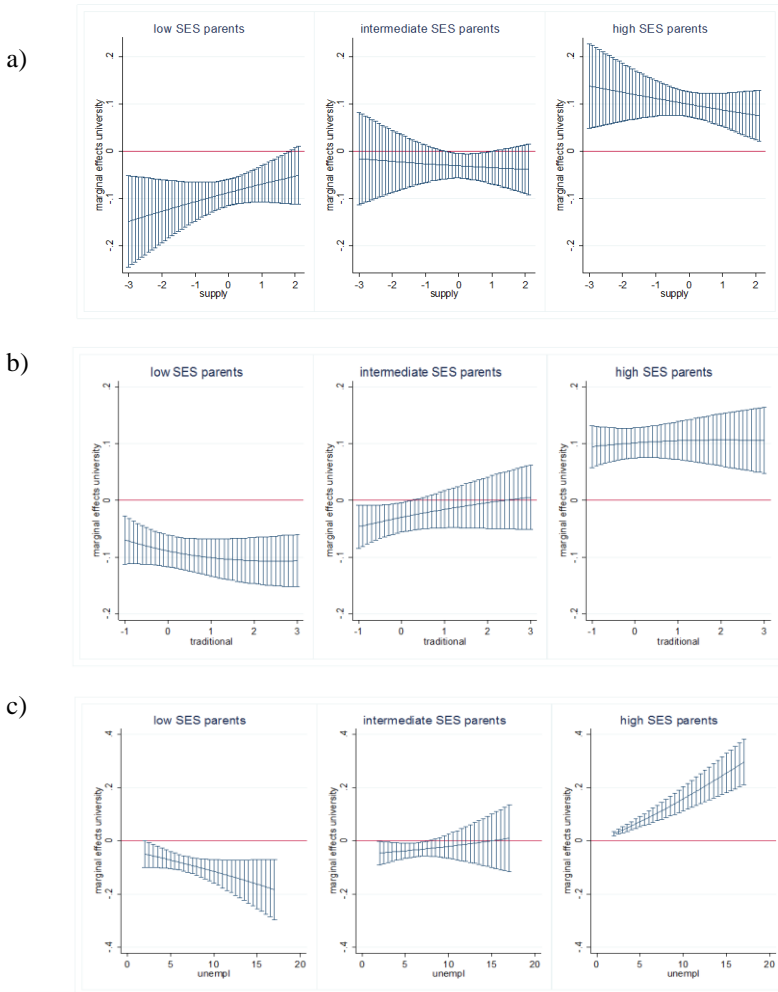


Figure 5.5: Selected marginal effects on the chance to enter university by parents' social status and selected values of a) supply with higher education offerings, b) traditional university infrastructure, c) unemployment

The reference category are the respective other groups. For instance, the left column in *Figure 5.5a* represents the effect of entering university for graduates from low social origin, compared to the chances of graduates from intermediate and high social origin, for specific factor scores of factor 1. This explains why we do not find significant effects for graduates from intermediate social origin, because they are compared to students from higher and lower social origin at the same time. Graduates of low social origin have a lower general probability of entering university compared to other groups (negative effect), but the amount of university offerings increase their relative chances (*Figure 5.5a*, left column). Naturally this leads to decreased relative advantages for students from higher social origin. Thus, *Hypothesis 5a* can be confirmed and we can argue that a higher supply with university offerings in the local context reduces social disparities at the transition to university. At the same time, local unemployment increases social selection on the path to university (*Figure 5.5b*); in poor local labour market settings with high unemployment, graduates of a higher social origin are, on the one hand, more inclined to study at a university. As unemployment can also influence parental wealth and intergenerational transfers, graduates with a low familial social status are, on the other hand, more likely to avoid risky investments in university education, opting instead for alternatives for which risks and costs are lower and the probability of success is higher, such as vocational training.

Regarding the second factor we find, against our expectations, that the chance to enter university is not increased by a greater presence of traditional university infrastructure for graduates from lower social origin. The *Hypothesis 5c*, can therefore not be confirmed.

One of our three research questions addressed the issue of the spatial scale of contextual effects. Therefore, both models are calculated for all of the conceptualised travel time radii between 15 minutes and 2 hours. In Table 5.4 the results for the chance of entering university for several travel time radii and the optimal spatial scale are presented. The results for different travel time radii on the chance of spatially relocating can be found in Table 5.5.

We find that the effects of available higher educational opportunities (factor1) on the likelihood of entering university are strongest in a radius of 30 to 60 minutes, which corresponds with the average commuting time (Wingerter 2014, Einig & Pütz 2007).

Table 5.4: Event history model on the probability of entering university for different travel time radii

	15 min	30 min	45 min	60 min	90 min	120 min	Optimal radius model
Supply of higher education opportunities (<i>factor 1</i>)	0.007 (0.007)	0.024*** (0.007)	0.024*** (0.007)	0.023** (0.008)	0.008 (0.008)	0.006 (0.008)	0.024** (45min) (0.004)
Traditional univ. climate (<i>factor 2</i>)	0.014** (0.005)	0.011** (0.005)	0.010* (0.005)	0.010 (0.008)	0.010 (0.008)	0.002 (0.008)	0.014*** (15min) (0.007)
Unemployment rate	0.009*** (0.003)	0.007** (0.003)	0.007** (0.003)	0.007** (0.003)	0.005 (0.003)	0.004 (0.003)	0.009*** (15min) (0.003)
McFadden's Pseudo R ²	0.170	0.173	0.167	0.149	0.138	0.138	0.178
<i>N=person year</i>	3,380	3,380	3,380	3,380	3,380	3,380	3,380
<i>n=(individuals)</i>	(1,792)	(1,792)	(1,792)	(1,792)	(1,792)	(1,792)	(1,792)

Discrete-time event history model on the probability of entering university within the first five years after graduation from upper-secondary school; presented are average marginal effects (AMEs); clustered S.E. in parentheses, significance level: *p<0.05, **p<0.005, ***p<0.001, data: *NEPS-SC6, Federal Employment Agency, the Federal Statistical Office, German Council of Science and Humanities, BBSR*

additional control variables: baseline, parents' social status, sex, migration background, final grade, year (observation period), high school graduates

It was expected (*Hypotheses 6a*) that actual offerings are most important in a commutable spatial range. The effect of a traditional university climate is, in turn, strongest in closer proximity (15 minutes). These findings are in line with our *Hypothesis 6b*, as we expected the formation of educational preferences to be influenced at a spatial scale in which daily events and interactions can take place. We assumed this radius to be smaller than actual commuting zones. The effect of unemployment is, against our expectations, strongest in a 15-minute travel time radius but very stable up to a travel time radius of 60 minutes. *Hypothesis 6a* can therefore only be partly confirmed as we expected the impact of contextual conditions reflecting opportunities (higher education opportunities and unemployment) to be strongest in a commutable range.

Table 5.5: Logit model for the probability of attending university in one's home region for different travel time radii

	15 min	30 min	45 min	60 min	90 min	120 min	Optimal radius model
Supply of higher education opportunities (factor 1)	0.116*** (0.016)	0.111*** (0.017)	0.082*** (0.018)	0.064** (0.020)	-0.018 (0.018)	-0.022 (0.016)	0.111***(15min) (0.016)
Traditional univ. climate (factor 2)	0.091*** (0.017)	0.060*** (0.018)	0.040* (0.019)	-0.021 (0.022)	0.008 (0.021)	0.004 (0.016)	0.051***(15min) (0.018)
Unemployment rate	-0.047*** (0.006)	-0.047*** (0.006)	-0.047*** (0.005)	-0.044*** (0.007)	-0.022*** (0.008)	-0.012 (0.009)	-0.047***(45min) (0.007)
McFadden's Pseudo R ²	0.155	0.147	0.090	0.065	0.060	0.054	0.158
<i>N</i>	954	954	954	954	954	954	954

Binary logit model for the probability of attending university in one's home region on the condition that the person enrolled in university; presented are average marginal effects (AMEs); clustered S.E. in parentheses, significance level: *p<0.05, **p<0.005, ***p<0.001, data: *NEPS-SC6, Federal Employment Agency, the Federal Statistical Office, German Council of Science and Humanities, BBSR*
additional control variables: parents' social status, sex, migration background, final grade, year (observation period), high school graduates in local context, university within 45-minutes travel time

An explanation for the stable unemployment effects is the measurement of local unemployment as it was not possible to capture unemployment on the level of municipalities for the entire observation period. Hence, we had to make use of averaged unemployment values on the level of municipality associations which are larger than municipalities. As a

consequence, the unemployment rate is relatively stable in the units between 15 and 45 minutes of travel time.

With regard to chance to study in the home region, we find the strongest effects for both educational infrastructure factors at the level of a 15-minute travel time radius. This indicates that the probability that recent graduates do not relocate for study-related reasons is particularly high when the educational infrastructure in the very proximate living area is quite favourable. Unemployment effects do not differ between 15- and 45-minute travel time, but the standard errors are different at the fourth decimal digit. In summary, for both of our dependent variables, we find, in line with our hypotheses a decreasing influence of contextual indicators with increasing spatial radius and almost no variance between the characteristics for the units of 120-minutes travel time.

5.7 Conclusion

The aim of this paper was to analyse the impact of socio-structural local contextual characteristics on the chance to enter university and on the subsequent decision to study in the home region compared with a spatial relocation for study purposes. We extended the perspective on the relevance of educational infrastructure by not only capturing the distance to university or the number of universities in a specific spatial range but by differentiating substantial information on the local university infrastructure. We also included information

on the local labour market. On the basis of a travel time matrices for West German municipalities, we aggregated the relevant contextual information within travel time radii to determine the most relevant spatial scale for the process of transitioning to university.

We found that a favourable local educational infrastructure has a positive impact on the probability of enrolling to university. Here, we argued for two mechanisms to be at work. On the one hand graduates are influenced by the local educational *opportunity* structure; on the other hand, their *preference* formation for university education is influenced by the local educational infrastructure. Moreover, a favourable labour market situation reduces the benefits of university education compared to alternatives. Study-related mobility decisions are more strongly influenced by socio-structural local contextual conditions. Furthermore, the educational infrastructure is of particular importance when unemployment is high.

We find that contextual characteristics are not equally important for different social groups. Findings indicate that a favourable local university infrastructure can compensate for social status inequalities in the transition to university, while poor labour-market conditions increase the difference between different social groups. Particularly actual opportunities are most strongly relevant in eliminating social class differences.

Contextual conditions that are assumed to refer to higher education opportunities are most influential in a commutable spatial range, while contextual conditions that refer to the development of educational preferences have a smaller spatial radius. In general, contextual influences decrease as the spatial radius increases.

We can draw at least four conclusions from our empirical findings. *First*, we suggested that the conceptual question on the *where* of social facts is worth considering in context effect research. We find strong differences in the impact of contextual settings with regard to the respective spatial scale. Thus, our findings implicate that research on the impact of contextual settings should not generally be limited to a fixed structure of proximate contexts. One opportunity to overcome fixed administrative units is the use of travel times as proxy for perceptibility (preferences) and accessibility (opportunities). This conclusion is of relevance beyond the presented application on university enrolment. The spatial dimension of contextual settings has received little attention in sociological and economic research. We believe that conceptual and methodological strategies that focus on the relevance of spatial structuring could be of use for a much wider set of research applications. A limitation of our study is that municipalities are still a rather large local unit. An analytical approach that captures spatial distances, structures or radii on the basis of neighbourhoods (e.g. zip-code areas, or building blocks) that allows for a flexible aggregation of

these units seems particularly fruitful to capture the formation of preferences and the establishment of social (educational) norms.

Second, we find that comparable characteristics in contextual settings should be differentiated with respect to the mechanisms behind. It is not the context as such but the mechanisms represented by specific contextual conditions that is of relevance. With this in mind, we find that these contextual characteristics are not necessarily (and solely) additional influence factors but they moderate their respective influence on individual outcomes. A careful differentiation of contextual characteristics as regards content seems promising.

Third, findings on the group differences contain practical implications regarding the local or regional promotion of high school graduates from educationally disadvantaged families. Local opportunities seem to be of particular relevance regarding the chance to enter university and support to meet their specific needs in terms of information and resources could be of value.

Fourth, a limitation of the study is that we considered the choice on whether to attend university or not to be prior to the choice of the place of study. For reasons of clarity and due to the number of cases, we did not consider the choice on the field of study. Arguing from a decision-theoretical perspective it is worth reconsidering this, particularly against the background of socio-spatial context characteristics. The relation between contextual setting, social origin and

educational decision-making processes raises the question on the relevance of contextual characteristics not only for the three decisions as such but for the sequence of decisions. Moreover, it is worth to discuss if the sequence of decisions differs for different social groups. To find answers to these questions further research on the relation between socio-spatial contexts and individual decision-making processes is needed.

6 STUDY 3 – STRUCTURAL CHANGE, TEMPORARY CRISES, AND REGIONAL DIFFERENCES: A DECOMPOSITION ANALYSIS OF LABOUR-MARKET CONDITIONS AND THEIR RELEVANCE FOR INDIVIDUAL TRANSITIONS TO VOCATIONAL TRAINING²³

6.1 Introduction

The successful completion of vocational or academic training has become a crucial determinant of opportunities for individuals in contemporary societies. As opportunities for education and training are unequally distributed, they represent 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 characteristics of the environment in which the individuals live. While inter-individual differences in education and training have been repeatedly studied, comparatively little 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

²³ This study is the result of collaborative work together with Steffen Hillmert and Andreas Hartung and currently under review as: Hillmert, Steffen, Hartung, Andreas & Katarina Weßling (2016): *A Decomposition of Local Labor-Market Conditions and Their Relevance for Inequalities in Transitions to Vocational Training*.

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 VET-system 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. This paper therefore focuses on the German case when assessing the impact of varying labour-market conditions on individuals' transitions to training.

Conventional context analyses in training research have used (raw) local unemployment rates as a simple indicator of labour-market conditions. In contrast to that, the aim of this paper is to be much more specific about various aspects of these conditions. For example, a high level of local unemployment at a particular point in time may, on the one hand, reflect a temporary crisis, but, on the other hand, 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 various components of the labour-market situation: long-term

trends and short-term fluctuations as well as typical regional variation.

The paper is structured as follows: In the next section, we provide a brief overview of the relevant institutional structures and trends in vocational training. In section 3, we identify open questions found in previous research on the determinants of transitions to vocational training, develop the conceptual model, and outline our theoretical arguments and hypotheses. Section 4 introduces the used data sources and discusses the relevant methodological decisions, focusing particularly on dealing with non-stationary historical trends and regional variations in labour-market conditions. Section 5 presents our multivariate results regarding the effects of local labour markets on transition behaviour and on social inequality in the transitions. Section 6 concludes with a summary, implications for the study of context effects on training, and some notes on the applicability of our decomposition approach for a broad set of research questions.

6.2 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. Hillmert 2008, 2001 Shavit & Müller, 1998). Apprenticeships are a combination of school-based and firm-based training; their formal basis is a training contract with a company that takes on trainees. 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) 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 life 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 & 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 programmes were established (Berger 2003), even though a central legal act that included mandatory company dues (*Ausbildungsplatzförderungsgesetz* of 1976) was declared to be unconstitutional.

Typically, vocational training takes place subsequent to general secondary schooling. An important characteristic of the German system of general education is early tracking into three different types of secondary schools usually after four years of elementary schooling. The secondary school tracks form a hierarchy, and schooling in each of these tracks is completed with the attainment of a specific school leaving certificate (see *Figure 6.1*).

In 2011, 57% of an age cohort began vocational training in the dual system, and about 10% began school-based training after secondary school (Statistisches Bundesamt 2013: 8). In principle, all school leavers (even dropouts) have the possibility of entering apprenticeship training in the dual system. Full-time school-based vocational training is more strongly subject to institutional specificities, and an intermediate school degree is often a minimum formal requirement for entering school-based training (Dobischat 2010). Both types of vocational training programmes usually last for two to three years and lead to a specific occupational qualification. In addition to these fully qualifying options, a system of preparatory vocational training schemes has expanded significantly since the 1990s (Baethge, Solga, & Wieck 2007).

STUDY 3: A DECOMPOSITION ANALYSIS OF LABOUR MARKET CONDITIONS

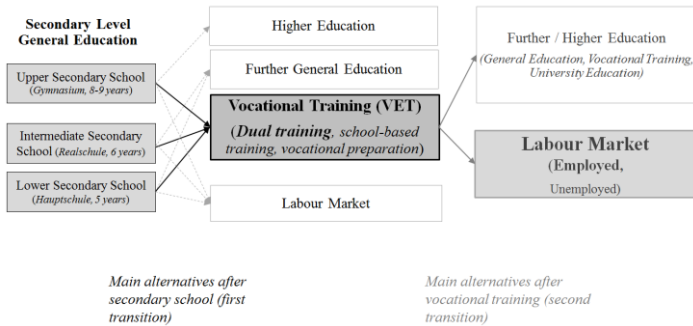


Figure 6.1: Alternatives after general secondary schooling and vocational training (two-stage transition model)

In a stylized life-course perspective, we can observe *two major transitions* associated with vocational training: transitions *to* the training system after general schooling and transitions *after* completion of training. In this paper, 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 last decades – the observation period of the following empirical analyses – is presented in *Figure 6.2*. 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 seems to follow 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.

STUDY 3: A DECOMPOSITION ANALYSIS OF LABOUR MARKET CONDITIONS

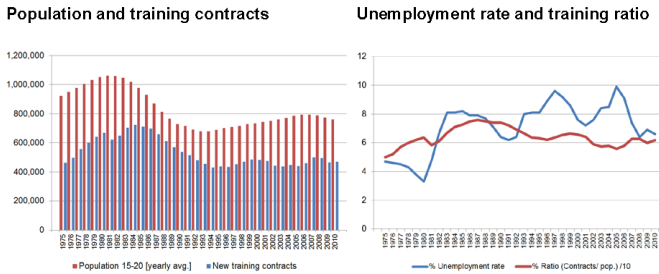


Figure 6.2: Apprenticeship Training in West Germany, 1974-2001, Data: Statistisches Bundesamt (2014a), BMBF (2011), Federal Employment Office (2014)

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 socio-economic 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 analysis.

6.3 Conceptual and theoretical considerations

Like the labour market, the market for dual vocational 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 vocational training institutions (cf. Dustmann & Schönberg, 2008). This is especially evident in the dual system, where employers decide which apprentices to recruit. Hence, access to the 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 (Breen & Goldthorpe 1997, Boudon 1974). However, there are also reasons to consider the regional and institutional settings as factors that influence the cost-benefit perception (Erikson &

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., school leavers observe recent economic developments to make inferences about their 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 the provision of training is closely linked to the current personnel requirements and budgetary restrictions of companies, which are associated with their economic situation (Muehlemann & Wolter 2011). Whether directly or indirectly, the training decisions of both individuals and companies will therefore be influenced by aspects of the labour market.

Short-term influences on transitions

Short-term developments on the training market can be traced back to two major determinants: (business-cycle) economic situation and demographic fluctuations. As a result of both, individual decisions for dual training and the specific provision of training opportunities will be positively associated with a favourable situation of the general labour market at the time of transition. Starting from the side of individuals and taking (temporary) unemployment as the most prominent indicator of an imbalanced general labour market, the central theoretical argument is that temporarily high

unemployment tends to discourage young adults from entering the labour market (Micklewright, Pearson & Smith 1990, Raffe & Willms 1989). When the market situation is considered difficult, decisions for general (further) schooling or school-based training appear to be more cost efficient and less risky than dual vocational training, which is more closely related to the labour market. Hence, the supply of potential trainees will be tied to business-cycle developments.

Not only the supply of but also the demand for trainees on the employer side can be expected to be closely related to the temporary economic situation of the company. 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 & 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 (Muehlemann, Wolter & Wüest 2009, Brunello 2009).

The other important component of short-term changes in the training market consists of 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 (Maier & 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. 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 so that market forces have again been strengthened in the training market.

In summary, we can expect a (small) negative effect of temporary aggregate unemployment on the chances of transitioning to dual training (Hypothesis 1a). The size of relevant cohorts may also negatively affect the chances of transitioning to dual training (Hypothesis 2a). As a result of political developments, both effects increase rather than decrease over time (Hypotheses 1b and 2b).

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 & 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 with the trend 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 stigmatisation (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 (cf. Thurow 1975).

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

Relevance of regional variations 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 (Manning & Petrolongo 2013, Muehlemann & Wolter 2011, Rouwendaal 1999). Not least due to the young 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 & Jacob 2012). However, in simple measures, the effects of regional variation may be conflated with trends (see the following section in this paper). Further attention should also be given to the conceptualization of the spatial scale of local labour-market conditions as could be shown when applying a flexible spatial concept of local socio-economic environments (see the *Study 1*). Inconsistencies in previous findings can at least partially be traced back to the different concepts of regional aggregation in which local labour-market conditions are measured.

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).

We can therefore expect a negative effect of (structural) unemployment on the chances of entering dual training

(Hypothesis 4a). Again, this effect increases rather than decreases over time (Hypothesis 4b).

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 gender, skills, abilities, and age (Meschi, Swaffield & Vignoles 2011, Morgan 2005, Rephann 2002, Rice 1999). However, inter-individual social 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 of training companies. In contrast, the success of lower qualified candidates will depend on the sufficient (local) supply of training opportunities, and their transition chances will follow the cyclical development of the training market.

We therefore expect that the transition behaviour of lower-qualified school leavers is particularly susceptible to varying labour-market conditions (Hypothesis 5)

Qualitative changes and life-course effects

A final aspect focuses on the *heterogeneous quality* of training placements and forms of potential 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’; cf. Neubäumer, 1993). Apprentices receive comparatively low wages and may be used to achieve short-term adaptations of the workforce during economic fluctuations (Muehlemann, Wolter & Wüest, 2009). 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. 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 the further employment careers 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

vocational 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 next major transition: 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 (cf. Hillmert 2001). 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.

Labour-market conditions during the first transition to dual training may have a conditional, qualitative impact that is indicated by delayed effects during the second transition to employment. If transitions to training are not affected by temporary unemployment, there will be negative delayed effects: 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 (Hypothesis 6a). 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. Delayed

effects will lose importance due to reduced state intervention in the creation of training opportunities (Hypothesis 6b).

6.4 Data and analytical strategy

In order to test these hypotheses, we use individual-level data from the *National Educational Panel Study NEPS* (Blossfeld, Roßbach & von Maurice 2011) and merge these with regional administrative data. In *NEPS Starting Cohort 6 – Adults (NEPS-SC6)*, individuals aged 18 to 65 at the time of the first interview provided information about their life course retrospectively. On the basis of this individual-level longitudinal data, transitions to training can be constructed as the central dependent variable (cf. *Table A 5*, left, in the appendix). Due to institutional guidelines, training positions are mostly available once a year between late summer and fall. Therefore, we use a discrete-time event history model and analyse the data on a yearly basis. We focus on the first four 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 learn more about potential qualitative developments in the transitions to training we 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 six months) after dual training (*Figure A 4*, right, in the appendix). Here, we use a continuous-time exponential event-history model.

The regional context data has 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). Therefore, we cannot consider respondents who left general schooling before 1975. Also, we exclude East Germany from our analysis. The combined data set consists of 5,640 individual cases with non-missing regional information.

Labour-market information on unemployment and employment has been provided by the Statistical Service of the Federal Employment Office (2014). It includes information on the unemployment situation in administrative districts. 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. In previous analyses on transitions to vocational training in Germany, we found evidence that a specific aggregation of administrative districts (home districts and neighbouring districts) is a good approximation for mapping relevant training areas (see *Study 1*). We therefore use this operationalization in this paper.

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, so 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 and short-term deviations due to, for example, business-cycle fluctuations. Rather than simply controlling for time (discontinuously) in the analytical model in the form of cohort groups, we model regional trends in the relevant variables. As the core of our macro-level data preparation, we apply a *decomposition* distinguishing three components in unemployment rates for any of the yearly values in the regionalized time series (see *Figure 6.3*, which illustrates the decomposition of local unemployment rates for a particular year). We first estimate a (linear) trend and the respective residuals for every regional area considered. We also calculate the deviations of local unemployment trends from the national (West German) trend. This differentiation allows us to decompose each region-specific level of unemployment in a particular year into three components: the long-term national trend (component 1), the deviation of the local trend from the national trend (component 2), and the short-term deviation from the local trend (component 3). By using the

components as separate predictors in the analytical models, we can assess their specific relevance for the transition process to dual training. While component 1 represents the common trend, component 2 represents the typical situation of a particular region relative to the average situation, and component 3 represents the current (short-term) regional situation relative to the typical regional situation.

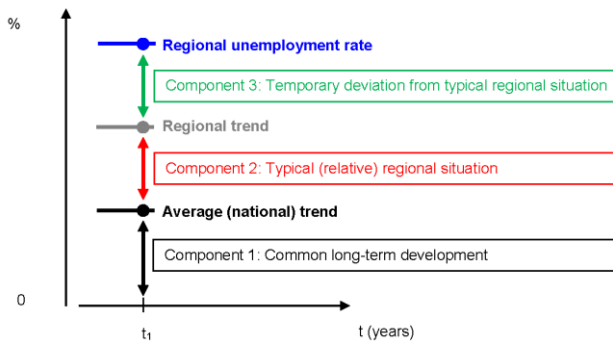


Figure 6.3: Decomposition of (regional) unemployment

We now apply this analytical approach to administrative time-series data. The empirical distributions of unemployment in 327 regions in West German (see Figure 6.4a) suggest that the developments in the regions have obviously been highly synchronized, although the amplitude of fluctuations has been different. An application of the decomposition method results in the specified components (panels b to d). We can analytically differentiate between *long-term trends* and *short term fluctuations* that do not represent a trend. 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 linear trend, the average duration of deviations is no more than six years. This is in line with the theoretical understanding of temporary adaptations.

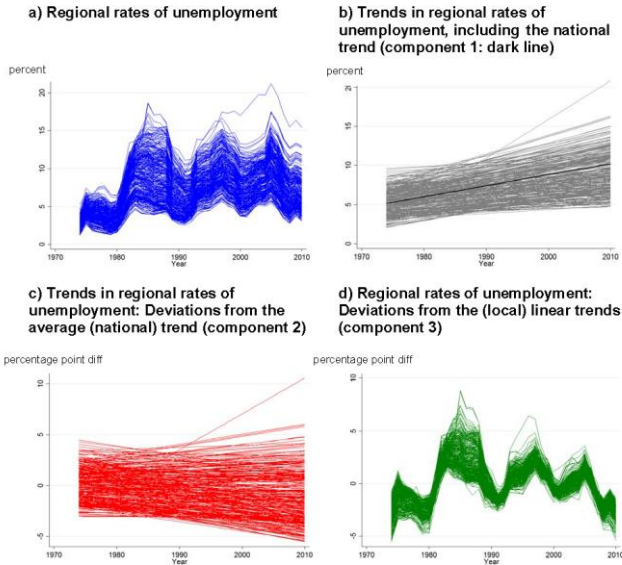


Figure 6.4: Unemployment rates (percentages/percentage point differences) in West Germany: Regional time series (1974-2010) and decomposition, Data: Federal Employment Office 2014, own calculations

In our analyses, we represent additional determinants of competition by considering the size of relevant youth cohorts on the regional level (see *Figure A 5* in the appendix). We also control for various characteristics on the individual level, including sex, qualification level, and migration background, as well-known predictors of transitions to training (Hillmert & Weßling, 2014).

To compare between models, the average marginal effects of the predictors are calculated. To allow for an adequate interpretation of interaction effects (Norton, Wang & Ai

2004), average marginal effects at representative values are calculated and presented in marginal effect plots (see *Figure 6.5*) (Williams 2012).

6.5 Multivariate results

We look at the transition from secondary school to dual training (observed within the first four years after school graduation) using a discrete-time event-history model. In *Table 6.1*, 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 effects of (temporary) unemployment and structural regional unemployment (and cohort size) on the chances of transitioning to vocational training. The results are in line with our expectations. De-trended unemployment for regions – ‘temporary component’ 3 – obviously 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 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 6.5* indicate, the negative effects 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 also the [absolute] marginal effect plots (b) in *Figure 6.5*) 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 marginal effect plots (c) in *Figure 5*. While graduates from lower secondary tracks are negatively affected by high levels of unemployment in both components, the impact of the regional unemployment level and temporary unemployment is rather insignificant for school leavers from intermediate secondary schools and is 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 is probably 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. *Hypothesis 5 can be confirmed.*

Table 6.1: Event history models for the transition to vocational training in the dual system

	M1	M2	M3	M4
Baseline (year of school graduation) (<i>Ref. year 1-4</i>)	0.365*** (0.006)	0.366*** (0.007)	0.309*** (0.007)	0.305*** (0.009)
Sex (male)			0.027*** (0.004)	0.028*** (0.006)
Lower sec. degree. (<i>Ref. intermediate</i>)			0.039*** (0.005)	0.028*** (0.004)
Higher sec degree. (<i>Ref. intermediate</i>)			-0.177*** (0.006)	-0.163*** (0.009)
Parent(s) lower/no sec. degree (<i>Ref. intermediate</i>)			-0.016** (0.005)	-0.009* (0.006)
Parents higher sec. degree (<i>Ref. intermediate</i>)			-0.034*** (0.006)	-0.027*** (0.010)
Parent(s) have no voc. degree (<i>Ref. VET</i>)			-0.017** (0.008)	-0.014* (0.008)
Parent(s) have univ. degree (<i>Ref. VET</i>)			-0.014 (0.010)	-0.035*** (0.010)
Migration background			-0.033** (0.005)	-0.027** (0.006)
<i>CONTEXT VARIABLES</i>				
Unempl.: Dev. local trend and country trend (comp. 2)	-0.002** (0.001)	-0.001* (0.000)	-0.002** (0.001)	-0.002** (0.001)
Unempl.: Trend residual (comp. 3)	-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 sec. degree x year			-0.008* (0.006)	-0.003* (0.001)
Higher sec. degree x year			0.024** (0.008)	0.003*** (0.000)
Unempl. rate % deviation (comp. 2) x year		-0.002* (0.001)		
Unempl. rate % trend residuals (comp. 3) x year		0.000 (0.009)		
Change in previous year in relevant population x year		-0.003** (0.001)		
Lower sec. degree x Deviation (comp. 2)				-0.006* (0.002)
Lower sec. degree x Trend residual (comp. 3)				-0.003 (0.001)
Higher sec. degree x Deviation (comp. 2)				0.011** (0.003)
Higher sec. degree x Trend residual (comp. 3)				0.015** (0.004)
<i>Events</i>	2,781	2,781	2,781	2,781
<i>N = (persons)</i>	5,640	5,640	5,640	5,640
<i>N = (persons years)</i>	18,457	18,457	18,457	18,457
<i>Pseudo R² (McFadden)</i>	0.234	0.243	0.327	0.329

Discrete-time event history model; presented are average marginal effects; clustered S.E. in parentheses, significance level: *p<0.1, **p<0.05, ***p<0.00, Data: NEPS-SC6, Federal Employment Office 2014, Federal Statistical Office 2014, own calculations

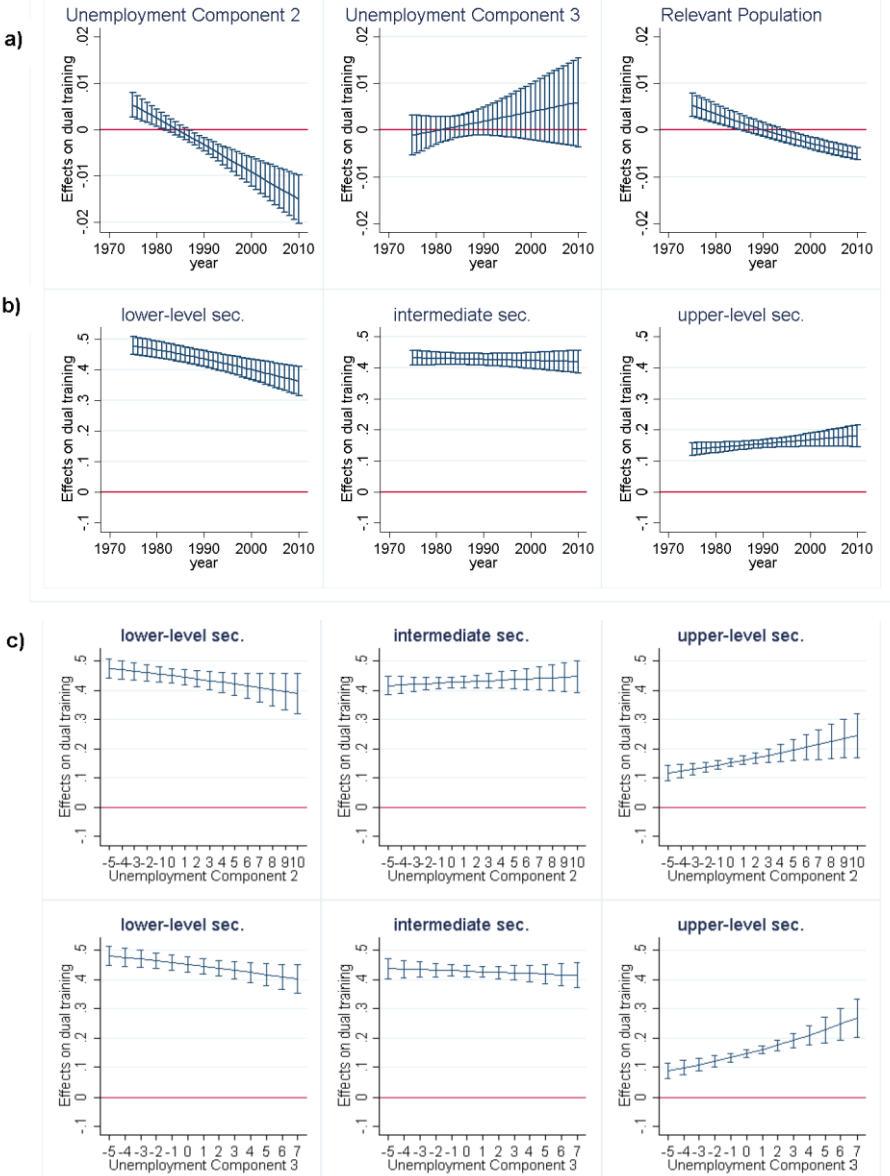


Figure 6.5: Selected marginal effects for the transition to vocational training in the dual system

Table 6.2: Event history models for the transition to employment after the completion of training

	M1	M2	M3	M4
Baseline	-2.705*** (0.022)	-2.743*** (0.021)	-2.719*** (0.024)	-2.319*** (0.082)
Sex (male)				-0.254*** (0.079)
Lower sec. degree. (<i>Ref. intermediate</i>)				0.078 (0.048)
Higher sec degree. (<i>Ref. intermediate</i>)				0.246** (0.079)
Parent(s) lower/no sec. degree (<i>Ref. intermediate</i>)				-0.011 (0.058)
Parents higher sec. degree (<i>Ref. intermediate</i>)				-0.243** (0.008)
Parent(s) have no voc. degree (<i>Ref. VET</i>)				-0.216** (0.080)
Parent(s) have univ. degree (<i>Ref. VET</i>)				-0.1125 (0.108)
Migration background				-0.163** (0.063)
<i>CONTEXT VARIABLES</i>				
Unempl.: Trend residual (comp. 3)		0.024** (0.010)	0.054** (0.018)	0.012** (0.010)
Unempl.: Deviation local trend and country trend (end of training) (comp. 2)	-0.021** (0.010)	-0.049** (0.011)	-0.023** (0.012)	-0.018** (0.002)
Unempl.: Trend residual (end of training) (comp. 3)	-0.070*** (0.011)	-0.072*** (0.011)	-0.089*** (0.017)	-0.069*** (0.010)
Change in previous year in relevant population		-0.025*** (0.006)	-0.024*** (0.006)	-0.023*** (0.006)
<i>INTERACTION TERMS</i>				
Unempl. rate % deviation (comp. 2) x year			-0.003** (0.001)	
Unempl. rate % trend residuals (comp. 3) x year			0.001 (0.001)	
Change in previous year in relevant population x year			0.001 (0.002)	
<i>Events</i>	2,197	2,197	2,197	2,197
<i>N = (persons)</i>	2,696	2,696	2,696	2,696
<i>LR Chi²</i>	22.41	50.06	56.47	125.00

Exponential event history model; presented are model coefficients; S.E. in parentheses; significance level: *p<0.1, **p<0.05, ***p<0.00, Data: NEPS-SC6, Federal Employment Office 2014, Federal Statistical Office 2014, own calculation

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 2,696 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 are presented in *Table 6.2*.

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. As we found at least a small 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 are also interactions between the context variables and the time trend. The respective effect plots in *Figure 6.6* suggest that the significant effects have disappeared in more recent periods. This is in line with our expectation that such delayed effects will 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).

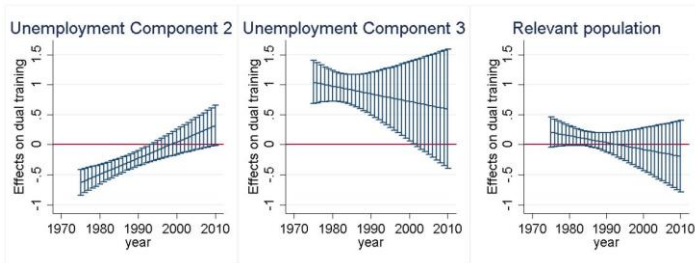


Figure 6.6: Interaction between context characteristics and time for the transition to employment after the completion of training

6.6 Conclusion

This paper 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 has 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. Note, however, 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 programmes. Moreover, 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, a number of questions remain open. 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 indicators, can be useful even for cross-sectional analyses. While time-dependent components (trends, temporary deviation) are not applicable under such circumstances, de-trending may improve the adequacy of the *cross-sectional* measures as it allows for identification of the *purely* structural component. We are therefore convinced that our decomposition approach is useful for a broad set of applications.

C. CONCLUSION AND OUTLOOK

7 OVERALL CONCLUSION AND OUTLOOK

This dissertation contributes to improve upon what is known about the influence of socio-spatial contextual characteristics on inequality in educational transitions in the advanced educational career. Introduced by a theoretical framework, three empirical studies on educational transitions from general school to vocational training and university education aimed at providing answers to the four research questions initially asked in the introduction:

- 1) *Which are the underlying mechanisms at work regarding the impact of socio-spatial contextual characteristics on inequalities in individuals' chances of transitioning to vocational or academic training?*
- 2) *Where are relevant socio-spatial contextual characteristics located? (How large or small is the adequate spatial extension?)*
- 3) *Are different socio-spatial contextual characteristics interrelated regarding individuals' chances of transitioning to vocational or academic training?*
- 4) *Are socio-spatial contextual characteristics related to individual characteristics such as social origin or individuals' previous educational performance regarding the chances of transitioning to vocational or academic training?*

CONCLUSION AND OUTLOOK

In this final chapter of my dissertation, I provide a summary of the main theoretical considerations and empirical findings. Moreover, I discuss shortcomings and limitations that are worth being rectified in future research. I reflect on the relevance of the theoretical and empirical implications of the dissertation against the background of more general trends in research on contextual conditions and on educational as well as social inequality. I conclude the dissertation with notes on the practical relevance of the findings.

7.1 Summary

The relevance of spatially flexible context characteristics in explaining differences in individuals' chances of transitioning to vocational and academic training has been the key object of investigation.

The overall theoretical frame was a sociological life-course perspective (e.g. Elder 1985, Mayer 2004). Educational transitions form key objectives to be explained in life course theory (Pallas 2003, Kerckhoff 2000). To explicate educational inequality, a rational-choice approach on decisions and subsequent transitions was applied. Arguing from a rational-choice perspective, the final educational outcome is viewed as a successive sequence of decisions that base on the evaluation of costs, benefits and success probability (Mare 1980, Boudon 1974). In addition, norm-based educational preferences represent an explanation for educational inequality (Kroneberg, Stocké & Yaish 2006, Gambetta 1987, 1998).

In research on educational decision-making processes the crucial relevance of contextual settings such as family, school, or school class has repeatedly been stressed (e.g. Hillmert & Weßling 2014, Becker & Schulze 2013, Neugebauer & Schindler 2012, Esser 1999, Breen & Goldthorpe 1997, Coleman 1966). This general research focus was extended by concentrating on the relevance of characteristics of the socio-economic and socio-structural

living environment. For this purpose, social mechanisms through which these context characteristics impact educational transitions were derived and two main modes of influence that base on opportunities and preferences were targeted (Freese 2009, Peterson 2009). Following theoretical considerations on space in sociology (e.g. Hillmert 2016, Logan 2012, Löw 2001, Simmel 2009, 1995, Gieryn 2000), the argument has been brought forward that characteristics of the local or regional context become socially relevant in terms of spatial distance, spatial structuring, and dependencies within space. Thus, rather than focusing on fixed contextual units, the dissertation advocated that the question on the *where* of contextual settings should be answered empirically. In the three studies comprising the dissertation, two representative German surveys were combined with flexibly aggregated administrative data to contribute to a deeper understanding of the above stated research questions. For an overview of the empirical studies see *Table 7.1*.

Table 7.1: Summary of the three studies comprising the dissertation

	Study 1: Spatial structure and transitions to VET	Study 2: Spatial structure and transitions to higher education	Study 3: Decomposition of unemployment
Research focus	Impact of socio-spatial conditions (unemployment) on transition to VET, focus on spatial structure and spatial extension of effect	Impact of socio-spatial conditions (education infrastructure and unemployment) on transition to university and on chance to study in home region	Impact socio-spatial conditions
Central hypotheses	(1) Mechanisms, (2) Interrelation of contexts, (3) Spatial scale	(1) Mechanisms, (2) Interrelation of contexts, (3) Spatial scale, (4) Group-specific variations	(1) Mechanisms, (2) Interrelation of contexts, (4) Group-specific variations
Observation period	1999-2012	1986-2011	1975-2010
Individual data source	SOEP (v29)	NEPS SC6:5.1.0	NEPS SC6:5.1.0
Contextual data source	Federal Employment Office, Federal Statistical Office, Federal Agency for Cartography and Geodesy, BBSR	Federal Employment Office, Federal Statistical Office, Federal Agency for Cartography and Geodesy, BBSR, German Council of Science and Humanities	Federal Employment Office, Federal Statistical Office, Federal Agency for Cartography and Geodesy, BBSR
Level of aggreg. contextual	Administrative districts, NUTS-3	Municipalities, LAU-2	Administrative districts, NUTS-3
Methods	Spatial-weighting matrix, Discrete event history model	Confirmatory factor analysis (CFA), Calculation of travel time matrices, Discrete-time event history model, Logistic regression model	Linear regression model (decomposition), Discrete-time event history model, Event history model
Dep. variable(s)	Transition to VET within 4 years after lower or intermediate secondary school	(1) Transition to university within 6 years after graduation from upper-sec. school, (2) Attending university in home region	(3) Transition from school to VET (1 st transition) (4) Transition from VET to labour market (2 nd transition)
Main indep. variable(s) of interest	<ul style="list-style-type: none"> ▪ Unemployment rate (in the home, 1st and 2nd neighbouring districts) 	<ul style="list-style-type: none"> ▪ Supply with higher education infrastructure ▪ Traditional university climate ▪ Unemployment rate 	<ul style="list-style-type: none"> ▪ Decomposed unemployment components (typical regional situation (comp.2), temporal trend (comp.3)) ▪ Changes in age-specific population
Sample size	<ul style="list-style-type: none"> ▪ n (persons) = 2,144, N (person years) = 3,970, Events = 1,286 	<ul style="list-style-type: none"> ▪ Transition to university: n (persons) = 1,792, N (person years) = 3,380, Events = 1,037, Study in home region: n (persons) = 954, Events = 489 	<ul style="list-style-type: none"> ▪ 1st transition: n (persons) = 5,640, N (person years) = 18,457, Events = 2,781, 2nd transition: n (persons) = 2,696
Central findings	<ul style="list-style-type: none"> ▪ Socio-economic conditions impact transition to dual training ▪ Different spatial contexts are interrelated ▪ Context effects decrease with increased spatial scale 	<ul style="list-style-type: none"> ▪ Socio-economic & socio-structural conditions impact transition to university ▪ Socio-economic & socio-structural conditions are interrelated ▪ Spatial scale varies for diff. context effects, ▪ Effects decrease with spatial scale ▪ Context effects moderated by parents' SES 	<ul style="list-style-type: none"> ▪ Long-term, short-term and regional effects of socio-economic context can be separated ▪ Long-term developments and regional variations impact transition to dual training ▪ Delayed effects on transition to employment ▪ Context effects moderated by school-leaving certificate

In the first study, the aim has been to assess the spatial scale of socio-economic context characteristics that are relevant for the transition from lower and intermediate school to vocational training in the dual system. The processed individual survey data set (GSOEP) was linked to administrative contextual information on local socio-economic characteristics on the basis of administrative districts (NUTS-3). Concentric rings of administrative districts were calculated on the basis of contiguity matrices to demonstrate the radius in which school graduates' training prospects are influenced. The findings confirmed a negative impact of unemployment on individuals' training chances. Furthermore, the spatial conceptualisation of regional unemployment beyond fixed administrative boundaries appeared to be highly appropriate; regional unemployment in local units that are adjacent to the home district negatively impact the chance of enrolling for dual training. In contrast, further remote districts lose their significance. The finding contributes to the overall assumption that contextual influences decrease with increased distance. Beyond the relevance of spatial scale, patterns of spatial structuring have been detected; a higher unemployment rate in the home district leads to a decrease in the impact of unemployment in the surrounding districts. It was argued that this finding can be understood as a decrease in the search radius when unemployment is high in the close-range area due to the discouragement of adolescents.

In the second study, the objective has been to estimate the impact of socio-structural contextual characteristics on the chance to enter university and on the subsequent chance to do so in the home region. Different aspects of the socio-structural contextual conditions were conceptualised with the aim to represent the theoretically assumed mechanisms. A confirmatory factor analysis was applied to derive two factors regarding the university infrastructure; the first factor represents opportunities in terms of the supply with university facilities in the local context. A second factor was calculated that comprises the traditional university climate in the local area. In addition, information on the local labour market was included. In line with *Study 1*, a major concern was to learn more about the relevant spatial extension of contextual effects. For this purpose, an alternative approach is tested in the second study; it was made use of travel time matrices for West German municipalities (LAU-2). The contextual information has been flexibly aggregated within travel time radii to determine the spatial scale most relevant for the transitioning processes. Results indicated that the supply with university infrastructure as well as the traditional university climate, both affect the chance of enrolling to university positively. However, the influence of the supply with university offerings is overall stronger and more stable. Due to the close relation between labour market and training market the positive effect of local unemployment has been understood as the absences of vocational training alternatives.

Study-related mobility decisions have been found to be generally more strongly influenced by socio-structural contextual conditions than the chance to enter university at all. This finding was considered reasonable, as a spatial relocation is directly associated with regional disparities. Furthermore, the educational infrastructure is of particular importance when unemployment is high (i.e. training opportunities are limited). Also, group-specific differences in the relevance of contextual characteristics on the chance to study were found; the supply with study opportunities turned out to compensate for social status inequalities in the transition to university, while poor labour-market conditions increase educational disparities between students of different social origin. Results demonstrated that opportunity-based influences are most relevant in a commutable spatial range, while contextual conditions that refer to educational preferences have a smaller spatial radius. In line with *Study 1*, contextual influences have been shown to decrease with an increase in the spatial radius. The application of travel time data made it possible to give an accurate impression of contextual characteristics in perceptible and accessible areas. Compared with *Study 1*, the smaller level of aggregation of context data made it possible to conceptualise the contextual characteristics more precisely. However, findings from both studies support the general idea that the *where* of influencing indicators proved to be worth considering in context effect research.

In the third study, the goal has been to dismantle the effects of labour-market conditions on the chance to enrol to dual vocational training. Moreover, an additional life-course analysis on the chance to enter employment subsequent to training was carried out to answer the question if labour-market conditions have additional delayed implications for the transitions to employment. Aspects of regional socio-economic settings were dissected from business-cycle fluctuations on the one hand, and long-term developments on the labour and training market on the other. To separate these distinct aspects a statistical decomposition approach was conceptualised and applied. School graduate cohorts over recent decades from 1975 onwards were investigated on the basis of the longitudinal data from the NEPS-SC6. This data has been merged with the regional aggregate information. Resulting from the findings in *Study 1*, a specific conceptualisation of regional units that based on including the home district and the neighbouring districts was applied as it served as an appropriate approximation for mapping the spatial extension relevant for vocational training transitions. Negative but rather unstable associations between temporary business-cycle fluctuations and transition chances to training were detected. Moreover, the analysis of the transition from training completion to employment revealed that there are delayed effects of temporary labour-market conditions. Beyond that, findings confirmed long-term changes in the relative chances of entering vocational training for different

school qualification levels. Low-qualified school leavers have found it increasingly difficult to access dual training in recent decades. In contrast, vocational training has been of growing relevance for high-qualified school leavers. Results showed that there are persistent regional differences that are obviously more important for the transition to training than temporary business-cycle fluctuations on the labour market. Similar to *Study 2*, group-specific variations in the influence of socio-spatial contexts have been investigated. *Study 3* provided evidence for variations in contextual effects with regard to different school-leaving certifications; low-qualified school leavers are particularly susceptible to changes in labour-market conditions. Results from both studies indicated that local and regional conditions reinforce or mitigate the impact of various and well-studied inequality dimensions.

In summary, by taking local and regional characteristics and their spatiality into account, this dissertation contributed to exploring relevant influencing factors that impact adolescents at the transition from school to training or university. Clearly, the overall effects of contextual characteristics on transitions to vocational and academic training are relatively small compared to the relevance of the ‘usual suspects’ such as the social and ethnic origin, and the previous educational career. However, for the major part, socio-spatial contexts appear to be a significant and stable, additional dimension of educational inequality that has been largely neglected in empirical studies to date. More so, the findings on group-

specific variations demonstrated that local and regional context characteristics are not only relevant as such, but that they are particularly relevant with respect to the widely known and well-studied dimensions of social inequality and stratification.

7.2 Shortcomings and limitations

The conceptual considerations and empirical analyses of the dissertation are not without limitations. As limitations of the empirical studies are already identified in the conclusion section of each of the empirical chapters, this section will focus on restrictions and shortcomings from an overarching perspective.

First, a shortcoming affecting all of the three empirical studies is the problem of not being able to fully disentangle the process of educational attainment. Ideally, educational *aspirations* (the wish or goal to pursue a particular career path), educational *decisions* (actual applications for specific education or training programmes), and fulfilled *transitions* are to be separated. I argue that there are two modes of influence: opportunities and preferences. While aspirations should be more strongly influenced by contextual factors assigned to the preference mode, actual decisions refer to available opportunities in a specific residential setting. Without a further opening of the ‘black box’ (cf. chapter 2.2) and a clear distinction between the components, it is problematic to assign the contextual influences to specific aspects in the educational attainment process. In *Study 1* the relevance of unemployment was interpreted as both, a discouragement from applying for training as well as a lack of training opportunities. *Study 2* more strongly engaged in a differentiation between the two modes of influence. Results

indicate that actual opportunities have a stronger impact on the transition to university. However, without clear differentiation in the dependent variable the findings should be interpreted with caution. Applying data that explicitly captures the formation of educational aspirations in detail before transitions take place will rule out this problem. For this purpose, the data has to be structured in panel format and capture the time frame during which individuals' educational and occupational preferences are formed as well as the actual educational or occupational consequences.

Moreover, transitions are the result of a two-folded decision process, including not only school graduates' decisions but also the decisions of institutions and training companies. Apparent admission criteria of educational institutions (e.g. universities) make it easier to predict institutional decisions. The prediction is impeded when the decision-maker is an employer, which is the case at the transition to dual vocational training. Furthermore, information on (rejected) applications is of need to optimally trace the decision-making process of individuals. In summary, data that meets all of the elucidated requirements, and is, moreover, representative for the case of Germany (or other countries), available for several decades to observe changes across cohorts, plus contains information on the residential context does unfortunately not exist (so far).

As a consequence, I have to refrain from making strong causal claims. Besides the efforts to account for unobserved

heterogeneity on the individual and contextual level, the black box of the education process is only partially open up in this dissertation. This might bias the effects of contextual settings on educational outcomes. However, one can argue that even if the black box was open up, results from survey data analysis should be understood as observed empirical regularities rather than causal phenomena in a strict sense.

A conceptual shortcoming concerns the narrow focus on the educational decision-making process. *Study 2* indicated that the process of educational decision-making – especially at the transition step to vocational and academic qualification – includes several decision steps, such as *if, what* and *where* to study. I expect these decision steps to be strongly connected particularly with regard to the socio-spatial conditions in which individuals are embedded in. Moreover, the relation between contextual setting, social origin, and educational decision-making processes raises the question on the relevance of contextual characteristics not only with regard to the differentiated decision steps, but also with regard to the sequence in which the decision steps take place. Analyses might therefore not only include the general transition to university or vocational training (and spatial relocation) but furthermore the choice of field of study or the occupational field. Theoretically, it should be reflected upon a more complex conceptualisation of decision sequences. Not least due to the restricted number of cases, it has not been feasible

to include qualitative differences in terms of occupations or sectors, and study or training courses.

Further, due to data protection guidelines and limitations in data availability the administrative context data sets utilised in this project are on rather broad levels of aggregation (municipalities and administrative districts). This might limit the informative value on the spatial extension of contextual effects. To optimally assess the spatial scale of socio-economic and socio-structural context characteristics that are associated with theoretical mechanisms, geocoded information is highly favourable to be available for local units as small as possible – preferably for the respondents' addresses.

Moreover, the scope of this dissertation is limited as it covers only one country. Due to the educational system, especially the strongly developed VET-system, Germany provides a particularly interesting case as it includes a variety of vertically as well as hierarchically structured tracks among which adolescents can choose after school graduation. However, for the sake of more general statements on socio-spatial contexts and educational transitioning processes, the derived hypotheses should be tested in other (institutional) settings.

Notwithstanding the above, the empirical findings strongly indicate that socio-spatial contexts are of relevance in the process of transitioning from general school to vocational and academic training. Bearing in mind the outlined restrictions,

the applied approaches – particularly the flexible conceptualisation of spatial contexts – can be considered useful for both, sociological and economic research beyond the scope of educational transitions. Hence, the following section draws attention to potential for further research.

7.3 Implications for further research

As stated in the previous section, the dissertation leaves room for improvements and further developments in theoretical and empirical terms. Nevertheless, the empirical analyses provided, have gone beyond conventional analyses and they offer fertile ground for future research on matters of educational inequality and beyond.

First of all, a major shortcoming of the dissertation calls for analyses that differentiate between aspirations, decisions, and transitions. An explicit empirical focus on the impact of socio-spatial contextual conditions on students' aspirations during their last year(s) of general schooling before and directly after transitions take place is a promising way of identifying modes of influence more precisely. For Germany, recently available survey data sets, such as the NEPS will provide the possibility to capture aspirations and transitions separately.

Generally speaking, the dissertation initiates conceptual considerations for a broader theory on the relevance of socio-spatial contextual settings across individuals' life course; particularly the consideration of spatial features provides room for various research questions and applications. Combining conceptual ideas and empirical evidence from the present dissertation, suggests three key points for advancing theory:

First, linking contextual characteristics with specific mechanisms-based explanations that are assumed to be of relevance for a specific individual outcome seems to be a promising theoretical enhancement. Previous research on socio-spatial contexts predominantly focused on either specific characteristics (e.g. unemployment) or on the description of specific spatial units (e.g. the neighbourhood). Concentrating on the assumed mechanism through which contexts might impact the individual outcome reveals that the same indicator (educational infrastructure in *Study 2*; unemployment in *Study 3*) can have different implications. The model of frame selection (e.g. Esser & Kroneberg 2015) provides an appropriate theoretical foundation for further developments in this direction.

Also, it has been shown that same indicator on different spatial scales can represent different modes of influence. Therefore, I argue that, *second*, the spatial scale and structure should theoretically be taken into account when analysing the impact of contextual characteristics. With respect to a flexible understanding of spatial contexts, research can be significantly improved; the spatiality of contexts is relevant for individual outcomes in multiple ways, such as spatial scale, spatial structuring, dependencies between spatial contexts, and the duration that individuals are exposed to an environment. Arguing from a life-course perspective, it is assumed that the influence of spatially structured contextual characteristics changes across the individual life course.

Investigating changes and processes of socio-spatial contextual effects at specific stages in the life course is therefore a promising strategy to find out more about influences on individual decision making processes and transitions.

Third, further attention should be given to the variations in the relevance of socio-spatial contextual effects for specific social groups. In this dissertation, disparities in contextual influences for different groups of school leavers and for students from different social origin were investigated. Beyond that, variations in the effects of socio-spatial contexts can be considered to be, for instance, gender-specific or migration-specific. Concerning group-specific variations in contextual effects on individual outcomes, additional research is required in order to gain further insights.

Beyond theoretical enhancements, the applied approaches are of relevance in terms of methods in (at least) two respects: *First*, results indicate that heterogeneous context effects in previous research can, at least in part, be traced back to an undifferentiated use of economic and structural context variables. Different information on the contextual level might be interrelated. Moreover, the measurement of contextual indicators on fixed spatial units (e.g. administrative district or federal state) biases effects on individual outcomes and makes research on contextual influences less comparable (Kwan 2012, Fotheringham & Wong 1991). Further methodological considerations and investigations including aspects of

spatiality will help to disentangle the impact of contextual effects on individual outcomes.

Second, findings suggest that a theoretical mechanism might not exclusively be assigned to one particular spatial unit but rather has a specific spatial structure and scale. This is relevant as it violates the general assumptions of conventional multi-level analysis. Thus, methodological advancements that are concerned with an elaborate combination of multi-level and spatial analysis techniques are highly desirable. Due to a growing availability of local and geocoded data and steady advancements in analytical techniques, empirical social research has only recently become interested in spatial analyses but application possibilities seem manifold.

7.4 Concluding remarks and policy implications

Adolescence is considered a time in the life course during which multiple and simultaneous decisions and transitions occur. Young adults face the challenge of which path to choose in several respects, especially in terms of education and occupation. The acquisition of an educational and an occupational qualification are among the most critical features in modern societies. The main goal of this dissertation was to create a deeper understanding of the impact of different socio-spatial contextual characteristics on inequalities in educational transitions. The family, in terms of social status, the migration background, and gender as well as the previous educational career represent the ‘usual suspects’ that play the predominant role in explaining educational inequality. But the presented findings reveal: context matters! In that sense, the results of this research work are of relevance to adolescents. They might actively involve information on their particular residential constraints and possibilities in decisions regarding their educational and occupational future. However, to be able to do so, the relevance of residential contexts should be perceived in smaller and greater matters; the issue is underrated in research on educational and social inequality as well as in political and public discourses.

Overall, public debates on post-school education in Germany are largely concerned with stressing the unbroken relevance of the dual vocational training as ‘*the fundamental pillar of skilled workforce in Germany in the coming decades*.²⁴’ (Wanka 2015) while facing declining numbers of young adults participating in training and growing numbers of university students. Yet, particularly low-qualified school leavers are confronted with increasing difficulties to enter vocational training over the last decades. In this context, the prerequisites for vocational training – so called apprenticeship maturity (‘*Ausbildungsreife*’) – are under constant discussions. While increasing numbers of students raise inner-German concerns on a proceeding *academisation* – ultimately culminating in an ‘*academisation-mania*’ (‘*Akademisierungswahn*’) – (Schmidt 2014) associated with grade and certificate inflation, the development is considered benevolently in the international context; the OECD (Organisation for Economic Co-operation and Development), indeed, praises the increased number of school graduates attending university in Germany (Lueg 2015).

These bigger picture issues are not independent of local and regional constraints and possibilities. The findings provided in this dissertation demonstrate that the competitive disadvantages in the access to training programmes are

²⁴ In the original: ‘*Das duale System ist auch in den nächsten Jahrzehnten die wesentliche Säule der Fachkräftesicherung in Deutschland.*’

especially relevant for low-qualified school leavers and school leavers from lower social origin. Relocating from a poor socio-economic and socio-cultural residential context is less likely for those who lack (e.g. information and financial) resources. In addition, it is well-known from sociological research that disadvantages are often cumulated.

It can therefore be argued that the findings are considerably relevant to education professionals and economic decision-makers (e.g. employers that provide training); In order to offer *'the helping hand'* that is already referred to in Elvis Presley's song *In the ghetto*. Tailored support and information that include both, the individual situation of a school graduate and – in addition and relation to that – educational and occupational opportunities in a particular residential context might improve the matching of supply of and demand for vocational and academic training.

At higher levels, policy makers and urban planners might consider the relevance of local contexts for young individuals when actively shaping local opportunities by planning and establishing educational infrastructure.

Overall, a greater awareness for individuals' consequences resulting from disparities in local and regional contexts can enable school graduates to develop a view beyond (residential) horizon, and therewith broaden their educational preferences.

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9 APPENDIX

Table A 1: Descriptions of independent model variables on individual level

Variable	Category	Percentage
Sex	male	53.1
	female	46.9
School certificate	drop out without certificate	11.2
	lower secondary certificate	34.9
	intermediate secondary certificate	53.9
Parent' school certificate	no/lower secondary certificate	42.9
	intermediate certificate	46.5
	university entrance diploma	10.6
Parents' vocational education	no vocational training	18.2
	vocational training	70
	university degree	11.8
Migration background	immigrant of 1 st or 2 nd generation	19.1
	natives	80.9
Total		100 (<i>n</i> =2,144)

Data: GSOEP 2012, own calculations

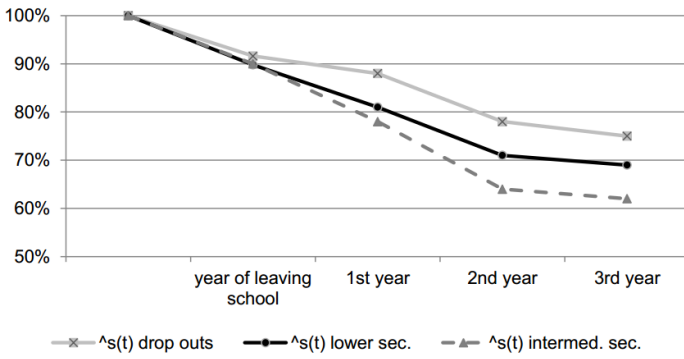


Figure A 1: Survivor function for different groups of school leavers (drop outs, lower secondary school graduates and intermediate secondary school graduates) to enter dual training within the first 3 years after school completion, Data: GSOEP 2012, own calculations

Table A 2: Descriptions of model variables (dependent variable: probability of entering higher education), data: NEPS-SC6, Federal Employment Agency, the Federal Statistical Office, German Council of Science and Humanities, BBSR, own calculation

Variable	Category	Percentage / Mean (Std.dev.) [Min – Max]	N=
Individual level			
<i>Dependent Variables</i>			
(1) University education	yes	42.14 %	
	no	57.86 %	1,792
<i>Independent Variables</i>			
Parents' social status (combined max.)	high	39.34 %	
	intermediate	34.82 %	
	low	25.84 %	1,792
Sex	male	47.82 %	
	female	52.18 %	1,792
Migration background	natives	81.81 %	
	migration background	18.91 %	1,792
Final grade		2.56 (0.60) [1-4]	
Year [observation period]		1997.0 (6.61) [1986 – 2011]	1,792
Context level			
Unemployment rate	<i>individual level</i>	6.04 (2.57) [1.78–17.5]	1,792
Supply of university opportunities (<i>factor1</i>)	<i>individual level</i>	0 (1) [-1.09– 3.3]	1,792
Traditional university infrastructure (<i>factor 2</i>)	<i>individual level</i>	0 (1) [-0.85 – 3.81]	1,792
High school graduates	<i>individual level</i>	0.24 (0.057) [0 – 0.59]	1,792

Table A 3: Descriptions of model variables (dependent variable: probability of attending university in one's home region), data: NEPS-SC6, Federal Employment Agency, the Federal Statistical Office, German Council of Science and Humanities, BBSR, own calculation

Variable	Category	Percentage / (Std.dev.) [Min – Max]	Mean	N=
<i>Individual level</i>				
Dependent Variables				
(2) Spatial relocation	Yes	49.88 %		
	No	51.22 %		954
Independent Variables				
Parents' social status (combined max.)	high	52.52 %		
	intermediate	29.58 %		
	low	17.90 %		954
Sex	Male	48.67 %		
	female	51.33 %		954
Migration background	natives	79.84 %		
	migration background	20.16 %		954
Final grade		2.29 (0.47) [1-3.9]		
Year [observation period]		1996.1 (6.36) [1986 – 2011]		954
<i>Context level</i>				
Unemployment rate	<i>individual level</i>	6.15 (2.61) [1.98–17.5]		954
Supply of university opportunities (<i>factor1</i>)	<i>individual level</i>	0(1) [-1.09– 3.57]		954
Traditional university infrastructure (<i>factor2</i>)	<i>individual level</i>	0 (1) [-0.83 – 3.78]		954
High school graduates	<i>individual level</i>	0.21 (0.059) [0 – 0.59]		954

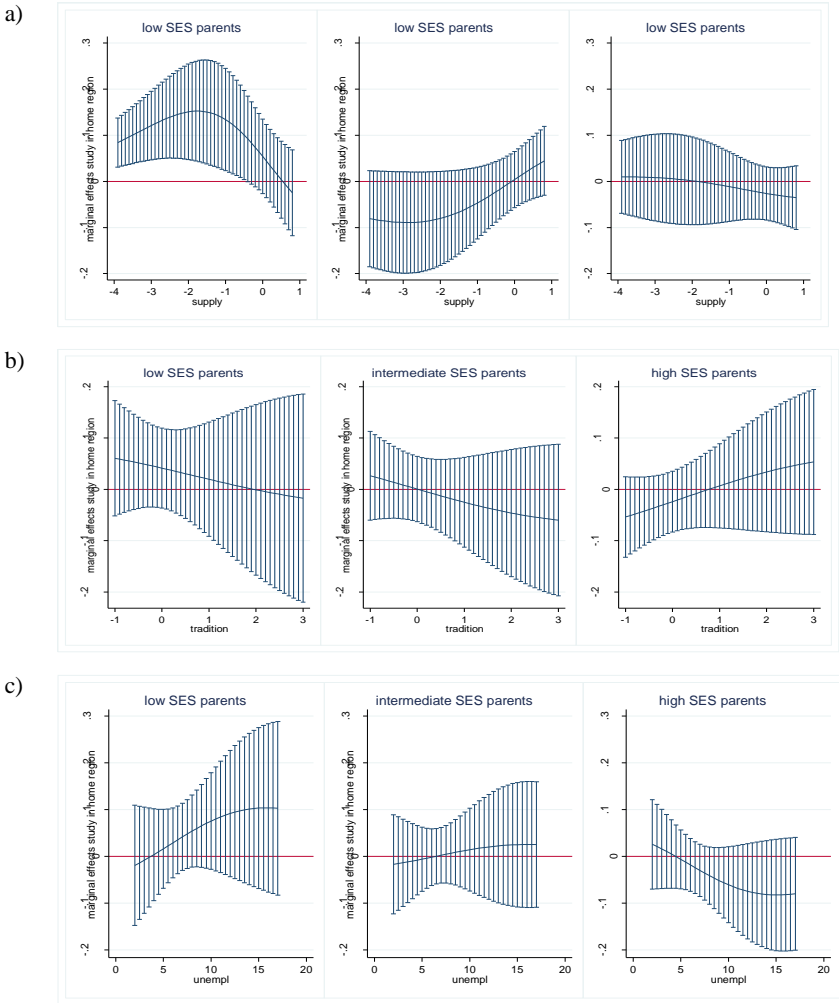
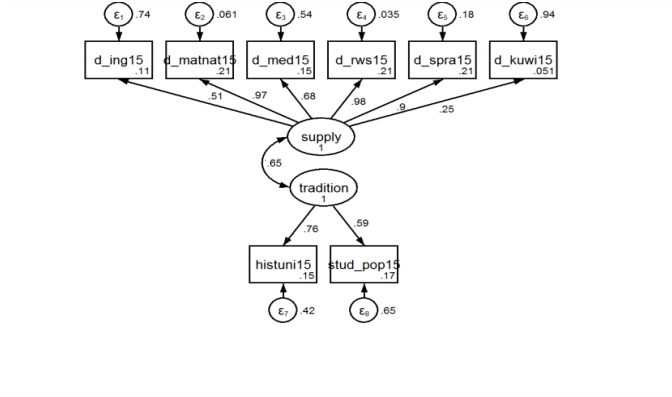


Figure A 2: Selected marginal effects on the chance to study in home region by parents' social status and selected values of a) supply with higher education offerings, b) traditional university infrastructure, c) unemployment, own calculation

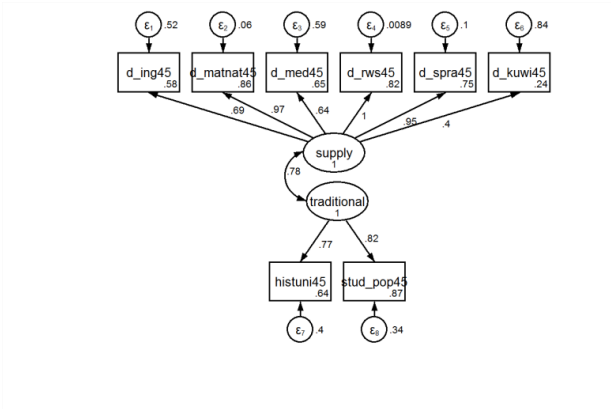
Table A 4a: CFA results for different travel time radii 1986 and 2011, data: the Federal Statistical Office, German Council of Science and Humanities, BBSR, own calculation

CFA (Confirmatory Factor Analysis) is used to study the relationship between a set of observed variables and a preassigned number of latent factors. The measurement model for CFA is based on a multivariate regression model that describes the relationships between a set of observed dependent variables and a set of continuous latent variables. In CFA the predicted factor structure of a number of observed variables is translated into the complete covariance matrix over the observed variables (Brown 2006). Assumptions on the structuring of data – in terms of the number of factors and the relation between the factors – have to be undertaken in advance. We expect a strong relation between the two factors include the covariance between them. The factors are calculated to adequately illustrate the dimensions of educational infrastructure that is assumed to be relevant for university enrolment. The factor scores are saved separately and treated as independent variables in the following analyses. Factor scores are z-standardized, so that a one unit change is a change in one standard deviation.

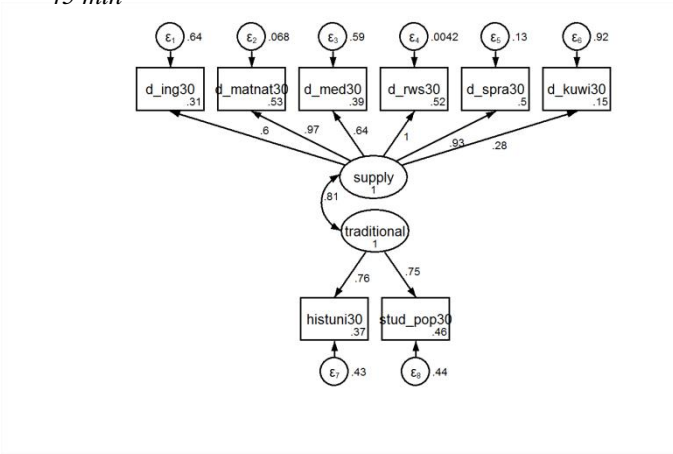
15 min



30 min



45 min



60 min

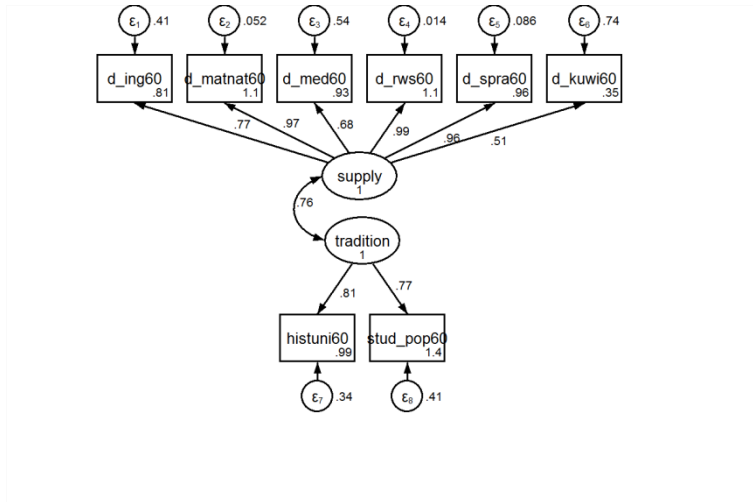
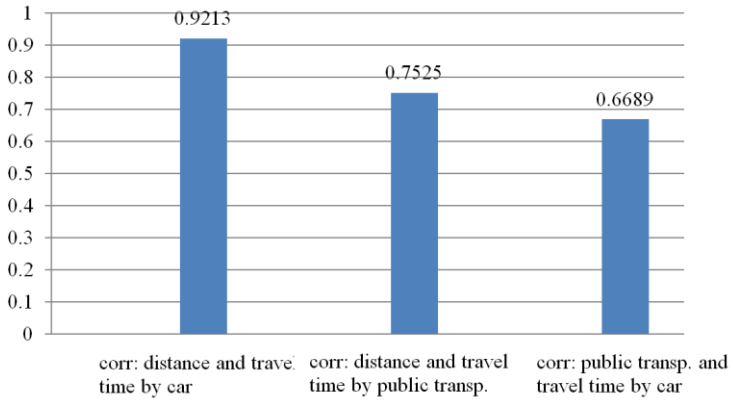


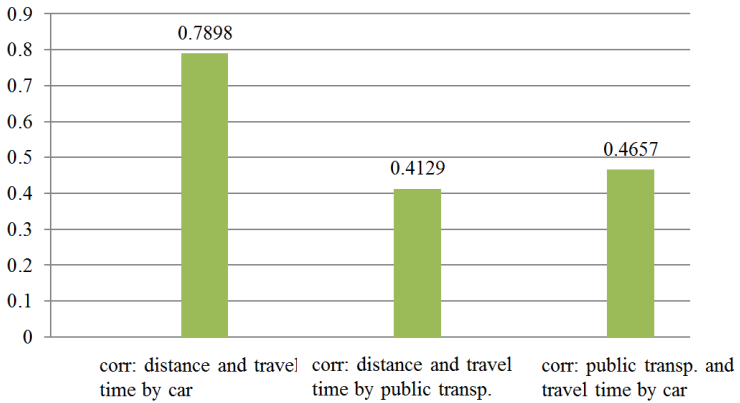
Table A 4b: Goodness of fit statistics for CFA for 1986 and 2011 for different travel time radii, data: the Federal Statistical Office, German Council of Science and Humanities, BBSR, own calculation

	1986		2011	
	X ² (df)	RMSEA	X ² (df)	RMSEA
15 min	13336***	0.286***	14476***	0.366***
30 min	11177***	0.262***	12997***	0.284***
45 min	10024***	0.248***	12176***	0.278***
60 min	10004***	0.241***	11222***	0.261***
90 min	-	-	-	-
120 min	-	-	-	-
RSMEA (Root mean squared error of approximation)				

a) Over all travel times



b) Travel time less than 120 minutes



c) Travel time more than 120 minutes

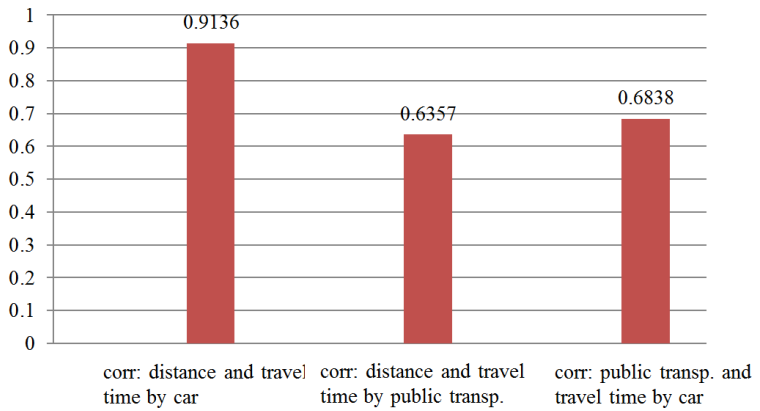


Figure A 3 a-c: Correlation between travel time by car, by public transportation and linear distance for a random sample of 1500 West German municipalities, data: BBSR 2015, Google Maps, own calculation

Table A 5: Descriptions of model variables (dependent variable: dual training), data: NEPS-SC6, Federal Statistical Office 2014

Variable	Category	Percentage / Mean (Std.dev.) [Min – Max]	N=
<i>Individual level</i>			
Dual training	no	49.04 %	
	yes	50.96 %	5,640
Sex	female	52.61 %	
	male	47.39 %	5,640
School leaving certificate	lower-level sec.	24.93 %	
	Intermediate sec.	39.98 %	
	upper-level sec.	35.09 %	5,640
Parents' school leaving certificate (combined max.)	lower-level sec.	50.83 %	
	intermediate sec.	20.98 %	
	upper-level sec.	28.19 %	5,640
Parents' vocational education (combined max.)	no vocational degree	7.04 %	
	vocational training	67.34 %	
	university degree	25.62 %	5,640
Migration background	Natives	84.50 %	
	Migration background	15.50 %	5,640
<i>Macro level</i>			
Unemployment – component 2	<i>individual level</i>	-0.05 (1.98) [-4.94 – 9.17]	5,640
	<i>aggregate level</i>	-0.05 (2.03) [-5.52 – 10.58]	327
Unemployment – component 3	<i>individual level</i>	0.24 (2.00) [-4.46 – 6.90]	5,640
	<i>aggregate level</i>	0.04 (1.91) [-5.53 – 8.83]	327
Change in relevant population	<i>individual level</i>	-0.61 (4.11) [-20.53 – 60.91]	5,640
	<i>aggregate level</i>	-0.36 (3.71) [-42.55 – 60.91]	327
Year [observation period]		1988.8 (8.63) [1975 – 2011]	5,640

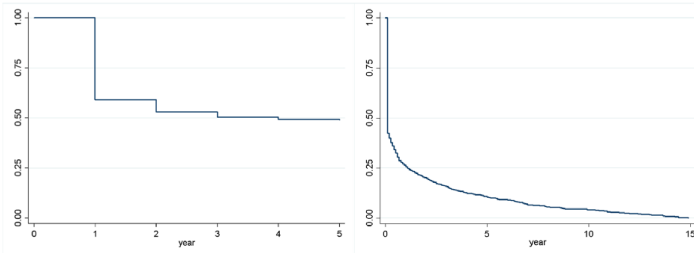


Figure A 4: Duration (in years) between leaving school and entering dual training (a); duration between completing training and entering employment (b) – survivor functions

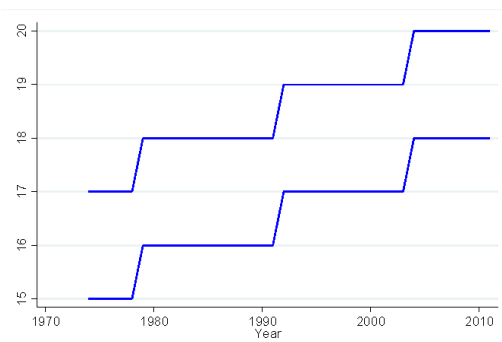


Figure A 5: Range of ages 'relevant' for competition in the vocational training market, 1974-2010

Relevant cohorts refer to 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 the years; the average age of trainees when beginning apprenticeships has increased significantly during the last three decades. We therefore use a flexible definition of age groups 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 two-year age band around this (rounded) estimate then defines the 'relevant' age group for a particular year. In the transition analyses, we de-trend the variable by using the first differences in the yearly time series on the local level.