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# Changes in Inequality of Educational Opportunity

## A Cross-National Comparison and the Long-Term Development in Germany

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# ABSTRACT

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## Changes in Inequality of Educational Opportunity
### A Cross-National Comparison and the Long-Term Development in Germany

This thesis provides a long-term cross-national comparison of changes in educational attainment and a detailed longitudinal analysis of the changes in inequality of educational opportunity in East and West Germany. Using data from the 2011 PIAAC study, the thesis examines how a different focus on equality (equality of condition and equality of opportunity) in different welfare regimes reveals cross-national variations in educational expansion, the association between educational background and educational attainment and the change in this association over time. Based on longitudinal data from the NEPS, the thesis then focuses on how far educational reforms have changed the character of the old clear-cut divisions between academic and vocational tracks in lower and upper secondary school as well as in the landscape of higher education in East and West Germany. The empirical findings indicate that educational expansion and educational inequality vary significantly across welfare regimes and over time. In Germany, I find strong and persistent associations between family resources and the probability of making the transition from primary school to the academic track. Educational reforms in lower secondary school did not provide more openness between the non-academic and academic tracks in Germany. However, reforms in the vocational education and training system have increased the permeability between tracks tremendously, so that the vocational and academic tracks are much more integrated today. More permeability is, however, not connected with more educational equalities. Overall, educational inequality in the attainment of a tertiary degree has remained surprisingly stable across birth cohorts.

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# 1 Introduction

## 1.1 Motivation and research aims

Over the last decades, the study of educational inequality has enjoyed a remarkable revival in many countries. This topic has particularly gained momentum alongside the evaluations of the Programme for International Student Assessment (PISA) in 2000, which were for some of the participating countries, particularly for Germany, a kind of PISA shock. The overarching objective of my thesis is to assess the long-term development of educational inequalities according to social origin and gender in a cross-national comparison and in a country-specific analysis in Germany.

The analysis of educational inequality is of relevance because the position that individuals attain in society as well as their life chances and well-being are strongly associated with educational attainment (Erikson & Jonsson, 1996; Goldthorpe, 2014). Higher education is often connected with higher income, better career opportunities, as well as lower risks of unemployment and precarious work (Hausner et al., 2015; Schmillen & Stüber, 2014). Furthermore, higher educated individuals often live healthier (Jungbauer-Gans & Gross, 2009; Sander, 1995; Wolfe & Zuvekas, 1997) and experience a higher subjective well-being (Wernhart & Neuwirth, 2007).

Many cross-national comparisons revealed that the level of educational inequality is varying tremendously among modern societies (Breen et al., 2009; Erikson & Jonsson, 1996; Shavit & Blossfeld, 1993). Several sociologists claim that differences in the extent and speed of educational expansion (Blossfeld et al., 2016; Halsey, Heath, & Ridge, 1980; Raftery & Hout, 1993) as well as the structure of educational systems (J. Allmendinger, 1989; Van de Werfhorst & Mijs, 2010) can explain a substantive amount of variation in inequality of educational opportunity that is observable across modern societies. In my thesis, I focus on another important aspect which might play a crucial role. This is the variation in the emphasis on equality of condition or equality of opportunity

(Erikson & Jonsson, 1996) among different welfare regimes (the liberal, social-democratic, conservative, Mediterranean, Eastern European and East Asian see Chapter 4) as well as among East and West Germany (see Chapters 5 to 8).

So far, the cross-national comparison of educational inequality and the conception of differences in welfare regimes are not very well connected. However, I claim that this combination offers new fruitful insights and provides a solution for a more condensed presentation when analyzing a large number of countries. Thus, Chapter 4 aims to extend existing literature on cross-national comparisons on educational inequality on a further theoretical dimension, namely welfare regimes.

After providing an overview on educational inequality in six welfare regimes in Chapter 4, the subsequent empirical Chapters 5 to 8 concentrate on Germany as one specific country of the conservative welfare regime. One major objective of these empirical chapters is to provide an East-West German comparison of social origin and gender inequality over children's, young peoples' and adults' educational careers and their final educational attainment. The distinction between East and West Germany is important because for about a period of 40 years Germany was separated into two different ideological, political and economic systems. Although the educational systems in the German Democratic Republic (GDR) and Federal Republic of Germany (FRG) shared the same history and culture and remained in some aspects also quite similar, for example in terms of the dual vocational training system, there are also major differences between those two educational institutions. Furthermore, after German unification, East Germany has taken over in great parts the West German educational system. However, in this process also some changes for the West German education system were introduced, which will be discussed in this thesis. After about 25 years of reunification, it is interesting to examine whether there are still strong differences between East and West German educational careers and educational attainments. Despite numerous research on educational inequality in the West

German educational system (Blossfeld, 1993b; Henz & Maas, 1995; Müller & Haun, 1994; Müller & Pollak, 2010), not much is known about educational inequality in the East German educational system before and after German unification (Solga & Becker, 2012). Accordingly, one of my contributions to the sociological literature is also examining educational inequality in East Germany.

What makes the inquiry of inequality of educational opportunity in East and West Germany so interesting? The East and West German education systems differ notably in many respects from other modern societies:

*First*, for the historical period of my analyses (from birth cohort 1947 to 1982 in the Programme for the International Assessment of Competencies (PIAAC) dataset and from birth cohort 1944 to 1986 in the National Educational Panel Study (NEPS) dataset), Germany overall was already a vanguard of the educational expansion in the early 1960s. Since then Germany has only experienced a relatively low educational expansion in upper secondary and tertiary education in comparison to other countries of the Organization for Economic Co-operation and Development (OECD) (Blossfeld et al. 2016).

*Second*, East and West Germany are characterized by a strong link between the educational system and the labour market (Müller & Shavit, 1998). This means that specific educational certificates are required to access and execute a particular job. Thus, education and vocational training are essential for the positioning in the stratification systems of East and West Germany.

*Third*, compared to other modern societies it is often highlighted that a rather small proportion of East and West Germans attains a tertiary level education so that the OECD have raised concerns about Germany's international competitiveness (OECD, 2006, p. 79). These OECD experts predict that in the process of occupational change towards more challenging service jobs and the increasing technological development more academics are needed. However, the OECD to a large extent neglects the fact that the German voca-

tional training system, particularly the *dual system*, provides an attractive alternative to tertiary level education and generates a broad basis of qualified employees with occupation specific-skills.

*Fourth*, it is often highlighted that the association between social origin and educational attainment is particularly strong and persistent in West Germany and reunified East Germany compared to other OECD countries (Autorengruppe Bildungsberichterstattung, 2016, p. 214). In no other Western country, children are separated so early into different school tracks (the 'Hauptschule', the 'Realschule' and the 'Gymnasium') (Hovestadt, 2002). In addition, the West German tracking system is known as very rigid so that it is very hard to correct for this early decision (Sandra Buchholz & Schier, 2015). Furthermore, half-day schools heavily rely on parents help with homework and exam preparation (Solga, 2008). However, it is worth noting that since the last decade, several reforms have been introduced to expand full-day care in schools and after-school children care services in West Germany (Autorengruppe Bildungsberichterstattung, 2016, p. 82).

The situation in the GDR was in some important aspects quite different. There was a comprehensive school system until the age of 15 or 16. Thus, children have not been separated into different school tracks so early (Günther & Hammer, 1979). Moreover, the educational system in the GDR was more open, providing several educational pathways on the academic and vocational tracks to enter higher education (Huinink et al., 1995). However, at the same time the access to the 'Abitur' and participation in higher education was restricted since the mid-1960s to avoid overeducation in the socialist economy. Furthermore, the influence of parents on their children was lower because there existed very well developed early childhood education and all-day schools (Günther & Hammer, 1979).

*Fifth*, due to more traditional gender roles, (West) Germany is characterized by a less strong increase in females' educational attainment than other modern societies.

What is very important for this thesis is the fact that lots of different reforms have been introduced in the lower and upper secondary school systems as well as in the system of higher education during the last decades. These reforms have been aimed to increase the permeability between the academic and non-academic tracks and to engender more educational equality for girls and boys from different social origins. First, there has been a huge expansion in the number of upper secondary schools (including different types of 'Gymnasien'). In Chapter 5, I therefore focus on the educational transition from primary to secondary school and study the long-term changes in the transition probability to the academic track and its associations with gender and social origin. I am particularly interested whether the social origin associations have increased, remained stable or even declined across birth cohorts in the German educational system. Second, there have been reforms introduced to facilitate the mobility between the academic and non-academic track in the general school system. Thus, Chapter 6 examines whether these reforms have opened up the general school system and reduced educational inequality. Third, multiple new alternative pathways from the vocational track to higher formal educational degrees and tertiary education have been created in the vocational education training system. Chapter 7 addresses whether the traditional separated vocational and academic tracks have become more integrated and reduced educational inequality. Fourth, higher education became more differentiated by the introduction of the universities of applied sciences and 'Berufsakademien'. In Chapter 7, I investigate social origin and gender differences for the graduation from the traditional universities and the universities of applied sciences.

My thesis aims to contribute to the literature of educational sociology by studying the associations between various aspects of family background and respondent's educational histories and final educational attainment. Thus, following Bukodi and Goldthorpe (2013), I differentiate in my analyses on East and West Germany between parental educa-

tion, parental class, and parental status resources. Each of those family resources is connected with specific mechanisms how those resources influence educational inequality of children, youth and young adults. The specific resources and mechanisms are explained in detail in my theoretical Chapter 2. Unfortunately, in Chapter 4, in which I conducted a cross-national comparison of 21 countries, I only have information on parental education. So in this chapter, I am not able to follow this multidimensional approach of social origin. However, several studies demonstrated that parental education is the central social origin variable (Pfeffer, 2008). A further advantage of the social origin measure 'parental education' is that mother's education can be taken into account because generally this information has only few missings. The situation is different for information on mother's class and status positions because often particularly among the oldest birth cohorts mother's did not participate in the labour market and became housewives.

So, why is it important to disentangle these three social origin resources in my analyses on East and West Germany? First, I elaborate in Chapter 5 that those three parental resources point to different mechanisms on educational inequality (see also Erikson 2016 for a similar approach) in East and West Germany. Second, I show that these three parental resources play a different role for the successive transitions in the educational careers of children, youth and young adults (Erikson & Jonsson, 1996, p. 55).

Considerable progress has been made in the availability of cross-nationally comparative and longitudinal data in recent years allowing me to use two well-suited datasets from the PIAAC and the NEPS (Adult Cohort (SC6)) for secondary analysis in my thesis. The former dataset allows me to make an extensive long-term cohort comparison of educational inequality for 21 OECD countries. The latter dataset provides rich retrospective longitudinal information on educational careers in Germany, which gives me the opportunity to study inequality over educational careers in a long-term historical changing institutional context. Unfortunately, in the PIAAC data and the Adult Cohort (SC6) of the

NEPS, I do not have detailed longitudinal information on competence levels, teacher assessments, ability, school performance, aspirations and subjectively expected success probabilities over the school career. So, I cannot explicitly include those variables in my empirical models. In Chapter 3, I provide a detailed description of the used datasets, variables and methods.

# 2 Theoretical perspectives on educational careers and institutions

In this chapter, I provide an overview on relevant theoretical perspectives from life course and educational inequality research. In addition, I describe the educational systems in East and West Germany.

## 2.1 The life course perspective

In my thesis, I take a *life course perspective* and focus on the educational careers and the highest educational attainments of successive birth cohorts (Kohli, 1985; Heinz, 1990, p. 60; Meulemann 1990, p. 109). Already Boudon (1974) notes that *educational attainment is the result of a process of choices and constraints* which are defined by the educational system. The life course provides therefore a suitable framework for studying the movement of individuals through the educational system. Kerckhoff et al. (1996) suggests using the term educational career as synonymously with educational trajectory or educational history, which is the outcome of a sequence of individual's educational choices in an institutional setting. In contrast, the term educational pathway refers to the institutionally defined possible routes in the educational system.

I am interested to examine how differences in starting conditions of children from different family origins shape their educational trajectories until the highest educational attainment. Furthermore, I want to find out how individuals' previous educational histories influence subsequent educational decisions and highest educational attainments (Blossfeld & von Maurice, 2011, p. 21; Lucas, 1999, p. 92). I am particularly interested to study how far educational reforms, and the new educational pathways they offer, change the opportunity structure over the educational career. I also assess how social origin resources of individuals are associated with the participation in alternative educational pathways. For my analyses, I rely on the highest educational attainment of a long series of birth cohorts from 21 countries provided by the PIAAC. In addition, I use detailed longi-

tudinal data on the educational careers of East and West German children, young people and adults which is offered by the NEPS.

## 2.2 The five principles of life course research

There are five central aspects of life course research that I address in this thesis (Elder, 1998, p. 4; Mayer, 2009, p. 414). These are (1) the principle of embeddedness in historical time and place; (2) the principle of timing of events and transitions; (3) the principle of linked lives, (4) the principle of human agency and (5) the principle of life span development. In the following, I describe these five theoretical perspectives with regard to individuals' educational careers.

The first principle, *the principle of embeddedness in historical time and place*, emphasizes that educational careers are shaped by historical periods and specific locations. In my thesis, I therefore elaborate in Chapter 4 on how the different institutional conditions in six welfare regimes (liberal welfare regime, conservative welfare regime, social democratic welfare regime, Eastern European welfare regime, Mediterranean welfare regime and East Asian welfare regime) influence educational outcomes. I argue that different emphasis on equality of condition and equality of opportunity across welfare regimes influences individuals' decisions and opportunities in the educational systems, leading to different manifestations of educational inequality.

In addition, I take into account the impact of the periods before and after German unification and the different institutional set-ups in the GDR and FRG on individuals' educational careers and highest educational attainments. In addition, I analyse how the institutional transformation from a socialist to a capitalist system has affected educational careers of East Germans. I also explore how a large number of educational reforms introduced in East and West Germany in the last decades have changed educational histories and outcomes. Furthermore, I assess how changes in families' perception of gender norms

have shaped men's and women's educational trajectories and educational attainment across birth cohorts in 21 countries and in Germany in particular. To conclude, from a life course perspective, it is important to take into account these different historical and country contexts to better understand the constraints and opportunities that individuals face while making educational decisions (Mayer, 1991).

The second *principle is the timing of events and transitions*. It points out that the consequences and the impact of educational events and transitions depend strongly on when they exactly occur during the educational career. In my thesis, I examine whether children that make the transition to the academic track straight away after primary school may experience different later educational opportunities than children that moved up to the academic track at a later stage or obtained higher educational certificates via second chance education.

In addition, in the FRG and reunified Germany the most important transition into different school forms after primary school takes place at a relatively early age of 10 or 12 (Trautwein & Neumann, 2008) compared to the GDR where tracking into different school types took place at an age of about 15 (Günther & Hammer, 1979). Early selection divides children into different school tracks that differ in their school curriculums, socialization and demands (Lucas, 1999, p. 13; Müller & Pollak, 2010, p. 309), within which the school environment is relatively homogenous with children having similar educational aspirations, self-concepts, family backgrounds and school performance. The earlier this tracking takes place the earlier children are exposed to different contexts that might influence their future educational prospects (Hanuschek & Woessmann, 2010; Müller & Pollak, 2010, pp. 309–310). Therefore, in my thesis I examine whether early tracking in the former FRG and reunified Germany is associated with higher social inequalities for children's final educational outcomes than in the GDR.

The third principle of life course research is that *the lives of individuals are linked*. It means that the educational careers of individuals should not be studied in isolation from other significant individuals (Mayer & Tuma, 1990). For children, youth and young adults the family of origin is an important social context that has to be taken into account. In my thesis, I concentrate on the intergenerational links between parents and their children. Differences in educational, economic and social resources among families may have a direct influence on educational transitions and the final educational outcomes.

The fourth principle is *human agency*, which means that although individuals are constrained in their decisions via external circumstances, such as institutional regulations of educational systems and the availability of family resources, they still make choices within the context of their available options (Dannefer, 1987; Heinz, 2003, p. 13; Hillmert, 2010; Mayer & Müller, 1989). This means that educational trajectories are not completely determined by the institutional set-up and the social structure. Human behaviour can therefore only be predicted on the basis of probabilistic models. Different educational choice models will be discussed in more detail in Section 2.4.

The social and institutional constraints, however, give individuals more or less room to realize their individual agency. In the analysis of education trajectories in East and West Germany before German unification, one should therefore keep in mind that under the Socialist Unity Party (SED) in the GDR, individual decisions were more constrained (Lenhardt & Stock, 2000, p. 523; Mayer, 1998). In the centrally planned economy of the GDR, educational policies and the educational system had to serve the demand of the socialist society for education and qualifications (Huinink et al., 1995; Lenhardt & Stock, 2000). The state had the control over access and denial to the vocational and academic tracks (Huinink et al., 1995, p. 100). The access to 'Erweiterte Oberschule' was restricted in the mid-1960s (Trautwein & Neumann, 2008, p. 472). Students at university level were

not free in their study subject choice either (Solga & Becker, 2012, p. 29). In addition, there was a quota for the access to different school tracks which was proportional to the size of different social groups (e.g. gender, social origin or place of residence) (Huinink et al., 1995, pp. 91, 98; Solga, 1995b). After German unification, East Germans had much more room to make their own educational decisions. Moreover, in my thesis, I study how far educational reforms have opened up new choices for individuals and how those choices are used by individuals with different family resources.

The last *principle of life course research is that there is a life span development.* This means that subsequent educational decisions and outcomes are highly contingent on previous educational achievements, educational decisions, and educational trajectories (S. Hillmert, 2009, p. 217; S. Hillmert & Jacob, 2010, p. 60). Using the NEPS dataset, I am able to reconstruct how previous educational decisions for the academic or non-academic track as well as previous educational certificates influence later educational outcomes. Moreover, I analyse how later educational corrections of previous educational decisions influence individuals' final educational certificates.

## 2.3 Social origin resources

In my thesis, the empirical analyses of the association between social origin and children's educational careers and final educational attainments are based on various concepts and measures of social origin. Unfortunately, in Chapter 4, I am only able to include parental education as social origin resource due to data restrictions. However, using the NEPS data in Chapters 5 to 8, I am able to apply a multidimensional approach of social origin (Bukodi & Goldthorpe, 2013; Marks, 2011; Weber, 1976) and distinguish parental education, parental class and parental status. I follow the idea that these various indicators represent different mechanisms of social origin which should be taken into account if one wants to understand inequality of educational opportunities (Bukodi & Goldthorpe, 2013;

Chan & Goldthorpe, 2007). Furthermore, I am interested to study how far the associations of the three social origin measures with educational transitions and final educational outcomes are changing differently across cohorts (Buis, 2013; Bukodi & Goldthorpe, 2013).

The first social origin indicator that I am using in all my empirical analyses is parental education. Many empirical studies have demonstrated that parental education is obviously the most important social origin measure affecting children's educational inequality (Baker, 2014; Buis, 2013; Ermisch & Francesconi, 2001; Mayer et al., 2009). This is the case because parental education comes causally and temporally before parents achieve their class and status positions and parent's education has a strong impact on both of these measures of social origin (Pfeffer, 2008, p. 544). Across cohorts, parental education also seems to have gained in relative importance because the lengthening of compulsory education, the general improvement of living conditions and the declining average family size have led to a reduced influence of economic factors such as parental class on children's educational inequality across birth cohorts (Blake, 1989; Erikson & Jonsson, 1996a; Breen et al., 2009).

For the empirical analysis of educational inequality in Chapters 5 to 8, in which I include several social origin indicators, parental education can be particularly considered as a variable that captures parents' *capacity to support their children with homework* and to guide them *through the educational system* (Bukodi & Goldthorpe, 2013, p. 3). In Chapter 4, I rely on the International Standard Classification of Education (ISCED) designed by the UNESCO to construct parental years of education. In Chapters 5 to 8, I use the CASMIN educational schema which was developed in the 'Comparative Analysis of Social Mobility in Industrial Nations (CASMIN)' project to define parental education.

Two further concepts of social origin play an important role in social stratification. These are class ('Klasse') and status ('Stand') (Weber, 1976). According to Goldthorpe

(2012, p. 212) these two concepts are relational. This means that they reflect social relationships in form of employment relationships and superiority or subordination within which individuals possess a more or less advantaged position (Goldthorpe, 2012, p. 204). I first present the definition of class and then discuss the mechanisms of how class influences educational inequality in more detail. According to Weber (Weber, 1976), individuals share the same *class position* if they dispose of similar economic goods or qualifications and skills that can be translated into income or other benefits on the market (see also Mayer, 1977, p. 159; Müller, 1977, p. 25). Differences in class positions of individuals have a strong impact on their life chances and life decisions. Individuals that share similar market situations are defined as a *class*. Individuals from different class positions vary in their possibilities to enforce their economic and political interests (Haller, 1983, p. 38). All the class positions between which inter- and intragenerational mobility is very likely form a common *social class* (see also Breen, 2005, p. 32). For the analysis of educational inequality, Bukodi and Goldthorpe (2013, p. 2) claim that *class* is especially an indicator for *economic resources* that are available in families to support and help their children in school. I also argue that the class position is associated with the possibility to make farsighted educational decisions. In Chapters 5 to 8, I conceptualize and operationalize families' classes by referring to one of the most popular international comparable class schemes which was developed by J. H. Goldthorpe, namely the Erikson-Goldthorpe-Portocarero (EGP) class scheme.

Another dimension of social inequality which is mentioned by Weber (1976) is *status* ('Stand'). A society is also stratified according to differences in social deference which become in praxis visible by more exclusive social relations (Mayer, 1977, p. 155).[1] Status groups try to preserve economic advantages on the market by social inclusion and exclu-

[1] This definition of status should not be confused with its second meaning. In the American context, (socio-economic) status is namely better understood as a measure to describe the position of individuals in a social inequality structure (Rössel, 2009, p. 128).

sion. Individuals in society are treated differently according to their observed distinguishing life styles, socialization and other ascribed characteristics. These differences in attitudes and life styles define with whom people interact, who their friends are and whom they marry. In the context of educational inequality, Bukodi and Goldthorpe (2013, p. 3) posit that *parental status* is an indicator which measures social and cultural resources that are available to families such as parental *social networks* and their *cultural tastes* which both are seen as factors that generate educational inequality. As an indicator for measuring status differences in Chapters 5 to 8, I apply the Cambridge Social Interaction and Stratification (CAMSIS) scale (a similar proceeding can be found in Bukodi et al., 2014 or Erikson 2016 for Sweden).

Weber (1976) makes three remarks on the relationship between class and status: First, he claims that class and status are distinct dimensions in societies, but they are also complementary and highly interwoven. Status can be dependent on individuals' economic resources which are determined by their class position on the market. However, status differences can also be generated by differences in other criteria such as education (Mayer, 1977, p. 159). In turn, access to higher occupations and therefore to a specific class position may be restricted to exclusive groups such as status groups (Mayer, 1977, p. 169). Second, the importance of class and status varies across historical contexts: In former feudal societies, status played a more significant role while in industrial societies class seems to be the dominant dimension. The same is postulated for capitalist and socialist societies (Bukodi, 2010; Goldthorpe, 2008; Solga, 1995b). Status is seen as more relevant in socialist societies and class in capitalist societies. Third, the distinction between status and class has also an analytical component of different forms of social inequality (Mayer, 1977, p. 160). If one only studies social inequalities using the concept of class, then one only analyses economic inequality on the market. For example, Goldthorpe (2008, p. 351) demonstrates that for the analysis of unemployment risks, career opportunities and in-

come inequality on the labour market, class captures more than status. Social inequality in a society, however, is more complex and includes also stratification by other qualitatively different forms such as status (Haller, 1983, p. 45). For instance, in the domain of cultural consumption of music, theatre or cinema, status can better explain social inequalities than class (Goldthorpe, 2008, p. 351). Goldthorpe also writes that '*[…] there is a considerable status variation within the classes of the class schema […], although the variation is greater within some classes than others. Hence there is plenty of scope to get different effects of class and status from one domain of life chances and life choices to another*.' (Goldthorpe, 2008, p. 351; see also Mayer, 1977, p. 229 for similar conclusions on Germany).

## 2.4 Educational decisions

During the educational career, children and their families are several times confronted to make decisions on which educational branch to choose or whether to continue education or to drop out (Maaz et al., 2006, p. 299). For example, in the German educational system families have to make the decision whether to send their children to the academic or non-academic track after primary school. If children finish lower secondary school, they have to make the decision whether they should continue into vocational training, obtain a higher entry certificate or directly make the transition to the labour market (Maaz et al., 2006, p. 299). Moreover, children from the academic track that have a higher education entry certificate have to decide whether they want to complete tertiary education or vocational training or directly enter the labour market. The choices families and their children make, are constrained by the institutional settings and regulations of the educational system as well as the sociohistorical structures (Blossfeld & von Maurice, 2011, p. 23; Maaz et al., 2006, p. 299). Early educational decisions might also have long-lasting consequences for the later educational careers of children. In this section, I will present sociological micro-

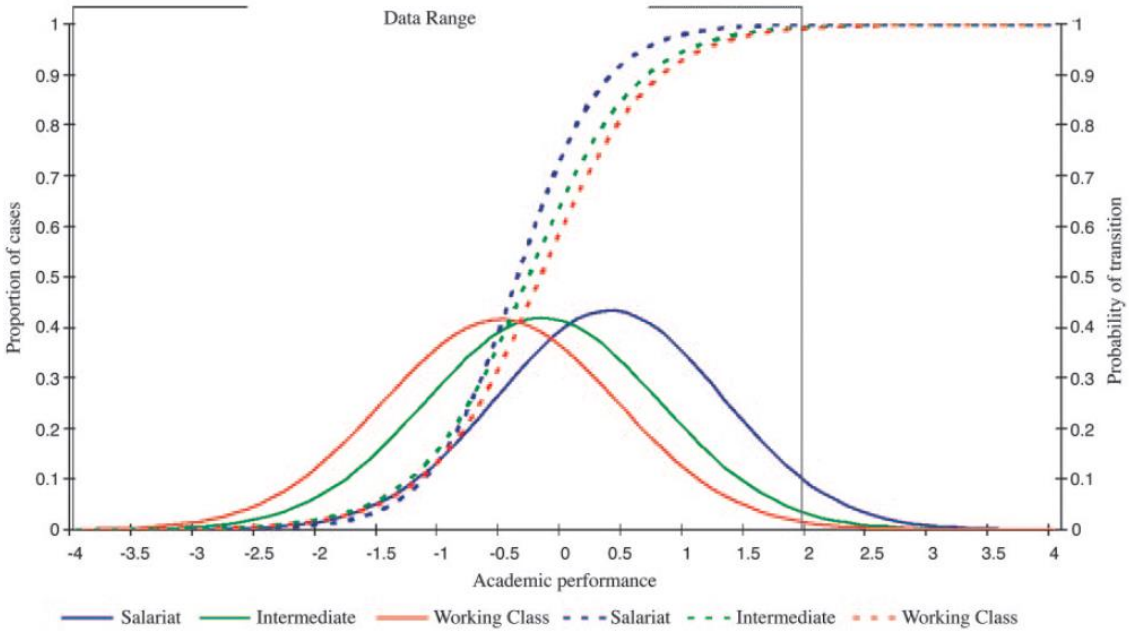
level theories on individual's educational decision making. First, I introduce the concept of primary and secondary effects which became popular through the work of Boudon (1974). Then, I present a formalized model of educational decisions (Esser, 1999; Breen & Goldthorpe, 1997; Erikson & Jonsson, 1996; Halsey et al., 1980).

### 2.4.1 Boudon's primary and secondary effects

Boudon (1974) examined in his seminal book '*Education, Opportunity, and Social Inequality*', how inequality in educational attainment of children from various social origin backgrounds is generated by their different educational decisions during their educational career. Relying on previous work by Girard and Bastide (1963), Boudon (1974, pp. 29–30) distinguishes *primary* and *secondary effects of social origin* which generate inequality of educational opportunity.

On the one hand, children from various social origins show differences in academic ability and performance because families do not dispose of the same educational, economic and social resources to support their children in school (see Figure 2-1). For example, Figure 2-1 shows that the normal distributions of academic performance for the three social class groups salariat, intermediate, and working class differ (Erikson et al., 2005). On average children from the working class show a lower academic performance than children from the intermediate and salariat classes (Erikson et al., 2005). Therefore the normal distribution is shifted to the right. In turn, children from the intermediate class have on average a lower school performance than children from the salariat (Erikson et al., 2005). These differences in the normal distributions of academic performance are known as *primary effects* (Erikson et al., 2005).

**Figure 2-1:** Fitted normal distributions for performance within the salariat, intermediate and working class. Fitted logistic curves for probability of transitions as a function of performance




Source: Figure is from Erikson et al. (2005), see also for similar figures Erikson and Jonsson (1996b)

*Secondary effects* are those that are expressed by differences in educational choices made by children and families from different social backgrounds, even if these children have the same school performance. For instance, Figure 2-1 shows the fitted logistic curves for the probability to make the next educational transition. The curve for children from the salariat is the left one and for the working class it is the right one. These curves show that for each competence level, children from the salariat are more likely to make the next educational transition (Erikson et al., 2005). The differences are small if school performance is very low or very high. So the biggest differences between the salariat and the working class are in the middle of the school performance distribution (Erikson et al., 2005). Boudon (1974, p. 29) states that these differences in educational decisions are produced by differences in subjectively expected cost and benefit calculations of families from different social origin.

### 2.4.2 The integration of Boudon's primary and secondary effects into a rational choice model

Erikson and Jonsson (Erikson & Jonsson, 1996, p. 10) highlight that not only primary and secondary effects are important for explaining differences in educational outcomes. Also *educational expansion* (this means the change in the number of students making the transition to the next educational level) is important. In addition, Becker (2000, p. 458) states that educational decisions are also shaped by institutional regulations. Several educational sociologists have integrated Boudon's distinction of primary and secondary effects into a formalized rational action framework (Stocke, 2007, p. 506), in which individuals rationally weigh the costs, benefits, and the success probability of whether to continue or quit education or the success probability of choosing a certain schooling branch (see Becker, 2000; Esser, 1999; Breen & Goldthorpe, 1997; Erikson & Jonsson, 1996, p. 14; Halsey et al., 1980, p. 116). Erikson and Jonsson (1996) have formalized the rational educational decision model in a simple form as follows:

$$\boldsymbol{U = p * B - C} \qquad (1)$$

P= utility of staying on in education;
p= probability of success to continue education;
B=benefit of additional education; and
C= costs of additional education

This model allows taking into account how changes in costs of further schooling or changes in expected benefits of further schooling in the expansion process influences individual's educational decisions. Children and their families will make decisions within a set of different educational pathways. Furthermore, these families judge these opportunities within the context of given constraints (Erikson & Jonsson, 1996, p. 13).

Children from higher classes dispose of more economic resources. Therefore, the subjectively expected *direct and indirect costs C of continuing education* are evaluated as lower than for children from lower classes (Jackson, 2013, p. 15). Parents from the salari-

at are financially better set to pay for schooling materials, to provide children with a cognitively stimulating home environment as well as other cognitively stimulating experiences. They also are more likely to invest in additional training for their children (Buis, 2013; Erikson & Jonsson, 1996; Lareau, 2015, p. 21; Luplow & Schneider, 2014). Second, families from higher classes evaluate longer schooling duration costs as less incisive than families from lower classes (opportunity costs through foregone earnings). Parents and children from higher social classes will therefore be more likely to make farsighted educational decisions for longer school tracks which promise higher economic labour market returns as well as higher prestige in adult life. However, parents and children from the working class are more reluctant to make long-term educational decisions, because they more often experience episodes of unemployment and work in precarious jobs which force them to make short-sighted plans. This is also commonly known as the *time horizon theory* (Hillmert & Jacob, 2003). *Nevertheless, the association of class and children's educational attainment should decrease across birth cohorts*, because the costs of education have been reduced in Germany (e.g. school fees were abolished and minimum schooling has been lengthened from 8 to 9 or even 10 years of schooling) (Blossfeld et al., 2015). Furthermore, the general economic living conditions for all families have improved across birth cohorts in Germany (Breen et al., 2009, p. 147; Müller & Haun, 1994, p. 6,7; Schimpl-Neimanns, 2000, p. 641).

*Benefits of further schooling or of a more demanding school track* are for example higher earnings prospects and lower unemployment risks in later life. For example, over the occupational career, employees with a vocational training certificate earn on average 243,000 Euro more than unqualified employees in Germany (Schmillen & Stüber, 2014). Individuals with an 'Abitur' earn 478,000 Euro more, with a 'Fachhochschulabschluss' 920,000 Euro more, and with a university degree 1,237,000 Euro more than unqualified employees in Germany (Schmillen & Stüber, 2014). In addition, in 2013 the unemploy-

ment rate for the unqualified was 20 %, for individuals with a vocational training certificate 5.1 %, and for academics 2.5 % (Hausner et al., 2015). The benefits of further education might increase across cohorts because the labour market increasingly demands for highly qualified manpower (Becker, 2003, p. 5).

Model (1) does not cover the case of *risk aversion* (Erikson & Jonsson, 1996, p. 15). *Risk aversion means* that not all families and their children aim for the highest educational attainment or for the most prestigious school track. Instead, working class families and their children choose for a realistic alternative which will avoid social downward mobility (Stocké, 2007, p. 514). They are already satisfied if their children attain a lower or intermediate educational degree (Dollmann, 2016, p. 205). In contrast, parents from the salariat and their children choose to continue in the more prestigious school tracks or choose to continue education to guarantee that their offspring obtain at least the same job position in life that they themselves have achieved (Breen & Goldthorpe, 1997, p. 283). Since losses through downward mobility of children from the salariat are seen as more painful than gains are joyous for children from the working class (see also *the prospect theory* of Tversky & Kahneman, 1992), *the subjectively perceived value B of further and more demanding education for salariat families is more than just the expected labour market returns*.

Breen and Goldthorpe (1997) use relative risk aversion to explain persistence in educational inequality across birth cohorts besides educational expansion. They come to the conclusion that not only the cost calculations of families have changed in favour for higher education in the process of educational expansion, but also the evaluation of benefits have changed across birth cohorts. Educational inequality is constant across cohorts because the balance between the utilities and costs of higher education has remained stable among the different classes.

Parents and children evaluate the likelihood of successfully gaining a certain school level on basis of their children's *previous school performance* (Erikson & Jonsson, 1996, p. 13; Jackson, 2013, p. 3). The better the previous school achievement of a child, the more likely it will be to succeed continuing in school. This assessment of school achievement is highly subjective (Halsey et al., 1980, p. 116). Dollman (Dollmann, 2016, p. 205) states that families from different social origin evaluate the success probability of children differently because these families have different possibilities to support their children in school if they face problems. Higher educated parents are better able to help their children with homework and exam preparation and they can advise their children on school matters. Furthermore, parents from the salariat dispose of more financial resources to pay for extra private tuition and higher status parents can ask their family members and friends for help if they cannot help their children themselves in school. In addition, children from higher status families are raised in a cultural environment in which they learn about art, museums and music. They are also socialized to behave and articulate according to middle-class norms that are expected by teachers and schools (Bourdieu, 1984; Lareau, 2015; Schimpl-Neimanns, 2000, p. 639). Children from lower status families are generally not familiar with these middle-class rules and therefore their school performance and success probability is evaluated as lower by teachers and schools (Erikson & Jonsson, 1996, p. 22).

In addition, *the theory of compensatory advantages* (Bernardi, 2012) assumes that privileged families will use all their educational, class and status resources to compensate for their children's poor school performance or for previous false schooling track attendance of their children. Thus, children from privileged background should be more likely to use the options available in educational systems to remedy previous mistakes.

*Diversion theory* assumes that particularly children from lower social origin are distracted from more advantageous university education, because they more often opt for vocational training or 'Fachhochschule' which is associated with lower costs and a higher success probability (Becker & Hecken, 2008; Müller & Pollak, 2010, p. 310). I argue that the prospect of vocational training or a 'Fachhochschule' degree will influence the decision of families at the successive branching points in the German educational system. It will influence the choice of (1) whether to opt for the academic or non-academic track after primary school; (2) whether children move from the non-academic track to the academic track before the first educational degree as well as (3) whether children will make up for the 'Abitur' via alternative routes provided by the educational system or opt for the traditional university later on (Müller & Pollak, 2010, p. 310).

*In summary, these educational decision theories are demanding in terms of measurements. They assume that the researchers have information on competence levels, teacher assessments, ability, grades, aspirations and subjectively expected success probabilities. Unfortunately, in the PIAAC data and the Adult Cohort (SC6) of the NEPS, I do not have this detailed information. I can only describe the changes of educational careers, educational transitions and educational attainments and their association with parental education, parental class, and parental status for a long series of birth cohorts. So, I cannot explicitly empirically test these theories. However, these theoretical models might help to understand the underlying mechanisms of the observed developments.*

## 2.5 The educational systems in East and West Germany

After the Second World War until 1990 Germany was split in two parts, the Federal Republic of Germany (FRG) and the German Democratic Republic (GDR)[2]. Even if the ed-

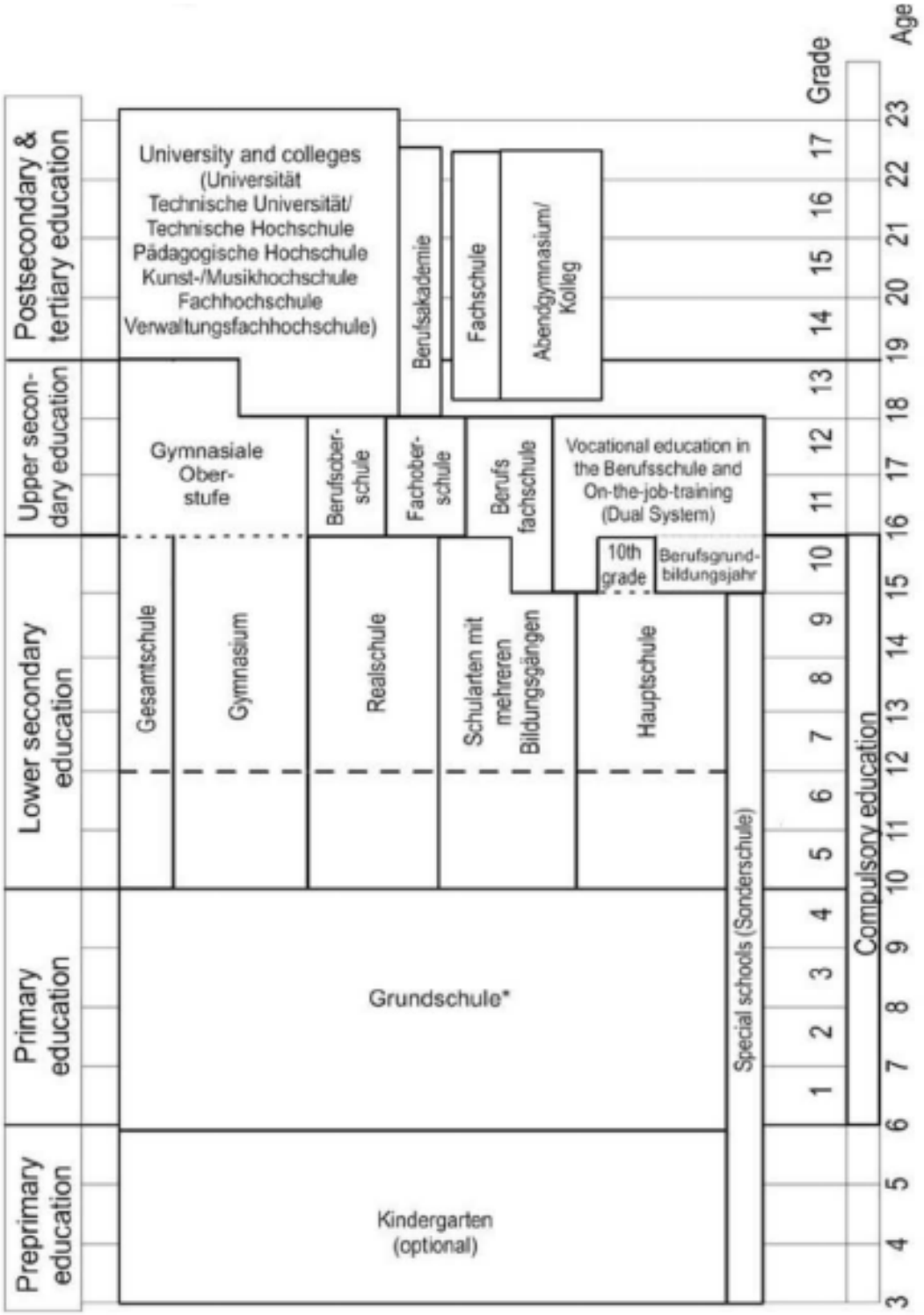
[2] The West German federal states were Bremen, Hamburg, Berlin (West), Baden-Württemberg, Bavaria, Saarland, Hesse, Lower Saxony, North Rhine Westphalia, Rhineland-Palatinate and Schleswig-Holstein. The East German federal states were Mecklenburg-Vorpommern, Berlin (East), Brandenburg, Saxony, Thuringia and Saxony-Anhalt.

ucational systems of these two Germanies had the same roots, they diverged until 1990 and basically formed two different educational systems. After German unification, East Germany more or less adopted the West German education system. In the following, I describe the West German education system. It was to a major extent took over by East Germany after German unification. Then, I go on to provide an overview of the East German educational system from 1950 until 1990. In addition, I present major changes in the East and West German educational systems after 1990. Furthermore, I describe major reforms introduced in the German educational system to open up the rigid tracking system and to abolish educational dead end pathways.

### 2.5.1 The West German education system

During the establishment of the FRG after the Second World War, West Germany was highly influenced by its former federal tradition and the interests of the French, British and American allies to promote a union of federal states in Germany. The West German educational system has to be seen as a result of these efforts of federalism, in which states (the 'Länder') have the legislative and administrative authority over the educational system (Lohmar & Eckhardt, 2013; Schneider, 2008, p. 77). Financial decisions on education and the supervision of schools up to the upper secondary level are the responsibility of the Federal Ministries of Education ('Kultusministerien') (Mitter, 1990). In cross-national comparison, the educational system in Germany is *lowly centralized* (Allmendinger, 1989, p. 234). Nevertheless, the educational systems among the federal states are quite similar and federal educational certificates and degrees are accepted everywhere in Germany (Schneider, 2008, p. 77). Therefore, the German educational system is known as being *highly standardized at the primary and secondary educational level* (Allmendinger, 1989, p. 234). This is also made possible by the regular meetings of the Standing Conference of Ministers of Education and Cultural Affairs ('Kultusministerkonferenz') in which

**Figure 2-2:** The West German educational system




**Source: Hörner (2007:325)**

educational matters are coordinated and made comparable (Lohmar & Eckhardt, 2013, p. 41; Schneider, 2008, p. 77). There also exist *private schools and private universities* in West Germany (Füssel & Leschinsky, 2008, p. 197; Mitter, 1990, p. 336), but this sector has only a small quantitative relevance.

Compulsory schooling starts at the age of 6 and lasts until Grade 9[3] (Baumert et al., 2008, p. 56). Pupils first spend 4 years in primary school ('Grundschule') (see Figure 2-2). After primary schooling, the West German educational system has a *tripartite* structure[4]. Pupils either continue to the '*Hauptschule*', '*Realschule*'[5] or '*Gymnasium*'. Low performing students normally go to the '*Hauptschule'*, average performing students choose the '*Realschule'* and high performing students normally enter the '*Gymnasium'*. The decision which school form students will attend is in some federal states dependent on binding teacher recommendations (Baden-Württemberg, Bavaria, Brandenburg, Saarland, Saxony and Thuringia) and in others the decision of families and their children (Berlin, Bremen, Hamburg, Hesse, Mecklenburg-Vorpommern, Lower Saxony, Rhineland-Palatinate, Schleswig-Holstein, Saxony-Anhalt and North Rhine Westphalia (except between 2006 and 2010)) (Skopek & Dronkers, 2015). Teacher recommendations are made under the evaluation of children's school grades as well as their cognitive and non-cognitive development. Studies show that if teacher recommendations are uncertain and can be disputed in terms of children's educational achievement, teachers also rely on children's possible educational support by their families (Hollstein, 2007). In federal states in which teacher recommendations are binding, parents have the possibly to object to the recommendation and can send their children to trial lessons or their children have to take a formal qualifying examination (Füssel et al., 2010, p. 96). Nevertheless the majori-

[3] In some federal states compulsory schooling lasts until Grade 10.
[4] Since the last decades there also exist 'Gesamtschulen' and 'Schulen mit mehreren Bildungsgängen' as an option after ‚Grundschule' (see Figure 2-2).
[5] Before 1964 the '*Realschule*' was also known as '*Mittelschule*' (Baumert et al., 2008, p. 57).

ty of parents follow the teacher recommendations (Füssel et al., 2010, p. 96). In some federal states, there were for a long period of time a so-called *'Orientierungsstufe'* (orientation stage) in Grades 5 and 6. In these two years it was easier to move between school types and to correct for previously made school type decisions. However, this school form is less common anymore.

Secondary education is divided into lower secondary and upper secondary education (see Figure 2-2). Lower secondary education defines the period in the educational system where students are between 10 and 15/16 years old and where education has a basic general character. '*Hauptschule'*, '*Realschule'* and '*Gymnasium'* all provide this kind of education (see Figure 2-2). Furthermore, in some federal states there also exist '*Gesamtschulen'* (comprehensive schools) since the 1970s, which integrate the three school types in one school form ('cooperative comprehensive school') or provide courses at three levels of difficulty ('integrated comprehensive school') (Kultusministerkonferenz der Länder 2014 b: 8; see also Figure 2-2). However, this school form is not so common in Germany (Autorengruppe Bildungsberichterstattung, 2014). Another alternative school type is the '*Waldorfschule*'. Students can receive the '*Mittlere Reife'* after 12 years and the 'F*achhochschulreife*' and '*Abitur*' after 13 years of schooling. Attendance rate of this school form is very low (Schneider, 2008).

The '*Hauptschule'* emerged out of the former 'Volksschule' (Mitter, 1990, p. 334; Schneider, 2008, p. 81). The '*Volksschule*' combined primary schooling and lower secondary education. Students from lower-social origin most often attended this school form until Grade 9. Since 1964 (*the Hamburger Act*), the upper part of the '*Volksschule*' (Grades 7-9) was renamed into '*Hauptschule*' (Leschinsky, 2008, p. 382). The '*Hauptschule*' normally lasts from Grade 5 to 9 and covers all compulsory schooling until Grade 9 (see Figure 2-2). Pupils can receive a '*Hauptschulabschluss'* after graduation.

Afterwards, they can either enter the labour market directly or continue to vocational training. In some federal states it is also possible to receive a '*Mittlere Reife'* or '*Fachoberschulreife*', if one stays one year longer at the '*Hauptschule*' (Leschinsky, 2008, p. 397; see Figure 2-2). In the 1990s, about 14 % of the pupils left the '*Hauptschule*' with a '*Mittlere Reife'* or '*Fachoberschulreife*'. In 2004 it already was about 20 % of pupils that received a higher upper secondary school certificate in the '*Hauptschule*' (Leschinsky, 2008, pp. 397–398). In the southern federal states it is possible to move to '*Realschu*le' with a so-called qualifying '*Hauptschulabschlus*s', which students can get, when they take an additional final school examination (Schneider, 2008, p. 82). While the '*Volksschule*' and later the '*Hauptschule*' were once attended by the majority (e.g. about 80 % of the 1930 cohort was educated in this school type), today the '*Hauptschule'* is attended only by a small minority and this school type is stigmatized as a 'school for leftovers' ('*Restschule*') with low future career prospects (Schneider, 2008, p. 81; Buch et al., 2011, p. 433; Ditton, 2013b, p. 746).

The '*Realschule'* ('Mittelschule' until the 1960s) lasts until the 10$^{th}$ grade and provides an extended general education (see Figure 2-2). After completing '*Realschule'*, students receive a '*Mittlere Reife'*. Graduates with a '*Mittlere Reife'* can either enter the labour market directly, take part in the dual vocational training system or (advanced) vocational schools ('*Fachoberschule*', '*Berufsoberschule*', '*Fach*-' or '*berufliches Gymnasium'*) as well as continue to the traditional '*Gymnasium*' (Lohmar & Eckhardt, 2013; see Figure 2-2). The transition to a traditional '*Gymnasium*' is, however, very rare.

The upper secondary level covers the educational period from students who are 15/16 to 18/19 years old (see Figure 2-2). It normally leads to a higher education entrance qualification as well as to a qualified vocational certificate (such as journeyman's certificate, craft certificate and commercial assistant certificate). This upper secondary level experi-

enced a massive expansion in the last decades. The upper secondary level can be either attained through attendance of the '*Gymnasium'/'Gesamtschule'* or (advanced) vocational schools and vocational training (see Figure 2-2). The '*Gymnasium'* provides the traditional route to the higher education entry certificate. In the 1960s, it was still a very elitist institution. However, in the last decades and in the process of educational expansion attendance of the '*Gymnasium*' has increased (Trautwein & Neumann, 2008, p. 476). Nevertheless, the '*Gymnasium*' is still a very selective institution in terms of abilities and social origin (Trautwein & Neumann, 2008, p. 477). The '*Gymnasium'* lasts generally from Grade 5 to 13 ('*Gymnasium 9'* – G9) and since 2013 it was shortened to Grade 12 ('*Gymnasium 8'* – G8; see Figure 2-2). Students who pass the 9$^{th}$ and 10$^{th}$ grade at the '*Gymnasium'* automatically receive the '*Hauptschulabschluss*' or '*Mittlere Reife'* respectively (Schneider, 2008, p. 82). The '*Gymnasium*' directly prepares for the entry into higher education and is an institution which educates the future elite (Baumert et al., 2008, p. 57). Graduates of this school form receive an '*Allgemeine Hochschulreife'/'Abitur'* after taking a final examination, which is a necessary precondition to attend university (Lohmar & Eckhardt, 2013). Students that leave this school form earlier automatically receive a '*Fachhochschulreife'*, which allows them to go to a '*Fachhochschule'* afterwards (Schneider, 2008, p. 84).

The other form of upper secondary education is vocational training. (1) The most popular option lasts 3 years in the 'dual system', which combines school-based (in the '*Berufsschule'*) and firm-based education (see Figure 2-2). Normally, apprentices go for two days of the week to the '*Berufsschule'* and the other three days they receive practical vocational training in firms. However, sometimes full-time school-based training is centered in certain months of the year and the rest of the time trainees attend full-time firm-based vocational training (Schneider, 2008, p. 87). Graduates from this type of vocational training can take a final examination or a '*Gesellenprüfung'* and receive a state-

recognized vocational training certificate. There are no school certificate requirements to attend this form of vocational training. It is also increasingly popular among holders of an '*Abitur'*. (2) Students can also attend full-time vocational schools. These are particularly popular among girls. Boys mainly attend these schools if they were not able to get a vocational training slot in the 'dual system'. These schools are either called ‚*Berufsfachschule'*, ‚*Berufskolleg', ‚Fachoberschule', ‚Berufsoberschule'* and ‚*berufliches Gymnasium'/'Fachgymnasium'*. There are '*Berufsfachschulen'/'Berufskollegs'* for many occupations (e.g. for business, craft, technical and health sector occupations; see Figure 2-2). This school type can last from 1 to 3 years and the requirement for access to this school form is a '*Hauptschulabschluss'* or '*Mittlere Reife'*. Graduates from these schools receive a state-recognized vocational training certificate or even are able to get a '*Fachhochschulreife'*. For the attendance of a '*Fachoberschule' (FOS)*, a '*Mittlere Reife'* is a necessary requirement (see Figure 2-2). This school form provides vocational training in business and administration, technology, health and social work, design, nutrition and home economics, as well as agriculture, bio- and environmental engineering. Students who go to '*Fachoberschule'* receive a '*Fachhochschulreife'* after completion. In some federal states it is also possible for students to get a '*Fachgebundene Hochschulreife'* or '*Allgemeine Hochschulreife'* (with a second foreign language) when attending an additional year at this school. The '*Fachgebundene Hochschulreife'* allows studying certain subjects at traditional university. The '*berufliche Gymnasium'* only offers Grade 11 to 13 compared to the traditional 'Gymnasium'. Only students that have at least a *'Mittlere Reife'* can attend this school form. Its subject orientation is also more vocational-oriented. However, the final school leaving certificate is the '*Abitur'*. The '*Berufsoberschule'* (short BOS) requires a *'Mittlere Reife'* and allows students who have attended vocational training in the 'dual system' to receive a higher education entrance certificate. This school normally takes 2 years (but can also be attended part-time for longer; see Figure 2-2) and

graduates can receive a '*Fachgebundene Hochschulreife'* (this certificate only allows to study certain subjects at the university) or an '*Allgemeine Hochschulreife'* (with a second foreign language, allowing the student to freely choose the subject of study) (Lohmar & Eckhardt, 2013, pp. 134–143).

At the tertiary level there is vocational education in the '*Fachschulen'/'Fachakademien'* and *'Berufsakademien'* (Mayer, 2008, p. 615; see Figure 2-2). For the '*Fachschulen*', the entry requirement is an apprenticeship certificate or a certificate of a '*Berufsfachschule*' in addition to some work experience. Graduates from '*Fachschulen*' either receive a 'state-approved technician' certificate or a 'master craftsman's' diploma ('*Meisterbrief*'). It is also possible to take an examination after several years of work experience to receive the '*Meisterbrief*', without attending the '*Fachschule*'. The '*Berufsakademie*' does not exist in all federal states. It combines practical training within firms with academic theoretical education. Only students that have a '*Fachhochschulreife*' or '*Abitur*' are allowed to attend '*Berufsakademien*'. Graduates from this school form receive a '*Diplom*' (BA) or since 2006 a 'Bachelor' degree (Schneider, 2008, p. 90).

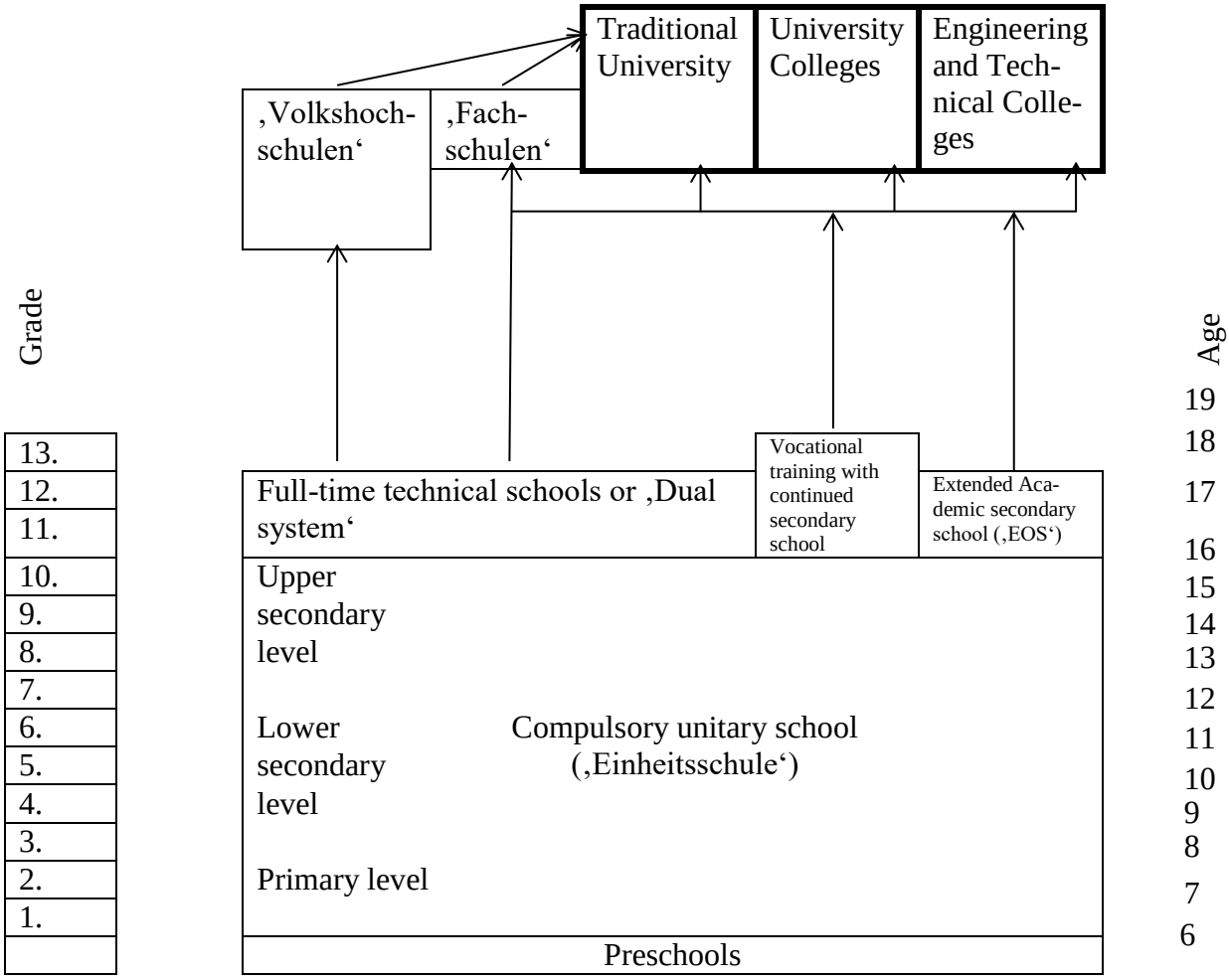
The '*Fachhochschulabschluss'*, ‚*Fachgebundene Hochschulreife'* and ‚*Allgemeine Hochschulreife'* allow students to access higher education institutions. Higher education combines two kinds of institutions the '*Fachhochschulen*' ('university of applied science') and the traditional universities (Mayer, 2008; see Figure 2-2). The '*Fachhochschule'* exists since the 1970s and provides a shorter and more practically-oriented higher education in engineering, architecture, design, business administration, social work etc. It has a closer link to the professional world because part of the study has to be done in firms to gain some practical experience ('*Praxissemester'*). The education in the '*Fachhochschule'* lasts 4 years and one can get a '*Diplom*' afterwards. Since 2003 students are able to do their '*Bachelor*'s' degree. Universities have a profession-oriented and

personality-developing function and have the aim to train the next generation of academics (Mitter, 1990, p. 338). It lasts at least 4 and a half years to gain a '*Diplom*', '*Staatsexamen*' or '*Magister*' degree. Since 1999 (Bologna reform) students can receive a 'Bachelor's' degree in 2 or 3 years and a following 'Master's' degree in additional 1 or 2 years. The entry requirement for traditional universities is the '*Allgemeine Hochschulreife'* or the '*Fachgebundene Hochschulreife'*. After completion of university it is possible to continue to pursue a doctorate degree. Since the last decades, higher education has expanded massively with the introduction of the '*Fachhochschule*' in the 1960s and more and more '*Allgemeine Hochschulreife'* degree holders (Mayer, 2008, pp. 605–609). In general, the higher education system is the responsibility of the state (Füssel & Leschinsky, 2008, p. 192).

### 2.5.2 The East German education system from 1950 until 1990

The Eastern part of Germany was highly influenced by the Soviet system and ideology. The idea of its educational system was oriented around one school for all ('Einheitsschule') (Baumert et al., 2008, p. 61). The East German education system was therefore *lowly stratified, highly centralized and standardized* (Schneider, 2008, p. 76). To enforce the major role of the state, *private education* was, with a few exceptions of religiously-oriented schools, *abolished* (Mitter, 1990, p. 336). Since the *Act of the democratization of the German school* ('Gesetz zur Demokratisierung der deutschen Schule') in 1946 and the *Act of the unitary socialist educational system* ('Gesetz über das einheitliche sozialistische Bildungssystem') in 1965 there was only one compulsory unitary school for all students from Grade 1 to 10 (school starting age was 6 or 7; see Figure 2-3). This school was the polytechnic primary and secondary school ('*Polytechnische Oberschule' - POS*). Previously, until 1959 this school was called '*Grundschule*' and lasted 8 years (Anweiler,

**Figure 2-3:** The East German educational system before German unification




Source:Author‘s portrayal

1990). In 1959, the polytechnic school was divided into primary level (Grades 1−4) and secondary level (Grades 5−10). In 1969, the polytechnic school was distinguished into primary level (Grades 1−3 ‘Unterstufe’), lower secondary level (Grades 4−6 ‘Mittelstufe’) and upper secondary level (Grades 7−10 ‘Oberstufe’) (Baumert et al., 2008, p. 64; see Figure 2-3). Graduates from polytechnic school received an educational degree that was comparable to the West German *‘Mittlere Reife’*. It was also possible to leave this school after the 8th and 9th grade. However, parents had to ask for permission at schools. Leaving school after Grade 9 as well as leaving after Grade 8 with a following ‘*Facharbeiterzeugnis*’ was comparable to the West German ‘*Hauptschulabschluss’*. Leaving polytechnic school after Grade 10 allowed students to start vocational training or

to study at the '*Fachschule*' (which was in some cases a predecessor of today's '*Fachhochschule*').

After compulsory schooling, like in West Germany, the East German educational system was structured into an academic and vocational track. Very talented students had the possibility to continue in the extended academic secondary school ('*Erweiterte Oberschule*' – EOS) after polytechnic school (see Figure 2-3). This school lasted 2 years and provided the possibility to receive a certificate that allowed students to enter traditional university and '*Fachschule*' afterwards (Baumert et al., 2008, p. 64; see Figure 2-3). Entry to university was highly selective and restricted in the GDR (Mitter, 1990). Only a small percentage of students was allowed to continue to '*Erweiterte Oberschule'* and they were more likely to attend this school form if their parents were members of the Socialist Unity Party of Germany (Sozialistische Einheitspartei Deutschland – SED), had a working-class background or when the students had full-filled the military service before. (Schneider, 2008, p. 77). Only high performing students could choose their university subjects freely (Schneider 2008). All the other students were allocated to university subjects by the requirements of the planned economy. If there were not enough university places available, some students started a vocational '*Facharbeiterausbildung*' instead of attending a university (Goedicke, 2006, p. 53). There was a strong educational expansion in the 1960s, which lead to an impressive increase in study places at the university. However, this development changed in the 1970s, were a decline at the university level took place for political and economic reasons (Hauser et al., 2013, p. 183).

Vocational training could either be done in the 'dual system' or in full-time technical schools (Mitter, 1990, p. 337; see Figure 2-3). In general, access to vocational training was highly influenced by the communist planning economy (Mitter, 1990, p. 338). Vocational training in the apprenticeship system had a duration of 2 years (not 3 years as in

West Germany) and took place on the one hand in firms and on the other hand in the '*Betriebsberufsschule*' (BBS) which was attached to firms. The practical training was mainly located directly within firms. The '*Betriebsberufsschule*' was the most common institution that provided the additional theoretical and practical training in school. Another school that provided this kind of education was the '*Betriebsschule*' (BS). However, this kind of school was also attended by employees of firms (adult education) and not only by apprentices. Also pupils from the polytechnic school and '*Erweiterte Oberschule'* received their practical 'polytechnic' education in the '*Betriebsschule*' (Schäfer, 1990). '*Kommunale Betriebsschulen'* (KBS) provide theoretical training for apprentices of small firms (such as from handcraft, agriculture and mercantile occupations). '*Zentralberufsschulen*' (ZBS) were visited by apprentices of small occupations that made only under 1 % of all apprenticeship occupations (Schäfer, 1990). The vocational training in East Germany was, as in West Germany, highly gender-segregated. However, more female vocational training was integrated in the East German apprenticeship system and women received similar or even higher degrees compared to men (Goedicke, 2006, p. 53).

The two-year vocational training which led to the 'Facharbeiterabschluss' allowed students to study specific subjects at a '*Fachschule*' or engineering school, which were both part of tertiary education (Schäfer, 1990; see Figure 2-3). For particularly talented apprentices it was also possible to receive, after 3 years of vocational training with continued school education (in the '*Volkshochschule*', '*Betriebsakademie*' and '*Betriebsschule*') a '*Facharbeiterabschluss*' and additionally an '*Abitur*' which allowed them to attend university (Baumert et al., 2008, p. 64; see Figure 2-3). However, admission to this programme was also restricted and often students were prepared to study more technically oriented university subjects. In addition, since the *Act of the Fachschule* in 1969, some universities provided a preparatory course for young skilled workers ('Facharbeiter') which led to the Abitur (Schäfer, 1990). Also the '*Workers' and Peasants' Faculty'*

(‘*Bauern- and Arbeiterfakultät’*) prepared for a higher education entrance certificate (Schulz, 1983, p. 15). However, these students could only study a restricted number of subjects at university (‘*fachgebundene Hochschulreife’*). Also some graduates of the ‘Fachschule’ were eligible to attend the university and in addition there were ‘*Volksschulen’* which already allowed working individuals to receive an ‘*Abitur*’ in evening courses (Anweiler, 1990). In general, the certificates that led to higher education were highly restricted in the former GDR (Mitter, 1990, p. 337). However, the GDR schooling system was designed to make sure that talented students could attend post-secondary education, no matter in which educational track they were (Schulz, 1983, p. 11). Admission to higher education was less socially selective. About 50 % of students came from working class backgrounds (Schulz, 1983, p. 9). Higher education was not a two-tier system like in West Germany. In the GDR, there were three types of higher education: the traditional university, university colleges (‘*Hochschulen*’) and engineering and technical colleges (Rytlewski, 1990; see Figure 2-3). Universities provided a broad spectrum of subjects, while ‘*Hochschulen*’ were more specialized in the subjects they offered. All institutions provided a ‘*Marxist-Leninist’* basic study (Rytlewski, 1990). The engineering and technical colleges provided a more practical education in the natural or social sciences, technology, economics etc. (Schulz, 1983, p. 7).

### 2.5.3 The East and West German education systems after German unification in 1990

After German unification, East Germany more or less took over the West German educational structure in the five new federal states (Mecklenburg-Western Pomerania, Brandenburg, Saxony-Anhalt, Thuringia and Saxony). The polytechnic school was replaced by the ‘*Grundschule*’ which cater the first 4 years of students’ education. Exceptions are Berlin and Brandenburg, where primary education lasts until Grade 6 (Baumert et al.,

2008, p. 70; Füssel et al., 2010, p. 95). In addition, the role of the 'Erweiterte Oberschule' was taken over mainly by the '*Gymnasium*' (Trautwein & Neumann, 2008, p. 472).

Nevertheless, some deviations from the traditional West German educational system emerged: A two-tier educational structure at the upper secondary level was introduced instead of the tripartite system (Baumert et al., 2008, p. 70). However, this trend towards a bipartite educational system is not restricted to East Germany alone. Also the West German federal states started to introduce the two-tier system since the late 1990s (Leschinsky, 2008, p. 428; Tillmann, 2012). The Saarland was the first federal state in West Germany which implemented this new system in 1997. Today, most Western federal states have already introduced this change and when the remaining federal states shall implement the bipartite structure is just a matter of time (Wernstedt & John-Ohnesorg, 2009, p. 7; Helbig & Nikolai, 2015, p. 300). Thus, the 'Hauptschule' and 'Realschule' tracks are more and more converging. In my analyses of educational careers in the general school system, I therefore concentrate on the two major educational tracks, the academic ('*Gymnasium*', '*Waldorfschule*', the academic track of comprehensive schools and the '*Erweiterte Oberschule'*) and non-academic track ('*Volksschule*' that lasts more than 6 years, '*Hauptschule*', '*Realschule*', '*Einheitsschule*' that lasts more than 8 years and the non-academic track of comprehensive schools).

The vocational training systems in East and West Germany have been quite similar. However, after German unification, the '*Betriebsberufsschule*' was externalized from firms and became the responsibility of the municipalities in East Germany (Goedicke, 2006, p. 53). Immediately, after 1990, many firms in East Germany experienced an economic hardship and were not able to train new apprentices. Furthermore, many firms faced problems of outdated technology and a lot of formerly socialist state-owned firms that provided dual vocational training were closed down after reunification (Mitter, 1992).

Therefore, the dual system in East Germany has been subsidized by the federal governments. After German unification state-funded practical institutions were introduced which are providing practical apprenticeship training outside firms. Furthermore, it has not been possible anymore to receive automatically the '*Facharbeiterabschluss*' and the '*Abitur*' at the same time, after three years of vocational training (Goedicke, 2006).

Also the system of higher education experienced some major changes in East Germany since German unification. In West Germany the '*Fachschule*' did not exist. Therefore, the GDR version of '*Fachschulen*' which provided training for social, pedagogical and artistic subjects, were transformed into '*Fachhochschulen*' in East Germany. In addition, the GDR '*Fachschulen*' that trained for engineering and economic occupations under the university level were transformed to '*Berufsfachschulen*' (Goedicke, 2006, pp. 53–54). Furthermore, the socialist '*academies of sciences'* were either abolished or were integrated into the university system (Goedicke, 2006, p. 54).

### 2.5.4 The openness of the German educational system and the decoupling of school form and educational certificate

The educational system in the GDR, was from the beginning more open than the educational system in the FRG (Anweiler, 1990; Huinink et al., 1995, p. 97). In fact, Huinink et al. (1995, p. 108) showed that upgrading a higher education certificate was quite common in the former GDR. Since the foundation of the GDR, the socialist party put a strong emphasis on equality in education (Anweiler, 1990, p. 13). To achieve this objective, the GDR introduced a comprehensive school system, which all students attended for at least 8 years (later 10 years) (Anweiler, 1990, p. 15). So, there was late tracking. At the age of 15 students could decide, whether they wanted to continue to the vocational track ('*Berufsschul*e' or '*Fachschul*e') or to the more prestigious academic track (the '*Erweiterte Oberschule*') which leads directly to a higher education entry certificate. Furthermore, there were multiple routes for individuals in the vocational track to upgrade a higher education

entry certificate later on or to enter higher education directly (Günther & Hammer, 1979, p. 82; Huinink et al., 1995, pp. 97–98). For instance, East Germans that were enrolled for two years in vocational training automatically received the '*Fachschulreife*' and those who completed three years of vocational training obtained the 'Abitur', which in practice allowed to study certain subjects at the university (Huinink et al., 1995, p. 97).

In West Germany and unified Germany tracking to '*Hauptschule*', '*Realschule*' or '*Gymnasium*' generally takes place at an early age of 10 (Jackson & Jonsson, 2013, p. 320; Trautwein & Neumann, 2008). In addition, educational tracking is very rigid, so that corrections of early placements are hard to revise (Buchholz & Schier, 2015). In the following, I focus on the situation in West Germany before the 1990s and the development in overall Germany after the reunification in 1990.

In West Germany, until the late 1960s mobility between different school tracks was not very common (Baumert et al., 2008, pp. 87–88). By that time, only 10 % of students moved between different school forms (Baumert et al., 2008, p. 87). The tracking was justified by the better learning opportunities in school classes with students that are more homogeneous in terms of abilities, motivation and school achievements (Glaesser & Cooper, 2011; Schindler, 2015). In the 1970s the educational discussion in West Germany changed. Comprehensive schools were suggested which should counteract early school decisions at the age of 10 which then have a long-lasting influence on children's later educational and life chances. Although comprehensive schooling was not introduced on a broad scale in West Germany in the end, the 'German Education Council' came to the conclusion that dead end pathways in the educational system should be abolished. The new aim was to restructure the West German tracking system in a way that early schooling decisions can be revised at later points in the educational career taking into account differences in the speed of learning and development progresses of children (German Ed-

ucation Council 1970: 38). The primary goal, of course, was to provide more upward mobilities from '*Hauptschule*' to '*Realschule*' and from '*Realschule*' to '*Gymnasium*'.

Furthermore, an additional educational reform was introduced, which reduced the strong link between educational certificates and school forms. Thus, the same educational certificate can be obtained in different schools. For instance, it is nowadays possible to attend the extended '*Hauptschule*' for one year longer in order to obtain a qualified '*Hauptschulabschluss*' or '*Mittlere Reife'*. Furthermore, it is also possible for students to receive a '*Hauptschulabschluss*' at the '*Realschule*', if they leave the school before the '*Mittlere Reife'* or pupils at the '*Gymnasium*' can leave the school after the 10$^{th}$ grade and automatically receive the '*Mittlere Reife'* (Baumert et al., 1999, p. 387).

Furthermore, new alternative school forms were created that allowed students to continue education after a first educational degree. These new institutions allow students to revise earlier school decisions and provide the opportunity to attain higher formal educational degrees later on. Since the last decades it is possible to obtain the '*Abitur*' and '*Fachhochschulreife*' in various types of school forms. Today, especially the '*Fachgymnasium*' and '*Gesamtschule*' are the main providers of the 'Abitur', besides the traditional '*Gymnasium*'. Furthermore, the '*Berufsfachschulen*' play a crucial part in the provision of '*Fachhochschulreife*' degrees besides the '*Fachoberschulen*' (Baumert et al., 1999, p. 388). In addition, high performing graduates from the '*Realschule*' can continue to the '*gymnasiale Oberstufe'* afterwards to obtain an '*Abitur*'.

Whether this *decoupling of school forms and educational certificates and the increasing permeability of the educational system* leads to higher educational equality or not is still an open question which will be addressed in this thesis (Schindler, 2015).

# 3 Research design

The goal of this Chapter is to describe the data, statistical methods and variables. I start off with a description of the two datasets used in my empirical analyses. Then, I present the dependent variables, the method of anaylsis as well as the independent variables. Finally, I provide an excursus on the school transition approach.

## 3.1 Data and sample

In my thesis I draw on data from the *the Programme for the International Assessment of Adult Competencies (PIAAC)* and the *National Educational Panel Study (NEPS):*

### 3.1.1 Data from the PIAAC

To conduct a cross-national comparison of the associations between parental education, gender and the highest educational attainment and its changes over time in six welfare regimes in Chapter 4, I use data from the PIAAC. This dataset was coordinated by the Organisation for Economic Co-operation and Development (OECD) and collected between August 2011 and March 2012.[6] The PIAAC dataset includes adults from 24 countries aged 16 to 65 years. I restrict my analysis to 21 countries because the data from Russia, Cyprus and Australia raise specific problems. The following countries are included in my analysis: Austria, Belgium (Flanders), Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Japan, Korea, the Netherlands, Norway, Poland, the Slovak Republic, Spain, Sweden, the United Kingdom (England and Northern Ireland) and the United States. For a more detailed description of the PIAAC study design and data structure, I refer the reader to Kirsch and Thorn (2013).

PIAAC provides highly equivalent information on the highest educational attainment levels of the respondents and their parents for the 21 analysed countries. The educational data in the scientific use file were coded according to the 'International Standard Classifi-

[6] In Canada, data collection took place from November 2011 to June 2012; in France from September to November 2012.

cation of Education (ISCED-97)' (UNESCO, 2012). The random sample of adults in the 21 countries contains 148,622 individuals.[7] I restrict my sample to 80,850 individuals aged 30 to 65 in order to be sure that the individuals have completed their highest level of education, and I limit my analysis to natives.

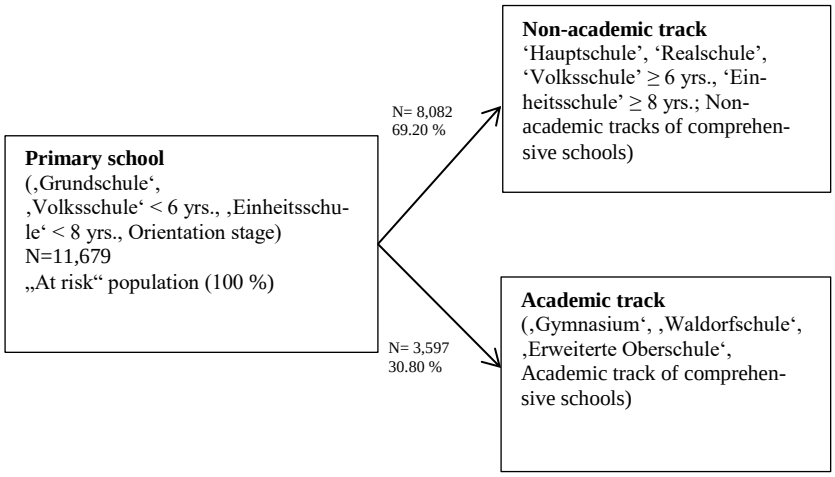
### 3.1.2 Data from the NEPS

For the remaining Chapters 5 to 8, I use unique retrospective longitudinal data from the so-called Adult Cohort (SC6)[8] of the NEPS (Blossfeld et al., 2011). This panel is carried out by the Leibniz Institute for Educational trajectories. In my analysis, I include all men and women who have participated in at least one of the NEPS panel waves until 2014 (see von Maurice et al., 2016, p. 11). One major advantage of this NEPS dataset is that it provides detailed information on respondents' complete educational histories for a large sample from the cohorts born between 1944 and 1986. However, I restrict my analysis to men and women born in Germany aged 25 years or above at the time of the interview in order to make sure that I am able to follow them up through the educational system until they possibly obtain their ultimate educational attainment at the institutions of higher education. There are 429 individuals in the dataset whose educational histories could not be reconstructed because of missing data. These cases were excluded from my analyses. 312 individuals who left the school system without any educational certificate are retained in the analyses until their compulsory schooling ends at the 8$^{th}$, 9$^{th}$ or even 10$^{th}$ grade in East or West Germany respectively.

[7] The country-specific samples range from a minimum of approximately 4,500 to a maximum of nearly 27,300.

[8] This thesis uses data from the National Educational Panel Study (NEPS): Starting Cohort 6 – Adults, *doi:10.5157/NEPS:SC6:6.0.1*. From 2008 to 2013, NEPS data were collected as part of the Framework Programme for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, the NEPS survey is carried out by the Leibniz Institute for Educational Trajectories (LIfBi) at the University of Bamberg in cooperation with a nationwide network.

**Figure 3-1:** Transition from primary school to the academic or non-academic track in West and East Germany




Source: Author’s graph

In my analysis, I do not include individuals who attended special schools for disabled or schools for pupils with learning disabilities (see for the same decision Buchholz & Schier, 2015). It is well-known that children from special needs schools are more likely to leave the educational system without any educational degree. Therefore, my analysis underestimates the proportion of school dropouts in the German school system.

In addition, the *first generation immigrants* are not part of my analysis, because those people arrived in Germany as adults and did not go to school in Germany anymore. I also exclude the *1.5 generation immigrants* from my analyses; because they are a very specific group (see Appendix A.5). The second and 2.5 generation immigrants are included in my analysis as either being born in East or West Germany.

I define all episodes of the ‘Grundschule’, the orientation stage (the first 6 years of ‘Volksschule’) or the first 8 years of the ‘Einheitsschule’ as primary school (see Figure 3-1). I assigned secondary schools to the academic or non-academic track according to the following two rules: (1) The academic track includes the ‘Erweiterte Oberschule’ (EOS) in the GDR, the ‘Gymnasium’ in the FRG and in West and East Germany after unification, the ‘Gymnasium’ track of the comprehensive schools (for the same approach

see Müller & Haun, 1994, p. 11), and the ‘Waldorfschule’. (2) The non-academic track includes schools such as the ‘Hauptschule’ the ‘Volksschule’ (if it was attended for more than 6 years), and the ‘Realschule’ in West Germany and in East Germany after unification, the ‘Einheitsschule’ (if it took longer than 8 school years) in the GDR, as well as the non-academic track of the cooperative comprehensive school and integrated comprehensive schools (see Figure 3-1).

### Chapter 5

For my statistical analysis on the transition from primary school to the academic track in East and West Germany before and after German unification (see Chapter 5**)**, I am able to include 11,679 valid cases. Regarding gender, 5,864 respondents (about 50 %) are females and 5,815 (about 50 %) are males; 9,097 respondents (78 %) are West Germans and 2,582 (22 %) are East Germans.

### Chapter 6

In Chapter 6, I analyse (1) school dropout; (2) between-track mobility, and (3) leaving school with an ‘atypical’ degree:

My analysis of school dropout considers all 11,679 pupils in secondary school as ‘at risk’. Of these, 312 left school without an educational certificate. However, in my analysis only 307 (about 3 %) are counted as having no educational certificate, because 5 of them have later passed an extra examination, called ‘Externenprüfung’, allowing them to study at the ‘Fachhochschule’ or traditional university. Thus, I did not consider these five individuals as dropouts without any educational degree from the school system in my analysis. A total of 196 of the 307 dropouts (about 64 %) are males and 111 (about 36 %) are females; 84 (about 22 %) of the dropouts are West Germans and 223 (about 78 %) are East Germans.

In my analysis of directional moves between the non-academic and academic track, I compare the type of track, in which individuals started their secondary school, with the type of track, in which they obtained their first general education certificate. My 'at risk' sample for the analysis of upward mobility from the non-academic track comprises of 7,800 pupils and my 'at risk' sample for the analysis of downward mobility from the academic track includes 3,567 pupils. Of these, 379 (or about 11 %) experienced a downward mobility event from the academic track and 369 (or about 5 %) reported an upward mobility event from the non-academic track. A total of 370 (about 50 %) of these mobile respondents are males and 378 (about 50 %) are females. 483 (about 64 %) of them are West Germans and 265 (about 36 %) are East Germans.

In my analysis of 'atypical' degrees, I consider the 7,810 respondents in the non-academic track and 3,557 respondents on the academic track as 'at risk'. A total of 525 (about 15 %) pupils left the academic track with an 'atypical' degree, namely 'Hauptschulabschluss' or 'Mittlere Reife'; and 60 (about 0.8 %) pupils left the non-academic track with an 'atypical' degree, namely 'Fachhochschulreife' or 'Abitur'.

## Chapter 7

In Chapter 7, I study mobility flows between the vocational and academic tracks in the German vocational training, post-secondary and tertiary education systems. Because not all tertiary education students might have already graduated at the age of 25, I also conducted my analyses of the educational transitions to higher education degrees (university of applied sciences or university degree) on students who are 30 years and above at the time of the last NEPS interview. If there are significant differences in the results between the analyses for individuals aged 25 and over and those aged 30 and over, I shall report and discuss these in a footnote.

In my analyses of transitions after attaining a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ as the first school degree, 8,275 respondents are considered as ‘at risk’. Three destination states are possible for them: (1) A total of 534 respondents did not obtain any further degree after the ‘Hauptschulabschluss’ or ‘Mittlere Reife’; 98 (18 %) of them are men and 436 (82 %) are women; 189 (35 %) are East Germans and 345 (64 %) are West Germans. (2) A total of 6,164 respondents completed a vocational training certificate after the ‘Hauptschulabschluss’ or ‘Mittlere Reife’. 3,144 (51 %) of them are men and 3,020 (49 %) are women; 1,506 (24 %) are East Germans and 4,658 (76 %) are West Germans. (3) Finally, 1,577 respondents obtained a higher education entry certificate after the ‘Hauptschulabschluss’ or ‘Mittlere Reife’. 942 (about 60 %) of them are males and 635 (about 40 %) are females; 215 (about 14 %) are East Germans and 1,362 (about 86 %) are West Germans.

For the analyses of educational careers after obtaining a higher education entry certificate as the first school degree, 4,669 respondents are ‘at risk’. Four destination states are possible: (1) A total of 194 of these respondents did not obtain another vocational training or academic education afterwards; 109 (56 %) of them are males and 85 (44 %) are females; 34 (18 %) are East Germans and 160 (83 %) are West Germans. (2) A total 1,279 obtained a vocational training certificate; 571 (45 %) are male and 708 (55 %) are female; 154 (12 %) are East Germans and 1,125 (88 %) are West Germans. (3) A total of 949 obtained a ’Fachhochschule’ degree; 568 (60 %) of them are males and 381 (40 %) are females; 198 (21 %) are East Germans and 751 (79 %) are West Germans. (4) Finally 2,247 graduated successfully from a university; 1,176 (52 %) of them are males and 1,071 (48 %) are females; 414 (18 %) are East Germans and 1,833 (82 %) are West Germans.

In my analysis of obtaining a tertiary educational degree after completing vocational training, 6,164 respondents are ‘at risk’. Of these, 505 obtained a higher education degree

after vocational training; 277 (55 %) are males and 228 (45 %) are females; and 336 (67 %) are East Germans and 169 (33 %) are West Germans.

## Chapter 8

In Chapter 8, I study social inequality in highest educational attainment for individuals that age 30 and above. 10,918 respondents are 'at risk'. Of these, 635 individuals are unskilled, 6,535 are skilled and 3,617 have a tertiary education. In the sample there are 5,443 (about 50 %) males and 5,475 (about 50 %) females; and 2,424 (22 %) East Germans and 8,494 (78 %) West Germans.

### Panel attrition, unit non-response, and item non-response

*Sample attrition* is an issue in many panel studies (Blossfeld and Rohwer 2002: 13), and the NEPS dataset is no exception. The problem with panel data is that the sample often shrinks selectively over time (Blossfeld and Rohwer 2002: 13). However, for my sequential description of individuals' educational careers, I used the detailed retrospective information collected in the first interview of the Adult Cohort (SC6) of the NEPS. If there were missing data for an individual, the retrospective interview was repeated. Therefore, panel attrition is a minor problem in my thesis. In my analyses, I used information on the educational careers of individuals that have been at least 25 years old at their last NEPS interview. Due to the retrospective nature of the sample, I do have information on the whole educational careers of individuals. If they dropped out later in the NEPS panel this does not affect my analysis, since I have the relevant data for these people. Sometimes, there have been temporary drop-outs in some of the NEPS panel waves. For example, some people could not take part in the first NEPS wave, but participated later in the NEPS panel. For these cases, the retrospective information has been collected retrospectively in a later wave. In my analyses, were I restricted the sample to individuals who age 30 and above, I compared the analyses to a sample, where I included individuals that age 25 and

above (see Chapter 7). The results are very similar and the substantive conclusions were the same.

Addressing *non-response,* one has to make the *distinction between unit and item non-response* (Groves et al. 2011). The failure of not obtaining information on a whole individual is called unit non-response (Groves et al. 2011: 169). Unit non-response can be of major concern, if the reason of non-participation in the survey is linked to the statistics measured in my thesis, for example highest educational attainment (Groves et al. 2011: 178). In the first NEPS wave (2009/2010) only 11,649 individuals of the gross sample of 27,009 individuals participated. This means that only 43.1 % (11649/27009) of the individuals took part in the first NEPS survey (Hammon et al. 2016: 4). Thus, the unit non-response was 56.9 %. To test, whether the unit non-response in the NEPS is selective, Hammon et al. (2016: 19, 23, 31, 38 and 44) compared for example the distribution of highest educational attainment and gender in the NEPS with the distribution of these variables in the 2009 Microcensus. They documented that the distributions are very similar. According to these comparisons, the *lower qualified are slightly underrepresented* and the *higher qualified are slightly overrepresented* in the NEPS waves. Thus, there is the usual slight middle class bias of surveys compared to microcensus data. In conclusion, the empirical findings of my retrospective analyses in my thesis, which are using data from the NEPS, should be only marginally affected by unit non-response bias.

If there is a missing at a single item in the survey this is generally labelled as item non-response (Groves et al 2011: 187). Since I was interested in the whole educational career of individuals, I had to exclude few cases that had missings for at least one of the educational certificate and school form items, since I was not able to reconstruct their whole educational career. In total, these were 429 from 12,108 individuals (3.5 %). A comparison of the descriptive statistics of the 429 missing individuals and the analysis sample shows that there are no important differences in the distributions of gender, being born in

East or West Germany, highest educational attainment and parental education (see Table 8-4 in the appendix). There is a slight difference in the distribution of cohorts. In the analysis sample, there are more individuals from older cohorts than in the sample of the excluded 429 individuals (see Table 8-4 in the appendix).

## 3.2 Dependent Variables

In the following, I define the dependent variables of Chapters 4 to 8:

### Chapter 4

In order to study the inequality of educational opportunity in Chapter 4, I use two dependent variables:

- *The average number of school years* necessary to obtain the highest educational attainment level (see Table 3-1).
- *The highest educational attainment level* as an ordered variable. Both variables are based on the ISCED-97 (see Table 3-1).

The advantage of the metric dependent variable is that it allows me to use a simple OLS regression with straightforward interpretations.

**Table 3-1:** Dependent variables

| ISCED-97 Classification | Average number of school years | Ordered variable of highest educational attainment |
|---|---|---|
| ISCED 1, ISCED 2A/B and ISCED 3C shorter than 2 yrs | 9 yrs | Lower secondary education |
| ISCED 3 A/B and ISCED 3C more than 2 yrs, ISCED 4 | 12 yrs | Upper secondary education |
| ISCED 5 and ISCED 6 | 17 yrs | Tertiary education |

Source: Author's presentation

## Chapter 5

In Chapter 5, in the binary logistic regression, the *dependent variable* is a dummy variable indicating *whether a child makes the transition to the academic track (Y = 1) or not (Y = 0).*

## Chapter 6

In Chapter 6, I use five dichotomous dependent variables and different risk sets of pupils. I estimate binary logistic regressions (Cox & Snell, 1970, p. 13):

- The *first dependent variable* indicates *whether secondary school children leave the educational system without any educational degree (Y = 1) or attain an educational certificate (Y = 0).*
- The *second dependent variable* indicates whether children from the academic track are *downwardly mobile* to the non-academic track (Y = 1) or not (Y = 0).
- The *third dependent variable* indicates whether children from the non-academic track are *upwardly mobile* to the academic track (Y = 1) or not (Y = 0).
- The *fourth dependent variable* indicates whether children on the academic track left the school system with only ‘Hauptschulabschluss’ or ‘Mittlere Reife’ (Y = 1) or not (Y = 0).
- The *fifth dependent variable* indicates whether children on the non-academic track left the school system with ‘Fachhochschulreife’ or ‘Abitur’(Y = 1) or not (Y = 0).

## Chapter 7

In Chapter 7, I use two dichotomous dependent variables and different risk sets of students. I estimate two binary logistic regressions (Cox & Snell, 1970, p. 13):

- The *first dichotomous dependent variable* indicates whether youth with a 'Hauptschulabschluss' or 'Mittlere Reife' do not upgrade their educational degree (Y = 1) or do upgrade it (Y = 0) (see Table 7-1)
- The *second dependent dichotomous variable* indicates whether youth with a vocational training certificate obtain a tertiary educational degree (Y = 1) or not (Y = 0) (see Table 7-3)

In my three multinomial logistic regressions (Powers & Xie, 2008, p. 247), I use three dependent variables and different risk sets of pupils:

- The first *multinomial dependent variable* indicates, whether students with a 'Hauptschulabschluss' or 'Mittlere Reife' obtain a vocational training certificate (Y = 2) or a higher education entry certificate (Y = 3). The reference category is whether those pupils do not obtain any further educational degree (Y = 1) (see Table 7-1).
- The second *multinomial dependent variable* indicates, whether young people with a higher education entry certificate graduate from a 'Fachhochschule' (Y = 2) or a traditional university (Y = 3). The reference category is whether those students do not obtain a tertiary degree (i.e. acquire no further educational degree or a vocational training) (Y = 1) (see Table 7-2).
- The third *multinomial dependent variable* indicates whether young adults with a higher education entry certificate do not obtain any further education (Y = 2) or obtain a vocational training certificate (Y = 3). The reference category is whether students obtain a tertiary degree ('Fachhochschulabschluss' or university degree) (Y = 1) (see Table 7-2).

### Chapter 8

In Chapter 8, I use three dependent variables. I estimate three binary logistic regressions (Cox & Snell, 1970, p. 13):

- The *first dichotomous dependent variable* indicates whether youth remained unskilled (Y = 1) or not (Y = 0) as highest educational attainment (see Table 8-20 in the appendix).
- The *second dependent dichotomous variable* indicates whether youth were skilled (Y = 1) or not (Y = 0) as highest educational attainment (see Table 8-21 in the appendix).
- The *third dependent dichotomous variable* indicates whether youth had a tertiary education (Y = 1) or not (Y = 0) as highest educational attainment (see Table 8-22 in the appendix).

## 3.3 Methods of analysis

In Chapter 4, I estimate an Ordinary Least Squares regression. Equation 2 shows how the number of school years is related to the independent variables ($X_1 = x_1, \ldots, X_p = x_p$):

$$\mathbf{Y_{yrs\ of\ schooling}} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1 X_1} + \boldsymbol{\beta_2 X_2} + \ldots + \boldsymbol{\beta_p X_p} \qquad (2)$$

In addition, I estimate an ordered logit model in which the dependent variable is the respondent's highest educational attainment level (see Table 3-1). This model is a kind of extension of the logistic regression model that applies to binary dependent variables allowing for more than two ordered outcomes. My ordered logit model estimates the chance whether someone has more than a lower secondary degree (j = 1) and whether someone has a tertiary degree (j = 2). The model is based on the so-called parallel lines or proportional odds assumption that means that the coefficients of the independent variables in both binary models are considered to be similar (R. Breen et al., 2009, p. 1493). I also estimate a partial proportional odds model that relaxes the assumption of parallel lines by

allowing particular coefficients (for which this assumption does not hold) to vary at different thresholds. However, the substantive conclusions based on this model are quite similar to those for the ordered logit model. Therefore, for the sake of simplicity, I show the results for the ordered logit model. Equation 3 relates the ordered educational attainment variable to the independent variables ($X_1 = x_1, \ldots, X_p = x_p$) (Williams, 2006).

$$\mathbf{P(X_i > j)} = \frac{\mathbf{\exp(\beta_j + \beta_1 X_1 + \cdots + \beta_p X_p)}}{\mathbf{1 + \exp(\beta_j + \beta_1 X_1 + \cdots + \beta_p X_p)}} \qquad \text{j=1, 2} \qquad (3)$$

In Chapters 5 to 8, I estimate a binary logistic regression. The observed dichotomous variable Y takes the value 1, if a respondent makes a specific educational transition or obtain a certain highest educational degree and has the value 0, if this transition was not made or this certain highest educational degree was not obtained. I am interested in the probability to make a specific educational transition or obtain a certain educational degree E(Y) = P(Y=1) that I consider as conditional on values of independent variables $P(Y = 1 | X_1 = x_1, \ldots, X_k = x_k)$ (see Cox & Snell, 1970, p. 13; Pampel, 2000).

Today, more and more social researchers recommend applying a linear probability model when analysing a dichotomous dependent variable (e.g. Hellevik, 2009). This model assumes that the conditional probabilities follow a straight line for all values of the independent variables. The linear probability model is particularly popular for two reasons: (1) the effects of the independent variables on the predicted probability are constant across all values of the independent variable; and (2) the effects of the independent variables are additive, meaning that the effects of independent variables stay the same regardless of the levels of the other independent variables in the estimation equation[9]. These two conditions make the interpretation of the regression coefficients relatively straightforward. However, linear probability models have the problem that for certain constellations of the independent variables the predicted probabilities might exceed 1 or fall below 0

[9] This second point is only the case if no interaction effect is included in the model.

(Cox & Snell, 1970, p. 14). A logistic regression model is therefore often used in which the logistic transformation of the predicted probabilities ensures that the predicted probabilities fall between 0 and 1. Cox and Snell (1970, p. 19) as well as Long (1997, p. 64) recommend a logistic regression model if the estimated probabilities are smaller than 0.20 and higher as 0.80. In Chapters 5 to 8, I estimated logistic regression models. I also estimated linear probability models and compared the results. If there are substantive differences between the estimation results, I report them in the footnotes. The logistic regression model can be written as[10]

$$\ln\left(\frac{P(Y=1|\,X_1=x_1,\ldots,X_k=x_k)}{1-P(Y=1|\,X_1=x_1,\ldots,X_k=x_k)}\right) = \alpha + \sum \beta_k x_k \qquad (4)$$

$P(Y = 1|\,X_1 = x_1, \ldots, X_k = x_k)$ is the probability to make a certain educational transition, given the values of *k* observed variables (which may be simple variables or two-way and three-way interactions between these variables). $x_k$ is the value of the *k*th independent variable $X_k$ in the set of *k* variables and $\beta_k$ is the logit coefficient of the *k*th variable.

Based on this model, the transition probability $P(Y=1|\,X_1=x_1,\ldots,X_k=x_k)$ can be obtained by

$$P(Y = 1|\,X_1 = x_1, \ldots, X_k = x_k) = \frac{\exp(\alpha + \sum \beta_k x_k)}{1+\exp(\alpha + \sum \beta_k x_k)} \qquad (5)$$

My aim is to use the logistic regression model as a descriptive tool (see Rohwer, 2012). This means that I am interested in seeing how two different values of the independent variable $X_1$ from $x_1'$ to $x_1''$ are associated with two different transition probabilities (see Rohwer, 2012):

[10] Some social scientists suggest deriving logit models from a latent variable approach (see Allison, 1999; Breen et al., 2014; Breen et al., 2013; Mood, 2010). A latent metric variable is presumed behind the observed binary outcomes. However: *'In most situations the concept of a latent distribution is unnecessary and it is preferable to work directly with the probabilities of success'* (Cox & Snell, 1970, p. 17). For a similar position see also Rohwer (2012). In my empirical analysis, I view the categorical variable Y as being inherently binary and rely on logistic transformations of the data to derive regression-type models (see Powers & Xie, 2008, p. 6).

$$\mathbf{P(Y=1|\ X_1=x_1', X_2=x_2,\ldots,X_k=x_k) - P(Y=1|\ X_1=x_1'', X_2=x_2,\ldots,X_k=x_k)} \quad (6)$$

Furthermore, the changes in the differences of the transition probabilities allow me to examine whether the educational opportunities of two groups are converging or diverging across cohorts.

In Chapter 5, I estimate separate logistic regression models (1) for West Germany, (2) for East Germany before unification, and (3) for East Germany after unification. In Chapters 6 and 7, I do not estimate separate models for East and West Germany due to a smaller sample size. Instead, I introduce an interaction term for being born in East or West Germany before and after German unification into the models.

In addition, in Chapter 7, I estimate three models in which the dependent variable is multinomial (with j =3 categories). These are the models in which I study (1) whether students with 'Hauptschulabschluss' or 'Mittlere Reife' complete a vocational training or upgrade their formal education to a higher education entry certificate (the reference category is obtaining no further education); (2) whether students with a higher education entry certificate leave the educational system without any further educational degree or obtain a vocational training certificate (the reference category is whether students obtain a tertiary education); and (3) whether respondents with a higher education entry certificate graduate from a university of applied sciences or a traditional university (the reference category is whether respondents did not obtain a tertiary education). In these three cases, I use multinomial logistic regressions (Powers & Xie, 2008, p. 247). The probability P(Y=j| $X_1 = x_1, \ldots, X_k = x_k$) for the nominal dependent events (j = 1,2) can be obtained as follows:

$$\mathbf{P(Y = j|\ X_1 = x_1, \ldots, X_k = x_k)} = \frac{\mathbf{exp}(\alpha + \sum \beta_k x_k)}{1+\sum_{j=2}^{J} \mathbf{exp}(\alpha + \sum \beta_k x_k)}, \text{ for } j > 1 \quad (7)$$

and the probability $P(Y = 1|\ X_1 = x_1, \ldots, X_k = x_k)$ for the reference event j = 1 is

$$\boldsymbol{P(Y = 1 | X_1 = x_1, \ldots, X_k = x_k) = \frac{1}{1+\sum_{j=2}^{J} \exp(\alpha + \sum \beta_k x_k)}} \quad (8)$$

In the methodological literature there is a broad debate on whether one should use weights when analysing longitudinal data (Goldstein et al., 2015). I estimate all models with and without the NEPS sampling stratification weights. I apply the so-called 'model-based' approach (Snijders & Bosker, 2012, pp. 216–223) to account for the specific data structure of the NEPS. Thus, I include the NEPS design variables 'marital status', 'household size', 'income', and 'federal state' in the analysis models. The conclusions I draw from the models with and without sampling stratification weights are basically the same. Thus, I report only the results for the models without weights in my tables. However, in a footnote, I shall highlight whether there are deviations in the conclusions for a model including the sampling stratification weights.

In my presentation of the results, I report logit coefficients $\beta_k$ with their standard errors in Chapters 5 to 7 and predicted probabilities $P(Y=1| X_1=x_1,\ldots,X_k=x_k)$ with their confidence bands across cohorts in Chapters 5 and 8. The logit coefficients can be interpreted as the logarithm of making a specific educational transition versus not making this transition (Powers & Xie, 2008, p. 37). For my interpretation of the tables, I focus on the signs and significances of the logit coefficients (Best & Wolf, 2012, p. 380).

## 3.4 Independent Variables

In the following, I present the independent variables that I used in my estimations. First, I present the social origin variables which I applied in my empirical chapters. In Chapter 4, in which I use data from PIAAC, I was only able to rely on parental education as social origin information. In Chapters 5 to 8, I was able to distinguish parental class, parental education, and parental status resources.

*Parental class*. The class position of families is defined by their family members' social relationships within labour markets and productive systems (Erikson & Goldthorpe, 1992). I apply the dominance approach with regard to mother's and father's class position in order to determine *parental class* (see Erikson, 1984). If a mother or a father has no class position, I use the class position of the partner. Originally, the theoretical concept behind the EGP class scheme is nominal. However, to apply the dominance approach, I have to make an assumption about which hierarchy of father's and mother's EGP classes is more important in defining the life chances of children (see Erikson, 1984, p. 504). The class position of higher qualified is seen as more important than the class position of the lower qualified. Moreover, self-employed rank over employed, and professionals take a higher position than the self-employed.

I have reduced the original 11 EGP class categories of the NEPS (see Erikson & Goldthorpe, 1992, pp. 38–39) to a scheme of nine classes and placed them in the aforementioned ranking order of dominance (R. Erikson, 1984, p. 505): (1) the '*higher service class*' includes higher-grade professionals, administrators and officials as well as managers in large industrial establishments and large proprietors [I]; (2) the '*lower service class*' includes lower-grade professionals, administrators, and officials, higher-grade technicians, managers in small industrial establishments as well as supervisors of non-manual workers [II]. (3) the '*small proprietors with employees*' class including also 'farmers and small holders and other self-employed workers in primary production' [IVc] as well as '*small proprietors, artisans, etc., with employees*' [IVa]; (4) the '*small proprietors without employees*' [IVb]; (5) the '*lower-grade technicians and supervisors of manual workers*' [V]; (6) the '*higher-grade routine non-manual employees*' [IIIa]; (7) the '*skilled manual workers*' [VI]; (8) the '*lower-grade routine non-manual employees*' [IIIb]; and finally (9) the '*unskilled workers*' class comprising 'semi-skilled or unskilled workers'

[VIIa] as well as ‘agricultural and other workers in primary production’ [VIIb] from the original EGP classification. I use this extended EGP version in Chapters 5 and 7.

However, in Chapters 5 to 8, I also simplify these nine class categories of the family of origin to three class categories: The *working class* consists of categories (9), (8), and (7). Categories (6), (5), (4), and (3) are combined into an *intermediate class*. Finally, children from higher (1) and lower service class families (2) are summarized as the *salariat*. These three classes also roughly reflect the ordinal character of families’ economic resources.

*Parental education*. In Chapter 4, were I use data from PIAAC, I rely on the ISCED-97 classification assigning the highest educational level of the parents to the family of origin as a whole (see Erikson, 1984). I construct a metric variable for the average years of schooling (see also Table 3-1). Parents with up to ‘lower secondary’ education (ISCED 1, ISCED 2A/B and ISCED 3C shorter than 2 years) are defined as having 9 years of schooling. Parents with ‘upper secondary’ education (ISCED 3 A/B, ISCED 3C more than 2 years and ISCED 4) have 12 years of schooling and parents with ‘tertiary’ education (ISCED 5 and ISCED 6) have 17 years of schooling.

In Chapters 5 to 8, I rely on data from the NEPS. Here, *mother’s and father’s education* are coded with the CASMIN educational classification (see Müller et al., 1989). To determine the educational level of the family, I also follow the dominance approach in which the highest educational attainment of the father or the mother is assigned to the family of origin (Erikson, 1984). The results of the dominance approach differ from the traditional sociological approach (in which the ‘male breadwinner’ determines the educational level of the family of origin) only if the mother has a higher educational attainment than the father. The dominance approach leads to a higher average educational attainment level of families compared to the educational levels of individual fathers and mothers in both East and West Germany (see e. g. Table 8-6 and Table 8-7 in the appendix).

The NEPS offers nine categories in the CASMIN classification for mother's and father's education. I simplify these to the three major educational levels in Germany: (1) the *lowest education level* includes parents without any educational certificate or with only 'Hauptschulabschluss' or only 'Realschulabschluss'; (2) the *intermediate education level* includes parents who have a 'Hauptschulabschluss' with vocational training, a 'Realschulabschluss' with vocational training or an 'Abitur' with or without vocational training. Finally, (3) the *highest education level* represents parents who have a higher education degree such as a university degree or professional college degree ('Fachhochschulabschluss').[11] To analyse gender effects on the transition from primary school to the academic track in East Germany after reunification in Chapter 5, I create a dummy variable for whether parents have a university or professional college degree (1) or not (0), because the variable *lowest education level* has only very few cases.

*Parental cultural resources.* Parental cultural resources are modelled using the CAMSIS status scale (see Prandy & Lambert, 2003 as well as Bukodi et al. (2014) and Erikson (2016) for a similar proceeding for Sweden). It was constructed for contemporary Germany on the basis of the 1995 micro census and is implemented in the NEPS dataset on basis of marriage partners and their ISCO88 codes. Originally, the CAMSIS scale measures social positions of individuals in terms of occupational similarities of pairs of occupations of friends or marriage partners using Goodmann's RC-II association models (Prandy & Lambert, 2003). The comparison of individuals' occupations with their friends' or marriage partners' occupations is seen as a structural manifestation of how access to these xclusive occupational positions is associated with the affiliation to a certain

[11] In Chapter 5, I also tested models with 'relative measures of parental education' (see Bukodi & Goldthorpe, 2016 for an application). However, the results are quite similar and the substantive conclusions of these analyses are basically the same as those for the 'absolute measures for parental education' (see for a similar finding DiStasio, Bol and Van de Werfhorst 2016). If there are any differences, I report these in a footnote in the results section. I did not test 'relative measures for parental class and status', because these indicators reflect complex employment opportunities or marriage and friendship relations that are hard to operationalize (for a discussion see also Bukodi and Goldthorpe, 2014, p. 16). In Chapters 6 to 8, I do not test for a relative measure of parental education.

social group. On the other side, it also shows how individuals with certain occupations experience different opportunities to meet each other. However, at the beginning, the CAMSIS scale was not aimed to reflect solely status differences since Prady and his colleagues do not make the theoretical distinction between class and status. Its aim was to measure general hierarchical differences in resources. However, Chan (2010: 53-54) could show for Britain that the CAMSIS scale is very highly correlated (r=0.9) with the Chan-Goldthorpe status scale, which was actually designed to capture status differences in society and which is constructed along similarities and dissimilarities of respondents' occupations and the occupations of their close friends. In this thesis, I use the CAMSIS variable as a proxy for parental status. The construction of this status indicator around occupations and marriage partners is only able to measure one way of how status can be generated (see Mayer 1977: 171). Of course, future research is needed to find an even better measure for parental status. Again, I apply the dominance approach in order to determine the parental status of the family from the CAMSIS information of the mother and father (Erikson, 1984). If a mother or a father has no CAMSIS information, the CAMSIS score of the partner is used. The CAMSIS scale scores are ranging from 20 points (lowest score) to 99 points (highest score) (see Table 8-5 in the appendix). In my analyses, I treat the CAMSIS scores as metric information. For the transition probability plots in Chapter 5 and for the empirical analyses in Chapters 6 to 8, I group the CAMSIS scores into three status categories: Children from families with scores of the lowest 30 % on the status scale are classified as children from *low-status parents*. Children from families with scores of the highest 30 % on the status scale are classified as children from *high-status parents*. All other children from families with in-between status scores are classified as *intermediate-status parents*.

*Correlations between parental education, parental class, and parental status.* I calculated Spearman's rho to investigate correlations between the three social origin variables

in East and West Germany. Correlations between parental class and parental education are moderate and have a level of 0.56 in East Germany and 0.48 in West Germany. Correlations between parental education and parental status are also moderate at a level of 0.58 in East Germany and 0.53 in West Germany. Correlations between parental class and parental status are higher. They have a level of 0.80 in East Germany and 0.82 in West Germany. In particular, the correlation between status and class might be considered as too high to include both variables simultaneously in the estimation. However, when I look at the distributions of status within each of the classes (see Figure 8-7 in the appendix, see also Figure 8-6 and Figure 8-8), it becomes clear that there are huge status differences even within each class. In other words, parental class and parental status actually do seem to be different origin dimensions. I shall therefore include both measures simultaneously in my estimation models to explore how they jointly affect the probability to make a specific educational transition or the probability to obtain a certain highest educational degree.

*Changes in the distributions of origin variables across birth cohorts.* To study how changes in the distributions of parental education, parental class and parental status affect children's inequality of educational opportunity over time[12] in Chapter 5, I include: (1) the *changing percentage of parents with tertiary education across cohorts* (see also Table 3-2 as well as Table 8-6 and Table 8-7 in the appendix), (2) the *changing percentage of parents from higher service class across cohorts (*see also Table 3-2 as well as Table 8-8 and Table 8-9 in the appendix), and (3) the *changing percentage of parents who have at*

[12] The analysis of East Germany before German unification is covered until the 1974 birth cohort. Therefore, the analysis of East Germany before German unification basically includes the proportions of parental education, parental class and parental status for the first six birth cohort groups in Table 3-2. The analysis of East Germany after German unification includes the proportions of parental education, parental class and parental status for the last two birth cohort groups 1976–1980 and 1981–1986 as well as the proportion of birth cohort group 1971–1975 for 1975 in Table 1.

**Table 3-2:** Changes across birth cohorts in the proportion of parents with tertiary education, from the service classes, and with a CAMSIS status score of at least 65 in East and West Germany

| Cohorts | Proportion of parents with tertiary education | | Proportion of higher service class parents | | Proportion of parents with a status score of at least 65 | |
|---|---|---|---|---|---|---|
| | West Germany | East Germany | West Germany | East Germany | West Germany | East Germany |
| 1944–1950 | 12 | 13 | 18 | 17 | 13 | 14 |
| 1951–1955 | 10 | 19 | 16 | 21 | 12 | 18 |
| 1956–1960 | 11 | 18 | 17 | 19 | 15 | 20 |
| 1961–1965 | 14 | 28 | 19 | 24 | 16 | 27 |
| 1966–1970 | 16 | 32 | 20 | 30 | 19 | 30 |
| 1971–1975 | 21 | 38 | 23 | 26 | 22 | 31 |
| 1976–1980 | 25 | 38 | 19 | 29 | 24 | 33 |
| 1981–1986 | 30 | 36 | 27 | 30 | 29 | 29 |

Source: Author's calculations using NEPS data

*least a CAMSIS status score of 65 across cohorts*[13] (see Table 3-2 as well as Table 8-10 and Table 8-11 in the appendix). These are all analysed separately for East and West Germans.

In Chapter 8, I used the three category version of the parental education, parental class, and parental status resources to create 3x3x3=27 social origin group combinations (see Table 3-3). Unfortunately, some of the 27 origin combinations are very rare (below 40 individuals). I therefore collapsed the 27 groups to 12 groups. Then, I condensed those 12 groups into 6 empirically important social origin groups (see right panel in Table 3-3). For example, social origin group 1 consists of children from most disadvantaged families. In contrast, social origin group 6 comprises children from the most advantaged families. The reduction to six social origin groups seems to be empirically reasonable, since for example, the explained variance of attaining a tertiary degree as highest educational attainment only declined to 0.0019 (from a Pseudo-$R^2$ of 0.1089 to a Pseudo-$R^2$ of 0.1070), if I reduce my analysis model from 12 social origin groups to six social origin groups (see Table 8-23 and Table 8-22 in the appendix). In addition, the differences between the

[13] The parental status of East German parents was higher during the period of the GDR than for West German parents. This finding calls for future research.

**Table 3-3:** The 27 social origin combinations of the three family resources

| No. of social origin combinations for the three parental resources | Parental education | Parental class | Parental status | Social origin groups |
|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 |
| 2 | 1 | 1 | 2 | 1 |
| 3 | 1 | 1 | 3 | no cases |
| 4 | 1 | 2 | 1 | 1 |
| 5 | 1 | 2 | 2 | 1 |
| 6 | 1 | 2 | 3 | no cases |
| 7 | 1 | 3 | 1 | 1 |
| 8 | 1 | 3 | 2 | 1 |
| 9 | 1 | 3 | 3 | 1 |
| 10 | 2 | 1 | 1 | 2 |
| 11 | 2 | 1 | 2 | 2 |
| 12 | 2 | 1 | 3 | no cases |
| 13 | 2 | 2 | 1 | 2 |
| 14 | 2 | 2 | 2 | 3 |
| 15 | 2 | 2 | 3 | 4 |
| 16 | 2 | 3 | 1 | 4 |
| 17 | 2 | 3 | 2 | 4 |
| 18 | 2 | 3 | 3 | 4 |
| 19 | 3 | 1 | 1 | 5 |
| 20 | 3 | 1 | 2 | 5 |
| 21 | 3 | 1 | 3 | no cases |
| 22 | 3 | 2 | 1 | 5 |
| 23 | 3 | 2 | 2 | 5 |
| 24 | 3 | 2 | 3 | 5 |
| 25 | 3 | 3 | 1 | 5 |
| 26 | 3 | 3 | 2 | 5 |
| 27 | 3 | 3 | 3 | 6 |

Source: Author's own portrayal

coefficients of the more detailed social origin groups and the coefficients of the collapsed six origin groups are very small. There is only one problematic case, namely social origin combination 18, which has a logit coefficient that is larger than for example of social origin combination 14.

I also included the following independent variables in my analyses of Chapters 4 to 8:

C*ohort trend variable*. All analyses comprise a cohort trend. In Chapter 4, I include a trend variable for seven birth cohorts and assigned the following values: '0' for the 1947–52 birth cohort, '1' for the 1953–57 birth cohort, '2' for the 1958–62 birth cohort, '3' for the 1963–67 birth cohort, '4' for the 1968–72 birth cohort, '5' for the 1973–77 birth cohort and '6' for the 1978–82 birth cohort. In Chapter 5, I include also a linear *cohort trend* to model

changes in the transition probabilities to 'Gymnasium' and 'Erweiterte Oberschule' across birth cohorts as well as the changes in social origin and gender effects over time. In the analyses of West Germans, this cohort trend ranges from 0 for the '1944 birth cohort' to 42 for the '1986 birth cohort'. In the analyses of East Germans before the German unification, the cohort trend ranges from 0 for the '1944 birth cohort' to 30 for the '1975 birth cohort'. In the analyses of East Germany after German unification, the cohort trend variable ranges from 0 for the '1976 birth cohort' to 11 for the '1986 birth cohort'. In Chapters 6 to 8, I include a linear *cohort trend* that ranges from 0 for the '1944 birth cohort' to 42 for the '1986 birth cohort'. I tested the linear *cohort trend* variables against birth cohort dummy variables as well as a cohort trend with a quadratic term. In all these models, results are very similar, so that the substantive conclusions are the same. To keep the analysis as simple as possible, I use only the linear cohort trend in my analyses.

*Female respondents.* In all chapters, I include a *dummy variable for females* (males are the reference category).

*East German.* My analyses in Chapters 6 and 7 include a *dummy variable for respondents born in East Germany*. Hence, the reference category is respondents born in West Germany. This dummy variable also includes second and 2.5 generation immigrants that were born in Germany.

*German unification.* My analyses in Chapters 6 and 7 also include a *dummy variable for German unification*. The reference category indicates the period before German unification.

*Interaction term for East Germans after German unification*. My analyses in Chapters 6 and 7 also include an interaction term for German unification and respondents born in East Germany.

## Chapter 4

In Chapter 4, I additionally included the following independent variables:

*Country dummy variables.* In my fixed-effects model, I use an effect coding (-1/+1) for each of the 21 countries.

*Welfare regimes.* I assign my 21 countries to six welfare regimes. My analysis uses an effect coding (-1/+1) for the 'liberal welfare regime' (the United States, the United Kingdom, Canada, and Ireland), the 'conservative welfare regime' (Austria, Belgium, the Netherlands, France, and Germany), the 'social-democratic welfare regime' (Norway, Finland, Denmark and Sweden), the 'Mediterranean welfare regime' (Spain and Italy), the 'Eastern European welfare regime' (Estonia, the Slovak Republic, Poland, and the Czech Republic) and the 'East Asian welfare regime' (Japan and Korea).

*Interaction terms.* I include six two-way interactions: (1) 'cohort trend' × 'parental education', (2) 'cohort trend'×'welfare regime', (3) 'cohort trend' × 'gender', (4) 'parental education' × 'welfare regime', (5) 'gender' × 'welfare regime' and (6) 'parental education' × 'gender'. In addition, I include two three-way interactions: (1) 'parental education' × 'cohort trend' × 'welfare regime', (2) 'gender' × 'cohort trend' × 'welfare regime'.

## Chapter 5

In Chapter 5, I additionally included the following independent variables:

*Mother's education.* Based on the dominance model, father's education determines the educational level of most families (see e.g. Table 8-6 in the appendix). However, in many families, mothers are mostly responsible for the care of children and children's education at home. To test whether mother's education has an additional influence on children's probabilities to make the transition to the academic track, I include two dummy variables indicating whether *mother's education is (1) higher or (2) lower than father's education*

(the reference category indicates that a *mother and a father have the same educational level*).

*Interaction terms.* Finally, I include five two-way interactions: (1) 'cohort trend'× 'parental education', (2) 'cohort trend' ×'parental class', (3) 'cohort trend' × 'parental status', (4) 'cohort trend' × 'mother's education relative to father's education', and (5) 'cohort trend' × 'female'.

The distributions of all used variables in Chapter 5 can be found in Table 8-5 in the appendix.

## Chapter 7

In Chapter 7, I also include five dummy variables indicating a student's type of previous school career and kind of first educational attainment in school. There is a set of five dummy variables for the school history.

*Downward mobility to the non-academic track.* The first of these dummy variables indicates whether a student was downwardly mobile in school from the academic to the non-academic track.

*Remaining on the non-academic track.* The second dummy variable indicates whether a student spent all the time at school on the non-academic track.

*Upward mobility to the academic track.* The third dummy variable indicates whether the student was upwardly mobile from the non-academic to the academic track in school.

*Remaining on the academic track*. The fourth dummy variable (the reference category [ref.]) indicates whether children were constantly on the academic track from the transition from primary to secondary school until the attainment of their first general education school leaving certificate.

*Traditional 'Abitur'.* And the fifth dummy variable indicates whether a student obtained her or his higher education entry certificate on the traditional academic track (1) or on a track of second chance education (0).

## 3.5 Excursus: The school transition approach

In my Chapters 5 to 7, I use the school transition model. This model has been criticised on many grounds in recent years. In the following, I would like to introduce the advantages of this model, its critique and explain why this critique is not a problem in my analyses. My aim in this thesis is to take a life course perspective and one of the most important advantages of the school transition approach in comparison to the analysis of highest educational attainment is that it better reflects the reality in which individuals attain their education over the life course, namely in consecutive irreversible steps (Mare, 1993, p. 353). The school transition approach has been made most popular by Robert Mare in the 1980s. He empirically analysed the inequality of educational opportunity as a result of separate educational choices at successive educational transitions using a sequential transition model (Mare, 1980, p. 295). His justification for the school transition approach is that the effect of social origin cannot be correctly revealed by looking only at the highest educational certificates of individuals. According to his view there are at each educational transition different mechanisms at work influencing the decision to persist in education or to withdraw (Mare, 1980, p. 295; Breen & Jonsson 2010: 758). Therefore, it is rather important to analyse whether the association between social background and school continuation decisions changes across educational transitions in the educational career. It can be assumed that at successive educational transitions different familial resources or structural restrictions play an important role for familial school continuation decisions (Mare, 1980). In my thesis, one specific purpose is to examine whether at different educational

transition points different family resources (parental education, parental class and parental status) are important.

Another advantage of the Mare model, as already previously mentioned, is that changes in the marginal distributions can be controlled for in the sequential logistic response model that is used for the analysis. In OLS regressions on school years analysing inequality of educational opportunity one cannot separate whether inequality of educational opportunity declines because the educational attainment increases across cohorts for all individuals in absolute terms or because there is a decline in the effect of parental background on schooling (Mare, 1981, p. 74). An illustrative example which induces changes in the marginal distribution of the outcome variable and in the independent variable of parental education, is educational expansion (Mare, 1981b, p. 102). It leads to both, a more equalizing overall increase in educational attainment of parents as well as an increase of educational attainment for their children across cohorts. In Chapters 5 to 7, I will analyse to which extent educational expansion affects the distribution of parents and the transition probabilities and educational careers of their children. According to Mare it depends on the research question which analysis model one wants to use (Mare, 1981a, p. 74). If the researcher is interested in the change in the pure association of social origin on educational attainment, than the Mare model is the appropriate method (Mare, 1980, p. 297). If one is interested whether in absolute terms educational inequality declines because the variance of educational distributions declines over time and becomes more equal, then the OLS regression on years of schooling is more appropriate (Mare, 1981a, p. 86).

To analyse educational inequality at each educational transition, one normally creates several dichotomous dependent variables on whether an individual quits (0) or continues (1) education at each transition point in school. At each following educational transition

only people are 'at risk' who have survived the immediately previous educational transition (conditional probability). The transitions are either defined as whether individuals have *attended* the next higher educational level or whether they have *completed or graduated* from the next higher educational level (Mare, 1980, p. 295). These dichotomous transition variables can either be synthetically generated using information from the final educational attainment (as it is available in cross-sectional datasets) or be directly constructed using complete retrospective information about the individuals educational career episodes as I did with the NEPS data.

For the analysis of the effect of social origin on each of the educational transitions a logistic response model is normally used. In this sequential educational transition models, one can analyse for each individual *i* from the *t*th birth cohort her or his educational transition probability *p* at transition *j* (Mare, 1981a, p. 74):

$$\ln\left(\frac{p_{ijt}}{1-p_{ijt}}\right) = \beta_{jt} + \sum_k \beta_{jkt} X_{ijkt} \qquad (9)$$

The $X_{ijkt}$ is a placeholder for the *k* independent variables included in the model of *i*th individual in birth cohort *t* which are influencing the decision of the individual to make the next educational transition *j* or not. The $\beta$ coefficients represent the impact of the independent variables *k* at transition *j* and for birth cohort *t*.

The Mare model became internationally very popular among educational researchers in the 1990s. Some of the most well-known applications of the Mare model can be found in the internationally comparative book on educational inequality by Shavit and Blossfeld (1993), in Breen and Jonsson's (2000) modification to include more complex school systems (as I also do in this thesis) and in Lucas' (2011) work, in which he applied the school transition model to panel data with time-varying covariates.

Besides its popularity, however, the Mare model has been criticized on several grounds. First, it is argued that *the Mare model cannot be interpreted causally due to un-*

*observed heterogeneity* affecting the estimated effect of social origin on school continuation probabilities (Cameron & Heckman, 1998, p. 272). In particular, the identified waning effect of social origin across successive educational transitions in the educational career, which is so typical for the Mare model, may not reflect a real decline of educational inequality in the career, but may be produced by the specific statistical model that is used (Cameron & Heckman, 1998).

The first problem of the logistic response model is its non-linear function (Cameron & Heckman, 1998, p. 281). In the literature, there are two different justifications for the use of the logistic regression model. One assumes that there is a latent metric variable behind the observed binary outcomes with a standard logistic distribution and a variance fixed to 3.29 (Mood, 2010, p. 68). This approach is derived from the choice models of economists. If the latent variable y* is smaller than 0, then the observed dichotomous outcome y is 0 and if y* is larger and equal than 0, y is 1. In the other approach, used by statisticians, the dependent variable of the regression model is simply transformed in a way so that the probability of making an educational transition can only vary between 0 and 1 (Razzaghi, 2013, p. 165; Powers & Xie, 2008). In the following, I only focus on the latent variable model of economists because the critique of the Mare model is mainly based on this representation. In this view, unobserved heterogeneity among logistic response models can vary so that the comparison of logits or odds ratios across transitions or birth cohorts is problematic, even if the included explanatory variables are identical across models. In the economic latent variable model, the dependent variable is then dependent on the scale of the unexplained error term: If the scale of the error term changes, then also the variance or scale of the dependent variable changes. It might be that important unmeasured characteristics between the educational transition models are not identical because it is very likely that at later transitions there are individuals who were already selected for some unmeasured characteristics that do not play a role anymore at later transi-

tions (Buis, 2015, p. 6). As a consequence, the variance of the error term at later transitions should be smaller than at earlier transitions. Because the variance or scale of the dependent variable is related to the variance of the error term, the dependent variables of different transitions vary (Mood, 2010, p. 69). Therefore, it is not possible to compare the effect sizes of coefficients across educational transitions. Xie (Xie, 2011, p. 346) calls this issue '*outcome incommensurability*'.

The second problem inherent in the sequential transition model is that the population at each successive transition becomes more and more homogenous and this selection process leads to a correlation between measured and unmeasured factors, which were previously uncorrelated (Mare, 1980, 1981a, 1993). As a consequence, the observed effects of explanatory variables which are included in the model, such as social origin, may be biased (Mare, 1993, p. 357). Two examples given by Mare (1993, p. 354) himself for unobserved factors that are likely to influence the effect of social origin are ability and motivation. One can assume that at an educational transition only the most skilled and motivated children of lower social origins will make this educational transition, while also less skilled and less motivated children from higher social origins will make the educational transition to the next level. The effect of social origin on successive educational transitions may therefore decline not because the association between social origin and the transition probability declines, but because only the most skilled and motivated children from lower social origin survived. They will make the next educational transition anyway, because they are capable to succeed in school independent of the support of their families. Xie (2011, p. 346) calls this problem '*population incommensurability*'.

Although the Mare model cannot be interpreted causally, it is still legitimate to use it for descriptive purposes (Buis, 2015, p. 4; Xie, 2011, p. 345). Mare (2011, p. 242) even argues that most questions concerning social inequality are motivated by description ra-

ther than causal explanation. As examples, he mentions the analysis of mobility tables and other multivariate analyses in which partial associations between social origin factors and educational and social attainments are estimated. Since the purpose of my thesis is to describe the association between social origin and inequality of educational opportunity over the educational careers of individuals born in East and West Germany, I use the Mare model.

Nevertheless, there are several attempts to overcome the causality problem. For example, Cameron and Heckman (1998, p. 285) try to circumvent the sequential transition model problem by applying an ordered discrete-choice model. In addition, there is a special issue of the Research and Social Stratification and Mobility journal (year 2011 Volume 29) which is devoted to the methodological problems of the Mare model and possible solutions. Besides all these new models, Mare (2011, p. 243) makes clear that one should think about the kind of unobserved heterogeneity itself. In particular, it is important whether it is exogenous or endogenous with respect to social origin. He states that for instance ability is at least in part endogenous to family background:

> *'...one usually wishes to control for exogenous covariates of the treatment, but not endogenous variables that may represent mechanisms through which treatments exert their effects. A blanket control for all unobserved variables is likely to overcontrol for the effects of the treatment. […] Similarly, in models of school transitions, it is important to distinguish, at least in principle, between unobserved heterogeneity that is simply correlated with measured family background and which thus should be taken into account, and unobserved heterogeneity that is in fact a consequence of measured family background and which thus should not be controlled. Again, outside of an experimental context, this problem can only be addressed with an explicit model of how unobserved heterogeneity works.'* (Mare, 2011, pp. 243–244)

A third objection by Cameron and Heckman (1998, p. 267) is that the Mare model ignores the fact that school dropouts could later return to school again. However, one can get around this problem if one would use individuals' highest educational attainment levels to (re-) construct educational transitions or in retrospective datasets, one could only

analyse individuals who practically have already left the educational system (e.g. analyzing only individuals who are older than 30 years as I do in my analyses).

Finally, Breen and Jonsson (2000) mentioned another limitation of the Mare model. It assumes that all individuals pass through school at only one school path. This might be appropriate for the school system in the United States. However, in Europe, there are many countries, in which different parallel school tracks exist. In particular, one can distinguish a vocational and academic track. It is quite likely that the probability to make the next educational transition depends highly on the previously chosen educational pathway or it is even not possible to make the next educational transition under some pathways. Students that make an equal number of transitions and complete an equal number of school years may still have different labour market returns, because they chose different educational branches. In addition, the effect of family on school continuation decisions could depend on the school branch children are attending. In the traditional Mare model, it is not possible that the social origin effect can differ between different school tracks. However, Breen and Jonsson (2000) applied a sequential multinomial transition model which allows for differing social origin effects for distinct school branches. In my analyses, I follow partly their approach.

# 4 Inequality of Educational Opportunity and Welfare Regimes[14]

Since the middle of the 20th century all modern societies have experienced an enormous expansion of their secondary educational school and training systems (Arum et al., 2007; Boli et al., 1985; Jackson, 2013). Several reforms have been introduced that have fundamentally changed the character of the old clear-cut divisions between academic and vocational/technical tracks in the lower and upper secondary school systems and increased educational participation at the upper secondary level (Benavot & Resnik, 2006).

Moreover, the landscape of higher education has also changed impressively (Arum et al., 2007). Transitions from upper secondary to tertiary education have expanded strongly in modern societies. Until the 1970s, higher education mostly followed graduation of an academically oriented secondary school (e.g., a 'Gymnasium', 'lycée', 'public' school, or grammar school), and universities, colleges or institutes of technology provided academic programmes for a small and homogeneous elite (Arum et al., 2007). However, the following decades saw not only a rapid rise in the participation rate in higher education but also a growing heterogeneity of new students.

A major issue in the sociology of education is the extent to which inequality of educational opportunity depends on social background and gender, and how the educational expansion in modern societies has changed these relationships ( Simkus & Andorka, 1982; Treiman & Yip, 1989; Shavit & Blossfeld, 1993; Gerber & Hout, 1995; Erikson & Jonsson, 1996a; Gerber, 2000; Iannelli, 2002; Breen & Jonsson, 2005; Ballarino et al., 2008; Breen et al., 2009; Bar Haim & Shavit, 2013). In this chapter, I ask how welfare regimes influence cross-national variations in educational expansion and the relationships between social background, gender, and educational inequality. Up to now, there are few links between the literatures on educational sociology and welfare regimes (Allmendinger

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& Leibfried, 2003). There are some studies in which educational researchers refer to the welfare state in national educational studies. For example, Jonsson (1993) and Erikson and Jonsson (1996b) interpret Swedish educational inequality in relation to the social-democratic welfare state. Another example is the recent cross-national comparative study by Peter, Egerton and Roberts (2010) that examines academic achievement differences in mathematics, reading and science in the three classical welfare regimes.

Different welfare regimes are closely connected to different ideas about equality in modern societies (Esping-Andersen, 1992, p. 8). Therefore, they can be expected to have consequences for the association between social background and educational opportunity. Erikson and Goldthorpe (Erikson & Goldthorpe, 1992) already stressed that more effort should be made to test the hypothesis whether societies with higher equality of condition are conducive to enlarging educational and social opportunities and how these changed over time. Different welfare states are linked not only to different educational institutions such as tracking, standardization, selectivity and private schooling (e.g. Arum et al., 2007; Jackson & Jonsson, 2013; Le Donne, 2014; Pfeffer, 2008; Schuetz et al., 2005; Van de Werfhorst & Mijs, 2010) but also to variations in policies of gender equality, income distribution, progressive taxation, public insurance coverage, labour market regulation and the de-commodification of labour. Taken together as a package, these welfare regime differences are linked to variations in inequality of conditions (Esping-Andersen, 1990).

In my analysis, I use highly equivalent educational data for 21 modern countries from the new Programme for the International Assessment of Adult Competencies (PIAAC) collected at the end of 2011. This cross-national dataset allows me to distinguish six welfare regimes representing different basic ideas about social and gender inequality in society: the liberal, social-democratic, conservative, Mediterranean, Eastern European and East Asian welfare regime. I am able to distinguish seven birth cohorts from 1947–52 to

1978–82. This allows me to study the impact of the different welfare regimes on the relationship between social origin and educational success in the 1960s and the early 1970s and the link between changes in these regimes and inequality of educational opportunity over the last decades.

This chapter is organized as follows: First, I present theories on the mechanisms underlying the association between parental background and educational attainment. Second, I describe differences in the main inequality conceptions of various welfare regimes and their supposed link with inequality of educational opportunities. Third, I present the empirical results, and finally, I summarize the findings.

## 4.1 The association between family background and inequality of educational opportunity

Parental background is strongly linked with children's educational attainment. First, the family of origin influences the cognitive and non-cognitive abilities of children and hence their school achievement. According to Boudon (1974, p. 29), this is the *primary effect* of stratification. In addition, parents and children from various social backgrounds make different educational decisions, even when these children have similar school achievements. Boudon (1974, p. 30) calls this the *secondary effect* of stratification. Erikson and Jonsson (Erikson & Jonsson, 1996a, p. 10) describe five mechanisms by which social origin influences school achievement (*primary effect*). First, abilities are partly transmitted *genetically* (nature). Second, they also are the result of different *environmental stimuli* (nurture). For example, highly educated parents can help their children with homework (Pfeffer, 2008), they can provide them with a favourable learning environment, they can motivate them and they can pay for tutoring as well as private education. Third, parents interact with their children and pass on the social skills that are favoured in school (*middle-class norms*). Fourth, differing nutrition and health habits among different social origin groups are associated with children's school achievements. Fifth, family size is related to stu-

dents' school performance. It is assumed that the more siblings a child has the less well she or he will perform in school. Boudon (1974, p. 84) concluded that secondary effects are probably more important for producing inequality of educational opportunity than primary effects.

According to Halsey, Heath and Ridge (1980) as well as Erikson and Jonsson (1996a), families apply *cost–benefit considerations* on whether children should continue their educational career or leave school. These decisions are associated with the structural positions of families in a society's inequality system (Breen & Goldthorpe, 1997; Erikson & Jonsson, 1996a). The *(subjectively) expected costs* for higher educational tracks are higher for families with lower resources and the *(subjective) success probabilities* are lower for parents with lower resources. The *(subjectively) expected benefits of different educational attainment levels* are probably evaluated differently by families from different social backgrounds (Boudon, 1974, p. 29). Typically, families with lower structural origin resources have a *higher time preference* (which means that they value future higher educational attainment levels less) and they have a *higher risk aversion* (to choose an academically more challenging but economically more rewarding academic track) (Breen et al., 2014). Various welfare regimes constrain and facilitate the decision making of families and their children in different ways. In particular, they influence the equality of conditions through a more or less equal income distribution, the extent of public provision of education, the degree of progressive taxation and the level of job security (Breen & Jonsson, 2007, p. 1780).

In a recent publication, Bukodi and Goldthorpe (Bukodi & Goldthorpe, 2013) reported an estimation of the simultaneous associations of parents' class, status and education with inequalities of educational opportunities. Although these three measures of social origin can be linked to different mechanisms by which parental resources are associated with

family decisions, it seems generally hard to disentangle and identify them in statistical terms, because they are highly correlated (Pfeffer, 2007). Due to the strong interdependencies in measures of social origin, I consider these mechanisms as complementary rather than competing. In my analysis of the PIAAC data, I can rely only on the highest education of the father and mother as social background information. Therefore, I define social origin by taking the highest educational level of both parents. In other words, I can model only part of the relationship between social origin and educational attainment, and my educational origin measure will also partly reflect other origin resources. However, because the excluded background characteristics of parental class, status and income are all causally and temporally subsequent to parent's educational attainment level, my approach can be conceived as an analysis of the total effect of parental education (Pfeffer, 2007, p. 2). Furthermore, new studies demonstrate that parent's education is a relatively powerful factor of social origin within the educational attainment process in modern societies (Baker, 2014; Buis, 2013a; Bukodi & Goldthorpe, 2013; Ermisch & Francesconi, 2001). This is because families' economic obstacles for education, in particular for children from less advantaged families, have been strongly reduced by the improving economic living conditions over the last decades (Breen et al., 2009) along with the declining average family size (Blake, 1989). In addition, Breen et al. (2009) argue that the direct economic costs of education strongly declined through the abolition of school fees, the extension of supplied schools, and the lengthening of minimum school duration. In summary, *parental education* seems to have become the *key origin factor in modern society when it comes to children's educational attainment* (Baker, 2014).[15]

Educated parents have better *knowledge of the educational system* and they have *personal experiences with the more demanding educational pathways* (see Lucas, 1999). In

[15] Education of the parents is also prior to social class and status position and does not change so much over the adult life course than these two measures.

other words, they are better able to consult, guide and manoeuvre their children through the upper parts of the school and university system. Their knowledge about the requirements and academic demands of school institutions will help them to reduce the uncertainty of educational decision making. In addition, the *status maintenance mechanism*, described by Breen and Goldthorpe (1997, p. 283) for social class, should also be an important mechanism for the intergenerational transmission of educational attainment levels. Parents want their children to attain at least the same level of education that they themselves have achieved. If children move down relative to their parents in terms of educational attainment, these *losses loom larger* (and are particularly painful for the parents) *than similar gains in educational attainment* (Kahneman & Tversky, 1979). Thus, differently educated parents have *different aspiration levels* right from the start, indicating that *families* do not consider children's absolute educational outcomes but *focus on* their *outcomes relative to their own educational degree*.

## 4.2 Welfare regimes and their impact on inequality of educational opportunity

Ideas on social equality differ across welfare regimes and should play a crucial role in accounting for cross-national variations in inequality of educational opportunity. In this chapter I examine the relationship between *equality of condition* and *equality of opportunity* (Breen & Jonsson, 2005, p. 223; Erikson & Jonsson, 1996a; Goldthorpe, 2007, p. 14; West & Nikolai, 2013, p. 471). The former is a political concept addressing the reduction and elimination of significant differences in socio-economic living conditions. More equal conditions among families provide more similar starting points for the next generation. The state can attain higher levels of equality of condition by progressive taxation, redistribution policies, extensive public social welfare or labour market regulations. *Equality of opportunity* is about the equal chances of individuals to attain a certain position in the stratification system of a society based on meritocracy and not on social prove-

nance (Breen, 2010). In this view, inequality is justified insofar as someone who has more talents and invests more time and effort should attain a more important position in the inequality system of a society (Goldthorpe, 1996, p. 256). These two concepts of equality do not exclude each other. They are in fact highly interwoven (Breen & Jonsson, 2005). I argue that differences in the emphasis on one of these two concepts in the various welfare regimes should lead to cross-nationally divergent outcomes in inequality of educational opportunity. Erikson and Goldthorpe (Erikson & Goldthorpe, 1992) and Goldthorpe (2007b, p. 14) formulate the following hypotheses on differences in inequality of condition in a society and their outcome: (1) a high level of inequality of condition in a welfare regime will be associated with a high level of inequalities of educational opportunities; (2) if inequality of condition increases or decreases in a society, it is likely that the inequality of educational opportunity will rise or decline over time.

In this chapter, I capture the variety of equality ideologies by using Esping-Andersen's seminal conception of 'The Three Worlds of Welfare Capitalism' (1990). One advantage of this country typology is that it is not only a subject of explanation on its own, but that it can also be used to account for national differences in outcomes. This parsimonious typology reduces the complexity of reality and makes it possible to discover some underlying connecting logic (Esping-Andersen, 1992). According to Esping-Andersen, states and their welfare systems will differ in their pathways as a result of their unique past historical and political circumstances together with the experiences in these countries (Esping-Andersen, 1990, 1992; see also Manow 2007). He identified three kinds of welfare regimes: the *liberal*, the *conservative* and the *social-democratic*. The qualitative distinctions between these three welfare regimes lie (1) in their different 'arrangements between state, market, and the family' (Esping-Andersen, 1990, p. 26, 1992, p. 35); (2) in the differential way they influence employment and social stratification; and (3) in the extent to which they allow individuals to live independently from the market (*de-commodification*).

Esping-Andersen's welfare regime typology has been criticized on several grounds. For example, it is argued that his classification is oversimplified. Three welfare regimes are not enough to capture the complex reality of welfare states (Esping-Andersen, 1992, p. 73). A more differentiated welfare regime classification is needed. Leibfried (1992), Bonoli (1997) and Ferrera (2010), for example, add a fourth welfare regime namely the Mediterranean welfare state. Moreover, since the fall of the Iron Curtain former socialist countries in Central and Eastern Europe have also been added to the traditional classification as a new regime type (Cook, 2010). Finally, there has been a growing research interest in the emergence of welfare regimes in East Asia (Peng & Wong, 2010). In my analysis of the PIAAC data, I therefore extend Esping-Andersen's typology by the Mediterranean, Eastern European and East Asian welfare regimes. A further typical objection to Esping-Andersen's welfare regime conception concerns its inability to explain institutional change. It provides only a snapshot of the 1970s and 1980s epoch in Western Europe and the United States (Arts & Gelissen, 2010, p. 577; Esping-Andersen, 1992). In this chapter, I take into account the development of welfare states since the early 1970s and formulate hypotheses on the dynamics of equality ideologies and their link to the association between parental education and inequality of educational opportunity over the last decades. Furthermore, it has been argued that Esping-Andersen's welfare regime conception is too male centred (Arts & Gelissen, 2010). Therefore, I also integrate the female perspective in my welfare regime classifications to study the association between gender and educational opportunities.

### 4.2.1 The liberal welfare regime

The *liberal welfare regime* is dominated by the institution of the *market* (Esping-Andersen, 1990). Market competition is connected with high levels of efficiency and productivity, so that ascription is assumed to have only a low importance for the alloca-

tion of individuals to different positions in the inequality system. The liberal welfare regime tries to provide *formally equal opportunities* to each individual. According to this model, only the most talented and most hard-working will attain the highest positions in the inequality system. The liberal state interferes with the market only minimally (*laissez-faire principle*) because it would otherwise produce new kinds of inequalities that are not justifiable on the principle of meritocracy (Esping-Andersen, 1990). However, because individuals start from different structural inequality positions, these formal equal opportunities cannot be utilized by everybody on an equal basis. Families with privileged social backgrounds will use their resources to pass on their advantages to their children. Therefore, this laissez faire ideology should be associated with high levels of inequality of educational and social opportunity among social groups. In liberal welfare states, only a minority of low-income workers has entitlements to benefits that are often highly stigmatized (Esping-Andersen, 1990). In addition, private insurance schemes are common, the public sector as provider of jobs is very small, de-commodification is low, employment of women is relatively high, childcare provision is organized mainly privately and is very expensive, and there exists only an underdeveloped public health care system as well as parental leave provision (Esping-Andersen, 1992, p. 75; Hofmeister et al., 2006, p. 18). Therefore, living conditions are highly unequal. However, in the liberal welfare regime, education is considered to be important for economic growth (Hanushek & Woessmann, 2010) and as a form of preventive social policy (Allmendinger & Leibfried, 2003, p. 63). Thus, the liberal welfare state places a strong emphasis on the role of basic education to integrate children from lower social origins and ethnic minorities into society (Hanushek & Woessmann, 2010). For example, the *United States* has been a forerunner in the expansion of secondary education. Nevertheless, the state provides only few resources for high-quality education. More privileged families therefore send their children to high-quality private schools and universities (Esping-Andersen, 2008; Iversen & Stephens, 2008, p.

608). In my analysis, the United States, Ireland, Canada and the United Kingdom belong to this type of welfare regime. In the process of globalization over the last decades, inequality of wealth and income has risen particularly in the liberal Anglo-Saxon countries (Bogliacino & Maestri, 2014; DiPrete, 2005; Gouskova & Stafford, 2002).

For my empirical analysis, I formulate the following four hypotheses (see also Table 4-1):

*Because education is seen as an instrument of economic growth and of the integration of lower social classes into the liberal welfare regime, I expect, from a cross-national comparative view, a relatively high average educational attainment level at the beginning of my observation window (Hypothesis 1).*

*In the liberal welfare regime, the inequality of condition (lack of redistribution policies, low de-commodification, low labour market regulation and a means-tested public welfare provision) is very high, so that I expect a comparatively high level of inequality of educational opportunity (Hypothesis 2).*

*In the process of globalization, the income and wealth distributions have become particularly more unequal in the liberal welfare states. For the development over time, I therefore expect a further increase in the inequality of educational opportunities (Hypothesis 3).*

*In the liberal welfare regime, I expect a relatively small gender gap in educational opportunities due to the idea that every citizen should get the same opportunities. In the process of educational expansion, I expect that women should catch up with their male contemporaries because the labour force participation of men and women has become more similar* (DiPrete & Buchmann, 2013) *(Hypothesis 4).*

### 4.2.2 The conservative welfare regime

At the end of the 19th century, the *conservative welfare regime* evolved out of a historical situation in which monarchies tried to circumvent increasingly popular democratic aspirations. They tried to preserve the old hierarchical social order and the monarch's authority by providing social insurance to the working population (Esping-Andersen, 1990). Social insurance entitlements were therefore linked closely to class and status, and they *reproduced the social stratification* in society instead of being redistributive. Especially civil servants had rights for privileged welfare provisions. Even today, the *social insurance programmes are highly connected with the occupation or status* in this welfare regime, and private market-based insurance is less common. The labour market is highly regulated and protects status groups. Because social security and income are highly connected to occupation and status, the inequality of condition is relatively high in cross-national comparative terms. Another property of the conservative welfare regime is that it is shaped strongly by the church and its conservative thinking about the family and gender roles (Manow 2007). In most of these countries, the *family therefore plays a major role* in the provision of welfare (Esping-Andersen, 1990). Particularly in the German-speaking countries, the state subsidizes the family to organize care for children and the elderly. The provision of public childcare is low (Esping-Andersen, 1992). In Germany for example, the state provides tax incentives for women to stay at home with their families, and it punishes extensive female full-time employment ('Ehegattensplitting'). If mothers work nowadays, then it is normally part-time. Due to rising worldwide competition and the more rapid changing market demands, firms adapt and are increasingly employing women in flexible part-time jobs (Hofmeister et al., 2006). In the conservative welfare regimes education is not part of the social policy and spending on social security is much higher than on education (Allmendinger & Leibfried, 2003, p. 64). A specific structural feature of the German-speaking countries is the dual vocational training system. This provides children

from the working class with a sound vocational training but – at the same time – it also partly diverts children from lower social backgrounds away from higher education (Becker & Hecken, 2009; Müller & Pollak, 2010). In my analysis, Germany, Austria, Belgium, the Netherlands and France are classified to the conservative welfare regime. Based on a high level of labour market regulation, these continental countries have experienced only a modest increase in the inequality of disposable incomes in the process of globalization. It remains to be seen whether this increase in inequality of conditions has been enough to produce a change in the effect of social origin on educational opportunities (Bogliacino & Maestri, 2014).

In sum, for the conservative welfare state, I formulate the following expectations (see also Table 4-1):

*From a cross-national comparative perspective, the average educational attainment level of the conservative regime should be high for the oldest cohort, because most of these countries have an extensive vocational training system (Hypothesis 5).*

*The inequality of educational opportunity should be relatively high in the conservative welfare regime, because it has a strong tendency to reproduce social stratification (Hypothesis 6).*

*Because the inequality in terms of disposable income has not changed so much in the last decades, I expect persistence in the inequality of educational opportunity over time (Hypothesis 7).*

*Based on strong gender-specific role models among the oldest cohorts, men are expected to invest much more in education than women. In the observation window, however, I expect a decline in the gender gap because the labour market participation of women has risen strongly across birth cohorts (Hypothesis 8).*

### 4.2.3 The social-democratic welfare regime

In the *social-democratic* welfare regime, the *state plays the major role* in providing social welfare and equality. This welfare regime derives from a long history of social democratic governments and pursues a *universalistic* approach, in which every citizen, independent of class position or gender, has equal rights of the highest standard and equal access to comprehensive services (Esping-Andersen, 1992, p. 78; Manow 2007) such as healthcare, high quality public childcare, high quality schooling (Iversen & Stephens, 2008, p. 608; Sahlberg, 2007; Simola, 2005) and, retraining and housing programmes (Peter et al., 2010). The Scandinavian social democratic model for achieving more equality and excellence in secondary education has been based on constructing a publicly funded comprehensive school system without tracking students during their common basic education (Erikson & Jonsson, 1996b; Jonsson & Erikson, 2007). The state guarantees a comparatively high level of *equality of living conditions* and emancipates the labour force from the market and the family *(de-commodification)* (Esping-Andersen, 1990). This all-embracing welfare state is financed by highly progressive taxation and by the promotion of full employment. A lot of jobs are provided by the state in the service sector that employs the highly skilled and particularly women (Hofmeister et al., 2006, p. 16). Because educational policy is an important part of the equality ideology of the social-democratic parties, the state invests extensively in it (Allmendinger & Leibfried, 2003, p. 64; Jonsson, 1993, p. 101). The Scandinavian countries, Norway, Finland, Denmark and Sweden belong to this welfare regime type. Since the 1990s, due to rising unemployment and budgetary constraints, the governments in the Nordic countries, particularly in Sweden, have reduced the extent of taxation and social welfare (Esping-Andersen, 1992, p. 80). Hence, even in the Scandinavian countries, there has been an increase in the inequality of disposable income (Bogliacino & Maestri, 2014, p. 26). Whether this rising inequality has had an effect on educational opportunities remains an empirical question.

For the social-democratic welfare regime, I formulate the following four hypotheses (see also Table 4-1):

*Due to the policies of universalization in social-democratic welfare regimes, I expect a relatively high average educational attainment level for the oldest birth cohort in cross-national comparative terms (Hypothesis 9).*

*Based on the de-commodification and equalization policies, the inequality of educational opportunity should be low in social-democratic Nordic countries compared to other welfare regimes (Hypothesis 10).*

*Over the last decades, it is likely that the inequality of educational opportunity has risen slightly as a result of increasing inequality of condition in the social-democratic welfare states (Hypothesis 11).*

*Due to the strong focus on gender equality, there should be comparatively small gender differences in educational opportunities among the oldest birth cohorts. Because educational equality is an explicit aim of this welfare regime, I expect that the gender-gap to the disadvantage of women should further decline or even reverse (Hypothesis 12).*

### 4.2.4 The Mediterranean welfare regime

In my analysis, Spain and Italy are examples of the Mediterranean welfare regime. In comparison to other Western societies, the Mediterranean countries are latecomers in the provision of welfare (Ferrera, 2010) and in the process of educational expansion (Cobalti & Schizzerotto, 1993). The countries belonging to this welfare regime also lag clearly behind in terms of women's labour force participation and the supply of skilled and highly-skilled jobs. The state does not play a large role in de-commodifying its citizens. There exists a strong dualism on the labour market between highly protected labour market insiders and lowly protected outsiders (Bernardi & Nazio, 2005). This leads to high inequalities of condition in these countries. Especially, young labour market entrants and women

belong to the group of labour market outsiders. This welfare regime is influenced strongly by the church, and the family is the main provider of social welfare (Breen & Buchmann, 2002, p. 291). Inequality of educational opportunities is high, because families have different access to resources to support their children. Childcare and care for the elderly and disabled are the responsibility of the (extended) family and are normally provided by women who stay at home. Social insurance for older people is very generous. They receive very high pensions. However, women, the unemployed and the poor are eligible for only few and low benefits (Ferrera, 2010). Bogliacino and Maestri (2014) as well as Bernardi and Nazio (2005) have shown that inequality has increased in the Mediterranean countries during the process of globalization.

For the Mediterranean welfare regime, I formulate the following four hypotheses (see also Table 4-1):

*Compared to other welfare regimes, the average educational attainment level in the Mediterranean welfare states should be lower for the older cohorts in my observation window, because this regime lags behind in the expansion of education (Hypothesis 13).*

*Inequality of educational opportunity is expected to be high, because the Mediterranean welfare regime tolerates a high inequality of condition and emphasizes the importance of the family (Hypothesis 14).*

*In the process of globalization, the differences between the insiders and outsiders of the labour market in the Mediterranean welfare regime have become greater, and therefore I expect an increasing inequality of educational opportunity across birth cohorts (Hypothesis 15).*

*Because of great differences in the life courses of men and women among the oldest birth cohort in my observation window, I expect a comparatively huge gender gap in educational opportunities in the Mediterranean regime. Because gender ideologies have also*

*changed drastically in Southern Europe, I expect these gender differences in educational opportunity to decline across birth cohorts (Hypothesis 16).*

### 4.2.5 The Eastern European welfare regime

Countries such as Poland, the Slovak Republic, the Czech Republic and Estonia experienced an enormous transformation from a planned socialist economy to a capitalist market system in the early 1990s. Before the 1990s, Estonia was a Soviet republic and Poland and Czechoslovakia belonged to the Communist Bloc. All these countries were strongly influenced by the Soviet socialist model. Central aims of the socialist system were to create equality among genders as well as among different social groups. Therefore, they carried out policies to guarantee gender and social equality in the educational system and on the labour market. Mass education at the secondary level was introduced to pursue industrial development (Cummings, 2003). Women were highly educated in these countries and participated full-time in the labor market. This was also facilitated by an extensive provision of childcare facilities and generous maternity leaves. The socialist countries tried to enforce wage and income equality among the working population. Equality of condition was an important aim of the socialist ideology. The economy was centrally planned and the labor market was highly state-regulated. Public welfare provision was very broad and covered all basic needs (Cook, 2010).

After the fall of the Iron Curtain, inequality in these former socialist Eastern European countries increased tremendously as a consequence of a greater market orientation. In the transition period from socialism to capitalism, unemployment, especially for the middle-aged workers, rose and wages declined. Countries belonging to this welfare regime varied in their extent of liberalization. The Czech Republic became less liberalized and kept a system with relatively high social subsidies. Poland took a middle position in liberalization. Estonia and the Slovak Republic became very market-oriented (Cook, 2010).

Whether the post-communist countries constitute an independent welfare regime is highly controversial. However, in my analysis, they have a common socialist past and they have experienced the transition from socialism to a free-market that has strongly increased the inequalities in their societies (Cook, 2010). Therefore, I assume that the integration of the former socialist countries into the capitalist world economy has increased the inequality of educational opportunity (Gerber, 2000; Iannelli, 2003).

For the Eastern European welfare regime, I formulate the following four hypotheses (see also Table 4-1):

*The average educational attainment in the former socialist countries of Eastern Europe should be comparatively high due to an emphasis on workers' education in order to pursue industrial development (Hypothesis 17).*

*In the period of the former socialist system, inequality of educational opportunity should have been low due to the strong focus on equality of condition and opportunity. In my analysis, I therefore expect a comparatively high educational equality for the oldest birth cohort (Hypothesis 18).*

*After the transition from socialism to capitalism, I expect a strong increase in the inequality of educational opportunity in the Eastern European welfare regime (Hypothesis 19).*

*Due to the policy of gender equalization in the socialist system, I expect that, compared to other welfare regimes, men and women should differ less in their educational opportunities among the oldest cohorts. After the transition to capitalism and the continuous equalization of women and men, I expect a further decline of the gender gap in the Eastern European welfare regime. However, this decline might be smaller in cross-national terms, because of increasing competitive processes between men and women and the lower focus on gender equalization in the capitalist system (Hypothesis 20).*

### 4.2.6 The East Asian welfare regime

In the recent welfare literature, countries such as Japan and South Korea are considered to constitute a distinct East Asian welfare regime (White & Goodman, 1998, p. 13). In the 1960s, in comparison to Western Europe and the United States, Japan and South Korea were economically underdeveloped with a high level of social inequality. Since the 1960s, however, Japan and South Korea have experienced rapid industrialization and an economic boom with quickly rising living standards and a massive educational expansion, especially on the higher education level (Kariya, 2011; Park, 2001). A consequence of the strong economic advances between the early 1960s and the late 1990s has been that the income distribution in these countries has become more equal (Esping-Andersen, 1992, p. 90; White & Goodman, 1998). Today, Korea and Japan are among the wealthiest countries in the world. The *equality of condition* is comparatively high, even if social policies play only a minor role in these Asian countries. In Confucianism the family and firms are the major providers of welfare and care (Esping-Andersen, 1992; Peng & Wong, 2010). The East Asian welfare regime therefore encourages services provided by communities, firms and the family. Expenditure on benefits and social insurances is low in the East Asian welfare regime compared to Western countries (Peng & Wong, 2010; White & Goodman, 1998). Social insurances and other benefits depend strongly on a high level of education and being employed in a large firm (Esping-Andersen, 1992, p. 91). Based on traditional gender-specific expectations, women are considered to be responsible for childcare and the household in the East Asian welfare regime. However, as in other modern societies, these traditional gender ideologies have changed and not only the female demand for higher education but also female labour market participation has increased. In the last two decades, Japan and Korea have been hit by major financial crises that seem to be connected with increasing social inequalities.

For the East Asian welfare regime, I formulate the following four hypotheses (see also Table 4-1):

*In the early 1960s, the East Asian welfare states started out from a comparatively low level of economic development but managed to catch up in a very short time. To promote economic development, the state invested intensively in education. I expect that the educational attainment should be low for the oldest cohort in this welfare regime, but across cohorts, the East Asian welfare regime should have experienced an enormous expansion of educational attainment (Hypothesis 21).*

*In the 1960s, inequality of educational opportunity should be high due to a low level of industrial development and high social inequalities (Hypothesis 22).*

*Based on rapid economic growth in which the inequality of condition declined and there was a massive educational expansion, I expect a decrease in the inequality of educational opportunity in the East Asian welfare regime (Hypothesis 23).*

*Based on traditional family roles in Confucianism, I expect a great gender-gap in educational opportunities for the oldest birth cohort. With the increasing labour force participation of women, the inequality of educational opportunities between men and women should decline over time (Hypothesis 24).*

Table 4-1 provides an overview on the expected hypotheses for the six welfare regimes.

**Table 4-1:** Summary of the hypotheses for the six welfare regimes

| | **Liberal** | **Conservative** | **Social-democratic** | **Mediterranean** | **Eastern European** | **East Asian** |
|---|---|---|---|---|---|---|
| Educational attainment | + | + | + | - | + | - |
| Interaction with cohort | | | | | | + |
| IEO in country comparison | + | + | - | + | - | + |
| Change of IEO | + | 0 | + | + | + | - |
| Gender inequality | + | + | -/0 | + | - | + |
| Interaction with cohort | - | - | - | - | - | - |

‚+' strong or increasing; ‚-' low or declining; ‚0' no or very low
Source: Author's portrayal

## 4.3 Results

I start my empirical analysis by comparing the estimates of the OLS regression and the ordered logit model. The dependent variable in the OLS regression is the respondent's average number of school years, and the dependent variable in the ordered logit model is the respondent's ordered educational attainment level (lower secondary, upper secondary and tertiary education). I include the cohort trend variable and the 21 countries in a fixed effects model (see Model 1 in Table 4-2). I clearly observe a strong average educational expansion trend across cohorts in both models. Because I am using effect coding for the country dummy variables, the coefficients represent average country differences from the grand mean. These differences reflect both, country differences at the beginning of the observation window and country differences from the average educational expansion trend within the observation window. The educational attainment level is below the cross-national average in Austria, the Czech Republic, Finland, Ireland, Italy, Korea, the Netherlands, Poland, the Slovak Republic, Spain and the United Kingdom. It is particularly low in Italy and Spain. In Belgium, Canada, Denmark, Estonia, France, Germany, Japan, Norway, Sweden and the United States, the attainment level is above the cross-national average. It is especially high in Japan and the United States. Results show that the directions and the statistical significances of the country coefficients lead to very similar interpretations in both models. There are only small differences in terms of statistical significance for the Czech Republic, Finland and Korea. However, the country coefficients take the same directions. I conclude that the OLS model and the ordered logit model lead to very similar substantive conclusions. This is also true for all the following steps in my analysis.

Now, I compare the fixed-effects model with the 21 country dummy variables from Model 1 in Table 4-2 with a model that replaces the 21 countries by six welfare regimes at the macro level in the OLS regression and the ordered logit model (see Model 2 in Ta-

ble 4-2). Again, the signs and significances of the coefficients in Model 2 are substantively similar for the OLS and ordered logit models. One difference is the Eastern European welfare regime: it is significant in the OLS regression but not significant in the ordered logit model. Because I am using an effect coding for the welfare regimes, coefficients represent average welfare regime differences from the grand mean. These differences reflect both welfare regime differences at the beginning of the observation window and welfare regime differences from the average educational expansion trend within the observation window. In the Mediterranean welfare regime, the average educational attainment

**Table 4-2:** Comparison of the country and welfare models: each model estimated with an OLS regression and an ordered logit model

| | **Model 1 OLS** | **Model 1 Ordered logit** | | **Model 2 OLS** | **Model 2 Ordered logit** |
|---|---|---|---|---|---|
| Cohort trend | 0.30 (0.005)*** | 1.22 (0.004)*** | Cohort trend | 0.30 (0.005)*** | 1.21 (0.004)*** |
| Denmark | 0.70 (0.04)*** | 1.60 (0.05)*** | Social-democr. | 0.50 (0.02)*** | 1.39 (0.02)*** |
| Finland | -0.18 (0.05)*** | 0.95 (0.03) | | | |
| Norway | 0.47 (0.05)*** | 1.35 (0.05)*** | | | |
| Sweden | 0.50 (0.06)*** | 1.41 (0.05)*** | | | |
| Canada | 0.53 (0.03)*** | 1.41 (0.02)*** | Liberal | 0.46 (0.02)*** | 1.33 (0.02)*** |
| Ireland | -0.29 (0.05)*** | 0.79 (0.03)*** | | | |
| United Kingd. | -0.19 (0.04)*** | 0.82 (0.02)*** | | | |
| United States | 0.81 (0.05)*** | 1.72 (0.06)*** | | | |
| Austria | -0.58 (0.05)*** | 0.74 (0.03)*** | Conservative | 0.22 (0.02)*** | 1.17 (0.02)*** |
| Belgium | 0.25 (0.05)*** | 1.17 (0.04)*** | | | |
| France | 0.43 (0.05)*** | 1.37 (0.04)*** | | | |
| Germany | 0.60 (0.06)*** | 1.51 (0.06)*** | | | |
| Netherlands | -0.29 (0.05)*** | 0.77 (0.03)*** | | | |
| Spain | -1.13 (0.05)*** | 0.36 (0.02)*** | Mediterranean | -1.55 (0.04)*** | 0.34 (0.01)*** |
| Italy | -1.56 (0.05)*** | 0.34 (0.01)*** | | | |
| Czech Republic | -0.23 (0.05)*** | 0.97 (0.03) | Eastern EU | -0.14 (0.02)*** | 0.98 (0.02) |
| Estonia | 0.47 (0.05)*** | 1.39 (0.05)*** | | | |
| Poland | -0.32 (0.05)*** | 0.89 (0.03)*** | | | |
| Slovak Republic | -0.94 (0.05)*** | 0.61 (0.02)*** | | | |
| Japan | 0.97 (0.05)*** | 1.92 (0.06)*** | Asian | 0.52 (0.03)*** | 1.37 (0.03)*** |
| Korea | -0.02 (0.04) | 0.95 (0.03)* | | | |
| Constant | 12.36 (0.02)*** | | | 12.21 (0.02)*** | |
| Cut 1 | | -0.95 (0.01) | | | -0.83 (0.01) |
| Cut 2 | | 1.23 (0.01) | | | 1.30 (0.01) |
| N | 80850 | 80850 | | 80850 | 80850 |
| Adj. $R^2$ | 0.08 | | | 0.06 | |
| Pseudo $R^2$ | | 0.04 | | | 0.03 |

* $0.01<p\leq0.05$; ** $0.001<p\leq0.01$; *** $p\leq0.001$
Source: Author's calculations

level is, as expected, below the cross-national average. In the social-democratic, liberal, conservative and East Asian welfare regimes the educational attainment level is above average. A comparison of the results of Models 1 and 2 suggests that the more parsimonious welfare regime model can explain the variation in educational attainment across countries almost as well as the full fixed-effects country model. The adjusted $R^2$s for the OLS models and the pseudo $R^2$s for the ordered logit models are very similar for both estimations. In the following analysis, I use the more parsimonious welfare regime conception to account for cross-national differences in educational attainment and their interactions with parental education, birth cohort and gender.

Table 4-3 tests my hypotheses from the theory section. In Model 3, I am interested in changes in parental education associations with educational attainment and in Model 4, I examine changes in gender differences in educational attainment across birth cohorts. I begin with Model 3 in Table 4-3, which includes the covariates cohort trend, parental education and welfare regime as well as the interaction effects parental education × cohort trend, welfare regime × cohort trend, welfare regime × parental education, and welfare regime × parental education × cohort trend in the OLS regression and the ordered logit model. The coefficient of the cohort trend is positive and highly significant. This means that there has been a strong educational expansion across birth cohorts in all modern countries. In addition, parental education is positively and significantly associated with children's educational attainment. Children from more highly educated backgrounds clearly have better educational opportunities to attain higher educational degrees and to receive more years of education. Families with better resources are thus more successful in passing on their educational privileges to the next generation. The interaction between parental education and the cohort trend is significant and negative.

Because the cohort trend covariate is coded zero for the oldest birth cohort (respondents born 1947–52), Model 3 allows me to distinguish the situation at the beginning of the observation window and the change within the observation window. At the beginning of my observation window, the various welfare regimes were in different phases of the educational expansion process. The social-democratic, Eastern European and liberal welfare regimes show on average a higher educational attainment for the oldest birth cohort and are the vanguards in the educational expansion process. *This is in line with my Hypotheses 1, 9 and 17* that the liberal, socialist and social-democratic ideologies and policies on education have already led to a comparatively high educational attainment level for the oldest birth cohort. According to the liberal idea, education is an important factor for economic growth and for the integration of lower social classes and migrants into the society. Therefore, access to education was expanded quite early in the liberal countries and particularly in the United States. In the former socialist Eastern European and social-democratic welfare regimes, the state tried to ensure equal starting conditions through equal access to comprehensive services and education. The educational attainment for the oldest birth cohort in the conservative welfare regime does not differ from the cross-national average in the OLS model. However, the ordered logit model indicates that educational attainment is significantly above average, but not as high as in the liberal, Eastern European and social-democratic welfare regimes. In the conservative welfare regime, spending is much lower on education than on social security. However, a unique feature of the German-speaking countries is the dual apprenticeship system that provides children from lower social classes with a sound vocational training (see *Hypothesis 5*). The Mediterranean and East Asian welfare regimes clearly lag behind in the process of educational expansion. The oldest birth cohorts in these countries had a significantly lower educational attainment level than the cross-national average. *This is in line with my Hypotheses 13*

**Table 4-3:** OLS and ordered logit regression on educational attainment (years of schooling and an ordered variable of educational attainment)

| Variables | Hypotheses | Model 3 OLS | Model 3 Ordered Logit | Model 4 OLS | Model 4 Ordered logit |
|---|---|---|---|---|---|
| Cohort trend | | 0.49 (0.03)*** | 1.48 (0.03)*** | 0.40 (0.04)*** | 1.39 (0.04)*** |
| Parental education | | 0.48 (0.01)*** | 1.43 (0.01)*** | 0.48 (0.01)*** | 1.44 (0.01)*** |
| Parental education×cohort trend | | -0.03 (0.003)*** | 0.98 (0.002)*** | -0.03 (0.003)*** | 0.98 (0.002)*** |
| Female | | | | -0.44 (0.14)** | 0.70 (0.08)*** |
| Female×cohort | | | | 0.18 (0.04)*** | 1.12 (0.03)*** |
| Female×parental education | | | | 0.01 (0.01) | 1.00 (0.01) |
| Female×parental education×cohort trend | | | | -0.0003 (0.003) | 1.00(0.003) |
| Social-democratic | + | 1.71 (0.17)*** | 4.41 (0.56)*** | 1.45 (0.17)*** | 3.74 (0.48)*** |
| Liberal | + | 1.29 (0.15)*** | 2.41 (0.28)*** | 1.11 (0.15)*** | 2.07(0.25)*** |
| Conservative | + | 0.34 (0.17) | 1.52 (0.20)** | 0.44 (0.18)* | 1.63 (0.22)*** |
| Mediterranean | - | -3.32 (0.41)*** | 0.04 (0.02)*** | -3.22 (0.41)*** | 0.05 (0.02)*** |
| Eastern European | + | 1.48 (0.20)*** | 4.82 (0.70)*** | 1.25 (0.20)*** | 4.14 (0.61)*** |
| Asian | - | -1.50 (0.21)*** | 0.30 (0.05)*** | -1.04 (0.22)*** | 0.40 (0.07)*** |
| Social-democratic×cohort trend | | -0.06 (0.05) | 0.92 (0.03)* | -0.04 (0.05) | 0.93(0.03)* |
| Liberal×cohort trend | | -0.19 (0.04)*** | 0.87 (0.03)*** | -0.17 (0.04)*** | 0.89 (0.03)*** |
| Conservative×cohort trend | | 0.12 (0.05)* | 1.08 (0.04)* | 0.13 (0.05)** | 1.09 (0.04)* |
| Mediterranean×cohort trend | | -0.04 (0.11) | 1.08 (0.10) | -0.10 (0.11) | 1.03 (0.09) |
| Eastern European×cohort trend | | -0.61 (0.06)*** | 0.62 (0.03)*** | -0.57 (0.06)*** | 0.64 (0.03)*** |
| Asian×cohort trend | + | 0.78 (0.06)*** | 1.72 (0.08)*** | 0.74 (0.06)*** | 1.69 (0.08)*** |
| Social-democratic× parental education | - | -0.12 (0.02)*** | 0.90 (0.01)*** | -0.12 (0.02)*** | 0.89 (0.01)*** |
| Liberal×parental education | + | -0.07 (0.01)*** | 0.95 (0.01)*** | -0.07 (0.01)*** | 0.95 (0.01)*** |
| Conservative×parental education | + | -0.03 (0.02)* | 0.96 (0.01)* | -0.03 (0.15) | 0.96 (0.01)** |
| Mediterranean×parental education | + | 0.24 (0.04)*** | 1.27 (0.05)*** | 0.24 (0.04)*** | 1.27 (0.05)*** |
| Eastern European×parental education | - | -0.13 (0.02)*** | 0.88 (0.01)*** | -0.13 (0.02)*** | 0.88 (0.01)*** |
| Asian×parental education | + | 0.11 (0.02)*** | 1.10 (0.02)*** | 0.11 (0.02)*** | 1.10 (0.02)*** |
| Social-democratic×parental education×cohort trend | + | 0.003 (0.004) | 1.01 (0.003) | 0.003 (0.004) | 1.01 (0.003) |
| Liberal×parental education×cohort trend | + | 0.01 (0.004)* | 1.01 (0.003)* | 0.01 (0.004)*** | 1.01 (0.003)* |
| Conservative×parental tion×cohort trend | 0 | -0.01 (0.004)* | 0.99 (0.003) | -0.01 (0.004)* | 0.99 (0.003) |
| Mediterranean×parental education×cohort trend | + | 0.002 (0.01) | 0.99 (0.009) | 0.003 (0.01) | 0.99 (0.01) |
| Eastern European×parental education×cohort trend | + | 0.04 (0.01)*** | 1.03 (0.004)*** | 0.04 (0.005)*** | 1.03 (0.004)*** |
| Asian×parental education×cohort trend | - | -0.05 (0.005)*** | 0.97 (0.004)*** | -0.05 (0.01)*** | 0.97 (0.004)*** |
| Social-democratic×female | -/0 | | | 0.48 (0.07)*** | 1.44 (0.08)*** |
| Liberal×female | + | | | 0.36 (0.07)*** | 1.40 (0.07)*** |
| Conservative×female | + | | | -0.26 (0.08)*** | 0.84 (0.05)** |
| Mediterranean×female | + | | | -0.17 (0.14) | 0.77 (0.08)* |
| Eastern European×female | - | | | 0.44 (0.08)*** | 1.40 (0.08)*** |
| Asian×female | + | | | -0.86 (0.10)*** | 0.55 (0.04)*** |
| Social-democratic×female×cohort trend | - | | | -0.02 (0.02) | 0.98 (0.02) |
| Liberal×female×cohort trend | - | | | -0.06 (0.02)** | 0.95 (0.01)*** |
| Conservative×female×cohort trend | - | | | -0.00 (0.02) | 0.10 (0.02) |
| Mediterranean×female×cohort trend | - | | | 0.10 (0.04)* | 1.11 (0.03)*** |
| Eastern European×female×cohort trend | - | | | -0.08 (0.02)*** | 0.93 (0.01)*** |
| Asian×female×cohort trend | - | | | 0.06(0.03)* | 1.05 (0.02)* |
| Constant | | 7.12 (0.10)*** | | 7.35 (0.13)*** | |
| Cut 1 | | | 2.89 (0.08) | | 2.73 (0.10) |
| Cut 2 | | | 5.23 (0.09) | | 5.09 (0.10) |
| *N* | | 80,850 | 80,850 | 80,850 | 80,850 |
| *Adj. R²* | | 0.17 | | 0.18 | |
| *Pseudo R²* | | | 0.09 | | 0.10 |

* $0.01<p\leq0.05$; ** $0.001<p\leq0.01$; *** $p\leq0.001$; Source: Author's calculation

*and 21* in which I expect that this is mainly a result of a late welfare state formation and the low economic development in these two welfare regimes.

Based on the coefficients of the interaction effects between welfare regime and the cohort trend, it can be seen that the differences in average educational attainment among the six welfare regimes not only diminish but also partly reverse. The East Asian welfare regime, which lagged behind at the beginning of the observation window, has become a forerunner in terms of educational attainment at the end of the observation window. *This finding is in line with my Hypothesis 21* and might be explained by a rapid industrialization and a strong focus on educational policy particularly with regard to higher education (Kariya, 2011; Park, 2001). The former socialist countries in Eastern Europe experienced the opposite development. During the socialist period, these countries still belonged to the forerunners of educational expansion. Today they lag behind. The liberal countries have also experienced a decline in their forerunner position and have become more average. Educational expansions across birth cohorts in the Mediterranean and the social-democratic welfare regimes do not differ from the cross-national average. This means that the social-democratic countries to some extent preserve their forerunner status, whereas the Mediterranean countries have continuously lagged behind the average and still do so today. All in all, the six welfare regimes are not constant over time, as many welfare classifications suggest, but converge strongly and even reverse their relative positions in terms of educational expansion.

In the next step, I consider the inequality of educational opportunities for the oldest birth cohort among the different welfare regimes. Based on the interaction effects of the welfare regime and parental education, it is clear that the Eastern European and social-democratic welfare regimes provided particularly equal educational opportunities. *This supports my Hypotheses 10 and 18* that more equality of condition does indeed increase

educational opportunities. The liberal and conservative welfare regimes offered slightly better educational opportunities than the cross-national average (*see also Hypotheses 2 and 6*). As expected, the East Asian and Mediterranean countries provided the most unequal educational opportunities for children from lower social origin for the oldest birth cohort, due to the combination of the importance of the family and low industrial development. Thus, *this supports my Hypotheses 14 and 22*.

Considering the change in the interactions between welfare regimes and parental education over time, it becomes clear that inequality of educational opportunity has increased particularly in the liberal and Eastern European countries. *This is in line with my Hypotheses 3 and 19.* In liberal welfare states, income and wealth inequality have increased continuously during the process of globalization (DiPrete, 2005). Due to a lack of policies of redistribution and public social insurance, the inequalities of condition have risen in the liberal countries, and these are presumed to strengthen the relationship between parental education and children's educational attainment. Since the 1990s, Eastern European countries have experienced a transformation from an equalizing socialist to a very competitive and unequal capitalist system. There has been a clear increase in the inequality of condition in former socialist countries, and this has had the expected consequence of rising inequality of educational opportunity in the observation window. This result is in line with reports on other socialist countries (Gerber, 2000; Iannelli, 2003). In the East Asian welfare regime inequality of educational opportunity is clearly decreasing across birth cohorts. *This supports my Hypothesis 23*. In these East Asian countries, the emphasis on economic growth, the increasing equality of condition and the massive expansion of the educational system have led to a remarkable reduction in educational inequality. In the remaining three welfare regimes, the change in the effect of parental education does not differ from the cross-national average. In comparative terms, this means that the social-democratic welfare regime still provides relatively equal opportunities today (*this is not in*

*line with Hypothesis 11*); the conservative welfare regime provides opportunities that are a little better than average (*see Hypothesis 7*); and the Mediterranean welfare regime is still very unequal in terms of educational opportunities (*this is in line with Hypothesis 15*).

In Model 4 of Table 4-3, I focus on the association between gender and educational attainment. Comparing the results of Models 3 and 4 than it is clear that the substantive conclusions do not change much. There are only two exceptions: first, the conservative welfare regime now shows the expected above cross-national average educational attainment for the oldest birth cohort in both the OLS and the ordered logit model. This means that especially women in the oldest birth cohort had a lower educational attainment than men in the conservative welfare regime. Women were much less likely to participate in the dual apprenticeship system than men in the German-speaking countries (Mayer, 1980). *This is in line with my Hypothesis 8*. Second, the association between parental education and educational attainment of respondents from the oldest cohort in the conservative welfare regime diminishes in the OLS model, but persists in the ordered logit model. Based on these differences, I conclude that the *inequality of educational opportunity in the conservative welfare regime is above average in the oldest birth cohort, which is in line with my Hypothesis 6.*

Model 4 in Table 4-3 shows the expected result that women in the oldest birth cohort generally lagged behind men in terms of educational opportunities and their average educational attainment level. Looking at the interactions between welfare regime and the female dummy variable, the coefficients for the social-democratic, Eastern European, and liberal welfare regimes are positive and significant. Women in these welfare regimes already had more equal educational opportunities than the cross-national average at the beginning of the observation window. *This confirms my Hypotheses 4, 12, and 20* that women in the oldest cohorts were less disadvantaged in the social-democratic, Eastern

European, and liberal welfare regimes due to policies giving men and women similar opportunities. In the East Asian, conservative and Mediterranean (only significant in the ordered logit model) welfare regimes, the coefficients of the interaction term between the welfare regimes and the female dummy variable are, as expected (*see Hypotheses 8, 16 and 24*), significant and negative. Women in the oldest cohorts in these welfare regimes were especially disadvantaged in cross-national comparison. The conservative and Mediterranean welfare regimes were highly influenced by the Catholic Church and its traditional thinking about gender roles. In the East Asian Confucian religion, the traditional family model was also dominant. Women in these three welfare regimes normally stayed at home in order to care for their children and their elderly. Therefore, women and their families were quite reluctant to invest much in female education.

The gender differences, however, have not remained constant across cohorts in the observation window. Looking at the interaction term between the cohort trend and the female dummy variable, it is clear that women have caught up with and even surpassed men in their educational opportunities and average educational attainment level across all modern societies. Comparing the differences between welfare regimes in the gender catch-up process, woman from the Eastern European and liberal welfare regimes have been less likely to catch up with males in terms of education over time than the cross-national average (*see Hypotheses 4 and 20*). However, one has to take into account that Eastern European and liberal welfare regimes already had a higher gender equality in educational attainment at the beginning of the observation window. In the Eastern European welfare regime, the change in women's educational opportunities is particularly below average since the transition from the socialist to the more unequal capitalist economy.

Women from the Mediterranean and East Asian countries have made remarkable gains in their educational opportunities relative to men in comparison to the other welfare re-

gimes. In these two welfare regimes, the traditional ideas about gender roles in which women should stay at home to care for the family have clearly diminished within the observation window (*see Hypotheses 16 and 24*).

I also estimated a model that included interactions between gender, parental education and welfare regime along with interactions between gender, parental education, cohort trend, and welfare regime. These results are not reported here, because the coefficients were not significant. In other words, I did not find origin-specific associations between gender and educational opportunities in my analysis.

## 4.4 Summary

Over time, modern societies have experienced a massive educational expansion in their upper secondary and tertiary education systems. Using highly equivalent cross-national data from 21 countries from the PIAAC study, I examined how welfare regimes are connected with the cross-national variations of educational expansion and the relationship between social background, gender and educational inequality. I distinguished the three classical liberal, conservative and social-democratic welfare regimes and added the Mediterranean, Eastern European and East Asian welfare clusters.

I demonstrated that these six welfare regimes could explain the variation in educational attainment across the 21 countries just as well as the full fixed-effects country model. My empirical analysis showed that there has been a strong educational expansion in the observation window in all 21 countries. All of these societies possess strong educational origin associations with respondent's educational attainment.

At the beginning of my observation window, welfare regimes differed tremendously in their average educational attainment. The social-democratic, Eastern European and liberal welfare regimes were forerunners in the educational expansion process. The conservative

welfare regime took a position in the middle and the Mediterranean and East Asian welfare regimes lagged behind.

In the six welfare regimes, differences in average educational attainment clearly narrowed and partly reversed within the observation window. In the East Asian welfare regime, the process of rapid economic development was closely connected with a massive educational expansion, so that this welfare regime has even become a forerunner in educational attainment. In contrast, the former socialist Eastern European welfare regime has lost its leading position in educational attainment at the end of the observation window. Today, it ranks only in the middle. Moreover, the liberal welfare regime also lost ground in the observation window compared to other welfare regimes. The social-democratic countries have managed to preserve their forerunner position, and the Mediterranean welfare regime still lags far behind the other welfare regimes.

Welfare regimes are closely connected with different ideas about social inequality and therefore have consequences for the inequality of educational opportunities. At the beginning of the observation window, inequality of educational opportunity was particularly low in the socialist Eastern European and social-democratic welfare regimes due to social policies that increase the equality of living conditions. In the oldest birth cohort, the liberal and conservative welfare regimes take a middle position in terms of educational inequality. Educational inequality was especially high in the East Asian and Mediterranean welfare regimes. These welfare regimes were latecomers in economic development and the inequality of condition was high. In addition, the family is the main provider of welfare in these regimes, and therefore the influence of the family on their children's educational attainment was high.

From a comparative view, the inequality of educational opportunity has risen in the liberal and Eastern European welfare regimes within the observation window. These

changes seem to be closely connected with changes in the inequality of condition. The liberal countries have experienced an increase in the inequality of income and wealth in the process of globalization (Bogliacino & Maestri, 2014). In Eastern Europe, inequality of living conditions has risen strongly since the transformation from a socialist to a competitive capitalist system. The opposite development can be observed in the East Asian welfare regime. The rapid economic advances with rising living standards and more equal income distributions (Peng & Wong, 2010) combined with a massive educational expansion are connected with more equality of educational opportunity in the observation window.

My empirical analysis indicates that in the oldest birth cohorts, women were disadvantaged in their educational opportunities and educational attainment in all welfare regimes. Differences in educational attainment between men and women were especially high in the conservative, Mediterranean and East Asian welfare regimes. These regimes represented particularly traditional ideas about gender roles. Women in the social-democratic, Eastern European and liberal welfare regimes had more equal educational opportunities than the cross-national average at the beginning of the observation window.

Within the observation window, women have impressively caught up with and even surpassed men in their educational opportunities and average educational attainment level across all welfare regimes. However, gender differences have diminished less strongly in Eastern European and liberal welfare regimes. In comparison to the other welfare regimes, the gender differences in the East Asian and Mediterranean countries have declined remarkably. The strong traditional gender roles, in which women should care for the family and stay at home, have obviously diminished in these two welfare regimes.

Table 4-4 provides an overview, which hypotheses could be confirmed in this empirical chapter. Furthermore, the theoretical implications of the results and the limitations of the analysis will be discussed in Chapter 8.

**Table 4-4:** Summary of the confirmed hypotheses

| | **Liberal** | **Conservative** | **Social-democratic** | **Mediterranean** | **Eastern European** | **East Asian** |
|---|---|---|---|---|---|---|
| Educational attainment | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Interaction with cohort | | | | | | ✓ |
| IEO in country comparison | x | ✓ | ✓ | ✓ | ✓ | ✓ |
| Change of IEO | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Gender inequality | x | ✓ | ✓ | ✓ | ✓ | ✓ |
| Interaction with cohort | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

‚+' strong or increasing
‚-' low or declining
‚0' no or very low
Source: Author's portrayal

# 5 Expansion of the transition to upper secondary school and its consequences for inequality of educational opportunities in East and West Germany

In the previous chapter, I described cross-national differences in the emphasis on equality of condition in six welfare regimes and how they have impacted on changes in inequality of educational opportunity during the process of educational expansion. (West) Germany was one of the countries belonging to the conservative welfare regime. Due to its specific vocational educational training system (the dual system), (West) Germany was among the countries that had already a very high educational participation in secondary school in the 1960s (Blossfeld et al., 2016). However, as the previous chapter has shown, in comparative terms the further speed of educational expansion in Germany was moderate during the last decades. In comparative terms, the association between educational attainment and social origin was quite persistent in (West) Germany over time. Finally, as in all other modern societies, women have impressively caught up with men in their educational opportunities. However, because of its traditional family orientation the progress was less strong as in other countries.

In the following three chapters, I present a more detailed longitudinal study of changing educational careers in Germany. I examine step by step how far educational reforms and the expansion of educational transitions have influenced the inequality of educational opportunity in different phases of the educational career. West Germany is a theoretically interesting case because social origin seems to play a particularly important role for children's educational outcomes (Baumert & Schümer, 2001; Jackson & Jonsson, 2013; Jonsson et al., 1996; OECD, 2001, 2004). There are three reasons for this: (1) in West Germany educational tracking to 'Hauptschule', 'Realschule' or 'Gymnasium' generally takes place at the early age of 10 (Trautwein & Neumann, 2008), (2) the West German tracking system is very rigid, making incorrect early placements hard to revise (S. Buchholz & Schier, 2015), and (3) the West German school system is organized in half-

day schools relying heavily on parents actively helping their children with homework and exam preparation (Solga, 2008, p. 3). When it comes to East Germany, less is known about the impact of the school system on educational careers and educational outcomes before and after German unification (Solga & Becker, 2012). After the Second World War, the German Democratic Republic (GDR) established an educational system in which the differentiation between different school types took place at the age of 15 or 16 (Günther & Hammer, 1979). However, from the 1960s onwards, access to the academic track was restricted to about 10 % of students in each cohort. Nevertheless, multiple routes were available for individuals in the vocational track to enter higher education (Günther & Hammer, 1979, p. 82; Helbig, 2012, p. 174; Huinink et al., 1995, pp. 97–98). In other words, the GDR educational system was more open in later phases of the educational career. In addition, the influence of parents was more limited in the GDR educational system, because children already entered in early childhood education and care institutions (‘Kinderkrippen’ and ‘Kindergarten’) and the school system was organized in all-day schools (‘Horts’) (Günther & Hammer, 1979). Finally, little is known about how the transfer of the West German school system to East Germany has affected educational careers of East Germans following German unification.

There are already many national (Blossfeld, 1988; Henz & Maas, 1995; Müller & Haun, 1994; Schimpl-Neimanns, 2000) and cross-national studies (Breen et al., 2010, 2009; Ehmke & Baumert, 2007; Jackson & Jonsson, 2013; Shavit & Blossfeld, 1993) analysing the change in inequality of educational opportunity across cohorts in Germany. However, this work often looked only at West Germany (e.g. Blossfeld, 1988; Henz & Maas, 1995; Müller & Haun, 1994) and broadly neglected the parallel development in socialist East Germany as well as the consequences of German unification in 1990. Moreover, most of this research analysed only the change in the highest educational attainment level across birth cohorts or utilized only the highest educational attainment lev-

el to reconstruct the most important transitions in the educational career of men and women in an ideal typical way (e.g. Breen et al., 2010, 2009; Shavit & Blossfeld, 1993). What is still missing is a longitudinal analysis of the actual educational trajectories of men and women in East and West Germany over a broad range of birth cohorts (Solga & Becker, 2012). It is clear, that families and individuals have to make decisions at successive crucial transition points defined by the institutional structure of the educational system. In the German tracking system, the most important educational transition is that from primary to secondary school (Maaz et al., 2006, p. 300). It is still unclear how far these first educational decisions in the German school system actually do determine the final educational attainment level of men and women from different social origins. In particular, there have been many educational reforms in the last decades that have opened up the rigid German tracking giving families much more choices to intervene and to revise the direction of educational trajectories (Buchholz & Schier, 2015; Ditton, 2013, p. 896; Henz, 1997, p. 58; Schindler, 2015; Schuchart, 2006). However, it is still not known whether this increasing opening up has led to a reinforcement of educational inequalities for men and women from different social origins or whether men and women from more disadvantaged families have indeed profited from these new correction opportunities.

The National Educational Panel Study (NEPS) retrospectively collects the complete educational careers of men and women over a broad range of birth cohorts from East and West Germany. I utilize data from the Adult Cohort (SC6) of the NEPS. My analyses cover the full range of cohorts born between 1944 and 1986. This database is unique because it allows me to follow up the educational careers of men and women from these birth cohorts through the various parts of the educational system and reveals how these trajectories unfold over time with regard to social origin and gender in East and West Germany.

In this chapter, I focus on entry to the 'Gymnasium' or 'Erweiterte Oberschule' as the first important educational transition in individuals' educational careers in (East and West) Germany. Breen and Jonsson (2000) as well as Schimpl-Neimanns (2000) argue that in West Germany the influence of social origin on the different educational tracks of the tri-partite school system differ. Consequently, in this case it would be important to study social origin effects at the first transition to 'Hauptschule', 'Realschule' or 'Gymnasium'. However, in recent decades there have been many educational reforms in the federal states of reunified Germany that have merged the 'Hauptschule' and 'Realschule' tracks into one single track. As a consequence, the 'Gymnasium' is the only separate track that is consistently available in all federal states across all birth cohorts (see also Neugebauer et al., 2013). Furthermore, what makes the 'Gymnasium' unique in comparison to the 'Hauptschule' and 'Realschule' is that it is the only track providing direct access to higher education (the 'Abitur') after completion (S. Hillmert & Jacob, 2010; Lörz & Schindler, 2009).

Thus, my aims in this chapter are fourfold: (1) I want to find out which dimensions of social origin (parental education, parental class and parental status) influence the first transition to the academic versus the non-academic track and whether there are differences between East and West Germany. I am also interested in (2) how these influences change across cohorts particularly before and after German unification, (3) whether there are social origin differences between boys and girls, and (4) whether this gender-origin relationship changes across cohorts in East and West Germany.

## Educational expansion in East and West Germany

Like many modern societies, Germany has experienced a massive educational expansion in the last decades (Blossfeld et al., 2015; 2016; Hadjar & Becker, 2009; Heath & Sullivan, 2011; Mayer et al., 2008). This expansion emerged earlier in the GDR than in

the Federal Republic of Germany (FRG) (Blossfeld et al., 2015, p. 152; Trautwein & Neumann, 2008, p. 472). The GDR initiated an enormous and fast educational expansion immediately after it was founded in 1949. This was the outcome of an explicit goal of the Socialist Unity Party ('Sozialistische Einheitspartei Deutschlands' – SED) to achieve more educational equality in East Germany (Kesler, 2003). In the FRG, the expansion of education gained momentum in the middle of the 1960s as a consequence of increasing worries that without greater educational investments, the West German economic growth rate would decline (e.g. Picht, 1965). In addition, there was also a discussion on equality of educational opportunity as a citizenship right (e.g. Dahrendorf, 1965). Even though the political discussion started in West Germany in the middle of the 1960s, Blossfeld (1993), Müller (1998, p. 91), and Schindler (2014, p. 28) could show empirically that the expansion of education actually took place much earlier in the FRG.

The expansion of the lower and upper secondary level in the GDR was shaped mainly by the introduction of the General Education Secondary School ('Einheitsschule') that was compulsory for all pupils until $10^{th}$ grade (Baumert et al., 2008, p. 62). Access to 'Erweiterte Oberschule' (which was equivalent to the West German 'Gymnasium') was restricted in the GDR, particularly after the mid-1960s (Huinink et al., 1995, p. 100). Less than 10 % of students were allowed to attend this school form after the 9th grade. However, the GDR offered the possibility of obtaining 'Abitur' via a technical trade (Huinink et al., 1995, p. 101; Kesler, 2003, p. 468; Trautwein & Neumann, 2008, p. 472). This option became increasingly popular during the last decades of the GDR (Helbig, 2012, p. 174). The rapid expansion of access to the academic track in East Germany took place only after German unification in the early 1990s, when the basic structure of the West German educational system was transferred to East Germany (Figure 5-1)(Kesler, 2003).

In the FRG, schools are the responsibility of each federal state. As a result, educational regulations vary considerably. In particular, the federal states implemented different reforms at different times in the process of educational expansion (Helbig & Nikolai, 2015, p. 20). Compulsory schooling was extended from 8 to 9 years and in some federal states even to 10 years (Schneider 2008). In addition, the number of middle schools ('Realschulen') and grammar schools ('Gymnasien') increased in the process of educational expansion (Blossfeld, 1985, p. 15). Furthermore, orientation stages in Grades 5 and 6 as well as comprehensive schools ('Gesamtschulen') were introduced in some federal states in the FRG in the 1970s (Schindler, 2014, p. 28). These reforms allowed families and teachers to postpone early school track decisions to the age of 11 or 12, an age when it is easier to make more appropriate evaluations of children's abilities (Leschinsky & Mayer, 1990, p. 17). Some federal states also abolished binding teacher recommendations in primary school, giving parents more room for educational decisions (Schimpl-Neimanns, 2000, p. 641). In addition, measures were taken to simplify and increase upward mobility between the 'Hauptschule', 'Realschule', and 'Gymnasium' tracks and thus to correct earlier school track decisions (Baumert et al., 2008, p. 2008; Schuchart, 2006, p. 404). Moreover, reforms were enacted enabling students to obtain higher formal education certificates outside the 'Gymnasium' (Buchholz & Schier, 2015; Henz, 1997a, 1997b; Schindler, 2015). As a consequence, rigid educational dead end pathways, which have been so characteristic for the German tracking system, were abolished or at least weakened in most federal states in the FRG and in reunified Germany (Blossfeld et al., 2015; Schimpl-Neimanns, 2000, p. 641).

Another more recent development has been the trend from a three-tier to a two-tier school system in both East and West Germany. In this two-tier educational system, the traditional elitist 'Gymnasium' remains as the main school form leading directly to the 'Abitur' and then to higher education. However, the previously separated lower secondary

schools (‘Hauptschulen’) and middle schools (‘Realschulen’) have been merged into one single school track (Helbig & Nikolai, 2015; Schneider & Tieben, 2011). After reunification, this two-tier system was first established in the federal states of East Germany because it strongly resembles the former school system of the GDR (Helbig & Nikolai, 2015, p. 301). But also in West Germany, the separate ‘Hauptschule’ track has been abolished in some federal states because it has become increasingly less popular and therefore developed into a kind of stigmatized ‘Restschule’ (a ‘school for leftovers’) (Schneider 2008). Today, more and more occupations in the German labour market demand higher formal qualifications. As a result, previously typical jobs for ‘Hauptschule’ degree holders nowadays require at least a ‘Realschule’ degree (Müller, 1998, p. 93). In summary, the outcome of this reform of the German educational system is that not only students increasingly obtain higher qualifications than the ‘Hauptschule’ degree, but also that the student composition in the ‘Hauptschule’ has become selective towards disadvantaged groups (children from lower social origin and migrants) (Solga & Wagner, 2001).

## Recent research on educational inequality at the transition to the academic track

Schneider (2008) analysed the impact of social origin on making the transition to ‘Gymnasium’ in East and West Germany between 1984−1985 and 2005−2006, relying on data from the German Socio-Economic Panel Study (GSOEP). His findings show that social origin (measured in terms of parental education, parental class and family income) has a strong impact on access to the academic track and that girls are more likely to enter ‘Gymnasium’. Another study by Relikowski, Schneider and Blossfeld (Relikowski et al., 2009) using longitudinal data from the ‘Educational Processes, Competence Development and Selection Decisions in Preschool and School Age’ (BiKS) project aimed to separate the influence of primary and secondary effects of social origin on making the transition to ‘Gymnasium’ in the federal states of Bavaria and Hesse. Their findings show in more de-

tail that a family's class position generates strong primary and secondary effects, and that parental education particularly contributes to the creation of secondary effects at the transition to 'Gymnasium'. One major drawback of these two studies, however, is that they focus only on one single birth cohort. Hence, they cannot examine changes in social origin effects during the process of educational expansion.

There are only very few studies investigating the long-term impact of educational expansion and its connected reforms on the change in educational inequalities at the first transition to the academic track. One study by Kesler (2003) compares educational inequality more specifically in access to 'Abitur' in East and West Germany using data from the German General Social Survey (ALLBUS). As social origin indicators, she uses parental education and parental class. Her empirical evidence suggests that educational inequality in access to 'Abitur' was similar in the late GDR and FRG. The chances of gaining an 'Abitur' via the 'Erweiterte Oberschule' were therefore, no more equal in the socialist GDR. After German unification, educational inequality persisted in East Germany. Nevertheless, some previously disadvantaged groups were able to improve their access to 'Abitur'. In West Germany, the disadvantage of children from parents with 'Hauptschulabschluss' in comparison to children from parents with 'Mittlere Reife' has declined. However, the differences in 'Abitur' access have increased among children from parents with 'Abitur' and 'Mittlere Reife' degrees. This study analysed only the change in inequality in East and West Germany immediately before and after German unification (birth cohorts from 1965 to 1981). Furthermore, it focused on the completion of 'Abitur' and not on the first transition to the academic track. Meulemann and Relikowski (2016) compared changes in primary and secondary effects at the transition to 'Gymnasium' in Hesse for two samples collected in 1969 and 2007 (the 2007 sample is from the BiKS). As social origin measures they used father's occupational prestige, highest parental education and number of books as a proxy for cultural capital. Their analysis shows

that primary effects have increased and secondary effects have declined across birth cohorts.

Moreover, Hillmert and Jacob (2010) looked at the transition to Gymnasium in West Germany using a small sample of the 1964 cohort from the German Life History Study (GLHS) and register data as well as the Microcensus. They applied a longitudinal approach and used parental education as their social origin measure. Their findings show that there are strong social origin effects at the transition to Gymnasium.

A recent study (Helbig, 2012, 2013) analysed the transition to 'Gymnasium' using data from the NEPS and the 'Working and Learning in a Changing World' (ALWA) study. Helbig was particularly interested in gender-specific differences in access to 'Gymnasium'. He used parental education and parental occupational status as social origin indicators. He found that girls were less likely to make the transition to 'Gymnasium' among the oldest birth cohorts born from 1944 to 1956. However, across birth cohorts, girls catch up with boys and even surpass boys in the likelihood of making the transition to 'Gymnasium'. Furthermore, he could show that educational inequality in access to 'Gymnasium' is persistent for boys and declining for girls. Although Helbig (2013) included information about East Germans for the youngest of his birth cohorts, the analysis of older cohorts is restricted to West Germans alone. In my analysis, I shall include information from the older East German birth cohorts as well.

## 5.1 Theories and hypotheses on the effects of social origin and gender on the first educational transition in East and West Germany before and after unification

In my empirical analysis, I focus on family resources and gender as the most important individual characteristics influencing the first educational transition in Germany. There are different theories on how social origin (such as parental education, parental class and

parental status) and gender affect access to the academic track in East and West Germany before and after unification.

### 5.1.1 The family as the unit of social origin and mother's education

In my analyses on the transition to the academic track, I am interested in how various resources available in families influence children's transition probability to 'Gymnasium' or 'Erweiterte Oberschule'. Erikson (1984, p. 501) states that *'it is the family that typically is the unit of consumption, that shares a dwelling, that brings up children and sends them to schools and universities.'* Therefore, the family[16] and not the individual is the relevant unit of stratification for my research question (Erikson & Goldthorpe, 1992, p. 237; Sorensen, 1994, p. 32).

It was once widely supposed that a family's social origin should be defined by the characteristics of the male breadwinner (Goldthorpe, 1983). Nowadays, this is commonly termed as 'conventional view' (Goldthorpe, 1983). However, with increasing female labour force participation and the dual careers of (married) couples, the attributes of the female partner have also become crucial for a family's position in the stratification system (Sorensen, 1994, p. 31). For example, Beller (2009) could show for the United States that father's occupation is becoming more and more a poor proxy for families' social class position across cohorts. Beller (2009, p. 524) therefore concludes that social origin measures combining information on both parents capture the social inequality positions of family background much better than origin indicators relying only on information about fathers. Moreover, the reliance on only the social background information of fathers might particularly lead to distorted research conclusions when analysing gender differences in access to the academic track.

[16] In my empirical analyses, the term 'family' is not restricted to conjugal couples with at least one child. I also see non-married couples or single parents with at least one child as one family unit.

Therefore, for my empirical analyses, I relax the assumption that only the father determines the position of families in East and West Germany. Applying Erikson's (1984, p. 503) dominance approach, I utilize social origin information of the primary generation (Erikson, 1984, p. 503), namely both mothers and fathers, to construct families' social origin. This means that whenever a mother and a father differ in terms of their education level, class position or status value, the partner with the dominant characteristic of these measures defines the inequality position of the family (Erikson, 1984, p. 503). Originally, the dominance approach applies to parental class. Therefore, the Erikson Goldthorpe and Portocarero (EGP) classes of fathers and mothers are brought into a dominance order constructed on the basis of employment status and level of employment (Erikson & Goldthorpe, 1992, p. 238; Erikson, 1984). I extend the dominance idea to parental education and parental status as well. When fathers and mothers differ in their education or in their status, the highest education or status score of one of the parents is taken to define the position of the family in these stratification dimensions (see for a similar approach, Bukodi et al., 2014). When mothers and fathers have the same education, class or status, the family position is set equal to the common category (Erikson, 1984, p. 504). Furthermore, if information on the father's class or status is missing, because, for example, he is out of work, the mother's attributes count. If the information on mother's class or status position is not available because she was a housewife or, did not take part in the labour market for other reasons, the class or status position of the father defines the family's social origin (Erikson, 1984, p. 504).

In West Germany, where the male breadwinner model has been prevalent for a long time and mothers have not worked or only worked part-time (Blossfeld & Hakim, 1997), the dominance model often reflects only the social position of the father. I therefore additionally include the variable 'mother's education' in the analysis to test whether mother's higher, lower or equal education compared to father's education is associated differently

with the likelihood of making the transition to the academic track. For example, empirical findings by Marks (2007, pp. 298–301) suggest that in Germany, mother's education plays a distinct role for her offspring's reading and math performance apart from father's education. Moreover, Minello and Blossfeld (2014, p. 75) could show that mothers' education is important for daughters' educational attainment. Mothers are normally the ones who read books to their children and provide them with other cognitive stimulations (Lareau, 1989, p. 84). Moreover, it is mostly mothers who do the lion's share of meeting teachers to discuss the progress of their children (Lareau, 1989, p. 84). *Therefore, mothers' education should exert a major influence on their children's school performance and as a consequence on their likelihood to make the transition to the academic track* (Buis, 2013a, p. 596) (*Hypothesis 1*). I do not include additional information on mother's class and status because these variables contain a high proportion of missing values.

### 5.1.2 Conceptualizing and measuring social origin

Regarding *social origin*, my aim is to study whether the structuring forces of family inequality are one-dimensional or multi-dimensional. Inequality is often considered only as a single hierarchical dimension. However, following Jaeger (Jæger, 2007) as well as Goldthorpe and Bukodi (2013), I argue that families actually have multiple resources available to influence the educational careers of their children in different ways. In my empirical analyses of children's opportunities to make the first transition from primary school to the academic track, I therefore apply a multi-dimensional concept of social origin (Marks, 2011, p. 226). I ask whether these multiple influences of social origin differ in East compared to West Germany and how far they change across cohorts.

In his analysis on educational inequality in Denmark, Jæger (2007) states that class is often used as a one and only measure to capture all kinds of social origin effects. However, to gain a better understanding of how different kinds of family capital influence the

opportunities of children, he suggests including separate indicators for families' economic, cultural and social capital in empirical estimations. In his study, Jaeger uses income and the EGP class scheme as indicators for family's economic capital. Moreover, he includes parental education and the subscription to newspapers as indicators for family's cultural capital. Finally, social networks are used as a measure for social capital of families.

Goldthorpe (2008) as well as Bukodi and Goldthorpe (2013) agree with Jaeger that various social origin resources should be included in analyses to measure social background. Goldthorpe (2000) sees class as a concept that is defined and constructed explicitly to capture social relations in (labour) markets and production units. Chan and Goldthorpe (2007, p. 529) have shown that the terms 'class' and 'status', in a Weberian sense, cannot be used interchangeably as assumed by, for example, Lazarsfeld (1939). They empirically demonstrated for Britain that status, measured by their newly constructed status scale, which is similar to the Cambridge Social Stratification Scale (CAMSIS), captures another dimension of social origin than class (measured by EGP) (Chan & Goldthorpe, 2007; 2005). Therefore, empirical analyses must include both status and class as separate concepts (Chan & Goldthorpe, 2007, p. 529; Mayer, 1977, p. 156). Relying on this previous research, my empirical analyses study 'parental education', 'parental class' and 'parental status' as three distinct forms of social origin resources each reflecting different mechanisms influencing children's transition to the academic track. I start by studying each of these three measures of social origin in separate estimations, before including all three measures simultaneously. I test whether each of these three different family resources impacts on the likelihood to make the transition to the academic track and whether these effects change independently over time (Buis, 2013; Bukodi & Goldthorpe, 2013, p. 1025). For example, Schimpl-Neimanns (2000, p. 664) showed that the influence of family's occupational position on educational inequality decreases over

time in Germany, whereas the influence of family's parental education, is constant over time. Of course, parental education normally comes before parents acquire their class and status positions in the life course. Thus, the effect of parental education on children's transition probability will be expressed partially via parental class and parental status.

### 5.1.3 Hypotheses on the effects of parental education

The first social origin indicator included in my analyses is *parental education*. Bukodi and Goldthorpe (2013, p. 3) argue that parental education can be interpreted as the *capability of parents to help their children with school matters* and to *navigate their children through the educational system* (see also Erikson & Jonsson, 1996, p. 26). Higher educated parents are more likely to send their children to the academic track (Lareau, 2015, p. 2). They motivate their children in school, and they influence their children's goals and aspirations towards making the transition to the academic track (Lareau, 1989, p. 7). Moreover, highly educated parents know from their own experience that success in the academic track does not require a stellar school performance and that knowledge of how the school system works and parents' targeted intervening can act as compensating factors leading to a successful completion of 'Gymnasium' or 'Erweiterte Oberschule' (Lareau, 2015, p. 20). Therefore, higher educated parents tend to send their children to the 'Gymnasium' or 'Erweiterte Oberschule', even if their children show poor school performance (Ditton et al., 2005, p. 296; Schimpl-Neimanns, 2000, p. 639). In addition, highly educated parents are also more likely to be actively involved in school events and they attend parent teacher conferences more often because they see education as a responsibility shared between parents and teachers. Furthermore, they are more likely to ensure that their children will do their homework and do well in school (Lareau, 1989, pp. 2–3). Lower educated parents normally interact less often with their children's teachers. They generally consider education as the responsibility of the school. In addition, they often

show a lower willingness to check their children's homework and pay less attention to how their children actually perform in school (Lareau, 1989, p. 8). Moreover, they lack the educational experience necessary to help their children. Thus, *for my empirical analyses, I expect that children from highly educated parents are more likely to make the transition to the academic track in both East and West Germany (Hypothesis 2). Furthermore, I expect that the influence of parental education on making the transition to the academic track increases across birth cohorts because there seems to be a general trend across birth cohorts for higher educated parents to spend increasingly more time on their children's cognitive development* (see Schaub, 2010) *(Hypothesis 3).*

In the GDR, early childhood education was much further developed than in the former FRG (Falk, 2000, p. 278; Sorensen & Trappe, 1995). Preschool institutions in East Germany did not just allow women to participate full-time in the labour market; they were also intended to reduce the influence of parents on their children's cognitive and non-cognitive development by ensuring their socialization in socialist educational institutions in which all children, independent of social origin, received similar attention (Launer, 1979). *Therefore, I expect that parental education has a smaller impact on the transition to the academic track in the GDR compared to the FRG (Hypothesis 4). Moreover, I expect that parental education effects are persistent in the GDR and West Germany.* Furthermore, because preschool institutions continued to be more common in East Germany after unification (Falk, 2000, p. 278), *I expect a lower effect of parental education in comparison to West Germany also after German unification (Hypothesis 5).*

### 5.1.4 Hypotheses on the effects of parental class

The second social origin measure to be examined in my empirical analysis of the first transition to the academic track is parental class. Chan and Goldthorpe (2007) claim that *class* represents the *life chances of families*. In other words, class is not just restricted to

income inequalities (Erikson & Goldthorpe, 1992, p. 236). It reflects a much more comprehensive view of economic inequality, such as income security, short-term income stability and long-term income prospects (Goldthorpe, 2012, p. 204). For example, members of the 'higher service class', the so-called 'salariat', have not only higher incomes than 'unskilled workers' but also lower risks of loss of income through unemployment. They enjoy a greater stability of pay streams over time and can expect continuously increasing incomes over their careers (Goldthorpe, 2012). Bukodi and Goldthorpe (2013, p. 2) use *class* as a comprehensive measure for families' *economic supply* for their children's educational advancement. This means that families with higher income, with more stable income prospects and better career opportunities will raise their children differently and make different educational decisions for their children than families that are in a more precarious economic position (Erikson & Jonsson, 1996, p. 32). For example, financial resources can be beneficial for access to learning opportunities before school entry and during the school career. If families can afford costly high-quality early childhood education and support tutoring in primary school (Erikson & Jonsson, 1996; Lareau, 2015, p. 21; Luplow & Schneider, 2014), children's cognitive and non-cognitive development will be promoted. Furthermore, children who live in economically more secure families are better able to concentrate on learning than children who have to worry about their family's financial situation. Moreover, parents with class positions characterized by a service relationship offering more job autonomy and demanding more responsibility may intentionally raise their children differently compared to parents who have labour contracts that expose them to the close supervision and command of others. Children from the 'salariat' therefore acquire cognitive and social savvy that makes them comfortable with authority figures in school. Thus, being a child of a salaried employee should be associated positively with children's school performance in primary school (Buis, 2013; Shavit et al., 2007, p. 37); and being a child of a wage worker should be associated negatively with

school performance. School achievement in primary school is indeed one of the most important conditions for teachers' school recommendations for 'Gymnasium' in the German educational system and for parents' decision making regarding the transition to the demanding academic track. Finally, future opportunity costs emerging through longer schooling in the academic track should be much lower for affluent classes. In particular, the *class maintenance mechanism*, as described by Breen and Goldthorpe (1997, p. 283), is important in this respect for the intergenerational transmission of education and class position. Parents make a great effort to ensure that their children attain at least the same education and economic class position that they have achieved themselves. If service class children move down relative to their parents in terms of education and class position, these losses are much more painful for these service class families than the pleasure similar gains in class position give to less educated working class families (Tversky & Kahneman, 1992). Thus, parents have varying aspiration levels right from the beginning. Hence, families do not consider children's absolute future education and class outcomes, but focus on these outcomes relative to their own class position. In summary, *I expect that children from the advantaged service classes should be more likely to opt for 'Gymnasium' or 'Erweiterte Oberschule' (Hypothesis 6).*

For the oldest birth cohorts in West Germany, standards of living were low and relative economic costs of education were high (see e.g. R. Breen et al., 2009, p. 1479). *Therefore, for the oldest birth cohorts in West Germany, I expect a strong parental class effect at the transition to 'Gymnasium' (Hypothesis 7).* However, because relative education costs have declined with higher standards of living in West Germany, the abolishment of education fees, and the extension of compulsory schooling from 8 to 9 or even 10 years (Breen et al., 2009, p. 1479; Müller & Haun, 1994, pp. 6–7; Schimpl-Neimanns, 2000, p. 641), *I expect that the effect of parental class on the transition to the academic track should have declined across birth cohorts in West Germany (Hypothesis 8*).

Although income inequality was lower in the former socialist GDR compared to the capitalist FRG, class structures in the GDR and the FRG were surprisingly similar (see Mayer & Solga, 1994). From a historical point of view, it is, however, important to note that members of the middle and upper class left the socialist regime in great numbers and moved to the capitalist West in the 1950s. This East West migration created lots of skilled job vacancies in the GDR until it was stopped by the construction of the Berlin Wall in August 1961. Thus, I expect that this higher degree of class openness in the GDR in the 1950s *was connected to a small effect of class inequality in access to 'Erweiterte Oberschule' among the older birth cohorts (Hypothesis 9).* However, after the establishment of the new socialist cadres during the course of the development of the GDR, a new class structure was established and the degree of openness was reduced again. In the literature, the decline in class inequality immediately after the socialist takeover and the gradual establishment of a new socialist elite with rising social inequalities is often referred to as the so-called *socialist transformation hypothesis* (see Mateju, 1993; Shavit & Blossfeld, 1993). *Thus, I expect that the effect of parental class on the transition probability to the academic track, which was small among the older birth cohorts (compared to the FRG), should have increased across the later birth cohorts in the GDR and particularly after German unification and the strongly increasing economic competition within the new capitalist system (Hypothesis 10).*

### 5.1.5 Hypotheses on the effects of parental status

The third social origin indicator in my transition analysis to the academic track is social status. Chan and Goldthorpe (2005, 2007) demonstrated empirically that status similarity of close friends represents an excellent indicator for their *cultural consumption, lifestyle and group membership* (Chan & Goldthorpe, 2005; 2007, pp. 522–524). Bukodi and Goldthorpe (2013, p. 3) use *parental status* as a measure of families' *social networks* and

shared *cultural tastes* influencing the educational inequality of children. For example, Lareau (1989, p. 9) claims that higher status parents have more friends, neighbours and relatives who are part of the educational system such as teachers. Higher status parents also obtain more effective advice about schools and better help for their children from their social networks (Erikson & Jonsson, 1996, p. 30). These parents are also influenced by their friends and acquaintances in terms of educational aspirations towards the academic track (Erikson & Jonsson, 1996, p. 30). Moreover, high-status mothers often maintain close contacts to other high-status mothers from their children's school classes. This helps them to monitor their children's school performance more effectively (Coleman, 1988; Lareau, 1989, p. 9; 2015, p. 14; Roth et al., 2010, p. 183). Furthermore, teachers and children from higher social status families share the same middle-class values and norms (Boudon, 1974; Bourdieu, 1984; Erikson & Jonsson, 1996, p. 22; Lareau, 2015; Schimpl-Neimanns, 2000). As a consequence, the cognitive standards and social behaviour of higher status children conform better with the expectations and regulations of schools, so that these children have a better chance of receiving teacher recommendations for the academic track. Taken together, *I expect that children from higher status parents are more likely to make the transition to the academic track (Hypothesis 11).*

There are competing theories on whether the effect of status was higher, equal or lower in the socialist GDR compared to the capitalist FRG. Some scientists expect that status had a greater importance for educational success in socialist societies because economic inequalities were levelled out there (Bukodi, 2010; Solga, 1995, p. 37; Wesolowski, 1976). Others believe that not only class but also status inequalities were effectively reduced in the GDR (Engler, 1991). *I tend to follow Engler's expectation that parental status played a less important role for access to the academic track in the GDR than in the FRG (Hypothesis 12). In addition, I do not expect any changes over time in the parental status effect in the FRG and in the GDR, because the higher status families always dis-*

*tance themselves from lower status families* (see Erikson & Jonsson, 1996, p. 25) *(Hypothesis 13). However, after German unification, I anticipate that the effect of parental status will have increased in the transition from the socialist to the capitalist society in East Germany because it is adjusting to the West German level (Hypothesis 14).*

### 5.1.6 Hypotheses on the effects of gender in the FRG and GDR

Immediately after the Second World War, both West and East Germany were still quite patriarchal societies despite the GDR state socialism's promotion of female employment (see Sorensen & Trappe, 1995, p. 197). Based on gender-specific norms in East and West Germany in the 1950s and 1960s (Blossfeld & Drobnič, 2001), *I expect that families considered educational investments in boys to be more important than in girls, so that among the older birth cohorts girls compared to boys should have had a lower transition probability to the academic track in both the FRG and the GDR (Hypothesis 15)*. However, because traditional gender roles were more dominant in West than in East Germany where women were already working full-time in the socialist economy in the 1950s and 1960s (Helbig, 2013, p. 144; Minello & Blossfeld, 2014, p. 67; Sorensen & Trappe, 1995, pp. 196–199), *I expect that the girls' disadvantage compared to boys in the transition to the academic track was smaller in East than in West Germany among the older cohorts (Hypothesis 16).*

Subsequently, gender perceptions have changed strongly towards more gender-egalitarian norms in all modern societies (DiPrete & Buchmann, 2013; Pampel, 2011). Based on the increasing female labour force participation in West Germany since the 1960s (Blossfeld & Hakim, 1997), *I expect that families in West Germany are also increasingly supporting girls in their educational careers, so that the girls' disadvantage at the transition to the academic track should be declining across birth cohorts in both parts of Germany (Hypothesis 17).* Indeed, it is also likely that the gender disadvantage reverses

and that girls are even surpassing boys in the transition to the academic track among younger birth cohorts in Germany (as is the case in most other modern societies). For example, DiPrete and Buchmann (2013) report for the United States that: (1) girls on average have an advantage relative to boys in terms of attitudes and traits that match the demand of the school-type learning environment. They show higher rates of conformity to the school culture and they have lower rates of disruptiveness, aggression, antisocial behaviour or attention disorders. Moreover, girls seem to be generally more interested in school and often express a stronger enjoyment of school. (2) Girls usually also work harder in school and invest greater efforts in doing their homework. *Given these average gender differences in non-cognitive skills in most modern societies, I expect that also in Germany, girls in primary school have an advantage in terms of school marks and teacher's recommendations for 'Gymnasium' in recent times, so that girls' transition probability to the academic track might be even higher among the younger birth cohorts in Germany (Hypothesis 18).*

### Interaction of parental education and gender

It is well known that lower educated parents have more traditional attitudes towards women's higher education and higher educated parents are more supportive of girls' academic educational careers (Helbig, 2012). *Thus, I expect that girls from lower educated families are more disadvantaged at the transition to the academic track than boys in West Germany, East Germany before unification and East Germany after unification (Hypothesis 19).*

### Interaction of parental class and gender

Parents from less advantaged classes should have more traditional gender norms on girls' educational attainment. In turn, parents from more advantaged classes should have more gender-neutral attitudes. Therefore, *I expect that girls from disadvantageous classes are*

*less likely than their male counterparts to make the transition to the academic track in West Germany, East Germany before unification and East Germany after unification (Hypothesis 20).*

### Interaction of parental status and gender

A study by Christin (2012) in the United States shows that girls participate more often in highbrow cultural activities than boys during their childhood. Because high-status parents put more emphasis on their daughters' cultural socialization, *I expect that girls should profit more from parental status than boys concerning the transition to the academic track in East and West Germany and I expect that girls from higher status parents are more likely to make the transition to the academic track (Hypothesis 21)* (see also van Hek et al., 2015).

Table 5-1 presents an overview of the expected effects on the transition probability to the academic track for East and West Germany.

**Table 5-1:** Summary of expected effects on the transition probability to academic track in East and West Germany

| No. of Hypothesis | | West Germany | East Germany |
|---|---|---|---|
| 1 | Mother's level of education | ++ | ++ |
| 2+4 | Higher educated parents | ++ | + |
| 6+7+9 | Parents belong to the service class | ++ | + |
| 11+12 | Higher status parents | ++ | + |
| 19 | Disadvantage of girls from lower educated parents in comparison to boys | -- | -- |
| 20 | Disadvantage of working class girls compared to boys | -- | -- |
| 21 | Disadvantage of girls compared to boys in parental status effects | ++ | ++ |
| 3+5 | Change of the effect of highly educated parents across cohorts | ++ | + |
| 8+10 | Change of the service class effect across cohorts | -- | ++ |
| 13+14 | Change of parental status across cohorts | 0 | ++ |
| 17+18 | Disadvantage of girls declines across cohorts | + | + |
| 15+16 | Disadvantage of girls in the FRG and GDR among the oldest cohorts | -- | - |

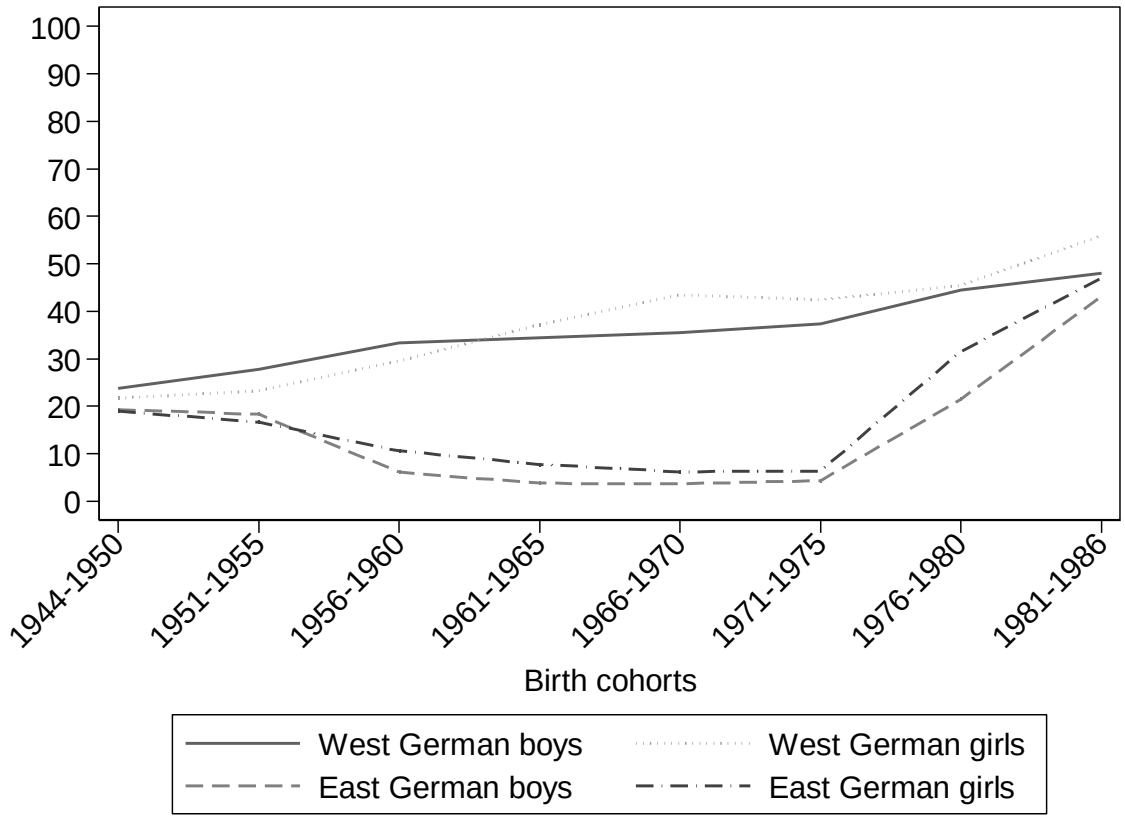
‚++': Effect on the transition probability is positive and strong.
‚+': Effect on the transition probability is positive but weak.
'0': No effect on the transition probability expected.
‚-': Effect on the transition probability is negative but weak.
‚--' Effect on the transition probability is negative and strong.
Source: Author's portrayal

## 5.2 Results

### 5.2.1 Description of changes in the transition probabilities to the academic track

I first describe how transition probabilities to the academic track for girls and boys in East and West Germany have changed across birth cohorts. Figure 5-1 shows that in West Germany the transition rates to 'Gymnasium' have increased steadily for girls and boys in the process of educational expansion. Beginning with the 1961−1965 birth cohort, West German girls started to slightly overtake their male counterparts in making the transition to the academic track. However, even for the older birth cohorts one cannot say that there was a great disadvantage for girls in West Germany, because transition rates for boys and girls were quite similar.

**Figure 5-1:** Change across birth cohorts in the transition probabilities to the academic track for girls and boys in East and West Germany




Source: Author's portrayal using NEPS data

In contrast to West Germany, I observe a non-monotonic trend in the transition probabilities to the academic track in East Germany. Figure 5-1 shows a steady decline of the transition probabilities to 'Erweiterte Oberschule' during the period of the GDR from about 19 % (1944–1950 cohort) to 8–10 % (1961–1965 cohort). This contraction in the transition to the academic track reflects the well-known GDR educational policy of restricting access to 'Erweiterte Oberschule' from the mid-1960s onwards. The GDR is therefore an interesting case for my study of changes in educational inequality because it contrasts sharply with the monotonic expansion of the transition to the academic track in West Germany. It is worth noting that in the GDR, girls and boys did not differ much in their transition probabilities to the academic track (see Figure 5-1). This high level of gender equality at the transition to the academic track seems to be the result of explicit policies to reduce the differences between men and women in the socialist society of the GDR.

After German unification in 1990, the transition probabilities to 'Gymnasium' expanded suddenly in East Germany as well, so that the transition probabilities in East and West Germany converged for the youngest birth cohort in my study, children born 1981–1986 (see Figure 5-1). After German unification, East German boys were slightly less likely than girls to make the transition to 'Gymnasium'. Thus, the trend for girls to surpass boys at the transition to the academic track is similar in both East and West Germany. Because the transition probabilities to the academic track declined monotonically in East Germany before unification and then increased monotonically after German unification, I estimate separate logistic regression models for East Germany before and after German unification.

### 5.2.2 The impact of different dimensions of social origin on the transition rate to the academic track in West and East Germany

In the following, I use logistic regression models to describe the influence of various social origin indicators on the transition probability to the academic track. In particular, I

also investigate whether these social origin effects change across birth cohorts. In each of the tables (Table 5-2, Table 5-3 and Table 5-4), I estimate separate models (1) for West Germany, (2) for East Germany before unification, and (3) for East Germany after unification. In a first step, I include one of the three social origin dimensions (parental education, parental class, or parental status) separately in Table 5-2, Table 5-3 and Table 5-4. The coefficients in the tables are reported as logits. In a second step, I estimate models with all three social origin components simultaneously (Table 5-5). In addition, I plot the transition probabilities across cohorts for specific origin groups in order to analyse changing inequalities in educational opportunity in East and West Germany (see Figure 5-2, Figure 5-3, and Figure 5-4). Finally, I estimate logit models for boys and girls in order to explore the role of gender in the transition to the academic track (see Table 5-6).

#### 5.2.2.1 Parental education

In Table 5-2, I first examine the association between parental education and children's transition probability to the academic track. The coefficient of the cohort trend variable in Model 1 is positive and statistically significant[17]. Thus, the transition probabilities to 'Gymnasium' are increasing across birth cohorts in West Germany (see Figure 5-1). Actually, there has been a massive expansion of the transition to 'Gymnasium' in West Germany. Furthermore, Model 1 demonstrates that the higher the educational level of the parents the more likely is the transition to 'Gymnasium'. *My empirical findings therefore confirm Hypothesis 2* that parental education is an important origin resource that increases the likelihood of making the transition to the academic track in West Germany. Furthermore, Model 1 in Table 5-2 shows that if mother's education is higher than father's education, West German children are even more likely to make the transition to 'Gymnasium'. *This is in line with Hypothesis 1* that mothers are more important than fathers for

[17] In the linear probability model, this coefficient is not statistically significant.

**Table 5-2:** Influence of parental education on transition to the academic track

| Variables | West (1) | West (2) | East before (3) | East before (4) | East after (5) | East after (6) | East after (7) |
|---|---|---|---|---|---|---|---|
| Cohort trend | 0.02** | | -0.03 | | | 0.05 | |
| | (0.01) | | (0.08) | | | (0.38) | |
| *Parental education (Ref.: Low educational level)* | | | | | | | |
| Intermediate educational level | 0.93*** | 1.01*** | 1.56 | 0.88 | 0.41 | 0.08 | 0.54 |
| | (0.22) | (0.11) | (0.93) | (0.53) | (1.13) | (2.53) | (1.15) |
| High educational level | 3.23*** | 3.15*** | 2.98*** | 2.25*** | 1.41 | 0.24 | 1.64 |
| | (0.26) | (0.13) | (0.97) | (0.55) | (1.13) | (2.55) | (1.15) |
| *Mother's education (Ref.: same education as father)* | | | | | | | |
| Mother's education higher than father's | 0.43** | 0.33*** | 0.90 | -0.04 | -0.37 | -0.21 | -0.44 |
| | (0.17) | (0.08) | (0.50) | (0.27) | (0.25) | (0.57) | (0.26) |
| Mother's education lower than father's | -0.19 | -0.25*** | -0.29 | -0.01 | -0.23 | -0.08 | -0.18 |
| | (0.12) | (0.06) | (0.30) | (0.17) | (0.25) | (0.54) | (0.26) |
| Proportion of parents with tertiary education across cohorts | | 0.03*** | | -0.10*** | | | 0.18*** |
| | | (0.004) | | (0.01) | | | (0.04) |
| *Interaction effects* | | | | | | | |
| Intermediate educational level×cohort trend | 0.001 | | -0.07 | | | 0.05 | |
| | (0.01) | | (0.08) | | | (0.39) | |
| High educational level×cohort trend | -0.006 | | -0.08 | | | 0.23 | |
| | (0.01) | | (0.08) | | | (0.39) | |
| Mother's education higher than father's×cohort trend | -0.004 | | -0.08** | | | -0.05 | |
| | (0.007) | | (0.04) | | | (0.09) | |
| Mother's education lower than father's×cohort trend | -0.002 | | 0.02 | | | -0.01 | |
| | (0.005) | | (0.02) | | | (0.08) | |
| Constant | -2.28*** | -2.32*** | -2.76*** | -1.36 | -1.27 | -1.58 | -6.48*** |
| | (0.21) | (0.12) | (0.91) | (0.63) | (1.12) | (2.52) | (1.55) |
| Pseudo-$R^2$ | 0.13 | 0.13 | 0.11 | 0.10 | 0.04 | 0.09 | 0.08 |
| N of observations | 9,097 | 9,097 | 2,080 | 2,080 | 502 | 502 | 502 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

children's cognitive and non-cognitive development, school achievement and school success − the fathers often being absent from home because of full-time employment. Across birth cohorts this association of mother's relative education does not change. Furthermore, the coefficients of the interaction term between the dummy variables for parental education and the cohort trend variable are not significant. This *contradicts my Hypothesis 3*, positing that the association between parental education and the probability to make the transition to the academic track should be rising across birth cohorts because higher educated parents seem to increasingly foster their children's cognitive development (see the work by Schaub, 2010). Thus, children from lower educated parents neither worsened nor improved their (lower) relative opportunities of academic track attendance across cohorts. The educational origin association simply persisted.

Because the origin-specific transition probabilities are basically constant across cohorts, two scenarios might explain the overall increasing participation trend towards the 'Gymnasium' in West Germany (see Figure 5-1): (1) children from all three educational origin groups have gained in their transition probabilities to a similar extent; and (2) the overall increase in the transition probability to 'Gymnasium' is the result of a change in the composition of parents with different education across birth cohorts. Because the group of highly educated parents is increasing across birth cohorts (see Table 3-2), the proportion of families with higher educational demands for the 'Gymnasium' is also rising, leading to an increasing overall transition probability of children across cohorts.

To study the changing parental composition hypothesis, I replaced the birth cohort variable in Model 2[18] in Table 5-2 by a variable that captures the changing proportion across cohorts of parents with tertiary education (see Table 3-2). The coefficient for the proportion of parents with tertiary education is positive and significant (see Model 2 in Table

[18] A main effects model without a cohort trend interaction term is estimated in Model 1 of Table 8-12 in the appendix.

5-2). This finding suggests indeed that the second postulated scenario is quite likely: participation in 'Gymnasium' increases across cohorts because the general demand for higher education increases over time with the proportion of better educated parents. Model 2 again reveals a clear effect of parental education on the transition rate to the academic track. However, there is an important difference with regard to mother's education in Model 1: children are less likely to make the transition to 'Gymnasium' if the mother has a lower education than the father. *This again confirms my Hypothesis 1* that mother's education has an additional association with the transition probabilities of their children in West Germany. Children from families in which the mother is lower educated than the father are disadvantaged in the transition to 'Gymnasium'.

In Models 3 and 4 of Table 5-2, I examine the effect of parental education on making the transition to 'Erweiterte Oberschule' in East Germany before German unification. Model 3 shows that the transition probability to 'Erweiterte Oberschule' declines across cohorts in East Germany (see also Figure 5-1) − but this decline is only small and not statistically significant[19]. In contrast to West Germany, where the transition to Gymnasium expanded, there was a small contraction of access to the academic track in the GDR (see Figure 5-1). Since the 1970s, access to 'Erweiterte Oberschule' was restricted systematically in the GDR in order to prevent an over-qualification of the East German work force. Model 3 in Table 5-2 clearly reveals that children from highest educated parents were much more likely to make the transition to 'Erweiterte Oberschule' in the GDR system. Thus, the members of the educated socialist elite also managed a successful transition to the academic track even under the restrictive transition conditions in the GDR − which *confirms Hypothesis 2*. Because the coefficients of the interaction term between parental

[19] In a model including a relative measure of parental education (see Bukodi & Goldthorpe, 2016), empirical findings indicate that the transition rate to 'Erweiterte Oberschule' declined across birth cohorts. This is because the transition probability was restricted deliberately in the GDR and the proportion of parents with high educational attainment increased the demand for the academic track (see Model 4 in Table 5-2).

education and cohort trend are not significant[20], there was a quite persistent advantage of the educated elite in the GDR – *which is not in agreement with Hypotheses 3 and 5*. The so-called *socialist transformation hypothesis* (see also Shavit & Blossfeld, 1993) predicted a rising monopolization of access to the academic track by the educated elite. However, this obviously was not the case in the GDR.

It is interesting that mother's education compared to father's education has no additional effect on children's transition probability to 'Erweiterte Oberschule' in the GDR. The respective coefficients for the dummy variables of mother's relative education are not statistically significant and suggest that mother's education has no additional effect for full-time working mothers. In addition, there is even a negative interaction effect of having a mother who is higher educated than the father across cohorts on children's transition to the academic track. Thus, the influence of mother's relative education even declined across cohorts. An explanation of this trend might be that in the GDR, childcare facilities were expanded massively and the state gained wide-ranging control over the socialization of children through early childhood education institutions (crèche facilities and kindergartens) and all-day schools. Therefore, it is plausible that full-time employed mothers' influence on the cognitive and non-cognitive development of their children was declining in the GDR across birth cohorts, and that this led to a decline of their children's transition probability to the academic track.

In Model 4 of Table 5-2, I replace the cohort trend variable by the changing proportion of highly educated parents across birth cohorts in East Germany before unification[21]. This proportion is also increasing across cohorts in East Germany (see Table 3-2). Model 4 shows again that only children from the highest educated parents are significantly more likely to make the transition to 'Erweiterte Oberschule'. However, the macro variable

[20] In the linear probability model, children from highest educated parent are less likely to make the transition to 'Erweiterte Oberschule' across birth cohorts.
[21] A main effects model of the cohort trend can be found in Table 8-12 (see Model 2) of the appendix.

'proportion of highly educated parents' has a statistically significant negative effect. This means that, based on the restricted access to 'Erweiterte Oberschule' in the GDR since the 1970s, it was increasingly difficult for the growing proportion of highest educated parents in the GDR to place their own children in the academic track.

In Models 5, 6, and 7 of Table 5-2, I analyse educational inequality in East Germany after German unification. In Model 5, the two parental education dummy variables (reference category are children from low educated parents) are positive but not significant. Thus, there are the expected positive coefficient signs of parental education but the coefficients are not statistically significant, probably due to low sample size.

In order to analyse possible changes over time, I have introduced cohort interaction terms in Model 6 of Table 5-2. The main coefficient of cohort in years is positive but not statistically significant. Also the coefficients of the interaction term between the cohort trend and parental education are not significant. Again, this finding has to be treated with caution because the sample size for this estimation is comparatively small and significance tests depend on sample size.

In Model 7, I once more replaced the cohort trend variable by a variable indicating the changing proportion of highest educated parents across birth cohorts[22]. This proportion is again slightly increasing across birth cohorts (see Table 3-2). These results demonstrate that after German unification, the transition probabilities to 'Gymnasium' for East Germans did indeed increase significantly with the rising proportion of parents who have the highest educational attainment. Thus, I conclude that, in contrast to the historical period in the GDR before unification, the rising proportion of parents with higher education could realize their higher educational demands in school and achieve higher transition rates to the 'Gymnasium' for their children. In addition, Model 7 in Table 5-2 reports that

[22] A main effects model of the cohort trend can be found in Table 8-12 (see Model 3) of the appendix.

the coefficient for the variable indicating whether the mother has a higher education than the father is negative for making the transition to 'Gymnasium' – but statistically not significant (however the sample size is relatively small).

#### 5.2.2.2 Parental class

Table 5-3 reports how parental class is associated with the transition probability to the academic track in East and West Germany. Models 1 and 2 present the relationship between parental class and the transition probability to the academic track and its change over time in West Germany. The coefficient for the cohort trend in Model 1 demonstrates once more that there has been an expansion across birth cohorts in the transition to the academic track in West Germany (see Figure 5-1). Most importantly, the empirical results of Model 1 reveal pronounced class differences in the transition probability to 'Gymnasium' in West Germany. Unskilled workers and skilled manual workers have the lowest opportunities to enter the academic track.[23] Lower and higher grade routine non-manual workers, lower trade technicians, as well as small proprietors with and without employees have intermediate transition rates to the academic track. And the lower and higher service classes have the highest transition rates to the academic track. *This effect pattern of class supports my Hypotheses 6, 7 and 9 that parents and children from the service classes have not only lower relative costs but also higher gains from long-term schooling.* These privileged families have not only higher incomes but also more stable income prospects and better career opportunities that make the decision to send their children to the long-lasting academic track less risky.

[23] Furthermore, in the linear probability model, this was also the case for lower grade technicians.

**Table 5-3:** Influence of parental class on transition to the academic track

| Variables | West (1) | West (2) | East before (3) | East before (4) | East after (5) | East after (6) | East after (7) |
|---|---|---|---|---|---|---|---|
| Cohort trend | 0.03*** | | -0.04 | | | -0.09 | |
| | (0.008) | | (0.05) | | | (0.15) | |
| *Parental class (Ref.:Unskilled worker)* | | | | | | | |
| Lower grade routine non-manual workers | 1.06** | 0.69*** | -.35 | -0.26 | 0.89 | 1.01 | 0.88 |
| | (0.31) | (0.14) | (1.80) | (0.80) | (0.68) | (1.39) | (0.69) |
| Skilled manual workers | -0.18 | 0.12 | 1.36 | 0.87*** | -0.01 | -0.69 | -0.11 |
| | (0.23) | (0.11) | (0.71) | (0.40) | (0.49) | (1.03) | (0.49) |
| Higher grade routine non-manual workers | 1.36*** | 1.21*** | 2.82** | 1.64*** | 0.50 | -0.74 | 0.46 |
| | (0.25) | (0.11) | (0.75) | (0.40) | (0.47) | (1.01) | (0.48) |
| Lower grade technicians | 0.68** | 0.16 | 1.14 | 0.21 | -1.30 | -8.20 | -1.28 |
| | (0.35) | (0.16) | (1.32) | (0.80) | (1.10) | (6.85) | (1.11) |
| Small proprietors without employees | 1.07** | 1.11*** | 3.35*** | 2.09*** | 0.97 | -1.72 | 0.80 |
| | (0.38) | (0.19) | (1.31) | (0.66) | (0.83) | (2.55) | (0.84) |
| Small proprietors with employees | 0.64*** | 0.62*** | 2.30** | 1.84*** | 0.22 | -1.72 | -0.10 |
| | (0.22) | (0.11) | (0.80) | (0.47) | (0.89) | (3.40) | (0.90) |
| Lower service class | 1.91*** | 1.82*** | 2.10** | 1.79*** | 1.07*** | -0.76 | 1.04** |
| | (0.19) | (0.09) | (0.68) | (0.37) | (0.44) | (0.96) | (0.44) |
| Higher service class | 2.05*** | 2.10*** | 2.90** | 2.29*** | 1.60*** | 0.11 | 1.60*** |
| | (0.19) | (0.09) | (0.67) | (0.36) | (0.43) | (0.90) | (0.43) |
| *Interaction effects* | | | | | | | |
| Lower grade routine non-manual workers×cohort trend | -0.02 | | 0.04 | | | -0.04 | |
| | (0.01) | | (0.10) | | | (0.26) | |
| Skilled manual workers×cohort trend | 0.01 | | -0.05 | | | 0.13 | |
| | (0.01) | | (0.06) | | | (0.17) | |
| Higher grade routine non-manual workers×cohort trend | -0.009 | | -0.11 | | | 0.22 | |
| | (0.01) | | (0.06) | | | (0.17) | |
| Lower grade technicians×cohort trend | -0.03 | | -0.08 | | | 0.94 | |
| | (0.02) | | (0.11) | | | (0.71) | |
| Small proprietors without employees×cohort trend | 0.002 | | -0.11 | | | 0.39 | |
| | (0.02) | | (0.11) | | | (0.32) | |
| Small proprietors with employees×cohort trend | -0.001 | | -0.06 | | | 0.29 | |
| | (0.01) | | (0.07) | | | (0.43) | |
| Lower service class×cohort trend | -0.01 | | -0.03 | | | 0.33 | |
| | (0.009) | | (0.05) | | | (0.16) | |
| Higher service class×cohort trend | 0.002 | | -0.06 | | | 0.27 | |
| | (0.009) | | (0.05) | | | (0.16) | |
| Proportion of parents from the higher service class (across cohorts) | | 0.07*** | | -0.15*** | | | 0.59*** |
| | | (0.008) | | (0.02) | | | (0.15) |
| Constant | -2.30*** | -3.09*** | -3.08*** | -0.51 | -1.48*** | -1.01 | -18.76*** |
| | (0.16) | (0.17) | (0.63) | (0.52) | (0.39) | (0.83) | (4.29) |
| Pseudo-$R^2$ | 0.13 | 0.12 | 0.12 | 0.10 | 0.08 | 0.13 | 0.11 |
| N of observations | 9,097 | 9,097 | 2,080 | 2,080 | 502 | 502 | 502 |

Standard errors: *** p<0.01, ** p<0.05, Source: Author's calculations using NEPS data

These families also have to worry less about their financial situation and can afford costly high-quality early childhood education and, if necessary, pay for tutoring in primary school in order to promote their children's cognitive and non-cognitive development. In addition, the maintenance hypothesis, formulated by Breen and Goldthorpe (1997), suggests that service class parents want their children to attain at least the same education and economic class position as that they have achieved themselves. If service class children do not make the transition to the academic track, this is felt by their parents as a loss relative to their own educational level and class position that looms larger (and is particularly painful) than a child's transition to the academic is felt as a gain by less educated working class parents (Kahneman & Tversky, 1979). Thus, parents always consider the educational success/failure of their children relative to their own education and class position. Finally, parents who are working in service relationships offering high job autonomy, rich job responsibilities and high levels of creativity may raise their children accordingly to these standards. Children from the salariat therefore acquire cognitive and social competencies that are important for success at school and for getting the teacher's recommendation for 'Gymnasium' more easily. In Model 1 of Table 5-3 the coefficients of the interaction term between the class dummy variables and the cohort trend are not significant. Thus, class inequalities have been quite persistent across birth cohorts in West Germany[24]. *This evidence contradicts my Hypothesis 8* that class inequalities should decline across birth cohorts because there has been a substantially increasing standard of living in West Germany over the last decades that should make families' relative economic resources less important for children's educational advancement. Also the relative costs of academic education have declined with the extension of compulsory schooling in West

[24] In a model with sampling stratification weights, the interaction term between cohort trend and lower grade technician is statistically significant. In the linear probability model, the interaction term between cohort trend and higher service class is also statistically significant.

Germany. However, all these developments do not seem to have reduced service class children's relative advantages when it comes to getting on the 'Gymnasium' track.

In Model 2 of Table 5-3, I replaced the cohort trend variable by a variable indicating the proportion of higher service class parents across birth cohorts[25]. Based on the trend towards the service economy in West Germany, the proportion of higher service class parents has increased across cohorts (see Table 3-2). With Model 2, I want to test, whether the overall increase in 'Gymnasium' participation can be traced back to the rising proportion of parents from the higher service class. The positive coefficient for this macro variable shows that the rising proportion of parents from the higher service class has indeed increased the overall transition probabilities to 'Gymnasium' across cohorts in West Germany. Model 2 reveals a similar class association pattern as in Model 1. There is only one difference to Model 1. The coefficient for lower grade technicians no longer attains significance. Thus, they differ only slightly from unskilled workers in making the transition to 'Gymnasium'.

In Models 3 and 4 of Table 5-3, I estimate how parental class is associated with the transition to 'Erweiterte Oberschule' in the GDR. The (non-significant) negative coefficients of the cohort trend variable in Models 3 and 4 clearly reflect again the restrictive educational policy on entry to the 'Erweiterte Oberschule' in the GDR since the 1970s. In addition, Model 3 of Table 5-3 reveals a clear class pattern in access to the academic track. In particular, children from higher grade non-manual workers, small proprietors and the service classes are more likely to make the transition to 'Erweiterte Oberschule'. These empirical findings support previous empirical results from Mayer and Solga (1994) also reporting clear class differences in the former East German socialist regime. The coefficients of the interaction term between the cohort trend and the dummy variables for the EGP classes are not statistically significant. Thus there seems to be quite a persistent

[25] A main effects model of the cohort trend can be found in Table 8-13 (see Model 1) of the appendix.

impact of service classes on the transition to the academic track in the GDR across birth cohorts.[26] Again, *these findings are not in line with my Hypotheses 9 and 10* predicting that class effects should have increased in the GDR after the establishment of the GDR cadres (the so-called *socialist transformation hypothesis*).

Model 4 replaces the cohort trend variable by a variable that measures the changing proportion of parents from the higher service class across cohorts. This macro variable reflects the increasing importance of the higher service class in the GDR (see Table 3-2)[27]. In Model 4, parental class effects do not change much compared to Model 3. The macro variable measuring the proportion of service class parents has a negative and significant effect. This means that the restrictive GDR policy with regard to the transition to the academic track increasingly limited the chances of children from the higher service class in the GDR. Thus the academic transition demand of the expanding service class was increasingly overshooting the quite constant transition opportunities to the academic track in the GDR across cohorts.

Models 5, 6 and 7 in Table 5-3 examine the association between parental class and making the transition to 'Gymnasium' in East Germany after unification in 1990. Model 5 reports the average class differences at the transition to the academic track. East German children from parents from the service classes are significantly more likely to make the transition to 'Gymnasium' after German unification. The other class associations might be not significant due to a relatively small sample size.

In order to investigate possible changes in the parental class association over time in East Germany after unification, I have introduced cohort interaction terms in Model 6. Neither the main coefficients nor the interaction coefficients retain their statistical signifi-

[26] In the linear probability model, it seems that children from parents of the service classes and from higher grade routine non-manual workers were also less likely to make the transition to 'Erweiterte Oberschule' across birth cohorts. But again, given the low transition probability, the linear probability model does not seem to be the appropriate statistical tool.

[27] A main effects model of the cohort trend can be found in Table 8-13 (see Model 2) of the appendix.

cance.[28] Hence, it seems that educational inequality in terms of parental class position was persistent after the transformation from socialism to capitalism. *This result seems to reject my Hypothesis 10.*

In Model 7 of Table 5-3, I replaced the cohort trend variable by a variable measuring how the proportion of parents from the higher service class changes across birth cohorts in East Germany after unification (see Table 3-2)[29]. In Model 7, the coefficient for the proportion of parents from the higher service class is positive and statistically significant. The proportion of higher service class parents has increased from 28 % to 30 % from the 1976−1980 birth cohort to the 1981−1986 birth cohort. This means that children from the higher service class could indeed realize their participation demands in 'Gymnasium' in East Germany much better after German unification. Model 7 also shows that it is mostly children from the higher service class who have profited in their access to 'Gymnasium' after unification.

#### 5.2.2.3 Parental status

In Table 5-4, I investigate the association between parental status and the transition probability to 'Gymnasium'. Models 1 and 2 report findings for West Germany. Model 1 shows again that across birth cohorts the transition probabilities to 'Gymnasium' are increasing in West Germany. More importantly, Model 1 indicates − as expected − a strong parental status[30] link: the higher the status of the family of origin, the higher the probability that a child makes the transition to 'Gymnasium'. *This is in agreement with Hypothesis 11* predicting that children from higher status families are embedded in friendship networks providing better knowledge of schools as well as supporting parents and chil-

[28] In the linear probability model, the interaction effect between cohort trend and children from the service classes is significant. In a model with sampling stratification weights, the interaction effect between cohort trend and children from the lower service class is statistically significant.
[29] A main effects model of the cohort trend can be found in Table 8-13 (see Model 3) of the appendix.
[30] Parental status is measured by the CAMSIS scale and is here seen as a *proxy* for social resources and culture.

dren in regard to school matters. Social networks of high-status parents also influence families' and children's educational aspirations towards the academic track. Cultural tastes in these networks reflect middle-class values and norms that are also shared by teachers and schools. As a consequence, not only the cognitive standards but also the social behaviour of higher status children is likely to be in line with the expectations of teachers and the regulations in schools, so that higher status children have better chances of getting teachers' recommendations for the academic track. The non-significant interaction coefficient for parental status and cohort trend demonstrates that the parental status association persists across cohorts in West Germany. *This is in line with my Hypothesis 13* that when it comes to friendship relationships there is no good reason why the parental status association in West Germany should change over time.

In Model 2, I replaced the cohort trend variable by a variable reflecting the proportion of parents in each birth cohort who have a CAMSIS status score of at least 65 points[31]. This group is almost rising monotonically from 13 % (for the 1944−1950 cohort) to 29 % (for 1981−1986 cohort). The CAMSIS status scale ranges from 20 status points (lowest possible score) to 99 status points (highest possible score). In Model 2, the coefficient of the variable proportion of higher status parents is significant and positive. This means, that an important factor for the increasing overall demand for the academic track in West Germany is the rising proportion of higher status parents with a stronger preference for academic education.

Models 3 and 4 estimate transition probabilities to 'Erweiterte Oberschule' in East Germany before unification. Model 3 shows that the transition probabilities to 'Erweiterte Oberschule' have not changed significantly across cohorts. Most importantly, children

[31] A main effects model of the cohort trend can be found in Table 8-14 (see Model 1) of the appendix.

**Table 5-4:** Influence of parental status on transition to the academic track

| Variables | West (1) | West (2) | East before (3) | East before (4) | East after (5) | East after (6) | East after (7) |
|---|---|---|---|---|---|---|---|
| Cohort trend | 0.03*** | | -0.04 | | | -0.19 | |
| | (0.009) | | (0.04) | | | (0.13) | |
| Parental status | 0.06*** | 0.06*** | 0.05*** | 0.04*** | 0.04*** | 0.01 | 0.04*** |
| | (0.004) | (0.002) | (0.008) | (0.004) | (0.007) | (0.01) | (0.007) |
| Proportion of higher status parents (across cohorts) | | 0.05*** | | -0.13*** | | | -0.22*** |
| | | (0.005) | | (0.01) | | | (0.05) |
| *Interaction effect* | | | | | | | |
| Parental social status | -0.0002 | | -0.0009 | | | 0.01** | |
| ×cohort trend | (0.0002) | | (0.001) | | | (0.002) | |
| Constant | -4.44*** | -4.61*** | -3.81*** | -1.75*** | -2.74*** | -1.92** | 4.01*** |
| | (0.20) | (0.12) | (0.47) | (0.34) | (0.40) | (0.84) | (1.60) |
| Pseudo-$R^2$ | 0.15 | 0.15 | 0.12 | 0.11 | 0.05 | 0.11 | 0.08 |
| Observations | 9,097 | 9,097 | 2,080 | 2,080 | 502 | 502 | 502 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

from high-status parents in East Germany were more likely to attend 'Erweiterte Oberschule'. In other words, the assumption that status differences in the former socialist society of the GDR were levelled out (see Engler, 1991) cannot be confirmed. Moreover, there is no statistically significant change in the parental status association across birth cohorts in East Germany before unification[32]. The parental status association was therefore also quite persistent in the GDR.

In Model 4, I replaced the cohort trend variable by a macro variable indicating the rising proportion of high-status parents in the GDR across birth cohorts (see Table 3-2)[33]. Model 4 shows again that children from higher status parents are more likely to make the transition to 'Erweiterte Oberschule'. However, with the rising group of higher status parents in the GDR, the probability of children making the transition to 'Erweiterte Oberschule' declined. Thus, there was a rising demand for the academic track from the in-

[32] However, the linear probability model leads to the conclusion that the effect of parental status on the transition likelihood to 'Erweiterte Oberschule' declined across birth cohorts in the GDR.
[33] A main effects model of the cohort trend can be found in Table 8-14 (see Model 2) of the appendix.

creasing proportion of higher status parents across cohorts that could not be satisfied by the quite constant transition opportunities to the academic track in the GDR.

Models 5, 6 and 7 in Table 5-4 report estimations for the transition probabilities to 'Gymnasium' in East Germany after German unification. In Model 5, I included only parental status in the analysis. As can be seen, the higher the parental status the more likely children are to make the transition to 'Gymnasium' after unification (*as predicted in Hypothesis 11).*

In Model 6, I examined whether the association between parental status and the transition to 'Gymnasium' changes after unification. The coefficient of the interaction term of the cohort trend and parental status is significant (however the sample size is relatively small, which can influence significances). *This finding supports Hypothesis 14* predicting that in the transformation from socialism to capitalism, the parental status association would increase because social networks are becoming more differentiated in East Germany after unification.

In Model 7, I replaced the cohort trend variable by a macro variable indicating the proportion of high-status parents across birth cohorts[34]. The proportion of high-status parents decreases slightly from 33 % to 29 % from the 1976−1980 to the 1981−1986 birth cohort (in the immediate phase of unification). The empirical findings of Model 7 for the main coefficient of parental status are still in line with the results in Model 6 and suggest that parental status has a strong positive association with making the transition to 'Gymnasium'. *This evidence supports Hypothesis 11*. However, the coefficient of the variable proportion of children with high-status parents has a negative association with the transition probability to 'Gymnasium'. In other words, the educational demand of higher status groups for the academic track was not satisfied completely after German unification.

[34] A main effects model of the cohort trend can be found in Table 8-14 (see Model 3) of the appendix.

#### 5.2.2.4 Simultaneous consideration of parental education, parental class, and parental status

In order to examine, whether parental education, parental class and parental status[35] each represent autonomous mechanisms for children's educational opportunities to enter the academic track, I simultaneously include all three origin variables into the logistic regression model (see Table 5-5). I still estimate separate models for West Germany, East Germany before unification and East Germany after unification and compare the findings. First, I discuss the estimation results for West Germany. As reported in Table 5-2, Table 5-3 and Table 5-4 the variable cohort trend still has a statistically positive association with the transition probability to 'Gymnasium' in West Germany. Thus, the transition probabilities to 'Gymnasium' expanded strongly in West Germany across birth cohorts. Moreover, all three social origin dimensions (parental education, parental class and parental status) as well as mother's relative education are statistically significant.[36] This finding suggests that these different mechanisms of origin cannot be reduced to two or even one origin mechanism. Each of these dimensions provides an independent and unique contribution to the probability of transition to 'Gymnasium'.

*The empirical evidence first supports Hypothesis 2* that children from higher educated parents are more likely to make the transition to the academic track. In the literature, there are three explanations for this effect: (1) better educated parents have a positive influence on their childrens' aspirations towards attending 'Gymnasium'; (2) parents with higher education know the academic track from own experiences and they are hence better able to consult their offspring; and (3) higher educated parents are more involved in school matters such as parent-teacher meetings, homework and exam preparation.

[35] Parental status (measured with the CAMSIS scale) is a *proxy* for exclusive relationships in social networks and for distinction via 'culture'.
[36] In a model including the sampling stratification weights, the independent variable 'mother's education is lower than father's education' is not statistically significant.

**Table 5-5** Influence of parental education, parental class and parental status on transition to the academic track

| Variables | West | East before | East after |
|---|---|---|---|
| Cohort trend | 0.02*** | -0.10*** | 0.17*** |
| | (0.002) | (0.01) | (0.03) |
| *Parental education (Ref.: Low educational level)* | | | |
| Intermediate educational level | 0.52*** | 0.20 | 0.09 |
| | (0.12) | (0.56) | (1.24) |
| High educational level | 1.74*** | 1.01 | 0.53 |
| | (0.15) | (0.61) | (1.26) |
| *Mother's education (Ref.: same education as father)* | | | |
| Mother's education higher than father's | 0.24*** | -0.06 | -0.35 |
| | (0.08) | (0.27) | (0.26) |
| Mother's education lower than father's | -0.12** | -0.03 | -0.27 |
| | (0.06) | (0.18) | (0.27) |
| Parental status | 0.03*** | 0.02 | 0.02 |
| | (0.003) | (0.007) | (0.01) |
| *Parental class (Ref.:Unskilled worker)* | | | |
| Lower grade routine non-manual workers | 0.17 | 0.14 | 0.89 |
| | (0.15) | (0.81) | (0.70) |
| Skilled manual workers | -0.14 | 0.76 | -0.21 |
| | (0.11) | (0.41) | (0.50) |
| Higher grade routine non-manual workers | 0.36** | 1.35*** | 0.06 |
| | (0.13) | (0.44) | (0.54) |
| Lower grade technicians | -0.26 | 0.05 | -1.45 |
| | (0.17) | (0.81) | (1.13) |
| Small proprietors without employees | 0.39** | 1.96** | 0.15 |
| | (0.20) | (0.68) | (0.89) |
| Small proprietors with employees | -0.01 | 1.37** | -0.48 |
| | (0.12) | (0.49) | (0.94) |
| Lower service class | 0.59*** | 1.01** | 0.45 |
| | (0.12) | (0.43) | (0.55) |
| Higher service class | 0.40*** | 1.29*** | 0.80 |
| | (0.13) | (0.44) | (0.59) |
| Constant | -3.53*** | -3.22*** | -8.09*** |
| | (0.16) | (0.61) | (1.84) |
| Pseudo-$R^2$ | 0.18 | 0.14 | 0.12 |
| Observations | 9,097 | 2,080 | 502 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

Beyond the educational position of the family, children's transition probabilities to 'Gymnasium' depend on whether the mother has a higher or lower education than the father in West Germany. *This empirical finding supports Hypothesis 1*. In West Germany, mothers are often housewives or work part-time. Mothers in West Germany are therefore the one parent who spends most time with children at home and who mostly attend parent teacher conferences at school.

Furthermore, *my empirical findings once again support Hypothesis 11* that having high-status parents represents an additional independent origin dimension which is associated with children's transition probability to 'Gymnasium'. High-status parents are (1) more likely to have access to social networks that provide valuable information on the functioning of the West German educational system, so that parents are better able to help their children and give more appropriate advice on school matters; (2) also often members of social networks influencing parental educational aspirations in favour of the academic track and providing a valuable source in order to better monitor children's school progress; and (3) familiar with the social norms favoured by teachers and schools that should positively affect school performance and teachers' recommendations for the academic track.

Finally, social class also represents an autonomous origin dimension which is associated with children's transition opportunities to the academic track. A closer look at the dummy variables of parental class reveals that children from unskilled workers (reference group), lower grade routine non-manual workers, skilled manual workers, lower grade technicians and small proprietors with employees all together have a lower transition probability to the academic track in West Germany. This suggests that economic inequalities as well as differences in income security, short-term income stability and long-term income prospects of families (Erikson & Goldthorpe, 1992, p. 236; Goldthorpe, 2012, p. 204) are important dimensions in West Germany when it comes to long-term decision making in regard to the academic track. In particular, future opportunity costs based on longer schooling in the academic track are an important issue for economically disadvantaged classes. Children who grow up in low-income families with less secure economic environments are likely to have greater difficulties in concentrating on learning than children who do not have to worry about their family's financial situation. In contrast, there are positive and significant associations with the transition rate to the academic track for

the higher grade routine non-manual workers, small proprietors without employees,[37] and the lower and higher service classes. Altogether, these families do not only have higher incomes and lower risks of income loss through unemployment but also enjoy a greater stability of pay streams over time and can routinely expect increasing incomes in their job careers (Goldthorpe, 2012). In other words, these families have the economic resources helping them to support their children's educational advancement. Consequently, it is much easier for them to make long-term educational decisions for their children. Better financial resources and higher economic security are also beneficial for access to learning opportunities before school entry along with tutoring during primary school. Economically privileged parents have high educational aspirations in regard to their children because they consider their children's educational success relative to their own education and class position (*class maintenance theory*). In addition, parents in service class positions experience much more job autonomy, responsibility and room for creativity, and these are supposed to shape the interactions with their children at home. Thus, being a child of a salaried employee is positively associated with children's school performance and appropriate social behaviour in primary school, and this also influences teachers' recommendations for 'Gymnasium' in West Germany.

In addition to the models reported in Table 5-5, I also estimated a model including the interactions between cohort trend and parental education, cohort trend and mother's education, cohort trend and parental class, as well as cohort trend and parental status. However, none of these interactions are statistically significant and are therefore not reported in this chapter. However, the statistically insignificant interaction effects lead to the conclusion that parental education, mother's relative education, parental class and parental status exert persistent associations with the access to 'Gymnasium' in West Germany.

[37] In the linear probability model and in a model with sample stratification weights, the effect for small proprietors with employees is not statistically significant.

Hence, neither does the parental education association increase across cohorts *(Hypothesis 3*) nor does the parental class association decrease across cohorts *(Hypothesis 8).* Only *Hypothesis 13,* in which I expected a persistent parental status association across birth cohorts, is confirmed.

Second, I examine the transition probabilities to 'Erweiterte Oberschule' in the GDR before unification and compare the findings to West Germany. Consistent with Figure 5-1 and in contrast to West Germany, I find that the transition probabilities to the academic track declined in the GDR between the 1944 and 1974 birth cohorts. This again points to the imposed restriction of access to 'Erweiterte Oberschule' by the socialist state in the mid-1960s. Furthermore, in contrast to West Germany, parental education[38], mother's relative education and parental status do not yield statistically significance. Consequently, it seems that the former socialist GDR did indeed provide more equality in educational opportunities than the former FRG. This empirical evidence is *in line with Hypothesis 4 in which I expected that parental education would explain less of the difference in access to 'Erweiterte Oberschule'.* In contrast to West Germany, early childhood education institutions as well as all-day schools were better developed and played a much more important role in the socialization of children in the GDR. Hence, the influence of parents on their children's cognitive and non-cognitive development was more limited because all children received a more equal and uniform socialization through their preschool educators and primary school teachers.

In contrast to West Germany, parental status is also not associated with making the transition to 'Erweiterte Oberschule' in the GDR.[39] This seems to be in line with previous research indicating that the socialist regime in the GDR levelled out status differences (*confirming Hypothesis 12).* In the GDR, general living conditions were quite similar

[38] In the linear probability model children from higher educated parents are significantly more likely to make the transition to 'Erweiterte Oberschule'.
[39] In the linear probability model, the effect of parental status is significant.

among citizens, so there was not much space for distinction. Furthermore, highbrow culture was highly subsidized by the state so that everyone could afford to go to the theatre or museum. Additionally, teachers themselves often had a background as peasant or worker and therefore may not have placed so much emphasis on highbrow culture in school. Moreover, social networks do not seem to have been very relevant for helping children to make the transition to 'Erweiterte Oberschule'.

Only parental class associations seem to have been important in the GDR. In particular, the higher grade routine non-manual workers, small proprietors with and without employees as well as the lower and higher service classes had significantly higher transition rates to the 'Erweiterte Oberschule'. The pattern is surprisingly similar with the class pattern in West Germany. *Thus, my Hypothesis 6 that children from more advantaged parental classes are more likely to make the transition to the academic track can be confirmed empirically for the GDR. However, Hypothesis 9 that the class differences in the GDR are smaller than in West Germany is not really supported by the empirical findings if I estimate a linear probability model.*

There are also no significant trends across birth cohorts for parental education, parental class and parental status in the GDR. I therefore do not report these estimations in this chapter. Educational inequality in the GDR was persistent. Hence, *Hypothesis 10 that parental class effects increase after the establishment of a new cadre (the socialist transformation hypothesis) could not be confirmed for access to 'Erweiterte Oberschule'.* It seems that the entry restriction to 'Erweiterte Oberschule' in the GDR suppressed the educational demands of the elite and reduced inequalities in educational opportunities.

Finally, I analyse the transition probabilities to the academic track in East Germany after German unification (see Table 5-5). My empirical findings reveal that there has been an expansion of 'Gymnasium' access in East Germany after German unification. This

finding is consistent with Figure 5-1. Moreover, Table 5-5 shows no statistically significant coefficients for parental education, mother's education compared to father's education, parental class and parental status. To sum up, my *Hypothesis 5 that parental education should still play a less important role after reunification because of still more developed preschool institutions compared to West Germany seems to be confirmed if I estimate a linear probability model (not reported here).* Moreover, *there is not much evidence for Hypothesis 10* in which I expected class inequalities to have increased after the transformation from socialism to capitalism (I come to the same conclusion with a linear probability model). Finally, *Hypothesis 14 in which I expected an increase in parental status effects after German unification, cannot be confirmed.*

Because there are also no significant interaction coefficients between the cohort trend and parental education, mother's relative education, parental class and parental status respectively in East Germany after reunification, I do not report these results in this chapter.

#### 5.2.2.5 Comparing social origin effects between East and West Germany using transition probability plots

Because the relationship between the independent variables and the predicted probabilities is non-linear in the logistic regression model, the effect of a unit change in a particular independent variable X on the change of the predicted probability depends not only on the location of the starting point of X, but also on the values of the other independent variables in the model. Therefore, the substantive interpretation of the effects of the logit coefficients of parental education, parental class and parental status in Table 5-5 on the transition probabilities to the academic track is not so straightforward. I therefore estimate predicted transition probabilities with their confidence intervals for specific substantively interesting social origin groups and examine how changes in the values of the social origin variables affect changes in the predicted probabilities of entering the academic track in (1) West Germany, (2) East Germany before unification and (3) East Germany

after unification. My transition probabilities are based on a logistic regression model simultaneously including cohort trend, parental education, parental class and parental status (see Table 8-15 in the appendix). I leave out the interaction terms between cohort trend and the three social origin variables, because they were not statistically significant. In addition, I have reduced the nine EGP parental class categories to three classes: (1) the working class, (2) the intermediate class and (3) the salariat. I have also grouped parents from different status levels into three categories: (1) low-status parents, (2) intermediate status parents, and (3) high-status parents.[40]

In a first step, I wanted to find out whether and how the transition probabilities to the academic track depend on the values of each of the three origin variables after controlling for the respective other two remaining social origin measures. The upper three plots of Figure 5-2, Figure 5-3, and Figure 5-4 show predicted probabilities depending on the values of one of the three social origin indicators under the condition that the remaining other two social origin indicators are set to the *lowest* categories in (1) West Germany (Figure 5-2A, Figure 5-3A, and Figure 5-4A), (2) East Germany before unification (Figure 5-2C, Figure 5-3C, and Figure 5-4C), and (3) East Germany after unification (Figure 5-2E, Figure 5-3E, and Figure 5-4E). For example, in Figure 5-2A, I report the transition probability plots for children of low-, intermediate-, and high-educated parents who also belong to the working class and the low-status group in West Germany. The three plots at the bottom of Figure 5-2, Figure 5-3, and Figure 5-4 present transition probabilities to the academic track depending on the values of one of the three social origin indicators under the condition that the remaining other two social origin variables are fixed to the *highest* categories in (1) West Germany (Figure 5-2B, Figure 5-3B, and Figure 5-4B), (2) East Germany before unification (Figure 5-2D, Figure 5-3D, and Figure 5-4D), and (3) East Germany after unification (Figure 5-2F, Figure 5-3F, and Figure

[40] For a more detailed description see the data and methods section.

5-4F). For instance, in Figure 5-2B, I show the transition probability plots for children from parents with low, intermediate, and high education under the condition that these parents also belong to the salariat and the high-status group in West Germany.

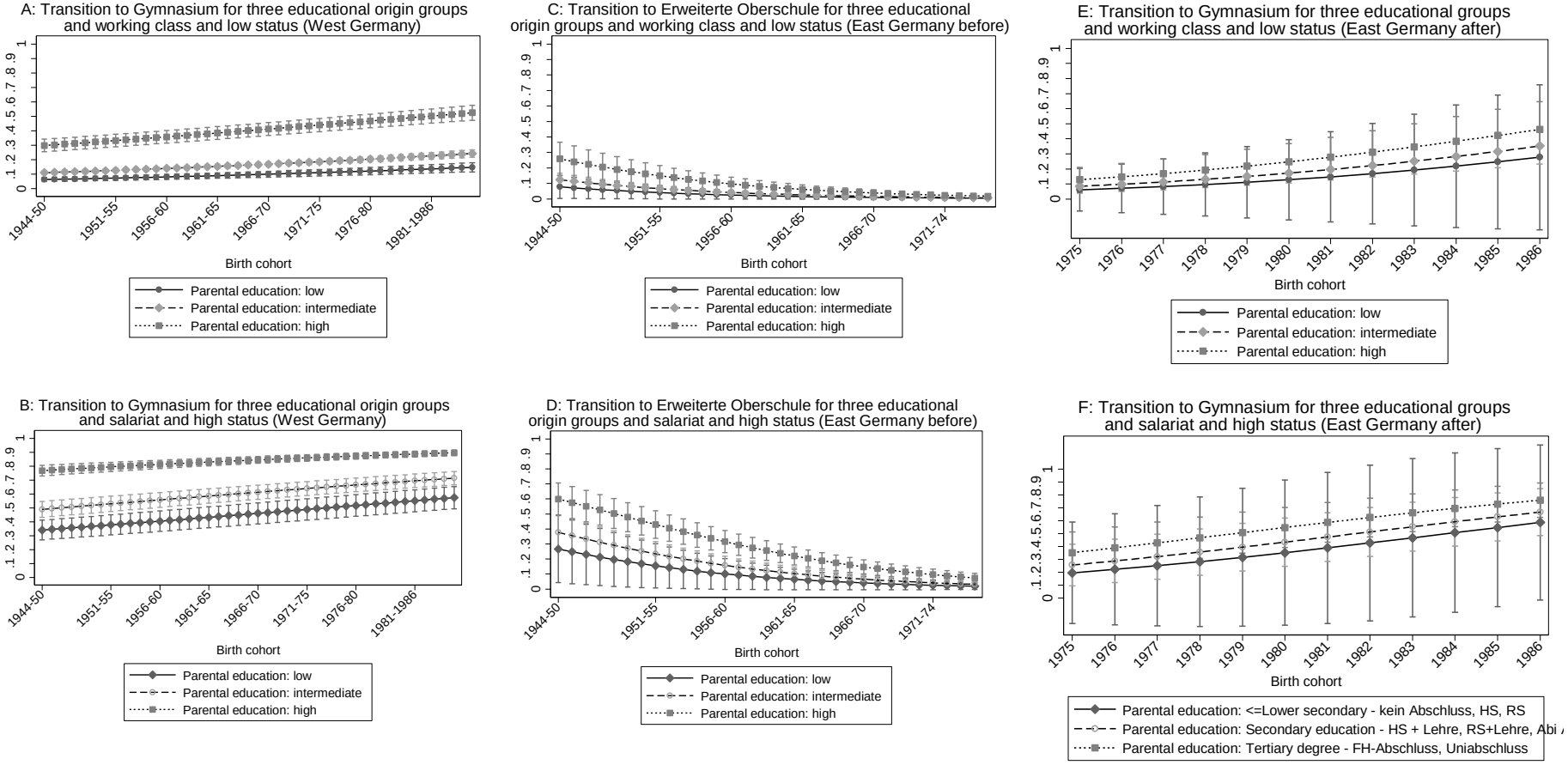
When I compare the difference in the predicted probabilities for parents with the highest and lowest educational attainment level under the condition that these parents also belong to the working class and have a low status (see Figure 5-2A) then the effect in West Germany is 0.24 (0.30 - 0.06 = 0.24) for the 1944 birth cohort and 0.38 (0.52 - 0.15 = 0.31) for the 1986 birth cohort (see Figure 5-2A). Thus, the effect of parents' education is monotonically increasing across cohorts for children from working class parents with a low status. If I compute the same probability differences for children from parents with the highest and lowest educational attainment level, but now under the condition that they also belong to the salariat and the high-status group (see Figure 5-2B), then in West Germany the difference in the predicted probabilities is 0.43 (0.77 - 0.34 = 0.43) for the 1944 birth cohort and 0.33 (0.90 - 0.57 = 0.33) for the 1986 birth cohort (see Figure 5-2B). This means that the effect of parental education has declined across cohorts for this constellation of privileged families. Thus, *the transition probability differences of the same change in education depend strongly on the values of the other two social origin variables and the cohort trend.*

Both Figure 5-2A and Figure 5-2B for West Germany compare frequently occurring social origin combinations with rarely occurring ones. For instance, in Figure 5-2A, it is very common for low-educated parents to belong to the working class and have a low status. On the other hand, highly educated parents who also belong to the working class and have a low status reflect a status inconsistency which is also rare (see Figure 5-2A). In turn, in Figure 3B, it is very frequent for high-educated parents to belong to the salariat and have a high status. On the other hand, low-educated parents who also belong to the

salariat and the high-status group represent a status inconsistency that also happens not so often (see Figure 5-2A). A more socially relevant comparison with regard to social origin is therefore a contrast between children from advantaged families and children from disadvantaged families. If I compare children from families with high education from the salariat and the high-status group with children from low-educated families belonging to the working class who also have a low status, then the difference in the predicted probabilities is 0.71 (0.77 - 0.06 = 0.71) for the oldest birth cohort (see Figure 5-2A) and 0.75 (0.90 - 0.15 = 0.75) for the youngest birth cohort (see Figure 5-2B). This means that the inequality at the transition to the academic track was in fact very high in West Germany for the 1944 birth cohort − and this inequality increases even further across birth cohorts.

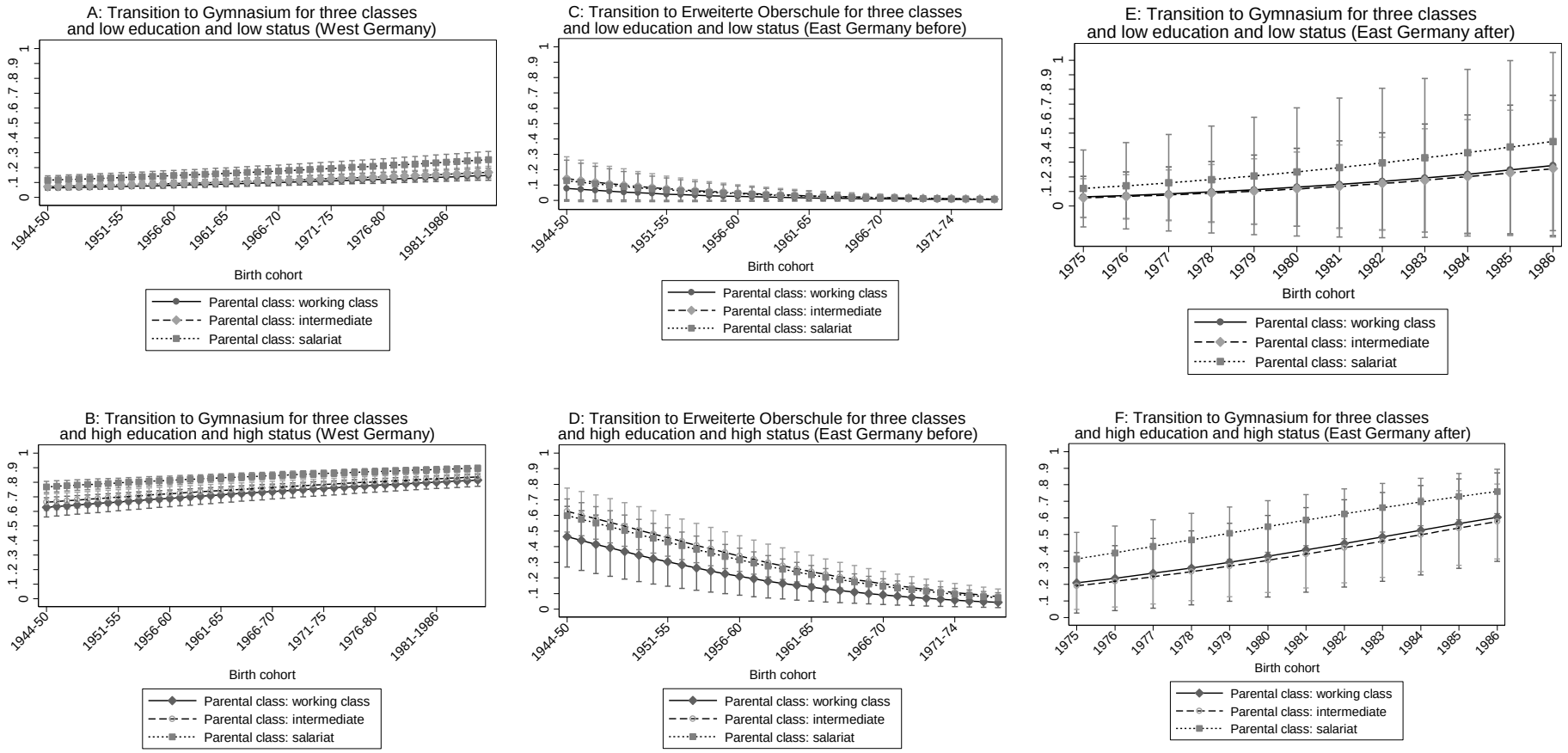
In a second step, I compare the differences in the predicted probabilities for changes in the values of parental education (Figure 5-2A and Figure 5-2B), parental class (Figure 5-3A and Figure 5-3B) and parental status (Figure 5-4A and Figure 5-4B) in West Germany. This allows me to examine which of the three origin variables produces the biggest differences in the transition probabilities while controlling for the respective other origin variables. All origin variables reveal a similar pattern in the transition probabilities. The predicted probabilities for the transition to the academic track increase, the higher the parental education or the parental status or when the parents are members of the salariat compared to being members of the intermediate class or workers. This supports my hypothesis that in West Germany each of the three social origin resources has indeed its own importance for children's transition to 'Gymnasium'. However, if I evaluate the magnitude of the differences in the transition probabilities across parental education (Figure 5-2A and Figure 5-2B), parental class (Figure 5-3A and Figure 5-3B) and parental status (Figure 5-4A and Figure 5-4B) then it is obvious that parental education produces the biggest differences in the transition probabilities, followed by parental status. Parental class differences seem to have the smallest impact on the transition rate in West Germany.

**Figure 5-2:** Transition probabilities for different educational origin groups and parental class and parental status are fixed at different levels



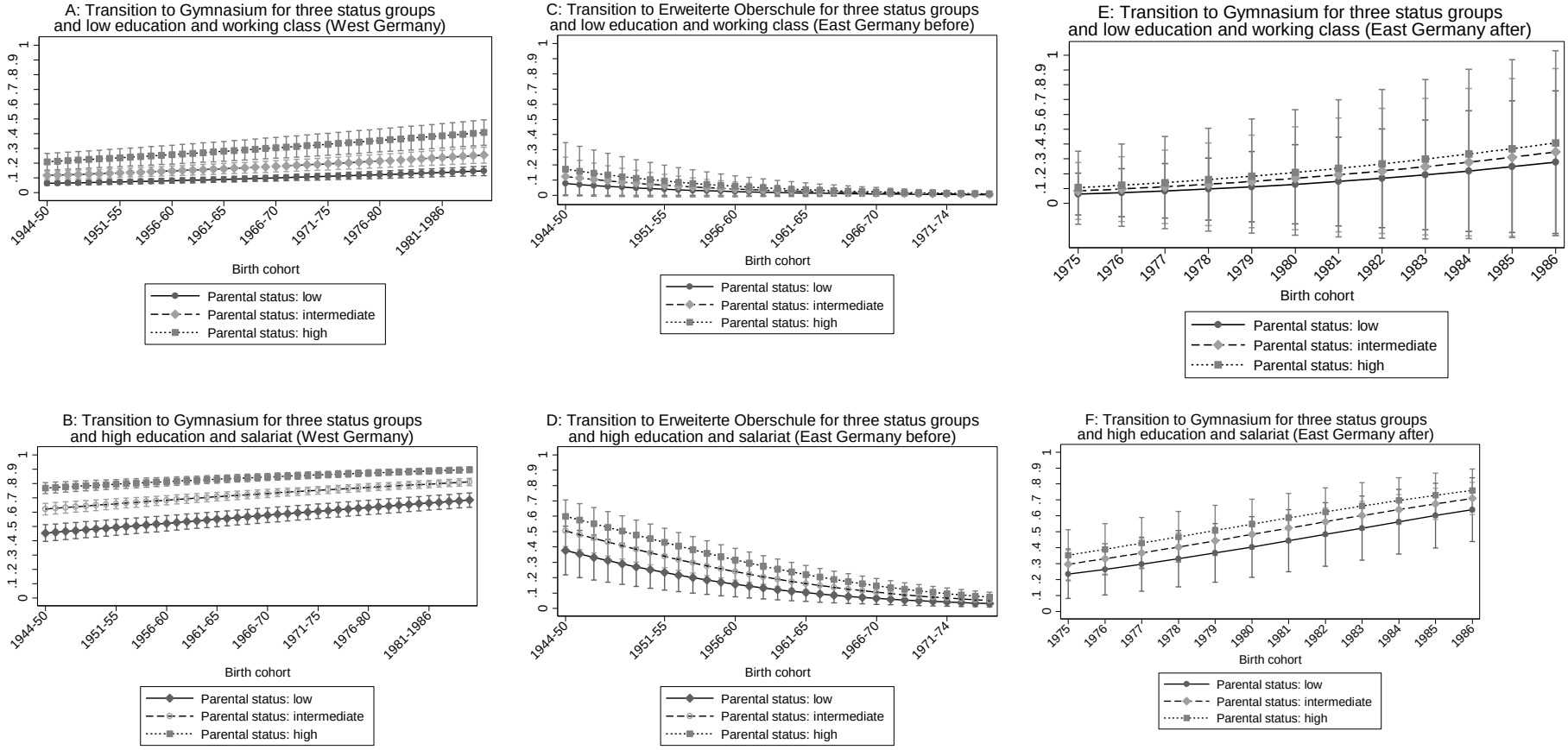

Source: Author's calculations using NEPS data

**Figure 5-3:** Transition probabilities for different parental classes and parental education and parental status are fixed at different levels




Source: Author's calculations using NEPS data

**Figure 5-4:** Transition probabilities for different parental status groups and parental education and parental class are fixed at different levels




Source: Author's calculations using NEPS data

In a third step, I compare the changes in the predicted probabilities in (1) West Germany (Figure 5-2A, Figure 5-2B, Figure 5-3A, Figure 5-3B, Figure 5-4A, and Figure 5-4B), (2) East Germany before unification (Figure 5-2C, Figure 5-2D, Figure 5-3C, Figure 5-3D, Figure 5-4C, and Figure 5-4D) and (3) East Germany after unification (Figure 5-2E, Figure 5-2F, Figure 5-3E, Figure 5-3F, Figure 5-4E, and Figure 5-4F). In West Germany, as just discussed using some group comparisons, it is clear that all social origin groups profit from educational expansion and there seems to be a slight trend towards diverging inequalities in this expansion process. The picture in East Germany before unification is, however, completely different. For all combinations of parental origin groups (in terms of parental education, parental class, and parental status) the transition probabilities of children are declining across cohorts. This decline is a consequence of the policy of restrictive access to 'Erweiterte Oberschule' in the GDR. In this trend of declining transitions to the 'Erweiterte Oberschule' the differences in predicted probabilities between the social origin groups are shrinking strongly. This evidence obviously contradicts the prediction of the so-called *socialist transformation thesis* (see Mateju, 1993; Shavit &Blossfeld, 1993) claiming that educational inequalities rise in socialist countries after the establishment of new cadres.

Finally, I focus on the changes in the transition probabilities to 'Gymnasium' for various social origin groups in East Germany after unification. It is important to remember that in the process of German unification the structure of the West German educational system was imposed on East Germany. Thus, the rules of the game in the transition to the academic track have changed fundamentally since unification. As Figure 5-2E, Figure 5-2F, Figure 5-3E, Figure 5-3F, Figure 5-4E and Figure 5-4F document, there has been a rapid quantitative expansion in the transition to 'Gymnasium' in East Germany after unification for all social origin groups. In addition, it seems that the differences in the pre-

dicted probabilities for all three social origin indicators are slightly increasing even when these changes are not statistically significant. However, these large confidence intervals are also a consequence of the small sample size for East Germany after unification. Thus, in East Germany there are some signs for a rising educational inequality after German unification. In other words, *this evidence seems to support Hypothesis 10* that the strongly increasing economic competition in the capitalist system after unification has increased the effect of social origin variables on the transition probability to the academic track in East Germany.

### 5.2.3 The associations of social origin and gender with the transition to the academic track

In this section, I examine whether boys and girls differ in their probability of making the transition to the academic track and whether they vary in their social origin associations. To simplify my analysis, I reduce the EGP parental classes again to three categories: (1) working class, (2) intermediate class and (3) salariat.

In Table 5-6, I estimate separate models for (1) West Germany, (2) East Germany before and (3) East Germany after unification. Model 1 in Table 5-6 reports the results for West Germany. The negative coefficient for the dummy variable for 'female' indicates that in the oldest birth cohorts, girls were less likely than boys to make the transition to 'Gymnasium' in West Germany[41]. *This empirical finding is in line with my Hypothesis 15* in which I expected that families of the older birth cohorts should have had more traditional gender attitudes privileging boys' educational advancement. The interaction coefficient between cohort trend and the dummy variable female is statistically significant and positive. This means that across cohorts girls catch up with boys and even overtake them at the transition to 'Gymnasium' (see Figure 5-1; oldest birth cohort (-0.64) and youngest

[41] In a model with sampling stratification weights, the coefficient for 'female' is not statistically significant.

**Table 5-6:** Influence of social origin and gender on the transition to the academic track in East and West Germany for boys and girls

| Variables | West (1) | East before (2) | East after (3) |
|---|---|---|---|
| Cohort trend | 0.03 | 0.05 | 0.06 |
| | (0.01) | (0.09) | (0.21) |
| Female (ref. male) | -0.64*** | -1.19 | -1.34 |
| | (0.31) | (1.34) | (2.84) |
| *Parental education (Ref.: Low educational level)* | | | |
| Intermediate educational level | 0.54*** | 0.64 | - |
| | (0.26) | (0.98) | |
| High educational level | 1.81*** | 0.97 | 6.34 |
| | (0.33) | (1.08) | (3.45) |
| *Mother's education (Ref. same education as father)* | | | |
| Mother's education higher than father's | 0.29 | 1.18*** | -0.03 |
| | (0.19) | (0.53) | (3.36) |
| Mother's education lower than father's | -0.09 | 0.02 | 2.08 |
| | (0.13) | (0.34) | (3.12) |
| *Parental class (Ref.:Working class)* | | | |
| Intermediate parental class | 0.34 | 0.82 | -6.07 |
| | (0.18) | (0.49) | (4.52) |
| Salariat | 0.72*** | 0.19 | -4.38 |
| | (0.21) | (0.54) | (5.02) |
| Parental status | 0.03*** | 0.05*** | -0.05 |
| | (0.006) | (0.01) | (0.14) |
| *Interaction terms* | | | |
| Cohort trend×sex | 0.02*** | 0.04 | 0.07 |
| | (0.01) | (0.02) | (0.07) |
| Cohort trend×intermediate educational level | 0.0001 | -0.08 | - |
| | (0.01) | (0.08) | |
| Cohort trend×high educational level | -0.001 | -0.07 | -0.18*** |
| | (0.01) | (0.09) | (0.09) |
| Cohort trend×mother's education higher than father's | -0.0004 | -0.07 | -0.02 |
| | (0.01) | (0.04) | (0.09) |
| Cohort trend×mother's education lower than father's | 0.002 | 0.02 | -0.06 |
| | (0.005) | (0.02) | (0.08) |
| Cohort trend×intermediate parental class | -0.01 | -0.03 | 0.15 |
| | (0.01) | (0.04) | (0.12) |
| Cohort trend×salariat | -0.007 | 0.02 | 0.13 |
| | (0.01) | (0.04) | (0.13) |
| Cohort trend×parental status | -0.0001 | -0.002 | 0.002 |
| | (0.0003) | (0.001) | (0.004) |
| Female×intermediate educational level | -0.02 | 1.40 | - |
| | (0.24) | (1.25) | |
| Female×high educational level | -0.17 | 1.97 | -0.48 |
| | (0.29) | (1.33) | (0.59) |
| Female×mother's education higher than father's | -0.02 | -0.93 | 0.55 |
| | (0.16) | (0.61) | (0.55) |
| Female×mother's education lower than father's | -0.03 | -0.34 | -0.46 |
| | (0.12) | (0.37) | (0.56) |
| Female×intermediate parental class | 0.02 | 0.36 | 0.29 |
| | (0.16) | (0.55) | (0.76) |
| Female×salariat | -0.05 | 0.24 | 0.25 |
| | (0.18) | (0.57) | (0.85) |
| Female×parental status | 0.01 | -0.01 | -0.008 |
| | (0.01) | (0.01) | (0.03) |
| Constant | -3.63*** | -4.35*** | -4.22 |
| | (0.33) | (1.11) | (7.82) |
| Pseudo $R^2$ | 0.18 | 0.15 | 0.15 |
| Observations | 9,097 | 2,080 | 502 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

birth cohort (-0.64+ 0.02x42=0.2)). *This finding confirms Hypotheses 17 and 18,* that families increasingly adopt a more gender-egalitarian view across cohorts because of rising labour market returns to women's educational investments in West Germany (based on increasing female (part-time) labour force participation and the rise of dual earner couples).

As already shown in Table 5-5, there are also autonomous statistically significant associations for parental education,[42] parental class, and parental status in West Germany (see Table 5-6). However, Model 1 in Table 5-6 shows that mother's education relative to father's education is not statistically significant. In addition, as I have already discussed with reference to Table 5-5, the social origin associations do not change across birth cohorts in West Germany (see Table 5-6). Hence the three social origin mechanisms have a persistent association across cohorts in West Germany.

Moreover, the two-way interactions between the dummy variable female and, respectively, parental education, mother's education relative to father's education, parental class, and parental status are also not statistically significant in West Germany. *This evidence for West Germany is not in line with Hypotheses 19 and 20* in which I expected girls from lower educated parents or from disadvantaged parental classes to be less likely than boys to make the transition to 'Gymnasium' because their parents have more traditional gender attitudes than parents from the salariat or with higher education. Moreover, *this finding for West Germany contradicts Hypothesis 21* in which, I expected that girls from high-status parents would be more likely to make the transition to 'Gymnasium' than boys, because high-status parents invest more in their daughters' cultural resources (highbrow culture).

[42] The intermediate parental education effect is not significant both in the linear probability model and in a model including the sampling stratification weights.

Furthermore, because the three-way interactions between cohort trend, gender and the four social origin variables (parental education, mother's education relative to father's education, parental class, and parental status) are not statistically significant, I do not report them in Model 1 of Table 5-6. Thus, the social origin associations do not change across birth cohorts for boys and girls in West Germany.

In Model 2 of Table 5-6, I look at the transition probabilities to 'Erweiterte Oberschule' for girls and boys in East Germany before German unification. This model suggests that the gender association with making the transition to 'Erweiterte Oberschule' was already small in the GDR for the oldest birth cohort. *This finding supports my Hypothesis 16* that gender differences in access to the academic track should have been smaller in the GDR for the oldest birth cohorts already, because women in the socialist economy participated fully in the labour market. Thus, traditional gender roles such as the male breadwinner and female homemaker were less important for educational decisions in the GDR. In addition, the interaction coefficient for the cohort trend and gender is not statistically significant. Indeed, all these empirical findings indicate that the GDR introduced a gender equalization policy in education earlier than the FRG that effectively reduced gender differences at access to 'Erweiterte Oberschule'.

Parental status is the only social origin indicator that is statistically significant and positive in the GDR. This result differs from the finding in Table 5-5 in which parental status was not significant in the GDR. However, parental education and mother's education relative to father's education are not important for the transition to 'Erweiterte Oberschule' in the GDR. These empirical results underline the findings in Table 5-5.

In the GDR, the two-way interaction coefficients of the cohort trend and the social origin indicators of parental education, parental class, and parental status are also not sta-

tistically significant.[43] In addition, the interaction coefficients of the dummy variable female and the social origin indicators are also not statistically significant in the GDR. Thus, girls from parents with lower social backgrounds did not differ from boys in the transition to 'Erweiterte Oberschule'. Therefore, *my Hypotheses 19 and 20* that lower educated parents or working class parents send their daughters less often to the academic track in the GDR *cannot be confirmed.* Furthermore, *Hypothesis 21* that girls from higher status families invest more in their daughter's cultural resources *must be rejected* for the GDR.

A model including the three-way interactions between cohort trend, the dummy variable 'female' and dummy variables for the four social origin variables (not reported here) reveals that children whose mothers have a higher education than their fathers are less likely to make the transition to the academic track across birth cohorts. This means that mothers' relative educational association with making the transition declines over time particularly for girls. This model also shows that girls from lower parental class backgrounds were disadvantaged at the transition to the academic track among the oldest birth cohorts in the GDR, and that they catch up in their transition probabilities across birth cohorts.

Finally, in Model 3 of Table 5-6, I focus on East Germany after unification. None of the coefficients are statistically significant. This suggests that also after German unification there are no substantial gender differences in East Germany.

## 5.3 Summary

The aim in this chapter was to describe inequalities at the transition from primary school to the academic track and their changes across birth cohorts in (1) West Germany, (2) East Germany before unification, and (3) East Germany after unification. Using longitu-

[43] In the linear probability model, the interaction between cohort in years and parental status is statistically significant.

dinal data on individuals' educational careers from the NEPS, I analysed whether autonomous social origin associations with the transition probability to the academic track operate through parental education, parental class and parental status. In addition, I explored whether there are differences between girls and boys particularly with regard to social origin associations.

The comparison of educational inequality at the transition to the academic track between East and West Germany is interesting because these two parts of Germany were shaped by completely different political, ideological and economic systems for a period of about 40 years. Whereas the FRG experienced a massive expansion of 'Gymnasium' attendance across birth cohorts, the GDR restricted access to 'Erweiterte Oberschule' leading to a contraction of attendance across birth cohorts. Only after German unification, could East Germany massively expand its access to the academic track. Furthermore, tracking took place very early in the former FRG compared to the GDR. After German unification, however, when the West German educational system was imposed on East Germany, tracking also started at a younger age for children in East Germany.

Estimating the parental education, parental class, and parental status associations simultaneously in a logit model suggests that each of the three social origin indicators has its own relevance for making the transition to 'Gymnasium' in West Germany. This result provides support for three conclusions. First, the positive coefficient of parental education is consistent with the argument that parental education has a strong link with children's educational attainment. Higher educated parents are better able to cognitively prepare and motivate their children for 'Gymnasium' and they know from their own experiences how to guide their children to the academic track and beyond. Furthermore, they are also better equipped to help their children with homework and exam preparation. Second, the positive coefficients of the dummy variables for parents from economically privileged classes

suggest that class also matters. The costs of longer schooling in the academic track are less relevant for children from parents with higher income and greater economic security than children from economically disadvantaged classes. It is also easier for advantaged classes to pay for expensive preschools and tutoring in primary school that supports children's school performance. Third, the positive coefficient of parental status is also consistent with the claim that social distinction, lifestyle, and group membership are relevant for educational success. Social networks have a strong influence on parental educational aspirations for the academic track. Children from higher status parents are also part of a middle-class culture that is favoured by teachers and schools. Finally, higher status parents have networks that help them to gain important information on how the educational system works, and this makes it easier to get the teacher's recommendation for the academic track.

In East Germany *before* German unification only parental class is important for making the transition to the academic track. This supports Mayer's and Solga's (1994) finding that class was the most important mechanism of social origin even though the GDR was a socialist system. Thus, compared to the FRG, fewer social origin mechanisms were at work at the transition to the academic track in the GDR. Parental class is also the only social origin dimension that is important for the transition to 'Gymnasium' in East Germany *after* German unification. Although East Germany has adopted the capitalist market economy and the educational system from West Germany, my estimations suggest that the mechanisms driving inequality at the transition to the academic track in East Germany before and after German unification are alike.

I also estimated a model including the interaction between cohort trend and the various social origin variables. However, these interaction coefficients are not significant in (1) West Germany, (2) East Germany before unification, and (3) East Germany after unifica-

tion. This suggests that the different mechanisms of parental inequality had quite a persistent association with the transition rate to the academic track over time.

Because the relationship between the independent variables and the predicted probabilities in the logit model is non-linear and difficult to interpret, I also estimated predicted probability plots. These estimations are based on a logit model including all three social origin variables simultaneously. The transition probability plots reveal that each of the origin factors of parental education, parental class and parental status is important for the transition to 'Gymnasium' in West Germany. The influence of parental education seems to be the most important in West Germany.

A comparison of the changes in predicted probabilities in (1) West Germany, (2) East Germany before unification and (3) East Germany after unification shows that in West Germany all social origin groups profit from educational expansion. In this process, educational inequalities also tend to diverge slightly in West Germany. The results for East Germany before unification are rather different. For all combinations of parental origin groups (in terms of parental education, parental class and parental status), the transition probabilities of children are declining across cohorts. This decline is a consequence of the policy of restrictive access to 'Erweiterte Oberschule' in the GDR. Thus, an important result of my analysis is that the differences in the predicted probabilities between social origin groups are strongly shrinking in the GDR. This finding does not confirm the prediction of the so-called *socialist transformation theory* (see Mateju, 1993; Shavit & Blossfeld, 1993) claiming that after the establishment of the new socialist elites, educational inequalities would increase. However, after German unification, the predicted probability plots for East Germany indicate that educational inequality is increasing again. In East Germany after unification, there has been a quick quantitative expansion of the transition to 'Gymnasium' for all social origin groups. Differences in the predicted

probabilities for all three social origin indicators are slightly increasing even if these changes are not statistically significant. However, these large confidence intervals are also a consequence of the small sample size for East Germany after unification. Overall, the probability plots show some signs of a rising educational inequality in East Germany after German unification. The increasing economic competition in the capitalist system in reunified Germany seems to lead to a divergence of social origin groups' transition probabilities to the academic track in East Germany.

With regard to gender differences at access to 'Gymnasium' and 'Erweiterte Oberschule', girls were less likely than boys to make the transition to 'Gymnasium' in the oldest birth cohorts in West Germany. Across cohorts, West German girls caught up with boys and eventually surpassed them among the younger birth cohorts. In the GDR, girls and boys had already basically the same transition probabilities to 'Erweiterte Oberschule' in the oldest birth cohorts. After unification girls also do not differ much from boys in their transition probabilities to 'Gymnasium'. In sum, the hypothesis that traditional gender norms had a stronger impact on the transition probability for the oldest births cohorts in West Germany could be confirmed. There was no difference in the parental education, parental class and parental status associations for girls and boys at the transition to the academic track in (1) West Germany, (2) East Germany before unification, and (3) East Germany after unification. Thus, the gender-specific claims with regard to the three social origin mechanisms are not consistent with the empirical evidence.

In conclusion, my empirical analysis contributes to the literature by providing a detailed comparison of social origin dimensions at the transition to the academic track in East and West Germany. My findings indicate that the different social origin dimensions have a quite different importance for West Germany, East Germany before unification, and East Germany after unification. In addition, the predicted probability plots show that

transition probability differences among the social origin groups are increasing in West Germany and decreasing in East Germany before unification. In East Germany after unification, probability differences increase slightly in access to ‘Gymnasium’. Furthermore, I could show that there are no social origin differences among girls and boys in access to the academic track in East and West Germany.

Further theoretical implications and limitations of the findings are reported in Chapter 8.

# 6 Social origin, between-track mobility, early dropout, and the attainment of ‘atypical‘ degrees in the general education system in East and West Germany

The previous chapter gave a detailed description of the changes at the first major educational transition in the German school system, namely the transition from primary school to the academic versus non-academic track in secondary school. In this chapter, I follow these pupils from their start in the academic and non-academic track until the end of their participation in the general school system. The sample is restricted to individuals who age 25 and above. The West German tracking system is known as being highly rigid. Early placements in the academic or non-academic secondary school track are therefore hard to revise (Buchholz & Schier, 2015). Nonetheless, based on various educational reforms in the last decades, many people believe that the German tracking system has become more open and has given families more choices to change the direction of their children’s educational trajectories (Buchholz & Schier, 2015; Henz, 1997a; Schindler, 2015; Schuchart, 2006). Today, it is still unclear how far a higher permeability really has emerged across cohorts between the tracks in the general education system, and whether this opening up has led to a decline or even further reinforcement of educational inequalities for children from different social origins. Thus, I am mainly interested in studying how far first educational placements in secondary school determine the subsequent school career of children from different social origins. I focus my empirical analysis on three specific events in the general education system: (1) dropout from the non-academic and academic track after the end of compulsory school age without attaining any educational degree; (2) school track mobilities between the academic and non-academic tracks; and (3) leaving the academic or the non-academic track with an ‘atypical’ degree; that is, pupils who left the academic track earlier with only ‘Hauptschulabschluss’ or ‘Mittlere Reife’ and pupils who obtained a ‘Fachhochschulreife’ or an ‘Abitur’ on the non-academic track.

Although the West German educational system is often characterized by a tripartite structure (‘Hauptschule’, ‘Realschule’ and ‘Gymnasium’), I shall not analyse mobilities between ‘Hauptschule’ and ‘Realschule’, because during the last two decades, the German school system is transforming broadly into a bifurcated structure in which the two school types are fusing into one single school track in both East and West Germany (Helbig & Nikolai, 2015). To avoid difficulties in the analysis of between track mobility emerging from these changes in the school structure, I concentrate my analysis only on the mobilities between schools of the academic track (the ‘Gymnasium’, the ‘Waldorfschule’, the academic track at the comprehensive school, and the ‘Erweiterte Oberschule’) and schools of the non-academic track (the ‘Hauptschule’, the ‘Realschule’, the non-academic track of the comprehensive schools and the ‘Einheitsschule’).

In my analysis I am interested in the following questions: How frequent are (1) dropping out from the educational system after the end of compulsory schooling without any educational degree, (2) the directional moves between the academic and non-academic tracks and (3) ‘atypical’ degrees? Has the likelihood of those three events changed across cohorts? And what is the relationship between family background and dropping out from the educational system, being mobile between school tracks and obtaining an ‘atypical’ degree? In addition, for all three types of events (dropout with no educational degree, between-track mobilities, and attainment of ‘atypical’ degrees), I shall also examine gender and East–West German differences.

I start off with a short review of the institutional changes in the school systems in East and West Germany that are supposed to have increased the openness of lower secondary education. I shall then give a short overview of previous research on this topic. Then, I shall integrate the various family resources (parental education, parental class and parental status) into a common framework of educational decision making (Erikson and Jons-

son 1996, Breen and Goldthorpe 1997; Esser 1999; Becker 2003) within the secondary school system and formulate hypotheses on how social origin, gender and being born in East or West Germany influence (1) the likelihood of dropping out from the education system without any educational certificate, (2) downward mobility to the non-academic track, (3) upward mobility to the academic track, (4) the decision to leave the academic track with only 'Hauptschulabschluss' or 'Mittlere Reife' and (5) the attainment of a higher education entry certificate on the non-academic track. Finally, I shall present my empirical results and draw conclusions based on this evidence.

## 6.1 Educational reforms and the changing permeability between school tracks in the general education system of East and West Germany

In the sociological literature on educational inequality in West Germany, it has become well established that the influence of parental characteristics on their children's educational trajectories is particularly marked at the transition from primary to secondary school. Compared to this first major transition, associations between parental resources and subsequent educational transitions seem to be much weaker and then generally decline with age (Becker, 2009, p. 104; Henz & Maas, 1995, p. 35). Often, this strong relationship is explained by children's poorly developed decision-making competencies at the age of 10 or 12 (Jacob & Tieben, 2010, p. 145). Thus, parents have to make the first major educational decisions on their children's behalf. Furthermore, it is argued that the prediction of children's future cognitive and non-cognitive capabilities at this early stage of their lives is relatively uncertain. Hence, parents are more likely to make educational decisions on basis of their own interests than on the basis of their children's previous school achievement (Jacob & Tieben, 2010, p. 145).

One consequence of this is that pupils who are less able might have been allocated to the cognitively more demanding academic track in secondary school, whereas other pupils, who would be able to succeed in the academic track, might have been allocated to

the non-academic track. In any case, misallocations of students to the academic or non-academic track are likely to happen (see Bos et al., 2004), and could, in principle, be resolved by between-track mobility in the later school career.

However, for the older birth cohorts in my study, Henz (1997a, p. 563) has already shown that the first educational transition to secondary school has largely determined children's subsequent educational careers and final educational attainments in West Germany. Based on institutional constraints, there was basically not much room for parents to correct early educational decisions in this historical period. Nonetheless, in the process of educational expansion, several educational reforms have been introduced on the lower secondary level that might have created more opportunities to revise previous educational decisions at the first transition in West Germany (Helbig & Nikolai, 2015, p. 173; Henz, 1997a, p. 53). To facilitate mobility between school tracks, (1) the curricula of the 'Gymnasium', 'Realschule', and 'Hauptschule' were made more similar and (2) a foreign language has been introduced to the 'Hauptschule' and 'Realschule' curricula in West Germany (Jacob & Tieben, 2010, p. 157). Moreover, (3) entrance examinations for the 'Gymnasium', (4) the criteria of very good grades, (5) knowledge of a second foreign language as necessary precondition for moving up to the 'Gymnasium', and (6) the probation phase at the 'Gymnasium' in Grades 5 and 6 have been abolished in many West German federal states (Helbig & Nikolai, 2015). However, until today, regulations regarding the necessary grades to move up to the 'Gymnasium' still vary a lot between West German federal states (Helbig & Nikolai, 2015). For instance, some federal states do not allow moving to the 'Gymnasium' after the 9$^{th}$ grade (Helbig & Nikolai, 2015). Furthermore, comprehensive schools were introduced in some of the federal states in the 1970s, facilitating the move between different curricula levels within one school (Kultusministerkonferenz der Länder 2014b: 8). In the 2000s, 'Hauptschulen' and 'Realschu-

len' were combined into one school track (Helbig & Nikolai, 2015). All these measures have been intended to increase upward mobility opportunities for late bloomers.

In the German Democratic Republic (GDR), children attended a comprehensive school ('Einheitsschule' – General Education Secondary School) at the lower secondary level. Thus, no mobility between school types was theoretically possible before the age of 15 or 16 (Mitter, 1990, p. 176). However, until the 1980s, it was possible to move to preparation classes for the 'Erweiterte Oberschule' (EOS) in Grades 9 and 10. These were often allocated directly to the EOS, so that these children left the 'Einheitsschule' earlier (Mitter, 1990, p. 176). Hence, it was practically possible to move between the school tracks of the 'Einheitsschule' and the 'EOS' before the 11$^{th}$ grade. After 1982, the transition to EOS was possible only after the 10$^{th}$ grade of the 'Einheitsschule' (Mitter, 1990, p. 177). This is also the time when the school career at the 'Einheitsschule' ended in the GDR. Thus, after the mid-1980s, there should have been no mobility between school tracks in lower secondary school in the GDR. After German unification, when East Germany to a major extent took over the West German education system, tracking into two school forms was introduced after either Grades 4 or 6 (Helbig & Nikolai, 2015, p. 300). Consequently, mobility between school tracks should be more frequent in present-day East Germany.

## 6.2 Review of previous research findings

There is not much research on school dropout in the German school system (Hoffmann, 2010; Solga, 2002). For example, Hoffmann (2010) used data from the German Socio-Economic Panel (GSOEP) to show that children from lower social origins and boys are more likely to leave the German education system without an educational degree. Hoffmann (2010) also demonstrated that East Germans are more likely to leave the education system without any proof of qualification. Stamm (2010) reported that particularly lower

social origin children are more likely to drop out from the academic track than higher origin children.

Moreover, only a few studies have examined mobilities between school tracks in the general education system in Germany. Often, these studies concentrated on West Germany alone (Henz, 1997a; Jacob & Tieben, 2010) or reunified Germany (Helbig, 2012). Empirical findings on whether the rate of upward track mobility is higher, similar or lower than downward track mobility are mixed. For example, Henz (1997a, p. 58) finds for the 1929–31, 1939–41, 1949–51, 1954–56, and 1959–61 birth cohorts from the German Life History Study (GLHS) that there is more upward than downward mobility in West Germany. Glaesser and Cooper (2011) come to similar conclusions. However, for the youngest 1959–61 birth cohort, Henz (1997a, p. 59) finds similar rates of upward and downward moves. In contrast, school researchers using official school data come to the conclusion that there is still much more downward than upward mobility between school tracks (Köller et al., 1999). Buchholz et al. (forthcoming) also support this conclusion with their new study. It should be pointed out that upward and downward mobility are generally relatively rare events (Köller et al., 1999).

Furthermore, Henz (1997a) found that there are strong links between social origin (measured in terms of parental education and socio-economic status) and the probability of being upwardly or downwardly mobile. Jacob and Tieben (2010), who also use the GLHS, come to a similar conclusion. However, they use only parental education as an indicator for social origin. Moreover, Trautwein et al. (2011) report similar findings on social origin for the federal state of Baden-Wuerttemberg. Glaesser and Cooper (2011) also find a strong social selectivity in mobilities between school tracks. In general, children from advantageous backgrounds have a higher rate of upward mobility and children from disadvantageous origins have a lower rate of downward movement. Recent findings

based on data from the 'Educational Processes, Competence Development and Selection Decisions in Preschool and School Age' (BiKS) project by Buchholz et al. (forthcoming) suggest that social selectivity increases over the educational career if children are mobile in secondary school. Furthermore, a recent study by Ditton (2013a), which uses longitudinal data from the Competence Development and Educational Careers in the School System (KOALA) study, reveals that children who demonstrated lower performance in primary school are more likely to move downwards from the 'Gymnasium' in Bavaria. Furthermore, Ditton (2013a) also finds strong social origin effects on downward mobility in Saxony and Bavaria. Using data from the NEPS, Helbig (2012) reported that girls were less likely to move to the 'Gymnasium' from the non-academic track among the older cohorts. However, across birth cohorts, they are now catching up. Today, girls are even more likely than boys to make the transition to the 'Gymnasium'. Using information on parent's education and status, Helbig (2012) finds that for girls, parental education is particularly relevant for the movement up to the 'Gymnasium'. For boys, parental status is more important. In addition, Helbig (2012) shows that girls are less likely than boys to move down from the 'Gymnasium' across birth cohorts. Higher parental education is particularly relevant for avoiding downward mobility for boys, and parental socio-economic status is particularly important to prevent downward moves of girls.

Finally, I am not aware of any research that has systematically analysed the issue of 'atypical' degrees across cohorts.

## 6.3 Theories and hypotheses

In this section I formulate hypotheses for my empirical analysis of (1) dropping out of the school system after the end of compulsory school age without any educational degree, (2) mobility between the academic and non-academic tracks in the general education system, and (3) leaving the academic and the non-academic track with an 'atypical' degree.

As in the previous chapter, I consider the family as the primary unit of social stratification (see Chapter 5). Hence, I constructed family background information following the dominance approach[44] (Erikson, 1984). Moreover, I regard social origin effects as multidimensional (Buis, 2013; Bukodi & Goldthorpe, 2013). Again, I distinguish parental education, parental class and parental status resources and their associations with the probability of leaving the educational system without any educational degree, the mobility processes between school tracks or with an 'atypical' degree. I argue that families with different educational, economic, and social resources, who make cost-benefit calculations and have different success probability expectations, make different decisions with regard to leaving the educational system without a degree. Furthermore, families and children from different social backgrounds should vary in their decisions to move upward and downward in secondary school (Becker, 2009; Jacob & Tieben, 2010, p. 153) or to obtain an 'atypical' degree.

### 6.3.1 Dropping out of the general education system without any educational degree

Students who have repeated (several) school years and/or fail to reach the ultimate goals of the non-academic track at the end of compulsory schooling normally have to leave the education system without any certificate. Dropout from the educational system without any degree can also be observed on the academic track, if pupils do not reach the goals of the upper secondary schools, and due to their age, are no longer admitted to schools in the non-academic track.

Due to the efforts of the state to reduce the proportion of school leavers without any educational degree and based on the rising general educational participation in the process of educational expansion (Solga, 2002), *I expect the proportion of pupils who drop out*

[44] For more details on this procedure see Chapter 5.

*from the non-academic and academic track after the end of compulsory school age without attaining any educational degree to be declining across birth cohorts (Hypothesis 1).*

Moreover, *I expect that particularly families with higher educational, economic, and social resources avoid having their children drop out of the educational system without any educational certificate* (*Hypothesis 2* – for more details on the various origin mechanisms see the Section 6.3.2 on downward mobility). Furthermore, because women are, on average, the better behaving pupils in school (see the arguments below in Section 6.3.6), *I assume that women are generally less likely than men to leave the educational system without any educational degree (Hypothesis 3). Finally*, it remains an empirical question whether *East and West Germans differ in their likelihood to leave the educational system without an educational degree.*

### 6.3.2 Downward mobility to the non-academic track

Downward mobility from the academic to the non-academic track can have manifold meanings. First, in some federal states in unified Germany (Hamburg, Lower Saxony, Bremen, Baden-Württemberg, Hesse, Bavaria and Thuringia), there are probation periods at the 'Gymnasium' lasting one or two years (Helbig & Nikolai, 2015, p. 170). If students do not perform as well as expected in the academic track, schools have the option to send them to the non-academic track (Helbig & Nikolai, 2015, p. 156). Thus, in this case, downward mobility is less the result of families' or children's own decisions, but the result of institutional regulations. Second, downward mobility from the academic track often also constitutes a reaction of parents to their children's low school performance in the academic track (Henz, 1997a). To avoid a complete dropout from the educational system through demotivation, parents often decide to send their children to the non-academic track – which has a less demanding curriculum and therefore offers a higher probability

of successful school completion (Jacob & Tieben, 2010, p. 154). I expect parents with different educational, economic, and social resources to vary in their decisions to send their children to the non-academic track.

First, if children experience difficulties at the 'Gymnasium' or the 'Erweiterte Oberschule', *less educated parents* tend to assess the probability of their children succeeding in the academic track as lower than higher educated parents, because they often cannot help their children with homework and exam preparation – particularly in subjects such as foreign or classical languages and mathematics (Lareau, 1989, pp. 2–3). Furthermore, because less educated parents often do not really know how the academic track of the educational system works (Lareau, 2015, p. 20), they should be more uncertain and pessimistic with regard to their children's success on the academic track. Thus, children from less educated parents should have a higher likelihood of moving downwards to the non-academic track. In turn, higher educated parents tend to consider their children's probability of succeeding in the academic track as higher because they can support their children in, for instance, (foreign) languages or mathematics in the upper secondary school. *Higher educated parents* also tend to evaluate their children's success probability on the academic track as higher, because they know from their own experiences that one can also succeed in these schools without being a high achiever. Moreover, higher educated parents often have better knowledge regarding when it is important to intervene in the school career of their children in order to avoid a downward move to the non-academic track. In sum, I expect children from higher educated parents to have a lower probability of moving to the non-academic track.

Second, *parents from the working class* are more often restricted by their economic resources and are more likely to experience less economic security in their jobs (e.g. they more often have episodes of unemployment or work in precarious employment relation-

ships). According to *time horizon theory* (S. Hillmert & Jacob, 2003), working class parents should therefore be more likely to send their children to the non-academic track, if they do not show the required school performance on the academic track (the non-academic track has a shorter duration and allows children to start working life earlier). Thus, the non-academic track is less costly for working class parents and fits better into their more short-sighted planning possibilities (S. Hillmert & Jacob, 2003). Furthermore, based on their class position, *families from the working and intermediate classes* value higher education less than families from the salariat, because these families can already secure their class position, if their children obtain a non-academic degree (Breen & Goldthorpe, 1997). Therefore, they feel less negative pressure about sending their children to the non-academic track. Conversely, *families from the salariat* can more often afford the costs of longer schooling, even if their children seem to be performing poorly on the academic track. It is also easier for them to pay for additional private tutoring should it be needed. In addition, they have a more secure economic position on the labour market, making it easier for them to pursue farsighted educational plans for their children. Finally, parents from the salariat will do whatever it takes to ensure that their children reach a similar position in the stratification system as they have achieved themselves (Breen & Goldthorpe, 1997). This implies staying − as far as possible − on the academic track. This goal of families is commonly labelled as the *status maintenance motive* (Breen & Goldthorpe, 1997). Thus, families from the salariat experience the painful additional cost of social demotion if their children leave the academic track compared to families from the working and intermediate classes. Thus, I expect children from the salariat to have the lowest likelihood of moving downward from the academic to the non-academic track.

Third, if children have a mediocre or low school performance, *low-status parents* are expected to evaluate the goal of achieving an academic degree as lower, because they

have social networks that do not generally expect children to achieve an academic degree. These networks are also less helpful in giving any necessary advice and help for their children in school (Roth et al., 2010, p. 182). Consequently, children from low-status families should be more likely to send their children downwards to the non-academic track. In contrast, *high-status parents* are more likely to be friends with other high-status people who generally have higher educational aspirations for their children (Roth et al., 2010, p. 183). These networks are also more likely to provide a source of advice if children have school problems. Thus, children from high-status parents should have a lower probability of moving down to the non-academic track.

In summary, *I expect that particularly less educated parents, parents from the working class, and parents with low status will be more likely to send their children down to the non-academic track (Hypothesis 4).*

A competing hypothesis is that the non-academic track in Germany still provides (1) the opportunity to gain a higher education entry certificate later in life (via institutions of second chance education) and (2) access to vocational training that promises decent rewards on the labour market, low unemployment risks, and quite stable and secure employment careers (Estevez-Abe et al., 2001, p. 156; Müller & Pollak, 2010, p. 310). Therefore, the move from the academic to the non-academic track can be seen as an opportunity for parents of low-performing students from all social origins to maintain their children's motivation to learn and to keep all options open (Estevez-Abe et al., 2001, p. 156). Thus, according to *this second theory, I expect there to be no significant differences with respect to parental education, parental class and parental status in the likelihood of moving to the non-academic track (Hypothesis 5)*

### 6.3.3 Upward mobility to the academic track

In recent decades, more opportunities for upward mobility to the academic track have been introduced into the German secondary education system. These changes allow children exhibiting a school performance on the non-academic track that is appropriate for the upper secondary school, to correct their wrong allocation (Henz, 1997a; S. Hillmert & Jacob, 2010, p. 66). In the literature, there are two theoretical perspectives on who profits particularly from this increasing openness to move up from the non-academic to the academic track. One position emphasizes that it is particularly children from lower social origins who will profit from these newly created opportunities, because these children often need more time to develop and to demonstrate their abilities at school. Children from disadvantaged backgrounds are also the ones who are more often placed in the non-academic track, even if they have performed quite well in primary school (Bos et al., 2004). There are two possible reasons for this wrong allocation: first, disadvantaged children are less likely to get the necessary teacher recommendation for the academic track, even if they perform well (Dollmann, 2016). Second, disadvantaged families are generally more risk averse (Breen & Goldthorpe, 1997) and therefore prefer to choose the less demanding non-academic track for their children at the end of primary school. Thus, it is claimed that it is particularly *children with lower social origin characteristics who are more likely to move up from the non-academic to the academic track (Hypothesis 6)* (Henz, 1997a; Jacob & Tieben, 2010).

The opposite position predicts that social inequalities will even be enforced by facilitating the move from the non-academic to the academic track, because privileged families obtain more scope to pursue their goals in school. Because privileged families not only have more resources to help their children in the transition to upper secondary school but also try to avoid their children's social demotion by making a greater use of these additional opportunities, privileged children will have a particularly high probability of mov-

ing up to the academic track (Henz, 1997a; Jacob & Tieben, 2010). For instance, *compensatory advantages theory* (Bernardi, 2012) claims that if children from advantaged family backgrounds have been previously placed on the non-academic track, their parents will do everything to counterbalance this previous failure of their children and place them on the academic track. Of course, these mechanisms work through different channels:

First, *higher educated parents* can help their children in school so that they can more easily demonstrate the required cognitive and non-cognitive skills needed to move up to the academic track. This is also commonly known as the *primary effect*[45] of social origin. Thus, highly educated parents are more likely to evaluate their children's probability of successfully completing the academic track as higher than less educated parents (*secondary effect* of social origin). Furthermore, the curricula of academic and non-academic tracks are very different. With every year children remain on the non-academic track, it becomes harder for them to move up to the academic track, because the knowledge gap between these two tracks is increasing − particularly in terms of foreign languages, science and mathematical skills. The actual movement of children from the non-academic to the academic track is therefore connected to a demanding catching-up process and requires great efforts. Of course, higher educated parents are better able to support their children's endeavours to make the transition to the academic track (Jacob & Tieben, 2010, p. 156). In addition, higher educated parents are often better informed about the institutional opportunities and requirements of the transition to the academic track than less educated parents. In particular, higher educated parents are often more likely to interact with children's teachers and take part in all kinds of school events. Moreover, they have experience with the higher education system themselves. Therefore, the probability to

[45] Boudon (1974) introduced the term 'primary effect' into the literature on the sociology of education. Such effects indicate the strong influence social origin on children's school performance.

move up to the academic track should be higher for children from higher educated parents.

Second, *families from the salariat* are particularly able to provide their children with a better learning environment, and they can pay for additional tutoring. This makes it easier for their children to move up to the academic track. Moreover, the academic track requires farsighted educational planning. Families from the salariat often have secure employment that allows them to develop long-term educational plans. Therefore, parents from the salariat should be more likely to send their children from the non-academic to the academic track. Conversely, *time horizon theory* (Hillmert & Jacob, 2003) claims that *working class parents* are reluctant to send their children to more long-term academic tracks, even if they show outstanding performance on the non-academic track. Working class parents are more likely to be employed in precarious jobs and are more likely to experience episodes of unemployment (Goldthorpe, 2000a, 2012). These circumstances often allow only short-sighted educational plans for their children. Therefore, working class parents should be less likely to send their children to the academic track.

Finally, *higher status parents'* educational aspirations are often influenced by interactions with members of their social group. Thus, higher status parents will evaluate the benefits of the academic track for their children more highly than lower status parents. Higher status families are also more likely to have friends and family members who have experience with upper secondary education (Lareau, 1989). This makes them better informed about possible options to move up to the academic track (Roth et al., 2010, p. 183). Moreover, good school performance is a necessary requirement for upward mobility to the 'Gymnasium' or the 'Erweiterte Oberschule'. Here as well, higher status parents also have better opportunities to ask their friends and family for help concerning their children's homework or exam preparation (Roth et al., 2010, p. 183). Thus, higher status

parents are expected to evaluate the probability of a successful transition to the academic track as higher. Furthermore, children from high-status families are more familiar with the style of social interaction and the middle-class culture of upper secondary schools (Boudon, 1974; Bourdieu, 1984). In turn, children from lower status parents have more difficulties in adjusting to the expected codes of conduct and manners in school. Hence, teachers are more likely to give better grades to high-status children, and these are important for having the opportunity to move up to the academic track.

In sum, *I expect children from higher educated parents, from the salariat and from families with higher status to be more likely to make the transition from the non-academic to the academic track (Hypothesis 7).*

### 6.3.4 Changes of mobility rates between tracks across birth cohorts

On the one side, across birth cohorts, an increasingly smaller and (in terms of lower cognitive abilities) probably more selective group of students starts its educational career on the non-academic track after primary school (see Chapter 5). This type of selection across cohorts should generally reduce the rate of upwardly mobile students from the non-academic track to the academic track. However, at the same time, many reforms have been introduced in the (West and East) German school system in order to increase permeability from the non-academic to the academic track − and this should increase the rate of upward moves. It is therefore hard to predict whether the rate of upward moves will be increasing, stable or decreasing across cohorts. On the other side, my Chapter 5 revealed that students are becoming increasingly successful across birth cohorts in making the first transition to the academic track after primary school. Thus, the ability composition of children starting on the academic track is increasingly shifting towards a lower average level across cohorts, which should increase the rate of downward mobility to the non-academic track. However, it is unclear whether the achievement standards of schools on

the academic track have remained stable over time during the process of educational expansion, or whether they have adjusted to these shifts in the ability composition. In sum, *based on the retrospective National Educational Panel Study (NEPS) data, covering a long series of birth cohorts without competence information, it is basically an empirical question whether the observed rates of upward and downward mobilities are increasing, stable or decreasing across cohorts.*

### 6.3.5 East-West German differences in track mobility

Compared to the tracked school system in the Federal Republic of Germany (FRG), the GDR had a comprehensive school system. As a result, mobilities between school tracks were in principle not possible. However, in some cases children moved earlier to preparation classes at the EOS. Therefore, mobility between school types did indeed happen. Access to the EOS was, however, very restricted, so that students who went to EOS were a carefully selected group. Due to this restricted access *to the EOS, I expect that upward mobility to the academic track was lower in the GDR than in the FRG (Hypothesis 8). Furthermore, I expect that downward mobility to the non-academic track was much lower in the GDR than in in the FRG (Hypothesis 9).* It is, however, an empirical question whether *upward and downward mobilities between tracks have increased in East Germany since German unification when the GDR comprehensive school system was abolished and replaced by a bifurcated school structure.* Unfortunately, due to the small number of events of between-track mobilities in the GDR, I am only able to analyse these transitions in a joint model for East and West Germany.

### 6.3.6 Gender patterns of track mobilities

In the process of educational expansion in West Germany, the educational opportunities for girls have increased relative to boys (see Chapter 5 and Becker, 2014). Several empirical studies show that these changes in gendered educational participation cannot be ex-

plained by different school performances of girls and boys (*primary effect)* (see e.g. Becker & Müller, 2011; Helbig, 2012). A more persuasive explanation for girls' increasing educational participation might be changes in adult gender roles in West Germany (Helbig, 2012). Nowadays, women in West and East Germany have higher educational aspirations because they are expected to participate continuously on the labour market in both parts of Germany. Furthermore, the norms for women regarding higher female participation in education and occupation have changed tremendously in West Germany (Helbig, 2012). In East Germany, women did not differ much from boys in their educational and labour market participation, even among the oldest birth cohorts in my study (Sorensen & Trappe, 1995). Unfortunately, based on the small number of mobility events between the academic and non-academic tracks, my analysis cannot go into every detail of the changes in gender associations across birth cohorts. However, there seem to be three good reasons (see DiPrete & Buchmann, 2013, pp. 101–112) to *expect that, compared to boys, girls should more often move up to the academic track (Hypothesis 10) and less often down to the non-academic track (Hypothesis 11)*: (1) On average, girls have an advantage relative to boys in terms of social behaviour in school: they show higher rates of conformity to the school culture and they have lower rates of disruptiveness, aggression, antisocial behaviour or attention disorders. (2) Girls, on average, work harder in school and invest greater efforts in doing their homework. And (3) girls, on average, express a stronger interest in and enjoyment of school.

### 6.3.7 Leaving the general education system with an 'atypical' degree

Pupils complete the academic track typically with an 'Abitur' and sometimes with a 'Fachhochschulreife' (after the 11$^{th}$ grade in the 'Gymnasium' that has a duration of 8 years [G8] or after the 12$^{th}$ grade in the 'Gymnasium' that has a duration of 9 years [G9]); and pupils who complete the non-academic track typically obtain a 'Hauptschulabschluss'

or ‘Mittlere Reife’. However, there are some pupils who leave these tracks with an ‘atypical’ degree.

In the first case of ‘atypical’ degrees, pupils on the academic track leave the general education system earlier (e.g. after the 9th or 10th grade) and attain only the educational level of a ‘Hauptschulabschluss’ or a ‘Mittlere Reife’ as their first certificate. These events have basically two explanations: First, since the 1970s, ‘Realschulen’ have not been easily available in all West German federal states. Therefore, particularly, among the older birth cohorts in my NEPS sample, it was quite common for children (particularly females) who only aimed to obtain a ‘Realschulabschluss’ to first attend the ‘Gymnasium’ and then leave it with a ‘Mittlerer Reife’ (Henz & Maas, 1995, p. 608). Second, students may also leave the ‘Gymnasium’ earlier with only ‘Mittlere Reife’ or ‘Hauptschulabschluss’ if they do not perform well on the academic track. Often, leaving the ‘Gymnasium’ without a higher education entry certificate is experienced as a partial failure by pupils and families because the ultimate aim of a higher education entry certificate has not been achieved. Thus, *I expect particularly children from families with higher educational, economic and social resources to have a lower probability of leaving the Gymnasium earlier with a ‘Hauptschulabschluss’ or a ‘Mittlere Reife’ (Hypothesis 12).* I have already provided a detailed discussion on the relevant social origin mechanisms on downward track mobility (see Hypothesis 5 in Section 6.3.2).

In addition, I expect that children who moved up to the academic track from the non-academic track should be less likely to leave the academic track with a ‘Hauptschulabschluss’ or a ‘Mittlere Reife’ than children who started the ‘Gymnasium’ already immediately after the first transition to secondary school. The reason is that these children can be expected to be particularly motivated and to be more able to overcome obstacles in their school careers.

Furthermore, I also expect women to leave the academic track more often than men with an 'atypical' degree, particularly among the older birth cohorts. This should be the case because female members of older cohorts used the 'Gymnasium' as a route to get the 'Mittlere Reife' and then to enter qualified service and administrative positions.

In the GDR, tracking to the academic track generally took place very late (after the 10th grade). In contrast, in West Germany and reunified East Germany tracking is taking place much earlier (after Grade 4 or 6). The relatively late tracking age in the GDR should have helped parents, children and teachers to make more informed assessments of children's cognitive and non-cognitive abilities, so that children's failure probabilities on the academic track should have been lower (Erikson & Jonsson, 1996). In turn, for West Germany and reunified East Germany, where children have been allocated to the academic track at an early age, parents, children and teachers are less well informed about children's future academic potentials. Thus, it is more likely that misallocations to the academic track happen and these pupils then have to leave the 'Gymnasium' with only 'Mittlere Reife' or 'Hauptschulabschluss'.

In the second type of 'atypical' degrees, pupils on the non-academic track attain even an 'Abitur' or a 'Fachhochschulreife'. In West Germany and East Germany after unification, children can gain the 'Fachhochschulreife' or 'Abitur' in comprehensive schools or in the combined 'Haupt-' and 'Realschule' ('Schulen mit mehreren Bildungsgängen') (Helbig & Nikolai, 2015, p. 99). However, the attainment of such degrees is very rare. Because the aim of the non-academic track is to obtain a 'Hauptschulabschluss' or a 'Mittlere Reife', these higher degrees are considered as prestigious 'atypical' degrees. Leaving the non-academic track with 'Fachhochschulreife' or 'Abitur' is experienced as a great success by pupils and families. *I therefore expect that particularly families with higher educational, economic, and social resources will use these rare opportunities to get one*

*of the two higher education entry qualifications (Hypothesis 13).* Again, the theoretically assumed social origin mechanisms are the same as those already described in detail for upward track mobility (see the arguments for Hypothesis 7 in Section 6.3.3).

Furthermore, I expect *women to leave the non-academic track with 'Fachhochschulreife' or 'Abitur' more often than men* (for a discussion of the relevant gender mechanisms, see the justifications for Hypothesis 11 in Section 6.3.6).

Finally, I expect that children who have previously been downward mobile from the academic to the non-academic track, may have particularly chosen those school forms of the non-academic track in which it is still possible to obtain a higher education entry certificate. These children and their families should have relatively strong aspirations to attain a higher education entry certificate, because they were previously placed on the academic track. Thus, I expect that pupils who moved downwards will be more likely to obtain a higher education entry certificate in the non-academic track.

## 6.4 Results

I start with an empirical analysis of dropping out of the education system without an educational certificate. Then, I investigate downward mobility to the non-academic track and upward mobility to the academic track. Finally, I assess leaving school with 'atypical' educational degrees.

### 6.4.1 Dropping out from the educational system without any educational degree

I start off with an analysis of school dropouts. Pupils who have repeated school years and/or perform inadequately on the non-academic track at the end of compulsory school age, often leave school without any certificate. Drop out without any educational degree can also happen on the academic track, if pupils achieve insufficiently, and due to their age, are no longer admitted to the schools of the non-academic track.

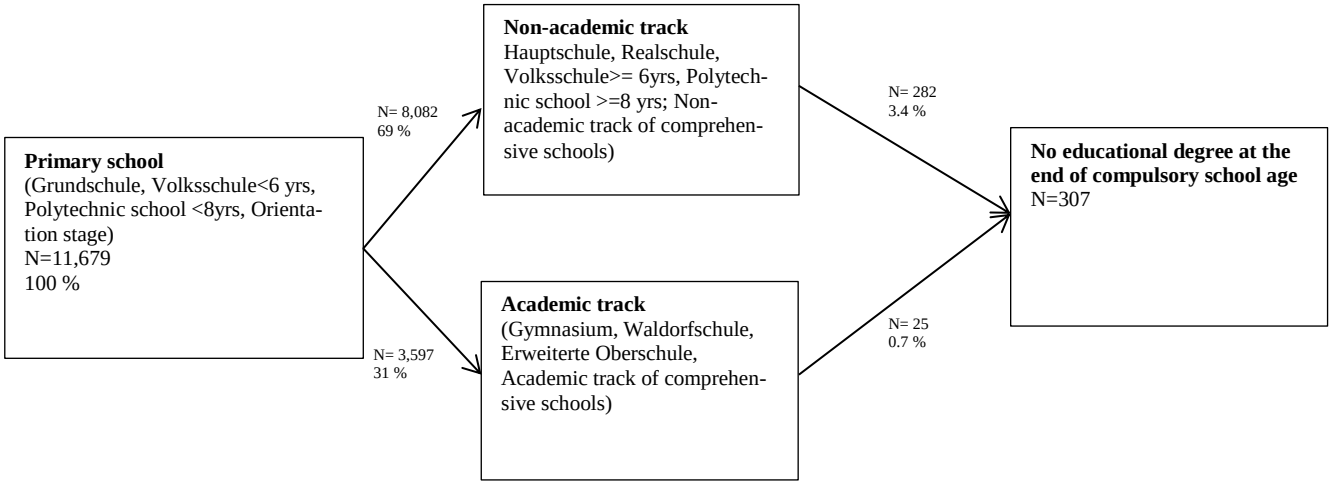
In my analysis, I examine how the proportion of school leavers without any educational certificate has developed in East and West Germany across cohorts and who is dropping out from the general education system without any degree[46]. Figure 6-1 shows that 282 (3.4 %) of students from the non-academic track and 25 (0.7 %) from the academic track dropped out without any degree from the education system.

Figure 6-2 illustrates the change in the proportion of individuals who leave the general education system without any educational degree across birth cohorts. Among the older birth cohorts, the number of dropouts without any degree was relatively high (between 8 % in East and 10 % in West Germany). Until the 1956−60 birth cohort, the proportions of individuals who left the educational system without any educational certificate declined in both parts of Germany. In East and West Germany, the proportion of school leavers without any educational certificate then remained at an almost constant level of about 1 %. Only in East Germany after the 1970 birth cohort did the proportion of individuals without any educational degree rise again to about 6 %. This rising proportion in East Germany seems to be connected with the change in the school system after German unification.

In Table 6-1, I report the estimates of logistic models for dropouts separately for individuals from the non-academic (Models 1 and 2) and the academic track (Models 3 and 4). My models include information on the cohort trend, parental education, parental class, and parental status[47], as well as whether pupils are females, grew up in East or West Germany and whether they experienced their secondary school years mainly before or after German unification.

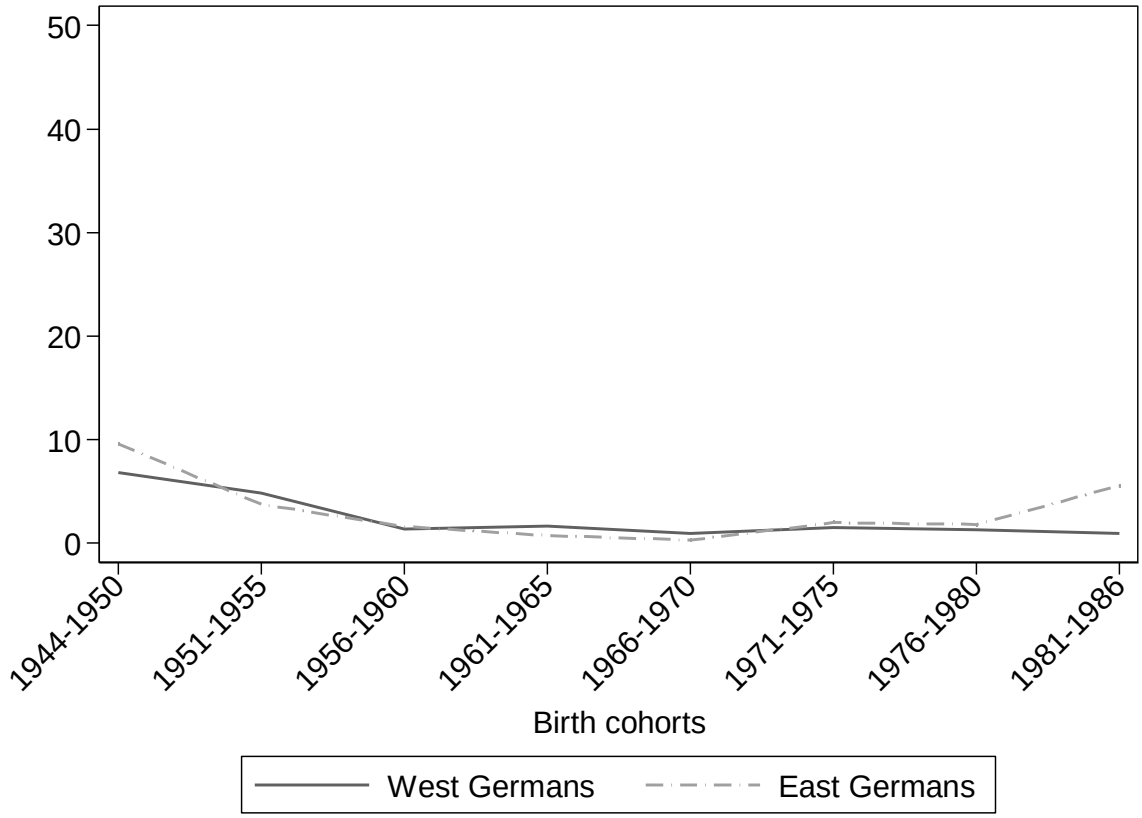
[46] The following Figure 6-2 includes second and 2.5 generation immigrants. I do not plot this graph separately for immigrants since the number of cases of those immigrants in my dataset is very low (N=17).
[47] Parental status (measured with the CAMSIS scale) is a *proxy* for exclusive social relationships in social networks and for a distinguishing lifestyle.

**Figure 6-1:** Dropping out of the educational system after the end of compulsory school age without any educational certificate




Source: Author's portrayal using NEPS data

**Figure 6-2:** Proportion pupils who drop out from the educational system without any educational degree in East and West Germany across birth cohorts (from 1944 to 1986)




Source: Author's portrayal using NEPS data

The *cohort trends* in Models 1 to 4 show that increasingly fewer students leave the educational system without an educational certificate across birth cohorts – independently of whether they were in the non-academic or academic track before. *This finding confirms my Hypothesis 1* that based on the efforts of the state to reduce the proportion of school leavers without any educational degree, the number of school leavers without any educational degree is shrinking. Moreover, Models 1 and 2 indicate that children from parents who have a vocational training certificate or even a tertiary education are significantly less likely to leave the educational system without an educational degree. Thus, children's dropping out of school is to a large degree concentrated among parents who are unskilled themselves. They can hardly help their children in school if they experience problems.

**Table 6-1:** Logistic regression for dropping out of the education system without any educational degree

| Variables | Non-academic track (1) | Non-academic track (2) | Academic track (3) | Academic track (4) |
|---|---|---|---|---|
| Cohort trend | -0.05*** | -0.04*** | -0.13 *** | -0.13*** |
| | (0.007) | (0.007) | (0.03) | (0.03) |
| *Parental education (Ref.: Low educational level)* | | | | |
| Intermediate educational | -0.56*** | -0.62*** | -0.93 | -0.93 |
| Level | (0.16) | (0.16) | (0.66) | (0.66) |
| High educational level | -1.45*** | -1.61*** | -1.20 | -1.20 |
| | (0.44) | (0.45) | (0.86) | (0.86) |
| *Parental class (Ref.: workers)* | | | | |
| Intermediate | -0.31 | -0.32 | -0.12 | -0.11 |
| | (0.20) | (0.20) | (0.68) | (0.69) |
| Salariat | -0.33 | -0.34 | -0.80 | -0.78 |
| | (0.24) | (0.24) | (0.73) | (0.73) |
| *Parental status (Ref. low parental status)* | | | | |
| Intermediate | -0.28 | -0.26 | 0.48 | 0.53 |
| | (0.20) | (0.20) | (0.69) | (0.70) |
| High | -0.48 | -0.47 | 0.50 | 0.58 |
| | (0.57) | (0.57) | (1.004) | (1.01) |
| Female (ref. male) | | -0.54*** | | -0.80 |
| | | (0.13) | | (0.45) |
| East German (ref. West | | 0.28*** | | -0.30 |
| German) | | (0.14) | | (0.64) |
| Constant | -1.80*** | -1.61*** | -1.99*** | -1.73*** |
| | (0.17) | (0.18) | (0.77) | (0.78) |
| Changes of state | 282 | 282 | 25 | 25 |
| Observations | 8,082 | 8,082 | 3,597 | 3,597 |

Standard errors: *** *p<0.01,* ** *p<0.05*
Source: Author's calculations using NEPS data

Parental class and parental status do not have an additional statistically significant influence on leaving the educational system without a degree. Thus this kind of dropout from the non-academic track is not connected with economic or social network resources. In conclusion, *my Hypothesis 2, could be confirmed only partly for parental education*.

In addition, Model 2 reveals that girls leave the educational system significantly less often without an educational degree compared to boys. *This is in line with my Hypothesis 3* in which I expected that girls more often behave in school in ways approved by teachers and are therefore less likely to leave the school system without any educational degree. In addition, East Germans more often leave the educational system without an educational

degree if they come from the non-academic track. This result calls for further investigations in the future.

In Models 3 and 4 of Table 6-1, I examine the likelihood of leaving the educational system without an educational certificate from the academic track. Models 3 and 4 show that there are no statistically significant associations between the three social origin indicators and the probability of dropping out of school. *This does not confirm Hypothesis 1* that there should be strong parental education, parental class and parental status associations with school dropout events. Thus, this dropout from the academic track seems to be quite random. However, it should be pointed out that the number of dropouts from the academic track is very small (N = 25), so that the standard deviation of the coefficients is large. Thus, this interpretation has to be treated with caution.

There are also no statistically significant differences between girls and boys[48] as well as between East and West Germans with regard to dropping out of the academic track. My empirical findings do *not confirm Hypothesis 3* in which I postulated that women should be less likely to leave the educational system without an educational degree. All in all, it seems that this type of dropout is not only very rare but also to a large extent a random process.

### 6.4.2 Inequality of educational opportunity and upward and downward track moves

I now turn to track mobility in the general education system. First, I ask how frequent the directional moves between the academic and non-academic tracks are, starting at the point when pupils leave primary school until they obtain their first general school leaving certificate. Then, I describe how social origin characteristics relate to upward and downward mobility rates.

[48] In the model with sampling stratification weights, the variable ‘female‘ is significant and indicates that girls are less likely to leave the educational system without an educational degree if they come from the academic track.

Figure 6-3 gives an overview on track mobility in secondary school. It shows that the overall rates of upward and downward mobility are relatively small. After taking dropouts into account, about 5 % (369 / (7,431 + 369) = 0.05) of pupils are upwardly mobile and about 11 % (379 / (3,188 + 379) = 0.11) are downwardly mobile. Thus, in the German secondary school system, the overall probability of downward mobility is more than twice as high as the overall rate of upward mobility. Hence, downward mobility is clearly dominant in Germany. All in all, these small (absolute and relative) transition numbers suggest that only a minor correction of the initial placements on the academic or non-academic tracks takes place in secondary school. These small mobility rates are particularly surprising, because many pedagogical experts claim that the proportion of incorrect assignments of pupils in the transition from primary to secondary school is substantial. For example, using data from the Progress in International Reading Literacy Study (PIRLS), Bos et al. (2004) report that only two-thirds of German children who belonged to the upper and lower literacy competence levels were assigned correctly to school tracks by teachers; and only less than one-half of the children who belonged to the intermediate literacy competence level received an appropriate school track recommendation. Unfortunately, I cannot test this issue with the NEPS data in my thesis. However, with future NEPS waves that follow children's educational careers and regularly test their competence levels, it is possible to explicitly test this theoretical argument. In sum, my empirical findings show that secondary school in Germany does indeed seem to be less open than it should be.

In Table 6-2, I examine associations between school-track mobilities and children's social origin characteristics. I estimate binary logistic regression models and report logit coefficients. In Models 1 and 2, I present results for downward mobility; and in Models 3 and 4, those for upward mobility. Before interpreting my empirical results, it should be said that I had to waive a more detailed analysis of cohort changes in social origin associ-

ations with upward and downward moves in this chapter because the number of mobility events is very small.

In Models 1 and 2, the *cohort trend* indicates that there was no real change in the rate of downward mobility across birth cohorts. Thus, the increasing number of pupils who have made the transition to the academic track across cohorts did not change the rate of mobility to the non-academic track in secondary school. This is a remarkable result, because the rising initial participation in the academic track across cohorts is very likely to be associated with a change in the ability composition of the students in the academic track. Both the school system and teachers seem to have adjusted their assessments to the changing competence situation across cohorts. Also it should be highlighted that this cannot be explicitly tested with the data from the NEPS Adult Cohort, since it lacks information on ability compositions of students on the academic track.

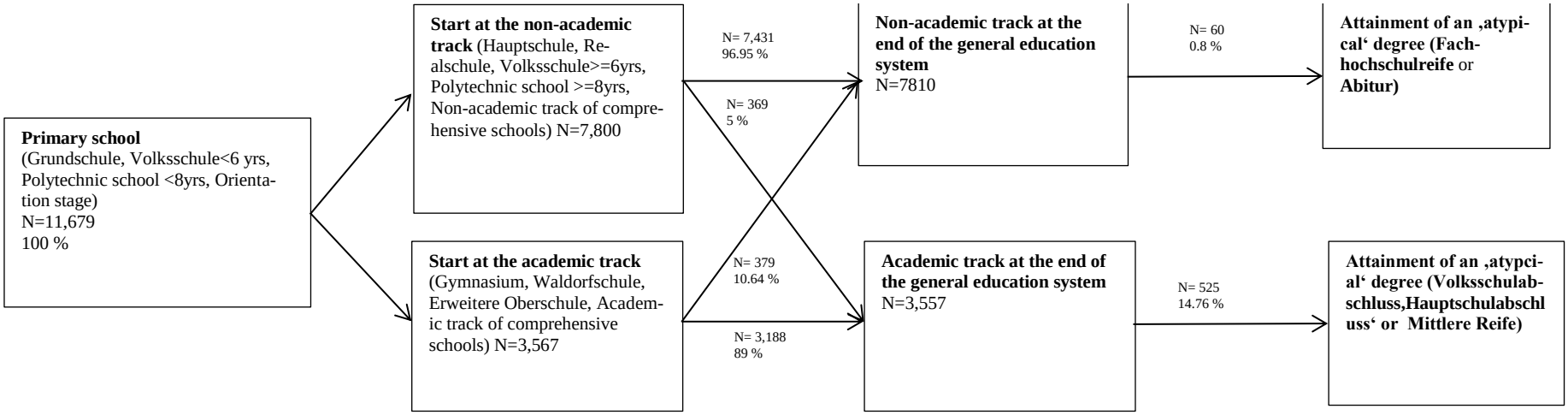
Furthermore, Model 1 reveals that among the three social origin resources, only parental education is statistically significant. The logit coefficient of parental education has a negative sign. Thus, children from higher educated parents are less likely to be downwardly mobile to the non-academic track. It seems that the higher educated parents' ability to help their children with homework and exam preparation is particularly important for staying on the academic track. In addition, higher educated parents are often more familiar with the academic track and they know how their children can succeed on it, even when the academic performance of their children is only mediocre or poor[49]. Furthermore, based on their own experiences with the school system, higher educated parents are better able to determine when and how to intervene in critical school situations. In other words, *my Hypothesis 4* is only partially supported and *Hypothesis 5,* which assumed that

[49]Also it should be pointed out that I cannot test here, whether it is particularly *children with a low or mediocre school performance* and high educated parents that particularly profit from the possibility of upward mobility, since I do not have information on school performance in the Adult Cohort (SC6) of the NEPS.

there is no relationship between social origin characteristics and the likelihood of being downward mobile, *must be rejected*.

In Model 2 of Table 6-2, I examine gender patterns and East-West differences before and after German unification with regard to downward moves to the non-academic track. Coefficients show that girls are significantly less likely to be downwardly mobile than boys. Thus, *this evidence supports Hypothesis 11*. It seems that girls do indeed less frequently move downward, because they have an advantage relative to boys in terms of social behaviour in school and conformity to the school culture. Model 2 also demonstrates that East Germans in the GDR were less likely to be downwardly mobile than West Germans in the FRG, because access to the academic track was very restricted and making the group of students highly selective (Hypothesis 9). The indicators for German unification as well as the interaction term for German unification and East Germany are not statistically significant. Hence, there was no change in the probability of being downwardly mobile in East Germany after German unification.

**Figure 6-3:** Mobility between the academic and non-academic tracks in the general education system and 'atypical' degrees




Source: Author's portrayal using NEPS data

In the next step, I analyse upward mobility to the academic track in Germany. At first glance, Model 3 in Table 6-2 seems to indicate no significant changes in the likelihood of being upwardly mobile across birth cohorts. However, this result changes in Model 4 after controlling for East-West differences and historical periods before and after German unification.[50] In Model 4, there is indeed a statistically significant trend towards more upward moves to the academic track across cohorts. This is the case even when the proportion of pupils who start their secondary education on the non-academic track is shrinking, and one can assume that there is an increasing selection towards lower competencies among pupils in the non-academic track[51]. Thus, based on a series of educational reforms, there seems to be an increasing openness in the German secondary school, offering late bloomers better opportunities to correct their educational trajectories. However, one should not overemphasize the impact of this increase on the whole system, because the overall rate of upward mobility to the academic track is still quite small.

Models 3 and 4 in Table 6-2 also show that only two of the three social origin indicators are statistically significant on the upward moves to the academic track. Particularly children from highly educated parents and from high-status parents have a much greater likelihood of correcting their educational trajectories and moving from the non-academic to the academic track. *This evidence is certainly not in line with Hypothesis 6* in which I expected that particularly children from lower social origins might be more able to use the new opportunities in the school system to make a later transition to the academic track.

[50] However, I would like to point out that the cohort trend is not statistically significant in the model including the sampling stratification weights. Thus, this empirical result has to be interpreted with caution.
[51] I cannot specifically model this with the Adult Cohort (SC6) of the NEPS, since the dataset does not provide competence measures.

**Table 6-2:** Binary logistic regressions for downward and upward mobilities in the general education system

| Variables | Downward mobility 1 | Downward mobility 2 | Upward mobility 3 | Upward mobility 4 |
|---|---|---|---|---|
| Cohort trend | 0.009 | 0.01 | 0.009 | 0.02 *** |
| | (0.005) | (0.009) | (0.005) | (0.008) |
| *Parental education (Ref.: Low educational level)* | | | | |
| Intermediate educational | -0.41 | -0.38 | 0.50 | 0.23 |
| Level | (0.27) | (0.27) | (0.32) | (0.32) |
| High educational level | -1.09*** | -1.03*** | 1.97*** | 1.31*** |
| | (0.30) | (0.31) | (0.34) | (0.35) |
| *Parental class (Ref.: workers)* | | | | |
| Intermediate | -0.06 | -0.07 | -0.0006 | 0.03 |
| | (0.21) | (0.21) | (0.22) | (0.23) |
| Salariat | -0.14 | -0.16 | 0.34 | 0.34 |
| | (0.21) | (0.21) | (0.23) | (0.23) |
| *Parental status (Ref. low parental status)* | | | | |
| Intermediate | -0.10 | -0.08 | 0.33 | 0.39 |
| | (0.20) | (0.20) | (0.21) | (0.21) |
| High | -0.02 | -0.009 | 0.98*** | 0.94*** |
| | (0.27) | (0.27) | (0.26) | (0.27) |
| Female (ref. male) | | -0.31*** | | 0.36*** |
| | | (0.11) | | (0.11) |
| East German (ref. West German) | | -1.06*** | | 1.24*** |
| | | (0.37) | | (0.13) |
| German unification | | -0.18 | | -0.79*** |
| | | (0.21) | | (0.31) |
| German unification*East Germany | | 0.80 | | 0.70*** |
| | | (0.48) | | (0.33) |
| Constant | -1.57*** | -1.52*** | -4.42*** | -4.99*** |
| | (0.29) | (0.31) | (0.32) | (0.34) |
| Changes of state | 379 | 379 | 369 | 369 |
| Observations | 3,567 | 3,567 | 7,800 | 7,800 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author‘s calculations using NEPS data

Rather, the empirical results *confirm in great parts Hypothesis 7* suggesting that it is particularly children from more advantaged families who take advantage of the newly offered institutional reforms. Highly educated parents are better able to actively help and consult their children in school matters; and high-status parents seem to be better informed on pathways to the academic track by their relatives and friends. These networks are assumed to facilitate their children’s likelihood of moving to the academic track. High-status children are also culturally socialized in a way expected by teachers and schools, and this might also facilitate the likelihood of upward moves. Finally, higher sta-

tus parents' educational aspirations might be influenced through their social networks in favour of the academic track. Therefore, these privileged parents can be expected to do everything they can to use institutional opportunities allowing their children to move to the academic track.

In Model 4 of Table 6-2, I additionally included gender and East-West differences before and after German unification. This model reveals that girls − as expected − are significantly more likely to be upwardly mobile to the academic track. Hence, *this fully confirms Hypothesis 10* that girls are more often upwardly mobile because their behaviour is more often favoured by teachers and schools than that of boys. Thus, they can be expected to more easily fulfil the non-cognitive requirements for being upwardly mobile to the academic track.

Based on the combinations of the significant (time-dependent) dummy variables and their coefficients in Model 4, it is clear that pupils in the FRG had a lower likelihood of moving upward within the school system than pupils in the GDR.[52] Thus, *this does not confirm my Hypothesis 8* that there should have been less upward mobility in the GDR. The likelihood of being upwardly mobile then declined further in West Germany and stayed mostly unchanged in East Germany after German unification.

### 6.4.3 'Atypical' educational degrees on the non-academic and academic tracks

Finally, I turn to the issue of leaving the non-academic or the academic track with an 'atypical' degree. To the best of my knowledge, this is the first analysis of these events using longitudinal data in Germany. First, I assess the quantitative relevance of these 'atypical' degrees and their changes across cohorts and then I describe social origin differences in obtaining them.

[52] However, in a model including the sampling stratification weights, the variables 'German unification' and 'German unification×East Germany' are not significant. Hence, this result has to be treated with caution.

### 6.4.4 Leaving the academic track with only ‘Hauptschulabschluss’ or ‘Mittlere Reife’

I begin my investigation of ‘atypical’ degrees by asking how many pupils leave the academic track with only ‘Hauptschulabschluss’ or ‘Mittlere Reife’. Figure 6-3 describes students’ educational pathways to the academic track and their departure from the academic track with only an ‘atypical’ degree. Figure 6-3 shows that 525 (about 15 %) of the 3,557 students, who were on the academic track since the transition from primary school or who later moved to the academic track via upward mobility left the academic track with only a ‘Hauptschulabschluss’ or a ‘Mittlere Reife’. Generally students who leave the ‘Gymnasium’ earlier with these two ‘atypical’ degrees are those who did not perform adequately on the academic track. Therefore, families and their children consider leaving the ‘Gymnasium’ before reaching a higher education entry certificate (‘Abitur’ or ‘Fachabitur’) as a kind of partial failure. Together with the proportion of students who dropped out without any degree from the academic track (0.7 %) (see Figure 6-1) and with the students who moved downwards from the academic to the non-academic track (11 %) (see Figure 6-3), a remarkable proportion of about 26 % of students on the academic track must be considered as failures. Thus, about one quarter of students do not succeed on the academic track in one or the other way in Germany.

The core questions now are whether there are marked social origin differences and differences with regard to pupils’ previous track histories in regard to leaving the academic track with an ‘atypical’ degree. In addition, I am interested in studying gender, and East-West differences in ‘atypical’ degrees on the academic track. I estimate three binary logistic regression models in Table 6-3. In Model 1 of Table 6-3, I introduce the *cohort trend*, and the three social origin indicators into the analysis. The sign of the cohort trend

**Table 6-3:** Leaving the academic track with a 'Hauptschulabschluss' or 'Mittlere Reife' (binary regression models)

| Variables | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| Cohort trend | -0.02*** | -0.02 *** | -0.03 *** |
| | (0.005) | (0.004) | (0.007) |
| *Parental education (Ref.: Low educational level)* | | | |
| Intermediate educational | 0.06 | 0.005 | 0.05 |
| Level | (0.27) | (0.27) | (0.27) |
| High educational level | -0.41 | -0.81*** | -0.74*** |
| | (0.30) | (0.28) | (0.28) |
| *Parental class (Ref.: workers)* | | | |
| Intermediate | 0.18 | | |
| | (0.18) | | |
| Salariat | -0.04 | | |
| | (0.19) | | |
| *Parental status (Ref. low parental status)* | | | |
| Intermediate | -0.37*** | | |
| | (0.17) | | |
| High | -0.91*** | | |
| | (0.24) | | |
| Upward mobility to the academic track | | | -0.23 |
| | | | (0.20) |
| Female (ref. male) | | | 0.12 |
| | | | (0.10) |
| East German (ref. West German) | | | -0.99*** |
| | | | (0.22) |
| German unification | | | 0.33 |
| | | | (0.20) |
| German unification×East German | | | 0.99*** |
| | | | (0.33) |
| Constant | -0.97*** | -1.16*** | -0.93*** |
| | (0.28) | (0.27) | (0.29) |
| Changes of state | 525 | 525 | 525 |
| Observations | 3,557 | 3,557 | 3,557 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

is negative and statistically significant. Thus, leaving the academic track with an educational degree below the higher education entry certificate becomes less likely across birth cohorts. Furthermore, my analysis shows that children from intermediate- and high-status parents are much less likely to leave the academic track with 'Hauptschulabschluss' or 'Mittlere Reife'. In *Hypothesis 12*, I expected that children from highly educated parents, from the salariat, and from high-status parents should be less likely to leave the academic track without a higher education entry certificate. *This could be partly confirmed* for parental status. However, Model 2 in Table 6-3, in which I included only parental education as a social origin measure, reveals that the parental status effect was mediated by parental

education. So, in fact, it is parental education that is important. Children from parents with a tertiary level education are significantly less likely to leave the academic track with an educational certificate lower than the higher education entry certificate.

In Model 3 of Table 6-3, I additionally include information on previous track mobility, gender, whether the respondent was born in East or West Germany, a dummy for German unification, and an interaction term for German unification and being born in East Germany. My analysis indicates that there is no statistically significant association between the previous upward mobility to the academic track and leaving the academic track with only 'Hauptschulabschluss' or 'Mittlere Reife'. Thus, whether someone moved immediately to the academic track after the transition from primary school or moved up later from the non-academic track to the academic track is not crucial for success on the academic track.

Furthermore, there are no statistically significant gender differences in the rate of attaining an 'atypical' degree on the academic track. Thus, the *expectation that women more often leave the academic track with an 'atypical' educational degree cannot be confirmed*. Moreover, East Germans are statistically significantly less likely to obtain a 'Hauptschulabschluss' or 'Mittlere Reife' at the academic track. However, after German unification, there are no longer any statistically significant differences between East and West Germans.

#### 6.4.4.1 Attaining an 'atypical' degree on the non-academic track

Next, I ask the question who obtains a 'Fachhochschulreife' or 'Abitur' on the non-academic track? In West Germany and East Germany after unification, children can receive the 'Fachhochschulreife' or 'Abitur' in (integrated) comprehensive schools or in the combined 'Haupt-' and 'Realschule' ('Schulen mit mehreren Bildungsgängen') (Helbig &

**Table 6-4:** Leaving the non-academic track with ‘Fachhochschulreife‘ or ‘Abitur’ (binary regression model)

| **Variables** | **A ‘Fachhochschulreife‘ or ‘Abitur‘ degree on the non-academic track** |
|---|---|
| Cohort trend | -0.02 |
| | (0.02) |
| *Parental education (Ref.: Low educational level)* | |
| Intermediate educational | -0.39 |
| Level | (0.49) |
| High educational level | -0.26 |
| | (0.62) |
| *Parental class (Ref.: workers)* | |
| Intermediate | 0.44 |
| | (0.45) |
| Salariat | 0.45 |
| | (0.49) |
| *Parental status (Ref. low parental status)* | |
| Intermediate | -0.05 |
| | (0.42) |
| High | 0.50 |
| | (0.62) |
| Downward mobility to the non-academic track | 1.72*** |
| | (0.35) |
| Female (ref. male) | 0.03 |
| | (0.26) |
| East German (ref. West | 1.04*** |
| German) | (0.33) |
| German unification | 1.42*** |
| | (0.55) |
| German unification×East | -0.67 |
| Germany | (0.62) |
| Constant | -0.67*** |
| | (0.62) |
| Changes of state | 60 |
| Observations | 7,810 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author’s calculations using NEPS data

Nikolai, 2015, p. 99). The attainment of ‘Fachhochschulreife’ or ‘Abitur’ is experienced as a great success by pupils and families. Figure 6-3 illustrates that only 60 (0.8 %) out of the 7,810 students from the non-academic track actually obtain a higher education entry certificate in my sample. Only 22 (0.3 %) students attain a ‘Fachhochschulreife’ and 38 (0.5 %) an ‘Abitur’. Thus, this school event is very rare. Together with the proportion of students who moved up to the academic track from the non-academic track (about 5 %) (see Figure 6-3), not even 6 % of the students are able to gain a higher education entry certificate if they are coming from the non-academic track. In other words, 94 % of pupils assigned to the non-academic track are stuck. This means that the non-academic track

within the general education system is quite a dead end road – even if there have been efforts to give late bloomers a second chance in the school system.

I am now interested in how far obtaining an 'atypical' degree on the non-academic track is associated with social origin, gender, the previous schooling career, and being born in East or West Germany. I estimate a binary logistic regression (see Table 6-4). Table 6-4 shows that all three social origin measures (parental education, parental class, and parental status) are not statistically significant. Thus, *my findings do not confirm Hypothesis 13* in which I expected that it would be particularly children from higher educated parents, from the salariat, and from high-status parents who should be more likely to obtain a higher education entry certificate on the non-academic track. However, I would like to point out that the number of students who obtain a higher education entry certificate is quite small (N = 60). Thus, this might explain, why there are no significant coefficients for the three origin variables. Moreover, Table 6-4 reveals that students who previously moved down from the academic to the non-academic track obtain a higher education entry certificate. Thus, children who came from the academic track seem to be more successful in obtaining a higher education entry certificate on the non-academic track. This suggests that the families of these students strategically select specific schools (comprehensive schools) in which it is possible to get 'atypical' degrees on the non-academic track.

Finally, Table 6-4 reports no statistically significant gender differences. Hence, *my Hypothesis 14 could not be confirmed* in which I expected that girls should more often obtain a 'Fachhochschulreife' or 'Abitur' because they are generally considered as the better behaving and more motivated pupils in school. Furthermore, East Germans in the GDR were more likely to obtain a higher education entry certificate on the non-academic

track. In general, after German unification more students attained a higher education entry certificate on the non-academic track[53].

## 6.5 Summary

This chapter examined how far the first educational placement in secondary school determined the subsequent school career of girls and boys from different social origins in Germany. Using data from the Adult Cohort (SC6) of the NEPS, I reconstructed the school histories of respondents and focused my analysis on three specific events in the general education system: (1) dropping out from the non-academic and academic track after the end of compulsory schooling without attaining any educational degree; (2) school track mobilities between the academic and non-academic tracks; and (3) leaving the academic or the non-academic track with an 'atypical' degree.

The results of my empirical analysis show that the proportion of pupils who drop out of the general education system without any educational degree has been small and is generally declining across birth cohorts. It is only in East Germany after German unification that I observed an increase in the proportion. This might be connected to the transformation of the school system in East Germany immediately in the early 1990s. Dropout without attaining any educational degree was more pronounced among students from the non-academic track (about 3.4 % in average) and quite an exception for students from the academic track (0.7 % in average). The dropout without attaining any degree from the academic track seems to be a random event. Children from lower social origin who attended the academic track are a very selective group of high achievers who will also succeed in school without their parents' help. Thus, they are as unlikely as children from higher social origin to leave the educational system without an educational certificate. However, dropout from the non-academic track seems to be strongly concentrated on

[53] In the models with sampling stratification weights, the variable 'German unification' is not statistically significant. Hence, this result has to be treated with caution.

children whose parents have a low education (and probably low educational aspirations for their children). Children from better educated families on the non-academic track are therefore rarely ‘at risk’ of dropping out. German policymakers and schools as well as teachers from the non-academic track should therefore target their measures specifically at children from educationally poor families to help them avoid leaving the school system without an educational certificate. In terms of gender, boys are more ‘at risk’ of dropping out than girls. Thus, more should be done to integrate low performing boys into the German school system.

My analysis of track mobility between the non-academic and academic track revealed that the overall rates of upward and downward mobility are relatively small. On average, only 5 % of the pupils on the non-academic track are upward mobile and only 11 % of the pupils on the academic track are downwardly mobile. The probability of moving downward to the non-academic track has been quite stable across cohorts. Although the probability of upward moves to the academic track has risen slightly across cohorts, it is still not high enough to give talented students an appropriate opportunity to continue learning on the academic track.

My results clearly demonstrated that downward and upward mobility between the non-academic and academic tracks is markedly socially selective. Children (in particular girls) from higher educated parents are much less likely to experience downward mobility to the less prestigious non-academic track; and children (in particular girls) from higher educated parents and from high-status parents are more likely to move up to the academic track. Thus, parents’ education is important for both directional moves, and parental status additionally becomes important for paving children’s way to the academic track.

Finally, I provided empirical evidence that ‘atypical’ degrees from the academic track are an important phenomenon that has been largely neglected in educational research up

to now. About 15 % of pupils on the academic track are leaving with only 'Hauptschulabschluss' or 'Mittlerer Reife'[54]. Together with the students who drop out without any degree from the academic track (0.7 %) and those who moved downwards from the academic track to the non-academic track (11 %), about 26 % of students on the academic track must be considered as failures. In other words, the German system already seems to be open downwardly when one quarter of the students do not reach the ultimate goal of a higher education entry certificate in Germany. I also showed that is particularly children from higher educated parents who are less likely to leave the academic track with an 'atypical' educational degree. Thus, as with downward mobility to the non-academic track, 'atypical' degrees on the academic track lead to a reinforcement of educational inequality over the educational career of children. There are, however, no gender differences in obtaining an 'atypical' educational degree on the academic and non-academic track.

Interestingly 'atypical' degrees on the non-academic track are not only more or less random but also very rare (0.8 %). Together with the proportion of students who moved up to the academic track from the non-academic track (about 5 %), not even 6 % of students are able to gain a higher education entry certificate when they come from the non-academic track. Thus, 94 % of the pupils assigned to non-academic track are indeed stuck. This means that the non-academic track within the general educational system is still a dead end road – even if there have been efforts to give late bloomers a second chance in the school system. It remains to be seen in the next chapter, whether mobilities between the academic and the vocational track in upper secondary education, which were opened up during the last decades, are more successful providing more equal educational opportunities.

[54] At least for the youngest birth cohorts, a 'Mittlere Reife' degree can be interpreted as a failure. For older cohorts this was not the case.

I also addressed differences between East and West Germans for between-track mobility, leaving the school system without an educational degree, and obtaining an 'atypical' educational certificate. I found that East Germans in the GDR were less likely to move down to the non-academic track and more likely to move up to the academic track. Although East Germans were less likely to move down to the non-academic track, I found that, if they are on the non-academic track, then they are more likely to leave the educational system without an educational degree. Furthermore, East Germans are less likely to obtain a 'Hauptschulabschluss' or 'Mittlere Reife' on the academic track and more likely to obtain a higher education entry certificate on the non-academic track.

The theoretical and policy implications as well as limitations of my analysis are further discussed in Chapter 8.

# 7 Social Origin, Mobility Flows Between Vocational and Academic Tracks and Highest Level of Educational Attainment

In the process of educational expansion, it is not only the general school system that has been changing in (East and West) Germany (see Chapter 6). Even more substantial reforms have been carried out in the German vocational training, post-secondary and tertiary education systems. Traditional dead end vocational pathways have increasingly been abolished (Schindler, 2014, p. 213), multiple new alternative routes from the vocational track to higher formal educational degrees and tertiary education have been created (second chance education), reforms were introduced to reward individuals' vocational and work experiences for access to higher education (Buchholz & Schier, 2015; Jacob & Tieben, 2010; Schindler, 2014), new pathways have crystalized from the academic track down to the vocational track and the institutions of higher education have become more differentiated (e.g. universities of applied sciences ('Fachhochschulen') have been established) in East and West Germany. These changes aim to reduce the clear-cut distinction between the vocational and academic pathways as well as to ameliorate the opportunities for talented students, particularly those from disadvantaged families, to obtain a higher educational degree (Helbig & Nikolai, 2015; Schindler, 2013, 2014, 2015).

Using data from the Adult Cohort (SC6) of the National Educational Panel Study (NEPS), I reconstructed in detail the educational histories of individuals that age 25 and above from attaining their first educational degree ('Hauptschulabschluss', 'Mittlere Reife', 'Fachhochschulreife' or 'Abitur'[55]) in the German general education system (see Chapter 6) until reaching their highest educational attainment at the time of the retrospective NEPS interview. For young men and women who have obtained a 'Hauptschulabschluss' or 'Mittlere Reife' as their first school degree, I study how far they later (1) leave the educational system without further vocational education, (2) complete a

[55] In this chapter, the option 'fachgebundene Hochschulreife' is included in the term 'Abitur'.

vocational training at a vocational school or in the dual system, (3) attain a higher education entry certificate (‘Fachhochschulreife’ or ‘Abitur’) or (4) achieve even a tertiary degree. For individuals who attained a ‘Fachhochschulreife’ or an ‘Abitur’, I examine whether they (1) leave the educational system without further vocational or academic training, (2) receive only a vocational training certificate or successfully graduate from either (3) a university of applied sciences or (4) a traditional university.

In this chapter, I describe whether the educational reforms of vocational, post-secondary and tertiary education have increased students’ opportunities to upgrade their educational level from a basic school qualification degree (‘Hauptschulabschluss’ or ‘Mittlere Reife’) to a higher education entry certificate (‘Fachhochschulreife’ or ‘Abitur’) or even a tertiary degree (‘Fachhochschulabschluss’ or university degree); and how far students who have attained a ‘Fachhochschulreife’ or ‘Abitur’ opt for vocational training or even leave the education system without any further vocational or academic certificates across cohorts. Thus, I study whether the strict separation between vocational and academic tracks has become increasingly blurred during the last decades so that the first educational decision at the transition from primary to secondary school has become less definitive for children’s later educational career trajectories as well as for their final educational attainment in West Germany (Schindler, 2014, p. 213).

Moreover, I investigate how mobility movements from the vocational to the academic track and vice versa are associated with a host of individual characteristics such as family origin, gender, the previous school career and being born in East or West Germany. I analyse whether the mobility flows between the vocational and academic tracks lead to a decline or reinforcement of inequalities in students’ educational careers. In particular, my analysis focuses on two questions: (1) Are men and women from advantaged families, who have attained only a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ as their first school

degree − more likely compared to children from disadvantaged families with the same basic educational level − to obtain a higher education entry certificate ('Fachhochschulreife' or 'Abitur') or even a tertiary degree via the vocational training system? And (2) are children from disadvantaged families who have attained a higher education entry certificate ('Fachhochschulreife' or 'Abitur') more likely − compared to children from advantaged families with this degree − to leave the academic pathway in order to complete only vocational training or even leave the school system without any further vocational training or academic education? If both of these mobility patterns can be observed, then the new pathways in the vocational training system exacerbate instead of reduce existing inequalities in students' educational careers.

This chapter is organized as follows: I start by describing the educational reforms that paved the way for second chance education in the vocational training system and increased the differentiation of tertiary education in East and West Germany. I then go on to give an overview on the state of research. Then, I present theories and hypotheses on the role that social origin, gender and East-West differences play in the mobility flows between the vocational and academic track and the highest educational attainment. Finally, I present my empirical findings and provide a summary.

## 7.1 Educational reforms creating new alternative pathways to higher education

In cross-national studies, the West German educational system is often described as a system with relatively early educational selection, rigid school tracking and a strong separation of vocational training and academic education (Schindler, 2014, p. 213; Schuchart, 2011). Children are channeled to the 'Gymnasium' or the schools of the non-academic track ('Hauptschule' or 'Realschule') at a relatively early age (see Chapter 5), and this allocation of students is then hard to revise within the general school system (see Chapter

6). Thus, the standard pathway to earn a higher education entry certificate (the ‘Abitur’) has been through the ‘Gymnasium’ in West Germany (and in the whole of Germany after unification) (Helbig & Nikolai, 2015). In particular, most children from the oldest NEPS birth cohorts in West Germany attained the ‘Abitur’ via this pathway.

However, starting with the ‘Hamburg Act’ (‘Hamburger Abkommen’) in the 1960s, several reforms have been implemented in West Germany offering new routes to higher education entry certificates (the ‘Fachhochschulreife’ or the ‘allgemeine Hochschulreife’) in the institutions of second chance education. The clear-cut differences between the ‘Hauptschule’ and the ‘Realschule’ were reduced. Children at the ‘Hauptschule’ could complete not only a ‘Hauptschulabschluss’ but also a ‘Mittlere Reife’ if they remained in the ‘Hauptschule’ for ten instead of nine years (Schuchart, 2006). Furthermore, it has been possible to obtain a ‘Mittlere Reife’ in vocational schools (‘evening schools’), in the dual vocational training system, or in transition systems such as the ‘Berufsvorbereitungsjahr’ (Schuchart, 2011). Subsequently, students with a ‘Mittlere Reife’ could upgrade their educational degree to a ‘Fachhochschulreife’, ‘fachgebundene Hochschulreife’ or ‘allgemeine Hochschulreife’ (the ‘Abitur’) (Schindler, 2013). This is the case when graduates with ‘Mittlere Reife’ continued their educational career in one of the higher vocational schools (the ‘Fachoberschule’, ‘Berufsoberschule’, or ‘Berufsfachschule’) (Schindler, 2013). Furthermore, ‘Mittlere Reife’ students have been allowed to attend vocational grammar schools (‘berufliches Gymnasium’ or ‘Fachgymnasium’). High performing graduates with ‘Mittlere Reife’ could also move to the upper secondary level (‘Oberstufe’) of the traditional ‘Gymnasium’ (Köller et al., 1999, p. 388; Schindler, 2013). Additional options to earn a higher education entry certificate have been offered by schools with evening classes (‘Abendgymnasium’), ‘Kollegs’, ‘Technische Oberschulen’, ‘Fachakademien des öffentlichen Dienstes’, and ‘Berufsakademien’ (S. Buchholz & Schier, 2015; Schindler, 2013). Finally, since 2009 it has even been possible to access

higher education with only a vocational training degree and three years of work experience (Schindler, 2013).

In the German Democratic Republic (GDR), the main educational pathway to the 'Abitur' and to higher education was provided by the 'Erweiterte Oberschule' (Baske, 1990). Until 1982, students could move after the eighth grade from the comprehensive school 'Einheitsschule' (General Education Secondary School) to the 'Erweiterte Oberschule', in which they usually gained the 'Abitur' after four years of schooling.[56] In the GDR, the strict separation between vocational training and general education was already abolished in 1959/60. Since then, it was possible to earn the higher education entry certificate in so-called 'Abitur classes' of vocational training institutions, in special schools, in the so-called 'Abitur classes' of 'Volkshochschulen' and in specialized courses (Baske, 1990, p. 210). Because it was particularly children from worker and peasant families who decided to undergo vocational training, the socialist government of the GDR established a vocational training pathway to higher education for these students (Schäfer, 1990, p. 352). However, this new pathway via vocational training was not chosen frequently until the mid-1960s (Schäfer, 1990, p. 352). After that, the combination of vocational training and general education became quite popular (Schäfer, 1990, p. 352) and developed gradually into the second main pathway to higher education. However, since the 1970s access to this alternative pathway was restricted as was access to 'Erweiterte Oberschule' in order to avoid an 'over-education' of GDR graduates. After German unification, East Germany in great parts took over the West German educational system and therefore also the West German new alternative vocational pathways to higher education.

In addition to the changes in the vocational training system, the institutions of higher education have been increasingly differentiated in West Germany since the 1970s.

[56] From 1982 until German unification in 1989/90, students in the GDR could move only after the final 10th grade of the 'Einheitsschule' to the 'Erweiterte Oberschule' that then lasted only two years.

‘Berufsakademien’ and universities of applied sciences (‘Fachhochschulen’) were established (Lörz & Schindler, 2011) that provide a more ‘professional-oriented’ and shorter tertiary level education compared to the more theoretical and longer education at the traditional universities (Mayer, 2008, p. 613). Particularly ‘Berufsakademien’ (in Baden-Württemberg) and the new so-called ‘dual studies’ in the system of higher education provide a combination of vocational training in companies with scientific education at the tertiary level (Mayer, 2008, p. 615). It is important to note that ‘Fachhochschulen’ have a lower prestige than traditional universities and completing their courses is often linked to lower average returns in terms of income and career gains compared to the returns from traditional university education (Mayer, 2008, p. 614). Nonetheless, all in all, these transformations have led to an increasing participation of students in institutions of tertiary education across birth cohorts in West Germany and in reunified East Germany.

Since the foundation of the GDR in 1949, tertiary-level education already was more differentiated than in West Germany. There were ‘Fachschulen’ taking a middle position between vocational training and universities. Some experts even rate the GDR ‘Fachschulen’ as equivalent to the ‘Fachhochschulen’ (Lenhardt & Stock, 2000; Mayer & Solga, 1994; Schäfer, 1990, p. 340), and in my analyses, they are also treated as ‘Fachhochschulen’. However, higher education was provided mainly at traditional universities, university colleges as well as in engineering and technical colleges (Rytlewski, 1990). Since the 1970s, higher education participation was restricted in order to respond to the limited demand for highly qualified employees in the GDR. However, following German unification, participation in higher education increased again when East Germany took over the West German higher education system.

## 7.2 Current state of research on transitions in the vocational training, post-secondary and higher education system in Germany

In this section, I provide a short overview on relevant empirical research findings addressing the increasing openness of the West German vocational training, post-secondary and higher education systems along with findings on social origin differences in the mobility between vocational training and academic education. To the best of my knowledge, there is only little research on these issues in East Germany. As Chapter 6 revealed, the 'movements between school tracks before attaining the first school leaving certificate' has not been very popular in East and West Germany up to now. For West Germany, this is in line with previous findings by Jacob and Tieben (2010) and Buchholz and Schier (2015).

There is also little research examining further upgrading after the first educational degree in West Germany. Hillmert and Jacob (2010) have investigated the educational attainment process for West Germans with data from the GLHS and register data. Their empirical findings show that there are no social origin differences (operationalized in terms of parental education) in upgrading to an 'Abitur' later on. However, they pointed out that the number of individuals embarking on second chance education was still very small in their sample (3 %), so that these findings have to be treated with caution (S. Hillmert & Jacob, 2010, p. 69). In contrast, Henz (1997a) as well as Jacob and Tieben (2010) showed for West Germany (using also data from the GLHS) that there are marked social origin influences (measured in terms of parental education and father's occupational status) on the upgrading to a higher formal educational degree for the birth cohorts born between 1929 and 1971. They demonstrate, however, that these influences were less pronounced compared to the social background effects on the transition from primary school to secondary school. Furthermore, recent research by Trautwein et al. (2011) analysed for the transitions to the 'Gymnasium' among 'Realschule' graduates in Baden-Wuerttemberg with data from the Transformation of Secondary Education and Academic

Careers (TOSCA) study. They provide evidence for strong social origin associations (measured in terms of parental education and occupational status). In contrast to this previous research, one advantage of my analyses in this chapter is that I use a comparatively large sample from the NEPS that provides detailed longitudinal information on educational careers for East and West Germans and also includes relatively young birth cohorts. This unique database allows me to conduct a more detailed analysis of upgrading to higher educational degrees for younger birth cohorts as well.

In a relatively recent study using data from the NEPS, Buchholz and Schier (2015) investigated the upgrading of students with a general education school leaving certificate. They report that this pathway is quite frequently used by boys and that girls are less likely to upgrade to higher general educational degrees. Furthermore, they showed that youth from higher social origins (measured in terms of parent's highest education) are more likely to upgrade their educational degree. They also find that the previous school career has no influence on the upgrading of the first school leaving certificate. Using data from the Federal Institute of Vocational Training and Education, Schindler (2015, p. 525) also reports that particularly youth from higher social origin (measured in terms of parental education and parental class) upgrade their educational certificate through second chance education. However, Schindler (2015), Bucholz and Schier (2015), Trautwein et al. (2011), Jacob and Tieben (2010), as well as Henz (1997a) limit their research to the general education system. In this chapter, I also address the question regarding who takes the opportunity of using vocational training (together with some few years of labour force experience) to enter higher education (Blossfeld et al., 2015). Compared to recent research in this field, my analysis distinguishes in more detail between resources of parental education, parental class and parental status.

In addition, I assess who makes the transition from 'Fachhochschulreife' or 'Abitur' to vocational training. Recent research by Becker and Hecken (2009) used cross-sectional data for the East German state of Saxony to investigate the *diversion thesis*. Their findings show that young people from lower social origins (measured in terms of parental class) are more likely to opt for vocational training than for 'Fachhochschule' or traditional university education. They argue that the subjectively expected higher costs of tertiary education and the lower evaluation of the success probability of tertiary education explain the differences in these educational decisions. In this chapter, I shall re-examine their findings with better longitudinal data from the NEPS. Furthermore, Becker and Hecken (2009) report that particularly young people from higher social origins also start a tertiary education after vocational training. Drawing on data from the German General Survey (ALLBUS), the German Socio-Economic Panel (GSOEP) and the GLHS, Müller and Pollak (2010) also report that 'Abitur' holders from lower social origins (measured in terms of father's education and father's class position) more often choose vocational training instead of a university education. Furthermore, they find that youth from higher social origin more often decide to leave the educational system with only an 'Abitur'. They are surprised by this result. Therefore, I shall use this chapter to examine whether their finding also holds for the NEPS data.

Another objective of this chapter is to explore *the transition to tertiary level education* in more detail. Lörz and Schindler (2011, p. 469) report that educational inequality at the transition to higher education is lower compared to previous educational transitions in the educational career. Furthermore, they find that children from higher educated parents and the higher classes are much more likely to make the transition to higher education than children from less educated parents and parents from the lower classes. These educational inequalities even increase across birth cohorts. They also showed that women are less likely to continue to higher education than men. In subsequent articles, Schindler and

Lörz (2012) and Lörz (2013) also find support for the *diversion thesis*. Young people from the working classes increasingly obtain a higher education entry certificate but then opt for vocational training and not for academic education. Lörz (2013) also highlights that particularly women are increasingly diverting into vocational training instead of higher education. Müller and Pollak (2010) come to similar conclusions. However, the studies by Schindler and Lörz draw on German data from the Institute of Higher Education Development (HIS) and Müller and Pollak (2010, p. 306) point out that this HIS data has a major selectivity problem, because it includes only individuals who have an 'Abitur' and are enrolled as students. Individuals in higher education who do not come via the traditional academic track are therefore not part of this dataset.

Another recent contribution by Blossfeld et al. (2015) that combined data from the GLHS and the NEPS studied birth cohorts from 1919 to 1980 and reported strong social origin influences (measured in terms of parental education) at the transition from upper secondary education to university graduation and weak social origin influences at the transition from secondary education to the 'Fachhochschule' certificate. However, Müller and Pollak (2010) claim that young people from lower social origins are relatively more likely to make the transition to 'Fachhochschule' than young people from higher social origin. I shall therefore examine these various claims with the NEPS data.

In conclusion, sociological research on these various educational transitions is still quite fragmented, and it has used different concepts of social origin, different datasets and different measurements. In this chapter, I shall therefore provide a more standardized and unified analysis of all the major educational transitions extending students' first school degree in the German general education system up to the highest educational attainment at the time of the retrospective NEPS interview. Utilizing a unique dataset with comparable definitions of people 'at risk' at different transitions and applying the same sociologi-

cal inequality concepts for the multiple measurements, my analysis will deliver deeper insights into how parental education, parental class and parental status resources are associated with the various routes to the highest educational attainment.

## 7.3 Theories and hypotheses

As in Chapters 4 to 6, I consider the family as the unit of social stratification (Sorensen, 1994) that provides educational, economic and social resources to support children's educational careers. To contribute to a deeper understanding of inequalities in educational careers, I apply a multidimensional concept encompassing these three different family resources (Marks, 2011). Depending on the first school degree, children have to make different educational decisions. If they have attained a 'Hauptschulabschluss' or a 'Mittlere Reife' as their first certificate, they have to decide whether they want to (1) leave the educational system and enter directly into the labour market, (2) start vocational training at a vocational school or in the dual system or (3) opt for a higher education entry certificate in an institution of second chance education. Students, who have attained a 'Fachhochschulreife' or an 'Abitur' as their first school degree can opt for (1) an immediate entry into the labour market (without further vocational training or academic education), (2) a vocational training, (3) the 'Fachhochschule' or (4) the traditional university. Rational choice proponents argue that students make decisions based on cost-benefit calculations and take into account the subjectively expected success probabilities of different educational career lines (Erikson & Jonsson, 1996; Esser, 1999; Halsey et al., 1980). Because students from different social backgrounds vary in the educational, economic and social resources that might be helpful or even necessary for the next educational career steps, they are likely to make different educational decisions (Erikson & Jonsson, 1996, p. 55). Following the Effectively Maintained Inequality (EMI) thesis (Lucas, 2001), I particularly expect that at every educational level social background resources will channel

students to different types of education that have important implications for the final educational attainment. I therefore expect that the mobility flows between vocational and academic pathways and students' final educational attainments will vary strongly by social origin resources.

### 7.3.1 Students who have attained a 'Hauptschulabschluss' or 'Mittlere Reife' and their further educational careers

For young men and women who have attained a 'Hauptschulabschluss' or a 'Mittlere Reife' as the first school degree, I first develop hypotheses on how social origin variables are associated with the different educational decision options mentioned above.

First, I assume that *students with a 'Hauptschulabschluss' or 'Mittlere Reife' whose parents have a vocational training certificate or tertiary education are less likely to leave the educational system immediately (Hypothesis 1),* because these students know from their parents' experiences how crucial it is for the future job career to complement the 'Hauptschulabschluss' or 'Mittlere Reife' with vocational training or to upgrade to a higher education entry certificate.

More specifically, *I expect children of parents with a vocational training certificate to be more likely to complete a vocational training (Hypothesis 2),* because parents want that their children obtain at least the same educational level that they have gained themselves. Moreover, through parents' own experiences with this specific career line, they can also better inform their children about the specific advantages (Lörz & Schindler, 2011). In Germany, vocational training certificates provide access to qualified jobs that are relatively well paid and secure (Becker & Hecken, 2009, p. 235; Müller & Pollak, 2010). It is therefore an attractive alternative to tertiary education for young adults with vocationally trained parents. This hypothesis is commonly known as the *diversion thesis* (Becker & Hecken, 2009).

I do not expect parents' economic or social network resources to be particularly relevant for leaving the educational system with only the basic educational level or with vocational training, because the question whether to leave school as an unskilled worker or to complete vocational training is not connected to major parental economic investments or parental status gains (Erikson & Jonsson, 1996).

Third, *I expect that parental higher education and parental high-status resources are particularly important for the decision to upgrade the 'Hauptschulabschluss' or 'Mittlere Reife' to a higher education entry certificate ('Fachhochschulreife' or 'Abitur') (Hypothesis 3).* Highly educated parents are often not only better informed about new pathways, but they can also coach their children to master the often high demands of the schools of second chance education. In addition, they want their children to attain at least the same educational level as they have achieved themselves.

Children from high-status parents should also be more determined than children from lower status parents to upgrade their educational degree to a higher education entry certificate (and later on possibly complete a tertiary educational degree), because they are exposed to the higher educational aspirations of their high-status family and friends. Consequently, higher status young adults and their parents should evaluate the benefits of prestigious educational certificates as being greater. Moreover, higher status young adults are generally also more likely to share a common mode of speech and style of social interaction with their teachers (Goldthorpe, 2007a, p. 80) in the schools of second chance education than their peers from lower status families. They should therefore be more likely to receive the good grades needed to attain a higher education entry certificate.

### 7.3.2 Students who have attained a 'Fachhochschulreife' or an 'Abitur' and their further educational trajectories

For young men and women who have attained a 'Fachhochschulreife' or an 'Abitur' as their first school degree, I suggest the following hypotheses on the relationship between the three social origin resources and the previously described educational choices.

First, *I expect that young men and women from parents with a vocational training certificate or tertiary degree are less likely to leave the educational system with only a 'Fachhochschulreife' or 'Abitur' (Hypothesis 4)*, because these families know that an additional vocational training or academic education is central for their children's later labour market returns. Students whose parents lack such own experience do not have access to this information.

There is empirical evidence for 'Fachhochschulreife' and 'Abitur' graduates that their probability of receiving a vocational training has increased compared to their parents (Van de Werfhorst & Andersen, 2005). Based on data from the German Life History Study (GLHS), Jacob and Solga (2015) showed that the proportion of 'Hauptschule' graduates in vocational training shrunk from 80 % to 38 % for men. In turn, more apprentices have a 'Mittlere Reife' degree or an 'Abitur' across birth cohorts (Jacob & Solga, 2015, p. 162). Two processes might explain this development: First, technological and organizational change increases the share of service and administration occupations in the economy for which higher formal educational qualifications seem to be essential (Jacob & Solga, 2015, p. 165). Second, educational expansion has led to an increasing proportion of individuals with an 'Abitur' who have a competitive advantage compared to lower qualified applicants and increasingly displace those lower educated individuals on the vocational training market (Jacob & Solga, 2015, p. 165). *Thus, I argue that young people with 'Abitur' who have parents with a vocational training certificate are also more likely to complete vocational training (Hypothesis 5)*. They know from their parents that voca-

tional training provides access to qualified, well paid and secure jobs in the German labour market (Becker & Hecken, 2009, p. 235; Müller & Pollak, 2010). Thus, if there is a choice for these young 'Abitur' graduates between an uncertain and more long-term tertiary education and a better known short-term vocational training, they might find the vocational training option to be more attractive.

For young people who have a 'Fachhochschulreife' or 'Abitur', I do not expect parents' economic or social status resources to play a particular role in the likelihood of completing vocational training, because vocational training is not connected to major parental economic investments or high-status gains in Germany. However, this is different for higher education entry certificate holders' decisions to continue to higher education. Tertiary education is connected not only with much higher costs (such as paying for maintenance or for a – relatively small – tuition fee in some federal states for a short period in the 2000s) but also a greater boost in terms of social recognition.

At the tertiary level there are qualitative differences between universities of applied sciences and traditional universities in East and West Germany. These two institutions differ in their educational durations and prestige. Following Lucas' (2001) EMI theory, I expect that privileged families will tend to secure the qualitative advantages offered by traditional universities for their children and that larger parts of the disadvantaged students are diverted into the less prestigious universities of applied sciences.

*I expect that for the 'Fachhochschulreife' and 'Abitur' students, there are no or only small parental education, parental class and parental status differences in the rate of completing a 'Fachhochschulabschluss' (Hypothesis 6)*. The 'Fachhochschule' provides similar opportunities to attain a tertiary level education for both low performing young adults from higher educated parents and excellent students from poorly and intermediate educated parents. Moreover, education at universities of applied sciences is also shorter,

and therefore, in total less costly than education at traditional universities. Therefore, parents from the salariat, intermediate, and working classes should differ less in their possibility of financing this new kind of tertiary level education. Finally, universities of applied sciences also offer low performing students from high-status parents and talented students from intermediate- and low-status families an option to attain a relatively prestigious higher education degree. If all of these three arguments are true, then the expansion of the universities of applied sciences should lead to not only a higher educational attainment across cohorts but also to more equality of educational opportunities for young adults from different social backgrounds (see Blossfeld et al., 2015). However, based on EMI theory, this gain in equality might have its price, because it is likely that advantaged families and their young adults will try to secure the benefits of traditional university education for themselves.

*For the completion of a university degree I expect that all three parental background resources (education, class and status) are important for higher education entry certificate holders (Hypothesis 7).* Although the decisions of these students are mediated by mechanisms that are normally not observable, I can at least formulate the following hypotheses. First, *higher educated parents* are often better informed about the quality of universities, university subjects and professions that require a university degree, because they have experience with university education themselves. Thus, students from these families can make a more well-informed choice regarding university education. For example, Schneider and Franke (2014, p. 31) as well as Peter et al. (2016, p. 560) demonstrated for Germany that young adults from high-educated families more often receive advice from their parents concerning their tertiary level education compared to youth from lower educated families whose parents lack any personal experience with university education. Furthermore, Schneider and Franke (2014, p. 33) found that students are generally not well-informed by their schools about the opportunities at the university level

(Which fields of studies are available? Which university offers an excellent education in a specific field of study? What are the funding opportunities? etc.). Hence, in Germany, families are the most important source of information on university education. In sum, students from higher educated parents should be more likely to evaluate the success probability of a tertiary level degree as higher than students without this background information.

Second, because university studies last several years, they are connected with a high financial burden and substantial opportunity costs. Hence, I expect that *families from the working class* have greater problems in providing economic support for their children's university education. Several empirical studies have also shown that particularly youth from the working class evaluate the costs of university education as prohibitively high in West Germany and reunified East Germany. This is partly a consequence of a lack of information (Becker & Hecken, 2009, p. 241; Peter et al., 2016, p. 556). In addition, working class families and their youth often do not anticipate the payoffs of a more prestigious and longer university education and therefore make a less optimal educational decision (Holm & Breen, 2016). Events such as parental unemployment, which is more likely in working class families, might also negatively affect the educational decision for a university education (Holm & Breen, 2016). In comparison, parents from the salariat are more often employed in secure and well-paid jobs giving them the opportunity to support their youth's university education over a longer period of study (Holm & Breen, 2016). Following the *relative risk aversion theory* (Breen & Goldthorpe, 1997), I assume that parents from the salariat also want to avoid their children moving downwards in the social stratification system. Thus, parents from the salariat want that their children graduate from university, which is often a requirement for a class position in the salariat (Holm & Breen, 2016). Conversely, young adults from the working class do not need to study at university in order to maintain their families' class position. In conclusion, parents from

the salariat more often evaluate the direct and indirect cost of their young adult's university degree as lower and the benefits of avoiding social demotion as higher than families from the working class.

Third, youth from *high-status parents* are more likely to be influenced by higher educational aspirations through interactions with similar high-status family members and friends. Therefore, they should also feel a higher pressure to complete a university degree than young adults from lower status parents. Consequently, young adults from higher status parents should evaluate the benefits of a prestigious university certificate as being higher.

### 7.3.3 Transition to higher education after completion of vocational training

After attaining a vocational training certificate, an increasing proportion of young men and women subsequently complete a tertiary education as well. There are two competing theories on who is more likely to continue to tertiary education after completing a vocational training. *The first theory expects that high-performing youth from less educated working class families with low status are more likely to embark on higher education after the completion of vocational training* (see Büchel & Helberger, 1995) (*Hypothesis 8*). It is argued that children from a lower social origin evaluate the long pathway to higher education as being more costly and involving a higher risk of failure. Thus, these young people decide to complete vocational training first and then use this as a secure basis to embark on a more uncertain higher education, but only if they demonstrate the required excellent school performance. Thus, if they do not succeed, they can at least rely on their vocational training certificates. *The second hypothesis states that youth from higher educated parents, from the salariat and from high-status families, who show a comparatively poor school performance choose vocational training as a bridge towards higher education* (Becker & Hecken, 2009) (*Hypothesis 9*). If the first hypothesis is true, the road via

vocational training to higher education might reduce inequalities of educational opportunities; if the second hypothesis is valid, then the bridge between vocational training and higher education will increase educational inequalities.

### 7.3.4 Changes in vocational training and higher education across birth cohorts

In the process of educational expansion, more young women and men gain the opportunity to obtain a vocational training certificate or to upgrade to a higher educational level in the reformed German vocational training, post-secondary and tertiary education systems. Thus, I assume that the proportion of young women and men who leave the educational system with only basic education (i.e. without further vocational training or academic education) is strongly declining across cohorts (Hypothesis 10). Furthermore, many apprenticeship positions in the dual system or in vocational schools now require higher qualifications than a 'Hauptschulabschluss' or 'Mittlere Reife' (Jacob & Solga, 2015; Van de Werfhorst & Andersen, 2005). Therefore, across birth cohorts, I expect that a rising proportion of 'Fachhochschulreife' and 'Abitur' holders complete vocational training instead of a tertiary level education (Hypothesis 11).

### 7.3.5 East-West differences in vocational training and higher education

Based on the restrictive GDR educational policies with regard to the academic track (see the Chapters 5 and 6) and the institutions of higher education, I expect that an increasing proportion of students left the educational system with an educational degree from the 'Einheitsschule' in the GDR − which many rate as comparable to the 'Mittlere Reife' in West Germany. In addition, the income differences between highly qualified, vocationally trained and unqualified employees were smaller in the GDR than in the FRG. Thus, the incentives for additional vocational training or higher education were lower for students in the GDR. Based on the restrictive policies in the socialist GDR, *I expect that these graduates (compared to equivalent graduates in the FRG) had a relatively low probabil-*

*ity of completing vocational training, upgrading their formal level of education or earning a tertiary degree later on (Hypothesis 12). However, since German unification, I expect that more young men and women with a basic school degree continue their education in the vocational training and post-secondary education system in East Germany as well, so that these young people do not differ from young people in West Germany after reunification (Hypothesis 13).*

Furthermore, *if young people have earned a higher education entry certificate in the GDR, I expect that they also have a greater likelihood of obtaining a university of applied sciences degree or a traditional university degree than the West German 'Fachhochschulreife' or 'Abitur' holders*, because access to the higher education entry certificate was restricted, so that only a small and selective group of highly talented and motivated students quasi automatically entered tertiary education *(Hypothesis 14)*. In turn, *since German unification, I expect fewer East Germans to earn a tertiary level education after the attainment of a higher education entry certificate,* because this group has become more heterogeneous in terms of abilities and educational aspirations *(Hypothesis 15).*

### 7.3.6 Gender differences in vocational training and higher education

For a long time, the traditional male-breadwinner model was the norm in both East and West Germany. Nevertheless, women in the GDR participated earlier and in greater proportions in education and full-time paid work due to the strong ideological focus on gender equality in the socialist system. In contrast, women belonging to the older birth cohorts in the FRG did not invest as much in education as men, because the traditional male-breadwinner model was dominant for a long time in which women more often stayed at home as housewives and were only rarely employed. However, West German women's life course model changed in the process of modernization leading to an impres-

sive increase in female participation in education and in (part-time) work across birth cohorts. Hence, *I expect that women in East and West Germany catch up with men within the vocational training, post-secondary and tertiary education systems (Hypothesis 16).*

Furthermore, *I hypothesize that women more often shy away from university education than men, because the vocational training system provides many attractive opportunities for women to enter qualified service occupations such as nursery or kindergarten teacher* (Müller & Pollak, 2010) *(Hypothesis 17).* Although West and East German women increasingly participate in the labour market today, they often do it by working part-time in intermediate qualified jobs for which vocational training certificates are required (Brzinsky-Fay et al., 2016).

In addition, *I expect that women should be less likely than men to complete an educational degree at the 'Fachhochschule',* because the majority of study courses at this educational institution are in engineering or technology (Müller & Pollak, 2010) *(Hypothesis 18*). Women prefer to participate in study programmes such as social pedagogy or business administration.

## 7.4 Results

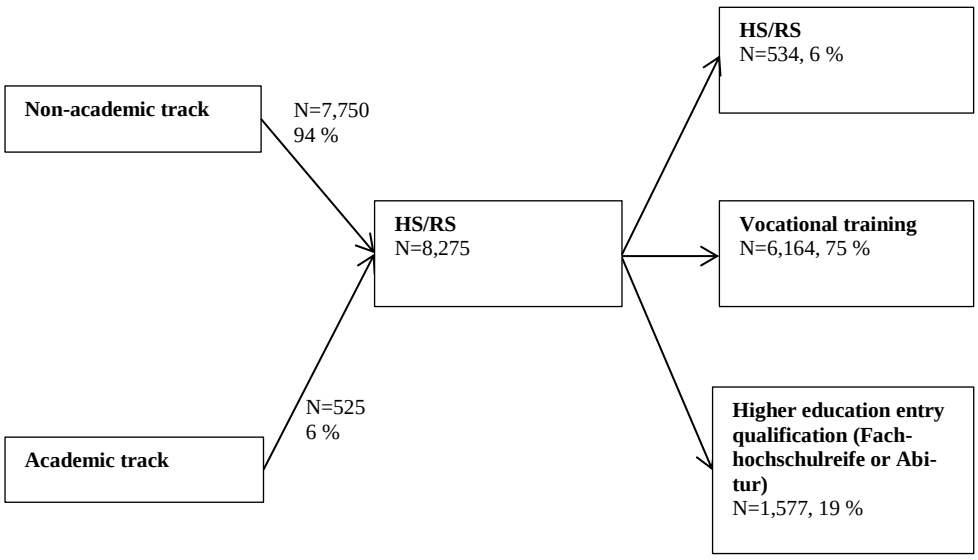
I start my empirical analysis with students who obtained a 'Hauptschulabschluss' or 'Mittlere Reife' as their first school degree and then left the educational system with this basic qualification level (see Figure 7-1). Then, I go on to empirically investigate which of the students with a 'Hauptschulabschluss' or 'Mittlere Reife' complete vocational training or even attains a higher education entry qualification ('Fachhochschulreife' or 'Abitur'). Subsequently, I focus on students who have attained a higher education entry qualification via the traditional academic track or the route of second chance education. I study who among them leaves the educational system directly (without any further vocational training or academic education), earns only a vocational training certificate or graduates

from a ‘Fachhochschule’ or traditional university. Finally, I focus on students who completed a vocational training certificate and then obtained a tertiary degree.

### 7.4.1 Educational careers after obtaining a ‘Hauptschulabschluss’ or a ‘Mittlere Reife’ as the first school degree

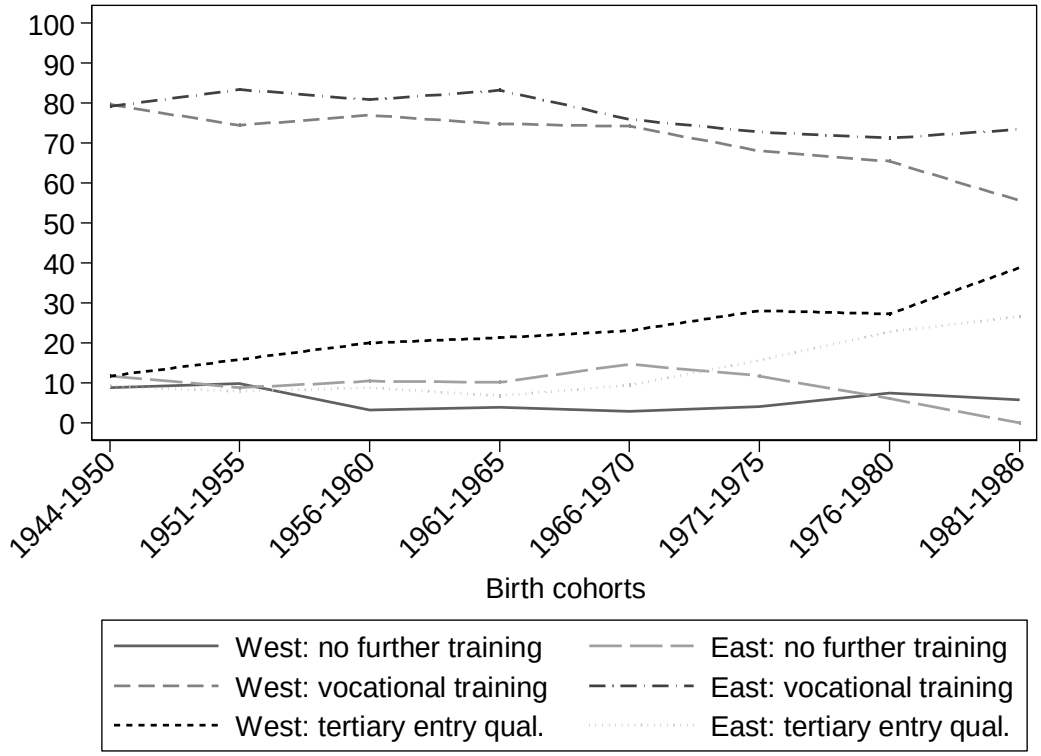
I first study the educational careers of students who have obtained a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ as their first school degree. Figure 7-1 describes which (non-academic or academic) school tracks they were coming from and illustrates the educational options of these students. A total of 7,750 (or about 94 %) of these students obtained their basic school degree on the non-academic track and 525 (or about 6 %) on the academic track (see Chapter 6).

**Figure 7-1:** Educational options of students who have obtained a ‚Hauptschulabschluss‘ or a ‘Mittlere Reife’ as their first school degree




Source : Author’s portrayal using NEPS data

**Figure 7-2:** Changes across cohorts in the proportions of young people with 'Hautschulabschluss' or 'Mittlere Reife' who leave without any further vocational training/school qualification, complete vocational training or upgrade their formal degree to a tertiary entry qualification in East and West Germany




Source: Author's portrayal using NEPS data

Only 534 (about 6 %) of the students who have earned a 'Hauptschulabschluss' or 'Mittlere Reife' as their first degree leave the educational system with nothing beyond this basic educational level. In Germany, where vocational training basically is a strong requirement for accessing skilled job positions in the primary labour market segment of the economy (see Blossfeld and Mayer 1987), those labour market entrants are often also labelled as the 'unskilled'. Thus, the majority of 6,164 students (about 75 %) with a 'Hauptschulabschluss' or 'Mittlere Reife' gains a vocational training certificate. However, there is also a relatively large number of 1,577 (about 19 %) students with a 'Hauptschulabschluss' or 'Mittlere Reife' who upgrades their formal education to a higher education entry certificate (the 'Fachhochschulreife' or the 'Abitur'). The

‘Hauptschulabschluss’ or ‘Mittlere Reife’ are therefore no longer just dead end roads in the German education system.

How has the proportion of individuals who leave the educational system with only a ‘Hautschulabschluss’ or ‘Mittlere Reife’ changed across birth cohorts in East and West Germany? Figure 7-2 shows that in West Germany, the proportion of school leavers with only a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ has declined across birth cohorts from about 9 % (1944−1950 birth cohort) to about 6 % (1981−1986 birth cohort). There have been two small peaks for the 1951−1955 (at about 10 %) and 1976−1980 birth cohorts (at about 7 %). However, in the observation window, the proportion of unskilled individuals is always below 10 %. This is in agreement with a recent publication by the OECD (2016, p. 32) which also reports a proportion of about 10 % unskilled in Germany.

In East Germany, the proportion of students who left the education system with only a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ was quite stable at about 10 % for the 1944−1950 to 1951−1965 birth cohorts. Then, the proportion increased to about 15 % until the 1966−1970 birth cohort and declined monotonically afterwards until the 1981−1986 birth cohort.

Next, I turn to the question how far social origin, gender, the characteristics of the previous school career and being born in East or West Germany are associated with leaving the educational system with only a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ as the highest educational degree. To address these questions, I estimate a binary logistic regression model for the event that a student with a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ leaves school without any further vocational training or other higher education (Y = 1) compared to acquiring vocational training or earning a tertiary education entry qualification (Y = 0). The logit coefficients for the ‘No Further Education’ (NFC) model are reported in Table 7-1.

**Table 7-1:** Binary logistic regression and multinomial logistic regression for the educational choices after obtaining a 'Hauptschulabschluss' or 'Mittlere Reife' as the first school degree

| Variables | NFC (Ref.: Further education) | VOC (Ref.: No further education) | HEEC (Ref.: No further education) |
|---|---|---|---|
| Cohort trend | -0.03*** | 0.03*** | 0.06*** |
| | (0.01) | (0.01) | (0.01) |
| *Parental education (Ref.: Low educational level)* | | | |
| Intermediate educational | -0.70*** | 0.65*** | 1.11*** |
| Level | (0.14) | (0.14) | (0.18) |
| High educational level | -0.62*** | 0.40 | 1.59*** |
| | (0.23) | (0.23) | (0.27) |
| *Parental class (Ref.: workers)* | | | |
| Intermediate | 0.17 | -0.17 | -0.11 |
| | (0.15) | (0.15) | (0.17) |
| Salariat | -0.07 | 0.03 | 0.28 |
| | (0.17) | (0.17) | (0.19) |
| *Parental status (Ref. low parental status)* | | | |
| Intermediate | -0.24 | 0.18 | 0.56*** |
| | (0.14) | (0.14) | (0.16) |
| High | -0.06 | -0.05 | 0.58+ |
| | (0.28) | (0.29) | (0.31) |
| *Mobility before the general education school leaving certificate (Ref.: Remaining on the academic track)* | | | |
| Downward mobility to the non-academic track | -0.73 | 63 | 1.17 |
| | (1.03) | (1.03) | (1.07) |
| Remaining on the non-academic track | -0.37 | 0.14 | 0.94*** |
| | (0.24) | (0.24) | (0.25) |
| Upward mobility to the academic track | -0.71** | 0.53 | 1.09*** |
| | (0.35) | (0.35) | (0.36) |
| Female (ref. male) | 1.64*** | -1.57*** | -1.97*** |
| | (0.12) | (0.12) | (0.13) |
| East German (ref. West | 0.89*** | -0.77*** | -1.80*** |
| German) | (0.11) | (0.11) | (0.14) |
| German unification | 1.16*** | -1.24*** | -1.18*** |
| | (0.21) | (0.21) | (0.23) |
| German unification×East | -1.53*** | 1.54*** | 2.03*** |
| Germany | (0.37) | (0.37) | (0.40) |
| Constant | -2.79*** | 2.71*** | 0.16 |
| | (0.17) | (0.17) | (0.22) |
| Changes of state | 534 | 6,164 | 1,577 |
| Observations | 8,275 | 8,275 | 8,275 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

At first, the *cohort trend* indicates again that there is a significant decline across birth cohorts in the likelihood of leaving the educational system with only a 'Hauptschulabschluss' or 'Mittlere Reife' (see also Figure 7-2). This *result supports Hypothesis 10* predicting that in the process of educational expansion, students across birth

cohorts increasingly have a better chance to obtain a vocational training certificate or a higher formal educational degree.

Furthermore, Table 7-1 reveals that among the social origin variables only parental education is statistically significant. The dummy variables for parents with intermediate or high educational levels are both negative. This means that young men and women from parents with vocational training or a higher education strongly avoid leaving the educational system as unskilled workers. Thus, it is particularly unskilled parents whose offspring also leave the educational system as unskilled workers. *This finding is consistent with Hypothesis 1*. The educated families know from their own experience that vocational training and higher education are beneficial in 'coordinated economies' such as Germany (Hall & Soskice, 2001, p. 25)

In addition, Table 7-1 shows that youth who experienced upward mobility from the non-academic to the academic track are less likely to leave the educational system with only a 'Hauptschulabschluss' or 'Mittlere Reife'. Moving up to the academic track is often connected with great efforts by children, and might be seen as an indication of their strong academic abilities and ambitions (and those for their families). Therefore, the move from the non-academic to the academic track provides young adults with information on whether they are able to advance their education in the academic or vocational education system (Holm & Breen, 2016).

Moreover, Table 7-1 demonstrates that girls are statistically more likely to leave the educational system with only a 'Hauptschulabschluss' or 'Mittlere Reife'. I also tested the interaction between the cohort trend and being female. However, this model indicated that there was no change for girls across birth cohorts. *This result is not in line with Hypothesis 16* in which I expected that women are increasingly catching up with men in the vocational training system. It seems that there are attractive job opportunities for some of the

women with a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ to enter into service and administrative occupations without further vocational training. Furthermore, East Germans in the GDR were statistically more likely to leave the educational system with only a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ (see also Figure 7-2). Thus, *there is support for Hypothesis 12* that East Germans in the GDR more often left the educational system with a ‘Hauptschulabschluss’ or ‘Mittlere Reife’, because educational qualifications were less strongly connected to labour market returns. Furthermore, since German unification fewer students in East Germany have been leaving the educational system with only ‘Hauptschulabschluss’ or ‘Mittlere Reife’. *This confirms Hypothesis 13* that vocational training and higher educational attainment are becoming more important because the returns to education have increased in reunified East Germany.

In the next step of my analysis, I investigate how far students who have attained a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ as their first school degree complete vocational training or even attain a higher education entry qualification (‘Fachhochschulreife’ or ‘Abitur’). Figure 7-2 shows that the proportion of students who complete vocational training has decreased monotonically across birth cohorts in West Germany(from about 80 % to about 60 %). In East Germany, the proportion of students with a vocational training certificate fluctuates around 80-85 % and then declines to about 75 % for the youngest birth cohort. The proportion of students who upgrade their formal education to a higher education entry qualification has increased monotonically across birth cohorts (in West Germany from about 11 % to about 36 % and in East Germany from about 10 % before German unification to about 25 % after German unification). This change is a clear sign that the vocational track in Germany has lost its dead end character, and that the move from the vocational to the academic pathway has actually become much more common in the course of the educational expansion and the accompanying educational reforms over the last decades. However, not everyone in Germany welcomes this development. The

new permeability from the vocational to the academic track, which is seen as being connected with a loss of talent for traditional craft occupations, has provoked strong doubts in the recent German educational policy debate that the world-famous dual vocational training system will soon disappear (the buzzword is 'academization mania', see Nida-Rümelin, 2014).

Now, I ask which of the students with a 'Hauptschulabschluss' or 'Mittlere Reife' opt for vocational training or an academic upgrading. I estimate a multinomial logit model in which the dependent variable indicates whether students with a 'Hauptschulabschluss' or 'Mittlere Reife' obtain a vocational training certificate ($Y = 2$) or a higher education entry certificate ($Y = 3$). The reference category of this model is whether these students do not obtain any further educational degree ($Y = 1$) (see Table 7-1). As covariates, I include information on the cohort trend, parental education, parental class, parental status[57], the previous school track mobility or immobility before the general school leaving certificate, students' gender, whether students were born in East or West Germany, whether students made the transition from primary school to secondary education before or after German unification as well as an interaction term for East Germans following German unification. I present logit coefficients in Table 7-1.

The *cohort trend* in the 'Vocational training' (VOC) model in Table 7-1 reveals that the proportion of students with a 'Hauptschulabschluss' or 'Mittlere Reife' who receive vocational training ($Y = 2$) compared to no additional training ($Y = 1$) is rising across birth cohorts (see also Figure 7-2).

Furthermore, the 'VOC' model in Table 7-1 shows that it is particularly youth from parents with a vocational training certificate (intermediate educational level) who are also significantly more likely to complete vocational training. The other two social origin indi-

[57] Parental status (measured with the CAMSIS scale) is a *proxy* for exclusive social relationships in social networks and for a distinguishing lifestyle.

cators are − as expected − not significant. *This confirms Hypothesis 2* that parents strongly wish for their children to complete at least the same level of education as they have attained themselves. These parents also know the vocational training system quite well, so that they can give their youth valuable advice. Finally, in Germany, vocational training is still an attractive alternative option compared to tertiary education for youth from vocationally trained parents. Thus, my analysis provides support for the *diversion thesis* (Becker & Hecken, 2009).

In addition, the 'VOC' model in Table 7-1 demonstrates that a student's previous school track mobility or immobility before the general education school leaving certificate has no statistically significant effect on students' likelihood to complete a vocational training or not.

Moreover, the 'VOC' model in Table 7-1 shows that girls are less likely than boys to complete a vocational training certificate. I also tested whether there are changes in girls' likelihood to obtain a vocational training certificate across birth cohorts (not shown here). However, this interaction term was not significant. Thus, the disadvantage of girls with a 'Hauptschulabschluss' or 'Mittlere Reife' as their first school degree did not change across birth cohorts with regard to vocational training completion.

Finally, the 'VOC' model in Table 7-1 indicates that East Germans in the GDR were statistically less likely to complete vocational training than their West German contemporaries if compared to the reference category 'NFC' in the multinomial model. *This is in line with Hypothesis 12* that East Germans should have been more likely to leave the educational system after the 'Einheitsschule' because the returns of additional schooling on the labour market were lower. However, since German unification, more East Germans completed vocational training compared to the GDR period if compared to the reference category 'NFC' in the multinomial model. *This confirms my Hypothesis 13*. In other

words, it seems that following German unification, the expected labour market returns of vocational training increased for East Germans due to the change in the economic system. However, the interaction term between German unification and being born in East Germany also shows that East Germans are still less likely to complete vocational training compared to West Germans. One reason is that the opportunities for vocational training are still worse in East Germany compared to West Germany (Konietzka, 2001).

Now, I turn to the question which students with a 'Hauptschulabschluss' or 'Mittlere Reife' as their first educational degree obtain a higher education entry certificate ($Y = 3$) in comparison to leaving the educational system with no further degree ($Y = 1$) (see Table 7-1). The *cohort trend* of the 'Higher education entry certificate' (HEEC) model is statistically significant and indicates that across birth cohorts more and more students obtain a higher education entry certificate compared to no further degree. *This is in line with my Hypothesis 10*. This finding is interesting, because it means that the transition between the vocational and the academic tracks has become more permeable during the process of educational reforms and expansion.

Furthermore, particularly young men and women from higher educated parents (and to a lesser degree from parents with vocational training) are more likely to upgrade their qualification level to a higher education entry qualification. Highly educated parents are often not only better informed about new pathways to the academic track, but can also coach their youth to master the often high demands of the schools of second chance education. In addition, they want that their children to attain at least the same educational level as that they achieved themselves. Moreover, parents' status seems to play an important role here. Young people from intermediate- and high-status parents seem to be more likely to earn a higher education entry certificate. Children from intermediate- and high-status parents are more determined than children from lower status parents to up-

grade their educational degree to a higher education entry certificate (and later on possibly complete a tertiary educational degree), because they are exposed to higher educational aspirations among their family and friends. Finally, the parental class indicators are not statistically significant. Thus, *these empirical findings to a large extent support Hypothesis 4* that the more advantaged youth are more likely to benefit from the new opportunities of second chance education.

The 'HEEC' model in Table 7-1 also demonstrates that young adults who obtained their "Hauptschulabschluss" or "Realschulabschluss" as their first school degree on the non-academic track or who were upward mobile to the academic track more often complete a higher education entry certificate after leaving the general school system than students who left the academic track without a higher education entry certificate in the general school system. Thus, those students that leave the academic track without the highest educational degrees do not really aim to obtain those degrees.

Moreover, the 'HEEC' model in Table 7-1 demonstrates that young women compared to young men have a lower chance of making the transition from the 'Hauptschulabschluss' or 'Mittlere Reife' to a higher education entry certificate. Thus, on the one side, women have become increasingly more similar to men on the traditional academic track (see the results on the gender-specific changes at the first educational transition in Chapter 5); but, on the other side, they seem to be less successful than men in advancing their educational careers via second chance education across cohorts. However, a model with an interaction term of being female and cohort trend shows that there is also a slight increase in women's participation on the second chance track (this model is not shown here, but available from the author upon request).

Finally, the 'HEEC' model in Table 7-1 shows that East Germans in the GDR were less likely to obtain a higher education entry certificate via second chance education. *This*

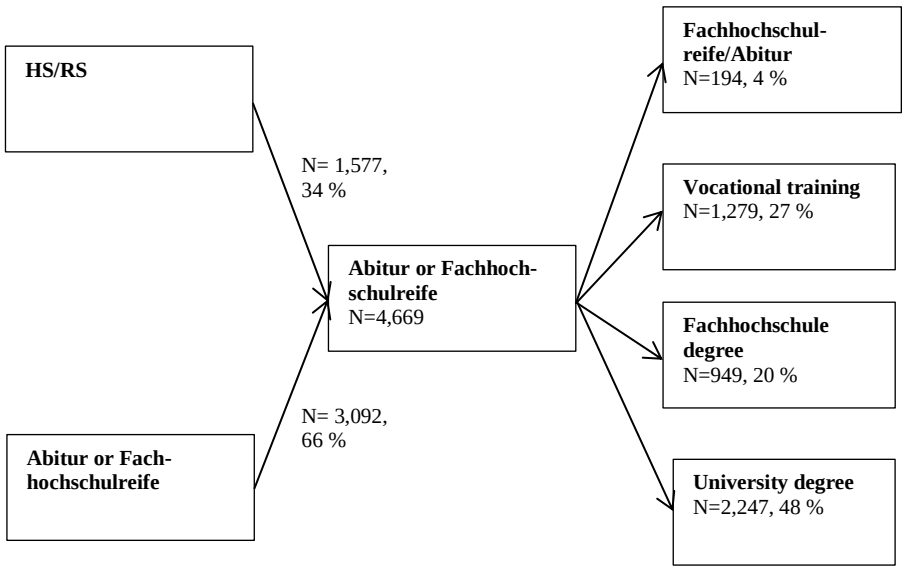
*confirms Hypothesis 12* that GDR youth did not continue to higher education after the 'Mittlere Reife' because higher education was restricted in the GDR since the mid-1960s. However, after unification in 1990, when the GDR restrictions to higher education were abolished, East Germans impressively increased their rates of upgrading to a higher education entry certificate.

### 7.4.2 Educational careers after obtaining a 'Fachhochschulreife' or 'Abitur'

In this section, I focus on students who have obtained a higher education entry certificate ('Fachhochschulreife' or 'Abitur') and follow them up until they obtain their highest educational attainment at the time of the NEPS interview. Figure 7-3 shows that in my sample 1,577 (34 %) of these students previously attained a 'Hauptschulabschluss' or 'Mittlere Reife'. However, the majority of 3,092 (66 %) students came via the traditional academic track. From the students with 'Fachhochschulreife' or 'Abitur', 194 (4 %) left the educational system with only a 'Fachhochschulreife' or 'Abitur', 1,279 (28 %) completed vocational training, 949 students (20 %) graduated from a 'Fachhochschule' and 2,247 students (48 %) graduated from a university.

In Figure 7-4, I describe the changes across birth cohorts in the proportions of students (aged 25 or over at the time of the NEPS interview) who (1) leave the educational system without attaining any further certificate after the 'Fachhochschulreife' or 'Abitur', (2) complete vocational training or (3) gain a tertiary degree (see Figure 8-9 in the appendix for a description of the changes in the proportions of students [aged 30 and over] who completed a university of applied sciences or a traditional university degree). Until the 1976−1980 birth cohorts, the proportion of students who leave the educational system without any further certificate declined from about 6 % to about 3 %. Afterwards, the share of these students seems to rise again to 10 %. However, this increase among the

**Figure 7-3:** Educational options of students who have obtained a higher education entry certificate




Source: Author's calculations using NEPS data

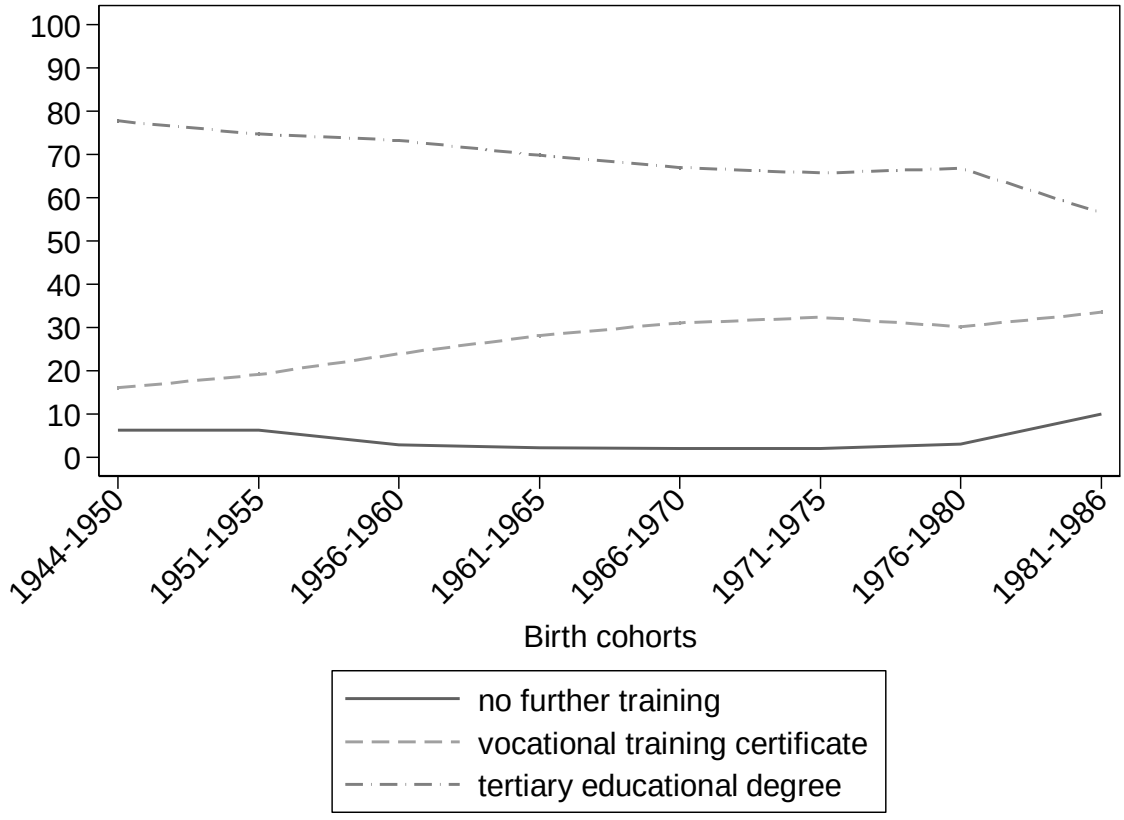
younger birth cohorts is due only to the fact that I included people up to age 25. This means that some of these students in the younger birth cohort have not yet finished their university studies. Thus, focusing my analysis on students up to age 30 (see Figure 8-9 in the appendix), I no longer find this increase among the last two birth cohorts. The percentage is then also at a level of 3 % for the 1981−1983 birth cohort.

More importantly, Figure 7-4 also clearly shows the impressive increase in the proportion of students with a 'Fachhochschulreife' or 'Abitur' who obtain only a vocational training certificate. This rises from 16 % to 34 %[58]. This increase is again a clear sign that the vocational and the academic tracks in Germany have become more integrated over the last decades, and that, by and large, they are no longer really separated pathways. This result might also be considered as empirical evidence against the often hold view that the German vocational training system is losing its traditional virtues ('academization mania', see Nida-Rümelin, 2014), because not only increasingly more talented young people who

[58] It is 30 % for respondents aged 30 and over.

hold a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ as their first school degree move up to the academic track, but at the same time, more talented young people with a ‘Fachhochschulreife’ or ‘Abitur’ move down to the vocational training system. Thus, in a modern service economy, these recent changes between the vocational and academic tracks might even complement the rising supply of qualified service and administration occupations for which a higher school qualification is beneficial (Jacob & Solga, 2015, p. 165).

**Figure 7-4:** Changes in the proportions of young people with a higher education entry certificate (‘Fachhochschulreife’ or ‘Abitur’) who acquire no further certificate, complete vocational training or graduate with a tertiary level education across birth cohorts




Source: Author’s portrayal using NEPS data

Furthermore, Figure 7-4 demonstrates that students with a 'Fachhochschulreife' or 'Abitur' less frequently complete a tertiary degree across birth cohorts. This percentage declines from 78 % to 57 %.[59] Thus, it seems that the increasing proportion of young people who hold a higher education entry certificate is connected with a more heterogeneous composition of students with different abilities and educational aspirations.

In the following, I analyse which of the young people with a 'Fachhochschulreife' or 'Abitur' (1) leave the educational system without further vocational training or academic education, (2) complete only vocational training (3) or graduate from a 'Fachhochschule' or traditional university. I examine in detail the role of social origin resources, gender differences, the influences of previous school careers, being born in East or West Germany and changes across birth cohorts. I estimate two different multinomial logistic regressions and report their logit coefficients in Table 7-2. In the first model, I contrast leaving the educational system with no further training or academic education ($Y = 2$) or the completion of vocational training ($Y = 3$) with the reference category that a student obtains a tertiary level education ($Y = 1$). In the second model, I contrast the completion of a 'Fachhochschulabschluss'($Y = 2$) or a university degree ($Y = 3$) with the reference category that a student does not earn any tertiary level education (Y = 1).

The 'No further certificate' (NFC)' model in Table 7-2 shows − as expected − that the cohort trend is statistically significant and negative (see also Figure 7-4). Thus, across birth cohorts, fewer students leave the educational system with only a higher education entry certificate. *This result is in line with my Hypothesis 10* that in the process of educational expansion, more students obtain vocational training or an academic education.

The 'NFC' model in Table 7-2 does not reveal statistically significant differences in terms of social origin, previous educational history or gender. Instead, leaving the educa-

[59] If I only include students aged 30 or above, the percentage for the 1981–1983 birth cohort is 67 %.

tional system with no further certificate seems to be a quite random event. Thus, *this result does not confirm my expectation (see Hypothesis 4)* that young men and women are less likely to leave the educational system with only a 'Fachhochschulreife' or Abitur if their parents possess a vocational training certificate or even a tertiary degree.

In addition the 'NFC' model in Table 7-2 shows that East Germans do not differ significantly from West Germans in leaving the educational system with only a higher education entry certificate.[60] However, after German unification, leaving the educational system with a higher education entry certificate increases in East and West Germany across birth cohorts. Finally, the interaction term between being born in East Germany and German unification is not statistically significant.[61] *This is in line with my Hypothesis 15* in which I expected that more East Germans with a higher education entry certificate would leave the educational system without a tertiary degree following German unification.

Next, I examine who obtains a vocational training certificate after completing a higher education entry certificate. The *cohort trend* in the 'Vocational training' (VOC) model in Table 7-2 indicates that across birth cohorts more students additionally earn a vocational training certificate. *This is in line with my Hypothesis 11* and reflects the trend I have already described in Figure 7-4. Thus, the vocational and academic tracks are much more closely integrated today than some years ago. Many apprenticeship regulations have changed due to the rising demands of applicants with higher formal school qualifications in the skilled service and administrative sectors of the economy.

The 'VOC' model in Table 7-2 also reveals that specifically young people from parents with a tertiary level education and with a high status do avoid vocational training af-

[60] If I include only individuals age 30 or over at the time of the NEPS, then East Germans during the GDR were less likely to leave the educational system with only a higher education entry certificate. *This is in line with my Hypothesis 14*. In the GDR, access to the higher education entry certificate was highly restricted. Hence, if students obtained such an educational degree, they generally also continued to tertiary level education (see Table 8-16 in the appendix).

[61] However, in a model, including the sampling stratification weights, this interaction term is statistically significant.

ter obtaining a higher education entry certificate. *This confirms my Hypothesis 5* that young men and women with a 'Fachhochschulreife' or 'Abitur' who have parents with vocational training degrees are also more likely to complete vocational training themselves. Their parents have knowledge of the vocational training system that provides relatively qualified, well paid and secure jobs in the German labour market (Becker & Hecken, 2009, p. 235; Müller & Pollak, 2010, p. 310). Thus, if these young higher

**Table 7-2:** Multinomial logistic regressions for individuals with a higher education entry certificate

| **Variables** | **NFC (Ref.: tertiary degree)** | **VOC (Ref.: tertiary degree))** | **FHS degree (Ref.: No tertiary education)** | **UNI degree (Ref.: No tertiary education)** |
|---|---|---|---|---|
| Cohort trend | -0.02*** | 0.04*** | -0.02*** | -0.04*** |
| | (0.01) | (0.01) | (0.01) | (0.01) |
| *Parental education (Ref.: Low educational level)* | | | | |
| Intermediate educational | -0.06 | 0.004 | 0.11 | -0.07 |
| Level | (0.44) | (0.19) | (0.24) | (0.20) |
| High educational level | -0.22 | -0.64*** | 0.45 | 0.59*** |
| | (0.47) | (0.21) | (0.26) | (0.22) |
| *Parental class (Ref.: workers)* | | | | |
| Intermediate | 0.54 | -0.17 | -0.02 | 0.16 |
| | (0.31) | (0.13) | (0.16) | (0.14) |
| Salariat | 0.51 | -0.22 | 0.12 | 0.31*** |
| | (0.32) | (0.13) | (0.16) | (0.14) |
| *Parental status (Ref. low parental status)* | | | | |
| Intermediate | -0.37 | -0.03 | 0.17 | 0.02 |
| | (0.27) | (0.12) | (0.15) | (0.13) |
| High | 0.59 | -0.41*** | 0.35 | 0.41*** |
| | (0.36) | (0.18) | (0.21) | (0.18) |
| Traditional academic track | -0.22 | -0.76*** | -0.10 | 1.09*** |
| | (0.16) | (0.07) | (0.09) | (0.08) |
| Female (ref. male) | 0.002 | 0.51*** | -0.57*** | -0.37*** |
| | (0.15) | (0.07) | (0.09) | (0.08) |
| East German (ref. West | -0.52 | -1.19*** | 1.08*** | 1.13*** |
| German) | (0.30) | (0.15) | (0.16) | (0.14) |
| German unification | 1.38*** | -0.44*** | 0.18 | 0.19 |
| | (0.31) | (0.14) | (0.17) | (0.14) |
| German unification×East | 0.69 | 1.43*** | -1.24*** | -1.38*** |
| Germany | (0.40) | (0.22) | (0.24) | (0.22) |
| Constant | -2.50*** | -1.05*** | -0.16 | 0.26 |
| | (0.48) | (0.21) | (0.26) | (0.22) |
| Changes of state | 194 | 1,279 | 949 | 2,247 |
| Observations | 4,669 | 4,669 | 4,669 | 4,669 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

education entry certificate holders have a choice between an uncertain and long-term academic study at the tertiary level and a better known and short-term vocational training, they are more likely to opt for this short-term alternative.

In addition, the 'VOC' model in Table 7-2 demonstrates that young adults who have obtained their higher education entry certificate on the traditional academic track are less likely to complete vocational training. In other words, it is particularly youth who have obtained their higher education entry certificates on alternative pathways who opt for a vocational training certificate.

Moreover, the 'VOC' model in Table 7-2 also shows that women more often complete vocational training after obtaining a higher education entry certificate than men. *This supports Hypothesis 17* claiming that women more often work in skilled (part-time) service jobs that require only an intermediate education such as that provided by a higher education entry certificate with vocational training.

Finally, the 'VOC' model in Table 7-2 indicates that East Germans in the GDR were less likely to obtain a vocational training certificate after a higher education entry certificate. *This is in line with Hypothesis 14* stating that access to a higher education entry certificate was highly restricted in the GDR since the 1970s. Thus, students who were lucky to obtain a higher education entry certificate continued their career quasi automatically in the institutions of higher education. However, after German unification, significantly fewer young adults obtained a vocational training certificate, because the labour market opportunities were difficult due to an economic downturn in Germany (Konietzka, 2001). Particularly East Germans had problems completing vocational training in firms after German unification, because many East German companies were simply not competitive on the globalized market and closed down (Bechmann et al., 2010). Nonetheless, one has

to say that in reunified Germany more East Germans earned a vocational training certificate after a higher education entry degree than in the GDR.

Now, I ask which students with a higher education entry certificate eventually graduate from a 'Fachhochschule' (FHS). The coefficient for the *cohort trend* in the 'FHS' model in Table 7-2 is statistically significant[62] and indicates that − compared to those students who opted for vocational training or no further certificate − an increasingly smaller share of students complete a 'Fachhochschulabschluss' across birth cohorts. Thus, even if the proportion of students who graduate from the 'Fachhochschule' expanded more quickly than the proportion of students who graduate from traditional universities (UNI) (see Figure 8-9 in the appendix) (Lörz & Schindler, 2011), the growth of graduates from both tertiary institutions was smaller than the growth of young people with a higher education entry certificate ('Fachhochschulreife' or 'Abitur') who completed vocational training (see Figure 7-4). An important finding from the 'FHS' model in Table 7-2 is that none of the three social origin indicators (parental education, parental class and parental status) attain statistically significance.[63] Thus − compared to students who opted for vocational training or did not acquire any further certificate − there are no social origin differences in the 'FHS' graduation rate. *This finding confirms my Hypothesis 6*. The 'Fachhochschule' provides a decent chance to obtain a tertiary level education for lower performing youth from higher educated parents and for excellent students from poorly and intermediate educated parents. Thus, there should be no great differences in terms of parental education for the 'Fachhochschulreife' or 'Abitur' holders who graduate from a 'Fachhochschule'. Education at the universities of applied sciences is also shorter and in total less costly. Therefore, it seems that parents from the salariat, intermediate classes and working clas-

[62] In a model, including only respondents aged 30 and over, the cohort trend is not statistically significant (see appendix).
[63] In a model including only students aged 30 or over, children from high-status parents are significantly more likely to obtain a 'Fachhochschulabschluss' (see appendix).

ses also do not differ in terms of their ability to pay for a 'Fachhochschule' education. And finally, education at universities of applied sciences also offers low performing students from high-status parents and talented students from intermediate- and low-status families an option to attain a higher education degree. Thus, no parental status issues seem to be involved in completing a university of applied sciences degree. In sum, the universities of applied sciences seem to increase the equality of educational opportunities at the tertiary level for young people from different social backgrounds (see also the results in Blossfeld et al., 2015).

The 'FHS' model in Table 7-2 also reveals that whether or not students received their higher education entry certificate on the traditional academic track does not provide a statistically significant association with obtaining a 'FHS' degree. Thus, young people who came from the academic and non-academic track complete the 'Fachhochschulabschluss' to a similar extent.

In addition, the 'FHS' model in Table 7-2 shows that women are significantly less likely to graduate from a 'Fachhochschule'. *This supports Hypothesis 18* that young women less often complete a 'FHS' education than young men, because the majority of study courses in these educational institutions are in engineering or technology (Müller & Pollak, 2010).

Finally, during the period of the GDR, East Germans were more likely than West Germans to obtain an educational certificate from the 'FHS' if they had a higher education entry certificate. *This confirms Hypothesis 14* that East Germans generally also complete a higher education certificate after obtaining their higher education entry certificate, because access to the higher education entry certificate, which is the most common pathway to tertiary level education, was restricted in the GDR. Since German unification, East and West Germans no longer differ in their likelihood of obtaining a 'Fach-

hochschulabschluss'. However, East Germans in reunified Germany who hold a higher education entry certificate less often obtain a certificate at the 'Fachhochschule' compared to the former GDR. *This confirms Hypothesis 15* that fewer East Germans obtain a 'Fachhochschulabschluss' because the restriction to a higher education entry certificate was abolished following German unification and this group of students became more heterogeneous in terms of educational abilities and aspirations.

Finally, I turn to students with a higher education entry certificate who subsequently also graduated from university (see Table 7-2). The *cohort trend* in the 'University degree' (UNI) model in Table 7-2 reveals that fewer students obtain a university degree across birth cohorts. *This development is in line with Hypothesis 11* that the proportion of 'Abitur' holders who graduate with a university degree is declining at the expense of the proportion of those students who complete a vocational training (see also Figure 7-3). This result again provides evidence for the declining clear-cut division between the traditional academic and vocational tracks.

Additionally, one has to take into account that traditional universities (UNI) are increasingly competing with universities of applied sciences (see Figure 8-9 in the appendix) that are socially less selective as I have shown in the 'FHS' model in Table 7-2. Thus, a large share of the less advantaged students with a higher education entry certificate seem to be diverted to the less prestigious universities of applied sciences. This engenders more equality. However, following Lucas' (2001) EMI theory, at the same time, it is also necessary to expect that advantaged families will tend to secure for (themselves and) their young adults the qualitative advantages offered by traditional universities. The 'UNI' model in Table 7-2 demonstrates exactly this: Children from highly educated parents, from the salariat[64] and from high-status parents are actually more likely to graduate

[64] There are no parental class associations with obtaining a university degree in a model including only respondents aged 30 and over (see appendix).

from a traditional university than children from less educated parents, from the working class and from low-status parents. *The complementarity and the synergy of all three social origin dimensions supports Hypothesis 7* that advantaged families do everything they can to secure their children a position at the traditional university. First, higher educated parents have experience with university education themselves. Thus, they can give their youth better advice about university education. Second, families from the salariat more often dispose of the economic resources and have more stable working careers allowing them to financially support their youth's long-term university education. And third, high-status families have access to network resources that are often useful for students when deciding which university to attend, which field of study to choose, when and how to change universities or how to gain access to student grants. Thus, the more access young adults have to educational, economic or social resources through their families, the higher the success probability of a university graduation. In addition, it is very likely that some of the social origin resources are also complementary. For example, if high-status parents do not have experience with university education themselves or do not have financial resources, they might rely on their social networks to obtain useful information about university education and about how to get access to financial support provided by the state. It is important to note here that all three social origin resources (education, class and status) are simultaneously relevant only for the transitions from primary school to the academic track (see Chapter 5) and from the higher education entry certificate to graduation from traditional universities. Thus, these two transitions seem to be the most crucial and symbolic steps in an individual's educational career for the intergenerational transmission of advantage in Germany.

The 'UNI' model in Table 7-2 also shows that students who have received their higher education entry certificate on the traditional academic educational pathway are more likely to obtain a university degree. Children who stayed on the academic track with the most

demanding curriculum probably have higher cognitive ability and self-efficacy, thereby helping them to also complete a university degree. They are therefore also more likely to evaluate the success probability of a university degree as higher. Furthermore, parents with high educational aspirations will already send their children to the academic track immediately after primary school and aim for their children to go on to obtain a university degree.

The 'UNI' model in Table 7-2 also indicates that women graduate from university significantly less often than men. *This confirms Hypothesis 17* that women with a higher education entry certificate are diverted from university education to vocational training. However, a model (not reported here, but available from the author upon request) including an interaction term between the cohort trend and being female indicated that women have been able to increase their completion rate of university education across birth cohorts.

The 'UNI' model in Table 7-2 also reports that East Germans in the GDR more often obtained a university education than West Germans if they had completed a higher education entry certificate. *This confirms Hypothesis 14* stating that because access to the academic educational pathways was restricted, students strongly aimed to earn a university degree. In West Germany, access to a higher education entry certificate was not restricted. Hence, a greater proportion of students in each birth cohort could also obtain a higher education entry certificate – and this group was probably more heterogeneous. In West Germany, students do not differ before and after the German unification in obtaining a university degree. However, in an analysis including individuals up to age 30 (not reported in this chapter), students significantly more often obtain a university degree since German unification in West Germany. East Germans following German unification obtained a university certificate less often if they had a higher education entry certificate

compared to East Germans in the GDR. *This finding supports Hypothesis 15* predicting that East German students who obtained a higher education entry certificate after German unification would aim less strongly for a tertiary degree, because the educational pathways to the higher education entry certificate have become less restrictive.

### 7.4.3 Which individuals with a vocational training certificate go on to graduate from tertiary education?

My last study objective is to cast some light on who obtains a university degree after completing vocational training. Since the foundation of the GDR, it was possible to obtain the higher education entry certificate and a vocational training certificate simultaneously in vocational training institutions without having to enter the academic track of the 'Erweiterte Oberschule'. In the early phase of the GDR, this option was not used by East Germans frequently, but after some years, it became an important second pathway to tertiary education. In West Germany, students with a vocational training certificate could continue to tertiary education if they took a special examination, went to higher vocational schools or passed a probation phase. Since 2009, a new educational reform was introduced allowing access to higher education with only a vocational training certificate and at least three years of work experience in all German federal states. Thus, these students no longer need the higher education entry certificate to access specific fields of study at the 'Fachhochschule' or university.

I am interested in how far graduation from a 'Fachhochschule' or university for students with vocational training is associated with a host of individual characteristics such as social origin, gender, the previous school career and being born in East or West Germany. In Table 7-3, I estimate a binary logistic regression and report logit coefficients. The reference category of the dependent variable is students with vocational training who do not graduate with a tertiary education.

**Table 7-3:** Obtaining a tertiary level education after vocational training

| Variables | Tertiary educational degree |
|---|---|
| Cohort trend | -0.03*** |
| | (0.01) |
| *Parental education (Ref.: Low educational level)* | |
| Intermediate educational | 0.66*** |
| Level | (0.27) |
| High educational level | 1.20*** |
| | (0.31) |
| *Parental class (Ref.: Unskilled workers)* | |
| Lower grade routine non-manual workers | 0.39 |
| | (0.29) |
| Skilled manual workers | -0.01 |
| | (0.18) |
| Higher grade routine non-manual workers | 0.28 |
| | (0.25) |
| Lower grade technicians | -0.16 |
| | (0.33) |
| Small proprietors without employees | 0.30 |
| | (0.41) |
| Small proprietors with employees | -0.14 |
| | (0.30) |
| Lower service class | 0.31 |
| | (0.24) |
| Higher service class | 0.62*** |
| | (0.25) |
| *Parental status (Ref. low parental status)* | |
| Intermediate | 0.20 |
| | (0.17) |
| High | 0.23 |
| | (0.27) |
| *Mobility before the general education school leaving certificate (Ref.: Remaining on the academic track)* | |
| Downward mobility to the non-academic track | 0.54 |
| | (0.73) |
| Remaining on the non-academic track | 0.91*** |
| | (0.21) |
| Upward mobility to the academic track | 0.40 |
| | (0.31) |
| Female (ref. male) | -0.05 |
| | (0.10) |
| East German (ref. West | 2.17*** |
| German) | (0.12) |
| | 0.41 |
| German unification | (0.29) |
| German unification×East | -2.18*** |
| Germany | (0.44) |
| Constant | -3.90*** |
| | (0.30) |
| Changes of state | 505 |
| Observations | 6,164 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

The *cohort trend* in Table 7-3 is statistically significant across birth cohorts and indicates that fewer children obtain a university degree or 'Fachhochschulabschluss' after vocational training. Unfortunately, in my empirical analysis, I am not able to study the consequences of the newly introduced reform in 2009 that should also have facilitated access to higher education for individuals with vocational training because only a few individuals who have taken this opportunity are already to be found in the NEPS dataset. However, future waves of the NEPS will shed light on this issue.

Table 7-3 also reveals that children from intermediate-[65] and high-educated parents as well as from the salariat are more likely to complete a tertiary level education after vocational training. This *rejects Hypothesis 8* predicting that particularly students from lower social origins are more likely to obtain a tertiary level education after the completion of vocational training. However, I find support *for my Hypothesis 9* anticipating that it is particularly children from higher social origins who take this opportunity to complete higher education.

In addition, Table 7-3 demonstrates that children who were constantly on the non-academic track before their first school leaving certificate are statistically significantly more likely to choose vocational training as a bridge to a tertiary degree. Hence, these children use vocational training as a safety net before taking the risk of seeking a more demanding university certificate.

Furthermore, Table 7-3 shows that men and women do not differ significantly in obtaining a university degree after completing vocational training.

Finally, Table 7-3 demonstrates that East Germans in the GDR were more likely to obtain a tertiary level education after completing vocational training than West Germans. This might be explained by the fact that one educational pathway via vocational training

[65] The coefficient for parents with an intermediate education is not statistically significant when I include only individuals aged 30 and over.

simultaneously offered an ‘Abitur’ and a vocational training certificate and allowed access to university education in the GDR. This pathway was frequently used by East Germans. Before German unification, 328 East Germans and only 151 West Germans utilized this educational pathway. In West Germany the most common access to higher education was and still is via the higher education entry certificate. The institutional regulations allowing access to a university education after vocational training were very restricted and varied tremendously among West German federal states. Thus, this pathway was not very common. Following German unification, East Germans were less likely to obtain a tertiary degree after a vocational training certificate because East Germany took over West Germany’s more restrictive educational regulations. However, East Germans are still more likely to choose this educational pathway via vocational training to higher education than West Germans.

## 7.5 Summary

In recent decades, major reforms have been undertaken in the vocational training, post-secondary and tertiary education systems in Germany. Traditional dead end vocational pathways have been abolished, and various new alternative routes of second chance education from non-academic school degrees to higher formal qualifications (such as the ‘Fachhochschulreife’ and ‘Abitur’) have been created. A characteristic feature of these new pathways to higher education is that young peoples’ vocational and work experiences are rewarded with access to higher education. Conversely, new transitions from the academic track down to the vocational training system have emerged and become standard options for people who have gained their ‘Abitur’ on the traditional academic school track. Finally, at the same time, the university system has become highly differentiated through the introduction of universities of applied sciences (‘Fachhochschulen’) and so-called ‘dual studies’ and ‘Berufsakademien’ with a primary focus on teaching profession-

al skills and offering a combination of vocational training in companies with scientific education at the tertiary level.

Using longitudinal data from the NEPS, I was interested in how far these reforms and changes have reduced the degree of separation between vocational and academic pathways in the tracked German system and have contributed to more equality of educational opportunities for young people from different social origins. I have reconstructed in detail the educational histories of individuals, from the attainment of their first school degree (‘Hauptschulabschluss’, ‘Mittlere Reife’, ‘Fachhochschulreife’ or ‘Abitur’) up to their highest educational degree at the time of the retrospective NEPS interview. For young men and women who have attained a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ as their first school degree, I studied how far they (1) left the educational system without further vocational education, (2) completed a vocational training; (3) attained a higher education entry certificate (‘Fachhochschulreife’ or ‘Abitur’) or (4) achieved a tertiary degree in their later educational career. For young people who attained a ‘Fachhochschulreife’ or an ‘Abitur’ as the first school degree, I examine whether they (1) left the educational system without any further vocational or academic training, (2) received only a vocational training certificate or later successfully graduated from either (3) a university of applied sciences, or (4) a traditional university.

First, my results demonstrated that the proportion of people with a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ who left the educational system without any further vocational training or who upgraded their formal education has been small in cross-national comparative terms (Blossfeld et al., 2015; OECD, 2016) and declines in the process of educational expansion. These labour market entrants are often called the ‘unskilled’ in the German ‘coordinated economy’ (Hall & Soskice, 2001) and are often limited to the secondary labour market (see Blossfeld & Mayer, 1988; Blossfeld, 2014, p.

153) with high unemployment rates, low wages, low prestige and limited job career opportunities (Blossfeld, 2014, p. 147). My analysis shows that among the 'Hauptschulabschluss' or 'Mittlere Reife' graduates, it is mainly young people from unskilled parents who are leaving the educational system without any further vocational training. Thus, there is a high degree of 'unskilled inheritance' in these families in Germany. In addition, there is also evidence that among these unskilled there are also more women than men who enter into quite unskilled service and administrative occupations in Germany.

The majority of graduates with a 'Hauptschulabschluss' or a 'Mittlere Reife' still completes vocational training. However, my analysis shows that the proportion of students with a 'Hauptschulabschluss' or 'Mittlere Reife' who complete vocational training has decreased and the proportion of students who upgraded their formal education to a higher education entry qualification has increased monotonically in East and West Germany across birth cohorts. This can be considered as a success of the educational reforms introduced in the vocational and post-secondary educational system. The vocational track in Germany has clearly lost its dead end character and the transition from the vocational to the academic pathway has actually become much more open in the course of educational reforms. This increase provides clear evidence that the vocational and academic tracks in Germany have become more integrated in recent decades, and that, by and large, they are no longer really separated pathways.

Asking which students with a 'Hauptschulabschluss' or 'Mittlere Reife' more often opt for vocational training, I could show that these are particularly young people whose parents have a vocational training certificate themselves. These parents not only more often wish their children to complete at least the same level of education as they have attained themselves, but they are also familiar with the vocational training system, so that they can

give their youth valuable advice. One also has to take into account that vocational training is still a legitimate educational option in Germany that is connected with lower risks of failure and lower costs than more long-term and costly tertiary education. Thus this evidence might also be taken as support for the *diversion thesis* (Becker & Hecken, 2009).

Which students with a 'Hauptschulabschluss' or 'Mittlere Reife' as a first school degree have the highest probability of upgrading to a higher education entry certificate? My empirical findings revealed that it is particularly young men and women who come from higher educated families. This result seems to indicate that highly educated parents are often not only better informed about new pathways to the academic track but can also coach their youth better in mastering the often quite high demanding schools of second chance education. Higher educated parents also want their children to attain at least the same educational level as they have achieved themselves. But parents' status also plays an important role when it comes to educational upgrading. Intermediate- and high-status parents seem to be more determined than lower status parents to upgrade their offspring's educational degree to a higher education entry certificate. Finally, based on my analysis, I could also demonstrate that this kind of educational upgrading is not a matter of available economic resources in Germany.

An interesting finding was that although women have surpassed men at the transition to the traditional academic track (see Chapter 5), it seems to be particularly men who advance their educational career via second chance education across cohorts and thus catch up again with women through second chance education.

Summarizing the results for young people who have left the educational system with only a higher education entry certificate ('Fachhochschulreife' or 'Abitur'), I find that this rare event seems to be fairly random with regard to social origin and gender. Thus, my

finding contrasts Müller's and Pollak's (2010) conclusion that particularly youth from higher social origin choose this option.

More interesting is a summary of my empirical results on which young people holding a higher education entry certificate ('Fachhochschulreife' or 'Abitur') are most likely to additionally complete only vocational training. I could show that this applies especially to young people from families with vocational training. Their parents have the experience that vocational training provides quite qualified, well paid and secure jobs in the German labour market. Thus, if these young 'Abitur' graduates have an option between an uncertain and long-term academic study at the tertiary level and a better known and short-term vocational training, the vocational training alternative is very attractive for them. However, if young people with a higher education entry certificate have parents with a tertiary degree and a high-status, they generally do not see vocational training as an option.

Thus, regarding the increasing openness between the vocational and academic tracks that I have documented in Germany, I can say the following with regard to the role of family resources: (1) students with a 'Hauptschulabschluss' or 'Mittlere Reife' are more likely to upgrade their education to a higher education entry certificate if their parents have a higher education; (2) students who have attained a higher education entry certificate (mostly through the academic track) are less likely to complete vocational training if their parents have a higher education and/or a higher status.

Interestingly, women who hold a higher education entry certificate ('Fachhochschulreife' or 'Abitur') more often opt for vocational training than men. I believe that this is related to the fact that they more often work in skilled (part-time) service jobs that require only an intermediate education such as that provided by a higher education entry certificate and additional vocational training.

Moreover, there are no social origin differences for students who earned a higher education entry certificate ('Fachhochschulreife' or 'Abitur') and then graduated from a university of applied sciences. This education is shorter and in total less costly. These new tertiary institutions seem to provide a decent chance to obtain a tertiary level education for lower performing youth from higher educated parents and for excellent students from poorly and intermediate-educated parents. And finally, education at universities of applied sciences also seems to offer low performing students from high-status parents as well as talented students from intermediate- and low-status families an option to attain a higher education degree. Future research has to illuminate these issues with competence tests and ability measures.

With regard to young men and women who hold a higher education entry certificate ('Fachhochschulreife' or 'Abitur'), my results showed in addition that young women less often complete a university of applied sciences education because these institutions often provide education in subjects that are preferred by men.

Finally, what about traditional universities? Are they more closely related to issues of social inequality than universities of applied sciences? The answer clearly is yes. My analysis support Lucas' (2001) EMI theory that advantaged families tend to secure for (themselves and) their youth the qualitative advantages offered by traditional universities. I showed that young people with a higher education entry certificate who come from highly educated parents, from the salariat, and from high-status parents are indeed much more likely to graduate from a traditional university than young adults from less educated parents, the working class and low-status families. Advantaged families use their resources to secure the traditional university education for their young adults. Highly educated parents have experience with university education themselves and can give more appropriate advice. Families from the salariat have economic resources and more stable

job careers so that they are better able to financially support long-term university studies. In addition, high- status families have access to social network resources that help students to receive information on which university to attend, which field of study to choose or how to gain access to student grants. Thus, the more access young adults have to parental educational, economic and social resources, the higher their success probability of university graduation.

In addition, my analysis of completing a tertiary degree after vocational training also supports the importance of social origin resources. Thus, this educational option to upgrade a tertiary degree also reinforces existing educational inequalities in Germany.

East Germans in the GDR more often left the educational system with only a 'Hauptschulabschluss' or 'Mittlere Reife', and if they obtained a higher education entry certificate, they generally also completed tertiary level education more often than West Germans. Furthermore, East Germans with a vocational training certificate were more likely to also complete a tertiary education. Since German unification, the restrictions in access to a higher education entry certificate and a tertiary education were abolished in East Germany and more students continued to obtain a higher education entry certificate whereas fewer students with such a certificate earned a tertiary level education. Furthermore, fewer East Germans obtained a higher education entry certificate after completing vocational training.

Theoretical and policy implications as well as limitations of my analysis are discussed in Chapter 8.

# 8 Summary and Discussion

In most industrial societies, the educational expansion and educational reforms in the last decades have fundamentally changed not only the character of the old clear-cut divisions between academic and vocational tracks in lower and upper secondary school but also the landscape of higher education (Benavot & Resnik, 2006). In my thesis, I studied how this expansion and these reforms are associated with changes in educational opportunities for women and men from different social origins in 21 OECD countries and in Germany in particular. The analysis took a long-term historical perspective and compared different political and economic systems such as national welfare regimes and East-West differences in Germany. Using an explicit sociological life-course perspective, I analysed the educational careers and final educational attainments of successive birth cohorts since the end of the Second World War. My analysis shows that the educational careers of children, youth and young adults are strongly influenced by the resources of the family of origin. Findings suggest that families and individuals are active decision makers who respond to changes in structural constraints. I focused on the sequence of educational participations and transitions until the highest educational attainment at the time of the interview. According to the life-course paradigm, educational career lines depend strongly on different ideas about equality in different societies together with the structural features of their educational systems. This draws attention to the ways in which institutional arrangements in modern societies shape the educational careers of individuals.

This chapter first summarizes the key findings of my empirical analysis and develops the theoretical and policy implications of the empirical results. Second, as a final remark, I examine changes in overall educational inequalities in the German educational system. At the end, I discuss limitations of my thesis and make suggestions for future research.

## 8.1 Central findings and implications

In **Chapter 4** I examined how a different focus on equality (equality of condition and equality of opportunity) in different welfare regimes reveals cross-national variations in educational expansion, the association between educational background and educational attainment and the change in this association over time. My analysis is based on highly comparable educational data for 21 modern countries from the 2011 PIAAC study. I classified these countries into the liberal, social-democratic, conservative, Mediterranean, Eastern European and East Asian welfare regimes.

My empirical results show that there has been a strong educational expansion in all welfare regimes over the last decades. Starting my analysis with the 1947–52 birth cohort, welfare regimes differed tremendously in their average educational attainment. The social-democratic, Eastern European and liberal welfare regimes were forerunners in the educational expansion process. The conservative welfare regime took a middle position and the Mediterranean and East Asian welfare regimes lagged far behind. In the six welfare regimes, differences in average educational attainment have become clearly smaller, and they have even partly reversed up to the 1978–82 (youngest) birth cohort. Particularly in the East Asian welfare regime, the process of rapid economic development was closely linked to a massive educational expansion, so that this welfare regime has now even become a forerunner in educational attainment. These developments show that welfare regimes are more dynamic over time than many theorists have assumed. *The theoretical implication is that welfare regimes converge or even reverse in their relative positions regarding educational attainment.*

In the 1947–52 birth cohort, educational equality was particularly high in the Eastern European and social-democratic welfare regimes due to socialist interventions (see also Gerber, 2000; Mateju et al., 2003) and social policies that increased the equality of living conditions (Erikson & Jonsson, 1996). In this birth cohort, the liberal and conservative

welfare regimes took a middle position in terms of educational inequality. In contrast, educational inequality was especially high in the East Asian and Mediterranean welfare regimes. These welfare regimes were latecomers in economic development and the inequality of condition was high. In addition, the family has been the main provider of welfare in these regimes, making its influence on the children's educational attainment particularly strong.

From a comparative view, inequality of educational opportunity has risen across cohorts in the liberal and Eastern European welfare regimes. This increase seems to be connected to widening socio-economic differences. The liberal countries have experienced a rising income and wealth inequality in the age of globalization (Bogliacino & Maestri, 2014; DiPrete, 2005). In Eastern Europe, inequality of living conditions has risen since the collapse of the socialist regimes. The opposite development can be observed in the East Asian welfare regime. A rapid improvement in living standards and an equalization of income distributions (Peng & Wong, 2010) combined with a massive educational expansion have been associated with more educational equality.

*Two implications of these findings are theoretically important: first, the inequality of condition is strongly associated with inequality in educational attainment, because a high inequality of resources between families grants them different opportunities to do the best for their children. Second, the relationship between social origin and educational attainment depends strongly on the specific historical situation and on the country-specific institutional contexts. It is therefore hard to imagine that the relationship between social origin and educational attainment can be understood without referring to a specific time and a concrete space. I also demonstrated this in my analysis of educational histories in East and West Germany after the Second World War.*

My empirical results in Chapter 4 also indicate that women in the oldest birth cohorts were disadvantaged in their educational opportunities and educational attainment in all welfare regimes. Differences in educational attainment between women and men were especially high in the conservative, Mediterranean and East Asian welfare regimes. These regimes are characterized by particularly traditional ideas about gender roles.

Across birth cohorts, women have caught up markedly with men in their educational opportunities and average educational attainment level across all welfare regimes. In comparison to the other welfare regimes, gender differences in the East Asian and Mediterranean countries have declined impressively. The strong traditional family orientation, in which women should care for the family and stay at home, has obviously diminished in these two welfare regimes. *The theoretical implication of this finding is clear: there is a secular trend towards declining gender differences in educational attainment in all modern societies. This convergence of gender opportunities contrasts sharply with the heterogeneous trends in origin-specific educational inequalities.*

Based on this cross-national comparison, the position of (West) Germany as a country belonging to the conservative welfare regime can be characterized by (1) a high educational expansion already in the 1960s (Blossfeld et al., 2016), (2) a moderate expansion during the last decades in comparison to other modern societies, (3) a relatively persistent educational inequality over time and (4) a less strong increase across birth cohorts in female educational attainment compared to other modern societies due to more traditional gender roles. In Chapters 5 to 7, I focused my analysis on the long-term development of educational careers in East and West Germany since the Second World War. Using unique longitudinal data from the Adult Cohort (SC6) of the NEPS (waves collected between 2007 and 2014), I reconstructed the educational histories of individuals born between 1944 and 1986 right up until the last NEPS interview.

In **Chapter 5**, I studied inequalities at the transition from primary to secondary school in West Germany and in East Germany before and after reunification. Because the German educational system has been transformed from a tripartite into a bipartite school structure in the last two decades (Helbig & Nikolai, 2015), I distinguished between only an academic track ('Gymnasium', 'Waldorfschule', the academic track of comprehensive schools and the 'Erweiterte Oberschule') and a non-academic track ('Volksschule' that lasts more than 6 years, 'Hauptschule', 'Realschule', 'Einheitsschule' that lasts more than 8 years, and the non-academic track of comprehensive schools).

My first notable finding was that enrolment in the academic track increased significantly across birth cohorts from about 20 % (1944–50 birth cohort) to 50 % (1981–86 birth cohort) and that enrolment in the non-academic track declined strongly from about 80 % to 50 % in West Germany and in East Germany after reunification. This impressive reallocation of pupils at the first educational transition in the German school system means that the academic track is losing its exclusive character, and this has major consequences for later transitions in individuals' educational histories. In the GDR, in contrast, access to the academic track was rigorously restricted by the government from the mid-1960s onwards. As a result, enrolment in the 'Erweiterte Oberschule' abated.

In addition, my empirical findings showed substantial associations between social origin and the probability that children make the transition to the academic track in East and West Germany. In West Germany, there have been strong and persistent associations with parental education, parental class and parental status. *This stability of the social origin association in West Germany is theoretically surprising, because the reallocation from the non-academic to the academic track has changed dramatically across cohorts. Thus, the expansion of the transition to the academic track has not affected educational inequalities. Two scenarios can explain the overall increasing participation trend to-*

*wards the academic track in West Germany: either children from all social origin groups have gained in their transition probabilities to a similar extent, or the overall increase in the transition probability to 'Gymnasium' is the result of a change across birth cohorts in the composition of parents with different origin resources. My analysis suggests that, to a major extent, it is the change in the social origin composition of parents that is responsible here.*

In the former GDR and in East Germany after unification, I have found only persistent parental class differences. As a consequence of restricted access to 'Erweiterte Oberschule', differences in the transition probabilities to the academic track declined for children from different social origins in the former GDR. *The theoretical implication of this result is that the differences in transition probabilities to the academic track for different social origin groups decline through drastic state interventions such as the limitation of access to 'Erweiterte Oberschule'.* In East Germany since German unification, social origin differences at the transition from primary school to the academic track have increased again, although not significantly. Otherwise, educational inequality is still less pronounced in East than in West Germany.

Moreover, I demonstrated that girls in the oldest birth cohorts in West Germany were disadvantaged compared to boys at the transition to 'Gymnasium'. However, over time, girls have caught up with boys impressively. In East Germany, there were no gender differences, even for the oldest birth cohorts.

In **Chapter 6**, I followed children's school careers from enrolment in the academic and non-academic track until the end of their first educational degree. My main interest was in examining whether the large number of school reforms in the last decades has improved mobility from the non-academic to the academic track and whether these reforms have led to an increase in educational opportunities for children from disadvantaged families. My

findings demonstrate that – despite these school reforms – mobility between the academic and non-academic track is still a relatively rare event in the general school system. *This is theoretically surprising, given that many educational researchers have reported that about 30 % to 50 % of children are allocated incorrectly to the academic or non-academic track after primary school when looking at their literacy and numeracy skills* (Bos et al., 2004). In addition, I showed that downward mobility to the non-academic track (11 %) is twice as high as upward mobility to the academic track (5 %). Thus, 'weeding out' poorly performing students from the demanding academic track seems to work better than enabling late bloomers on the non-academic track to move up to the academic track. *My findings suggest that there might be a major knowledge gap between schools in the academic versus non-academic tracks, and this becomes larger over the first years in secondary school. The curricular differences between the academic and non-academic track in classical and foreign languages, science and math are therefore a major barrier to increasing openness in the German school system. Hence, the implication for educational policy reforms would be early and regular assessments of the competence levels of students on the non-academic track in order to identify able students. Those talented students should then attend special classes and enhancement courses in order to help them close the knowledge gap between these two school tracks, so that they can then transfer to the academic track.*

Furthermore, I showed that children from higher educated parents are much more likely to move up to the academic track, whereas children from lower educated parents have a higher probability of moving down to the non-academic track. Hence, these reforms to the general school system that were designed to reduce educational inequality have not been successful in the East and West German educational systems. *These findings have two theoretical implications: (1) It is incorrect to assume that more openness to the academic track per se would particularly favour children from disadvantaged families who have*

*been assigned prematurely to the non-academic track in the German school system and only needed more time to develop. (2) My analysis rather suggests that children from advantaged parents benefit more from the permeability between tracks, because these children have parents who want to maintain their status, can help their children in school matters, and know how to coach their offspring in how to utilize institutional opportunities for their aims* (Lucas, 2001)*. Thus, educational policies that aim to open up the school system reinforce existing inequalities in educational careers.*

In addition, two further goals of Chapter 6 were to analyse who leaves the educational system without an educational degree and who graduates from the general education system with an 'atypical' educational degree. My empirical findings suggest that across birth cohorts, fewer individuals drop out of school without an educational degree and that it is pupils from the non-academic track who are more likely to leave the educational system without an educational certificate. The event that pupils from the academic track leave the educational system without an educational degree is rare and random. It is particularly children from unskilled parents who drop out from school without obtaining any educational degree. *An important educational policy implication would be to abolish grade repetition in schools in the non-academic track and to introduce targeted support programmes for those very disadvantaged children not only in secondary school but also earlier in pre-school and in primary school.*

Furthermore, my findings suggest that 'atypical' degrees are an important phenomenon that has been largely ignored by the educational literature. About 15 % of children leave the academic track with only a 'Hautschulabschluss' or 'Mittlere Reife' instead of a higher education entry certificate, and it is particularly children from less educated parents who opt for this choice. On the non-academic track, children seldom graduate with an

‘Abitur’ or ‘Fachhochschulreife’ (only about 0.8 %), and if they do so, no social origin differences are observable.

Moreover, in terms of gender differences, I find that girls are less likely to move down to the non-academic track and more likely to move up to the academic track. Girls also have a lower probability of dropping out of school without an educational degree if they come from the non-academic track. There are no gender differences for the academic track. In addition, there are no gender differences in obtaining ‘atypical’ degrees.

In Germany, reforms in vocational training, post-secondary and tertiary education have been even more significant than those in the general school system. Alternative pathways of second chance education from non-academic school degrees to higher formal qualifications (such as the ‘Fachhochschulreife’ and ‘Abitur’) have been established. These newly created pathways to higher education reward young peoples’ vocational and work experiences in access to higher education. In turn, new pathways from the academic track down to the vocational training system have also been established that provide a new educational option for young adults with an ‘Abitur’. At the same time, tertiary education has become more differentiated since the introduction of universities of applied sciences (‘Fachhochschulen’), ‘dual studies’ at the tertiary level and ‘Berufsakademien’ that are more practice-oriented than traditional universities.

In **Chapter 7**, I followed young adult’s educational careers after their first general educational certificate until their highest educational attainment. For young men and women who have attained a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ as their first school degree, I studied how far they (1) left the educational system without further vocational education, (2) completed a vocational training, (3) attained a higher education entry certificate (‘Fachhochschulreife’ or ‘Abitur’) or (4) achieved even a tertiary degree in their later educational career.

My research demonstrated that the proportion of people with a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ who left the educational system has been small in cross-national comparative terms (Blossfeld et al., 2015; OECD, 2016) and declines in the process of educational expansion. These labour market entrants are called the ‘unskilled’ in the German ‘coordinated economy’ (Hall & Soskice, 2001) and are often limited to the secondary labour market (see Blossfeld & Mayer, 1988; Blossfeld, 2014, p. 153) with high unemployment rates, low wages, low prestige and limited job career opportunities (Blossfeld, 2014, p. 147). My analysis shows that among the ‘Hauptschulabschluss’ or ‘Mittlere Reife’ graduates, it is mainly young people from unskilled parents who leave the educational system without any further vocational training. Thus, there is a high degree of ‘unskilled inheritance’ in these families in Germany. *The policy implication is that Germany still needs more targeted educational programmes (advice from professionals, support of teachers in school, more tutoring etc.) for the children from unskilled families in order to break this vicious circle of ‘unskilled inheritance'.*

The majority of graduates with a ‘Hauptschulabschluss’ or a ‘Mittlere Reife’ still complete vocational training. This is a well-known feature of the German vocational training system and, in particular, of the dual system. Compared to many other industrialized countries, Germany accordingly has a broadly qualified workforce with low unemployment rates in the transition to work (Blossfeld, forthcoming). However, my analysis shows that the proportion of students with a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ who complete vocational training is decreasing from about 80 % (1944–50 birth cohort) to about 60 % (1981–86 birth cohort) in West Germany (there is almost stability in East Germany) and the proportion of students who upgrade their formal education to a higher education entry qualification is increasing monotonically in East and West Germany across birth cohorts. *From a policy perspective, this can be considered as a success of the educational reforms introduced in the vocational and post-secondary educational system.*

*The vocational track in Germany has clearly lost its dead end character, and the transition from the vocational to the academic pathway has indeed become much more open over the course of educational reforms. The theoretical implication of this development is that it seems to be more effective to open up the educational system by honouring young peoples' vocational and work experiences with access to higher education than to lift children from the non-academic track to the demanding curriculum of the traditional 'Gymnasium' (classical and modern languages, and math and science) in the general school system. However, more and more educational experts in Germany (e.g. Nida-Rümelin, 2014) are warning that the new permeability from the vocational to the academic track is leading to a loss of talent for traditional craft occupations, because more students are embarking on tertiary education, and this is eroding the vocational education and training system. However, my analysis makes it clear that these doubts are unfounded, because there is also a strong increase of students with a higher education entry certificate who then complete vocational training.*

In my analysis, I showed that young people with a 'Hauptschulabschluss' or 'Mittlere Reife' from parents who themselves have a vocational training certificate more often opt for vocational training. These parents know the vocational training system and can give their youth valuable advice. In addition, my findings indicate that it is particularly young men and women coming from higher educated families who upgrade to a higher education entry certificate. This result seems to indicate that highly educated parents are often not just better informed about new pathways to the academic track. They can also coach their youth better to master the demands of schools providing second chance education. However, parents' status also plays an important role when it comes to educational upgrading. Intermediate- and high-status parents seem to be more determined than lower status parents to upgrade their offspring's educational degree to a higher education entry

certificate. Finally, based on my analysis, I demonstrated that this kind of educational upgrading does not depend on available economic resources in Germany.

I have also followed up the educational careers of young adults who attained a 'Fachhochschulreife' or an 'Abitur' as their first school degree. I examine how far they (1) left the educational system without any further vocational or academic training, (2) received only a vocational training certificate or went on later to graduate successfully from (3) a university of applied sciences or (4) a traditional university.

The proportion of young people who left the educational system with only a higher education entry certificate ('Fachhochschulreife' or 'Abitur') is small and there are no associations with social origin or gender.

My analysis demonstrated that, across cohorts, students with a 'Fachhochschulreife' or 'Abitur' much more often obtain a vocational training certificate instead of a tertiary degree. This percentage has risen from 16 % (1944−50 birth cohort) to 34 % (1981−86 birth cohort). *This increase provides clear evidence that the vocational and academic tracks in Germany have become more integrated over the last decades, and that, by and large, they are no longer really separate pathways. In a modern service economy in which higher school qualifications are increasingly beneficial for vocational training (Jacob & Solga, 2015, p. 165), this higher permeability between the academic and the vocational tracks makes the German vocational training system even stronger and not weaker.* Young adults with a higher education entry certificate are less likely to complete vocational training if their parents have a higher education and/or a higher status. *In other words, advantaged children not only move up more, but also move down less if there is more openness in the educational system. The theoretical implication of this empirical finding is that more openness and permeability between the educational tracks means that young people (and their families) get more choices; more choices for students (and their families) in-*

*creases the association of transitions with social origin resources – and this therefore means more inequality of educational opportunity.*

However, there are no social origin differences for students who earned a higher education entry certificate (‘Fachhochschulreife’ or ‘Abitur’) and then graduated from a university of applied sciences. This type of higher education is shorter, less demanding and in total less costly. *Education at universities of applied sciences seems to offer not only (low-performing) students from advantaged parents but also (talented) students from intermediate and disadvantaged families an opportunity to attain a higher education degree. If one wants to achieve more educational equality, then the policy implication would be to strongly expand the universities of applied sciences in the system of tertiary education.*

The highest probability of completing a university education is to be found in young adults with a higher education entry certificate whose parents are highly educated, come from the salariat and have a high status. Advantaged families use their resources to secure the traditional university education for their young adults. Highly educated parents have experience with university education and can give more appropriate advice. Families from the salariat have economic resources and more stable job careers that make them better able to financially support long-term university studies. In addition, high-status families have access to social network resources that help students to receive information on which university to attend, which field of study to choose or how to get access to student grants. Thus, the more access young adults have to parental educational, economic and social resources, the higher their probability of successful university graduation.

There are also strong social origin associations with completing a tertiary degree after vocational training. Furthermore, my analysis provides empirical evidence that women have caught up with men in education via the traditional academic track, whereas it seems

to be particularly men who are advancing their educational careers across cohorts via second chance education and universities of applied sciences.

Finally, East Germans in the GDR more often left the educational system with only a 'Hauptschulabschluss' or 'Mittlere Reife'. If they obtained a higher education entry certificate, they generally also more often completed tertiary level education than West Germans due to the restricted access policy to the 'Erweiterte Oberschule' and tertiary education. After German unification, East and West Germans have become more similar in their educational transitions over the educational career.

## 8.2 Is there an overall decline in educational inequality in the German educational system?

So far, my thesis has provided a detailed analysis of the changes in the transition probabilities and the associations between social origin and the various educational transitions in the German educational system. However, it is still unclear whether the introduced reforms have led to an overall decline in inequalities of educational opportunities (Schindler, 2015, p. 517). My analysis has shown that each of the family resources (parental education, parental class and parental status) is independently important for the educational career. In the following analysis, I therefore look at the combined effect of the three social origin resources. As described in Chapter 3, I have distinguished three categories for each of the three family resources: parental education: (1) low, (2) intermediate and (3) high; parental class: (1) workers, (2) intermediate class and (3) salariat; and parental status: (1) low, (2) intermediate and (3) high. Based on the resulting 27 social origin combinations (see Table 3-3 in Chapter 3), I derive six empirically important social origin groups that take a ranked order (see Table 3-3). Social origin group 1 consists of individuals from most disadvantaged families. In contrast, Social origin group 6 comprises children from the most advantaged families. The other four social origin groups are ordered in between (see Table 3-3).

Now, as shown in Table 8-1, I investigate whether the increasing permeability in the secondary, vocational, post-secondary and tertiary education systems had led to an increasing proportion of children from the lowest Social origin group 1 and the highest Social origin group 6 obtaining a tertiary education via the academic track in the oldest 1944 birth cohort and the youngest 1983 birth cohort. For the analysis of Table 8-1, I included only individuals that age 30 and above to make sure that they have already completed their educational career. I estimated the predicted probabilities from three binary logistic regressions, namely for the dependent variables making the transition to the academic track, for obtaining a tertiary degree via the academic track and for obtaining a tertiary degree via he non-academic track (see Table 8-17, Table 8-18 and Table 8-19 in the appendix). Table 8-1 reveals that from the 1944 to the 1986 birth cohort, the probability that children from the lowest Social origin group 1 will make the transition to the academic track after primary school has increased from 9 % to 19 %. However, at the same time, the probability of attaining a tertiary degree if children from the lowest Social origin group 1 also previously made the transition from primary school to the academic track has declined from 57 % to 38 % across birth cohorts. As a consequence of these contrary developments, the total probability of obtaining a tertiary degree via the academic track for the lowest social origin group was 5 % for the 1944 birth cohort and 7 % for the 1983 birth cohort (see for a similar procedure Mare 1980). Thus, the probability has not changed much over this long historical period and a period of massive expansion of the academic track. For children from the highest Social origin group 6, 60 % of children in the 1944 birth cohort and 77 % of the 1983 birth cohort made the transition from primary school to the academic track. In turn, the probability of obtaining a tertiary degree via the academic track has decreased from 87 % in the 1944 birth cohort to 75 % in the 1983 birth cohort for children from the highest Social origin group 6. Thus, in total, the probability of attaining a tertiary degree via the academic track has not risen much from 52 % in the 1944

birth cohort to 58 % in the 1983 birth cohort, given the long historical period and introduced reforms that should increase the permeability in the educational system.

Table 8-2 shows that across birth cohorts (from 1944 to 1983), children from the lowest Social origin group 1 less often make the transition to the non-academic track after primary school (from 91 % to 81 %). Furthermore, Table 8-2 demonstrates that for these students the probability of obtaining a tertiary degree on the non-academic track has increased from only 8 % to 9 % from the 1944 to the 1983 birth cohort. In total, the probability of obtaining a tertiary degree via the non-academic track has increased only from 7 % to 8 % from the 1944 to the 1983 birth cohort for the lowest Social origin group 1. Children from the highest Social origin group 6 have greatly decreased their probability of making the transition to the non-academic track after primary school from 40 % to 23

**Table 8-1:** Obtaining a tertiary degree via the academic track

| | **Probability of making the transition from primary school to the academic track** | **Probability of obtaining a tertiary degree via the academic track** | **Total probability** |
|---|---|---|---|
| Lowest Social origin group 1 | | | |
| 1944 birth cohort | 0.09 | 0.57 | (0.09 × 0.57) = 0.05 |
| 1983 birth cohort | 0.19 | 0.38 | (0.19 × 0.38) = 0.07 |
| | | | |
| Highest Social origin group 6 | | | |
| 1944 birth cohort | 0.60 | 0.87 | (0.60 × 0.87) = 0.52 |
| 1983 birth cohort | 0.77 | 0.75 | (0.77 × 0.75) = 0.58 |

Source: Author's calculations using NEPS data

**Table 8-2:** Obtaining a tertiary degree via the non-academic track

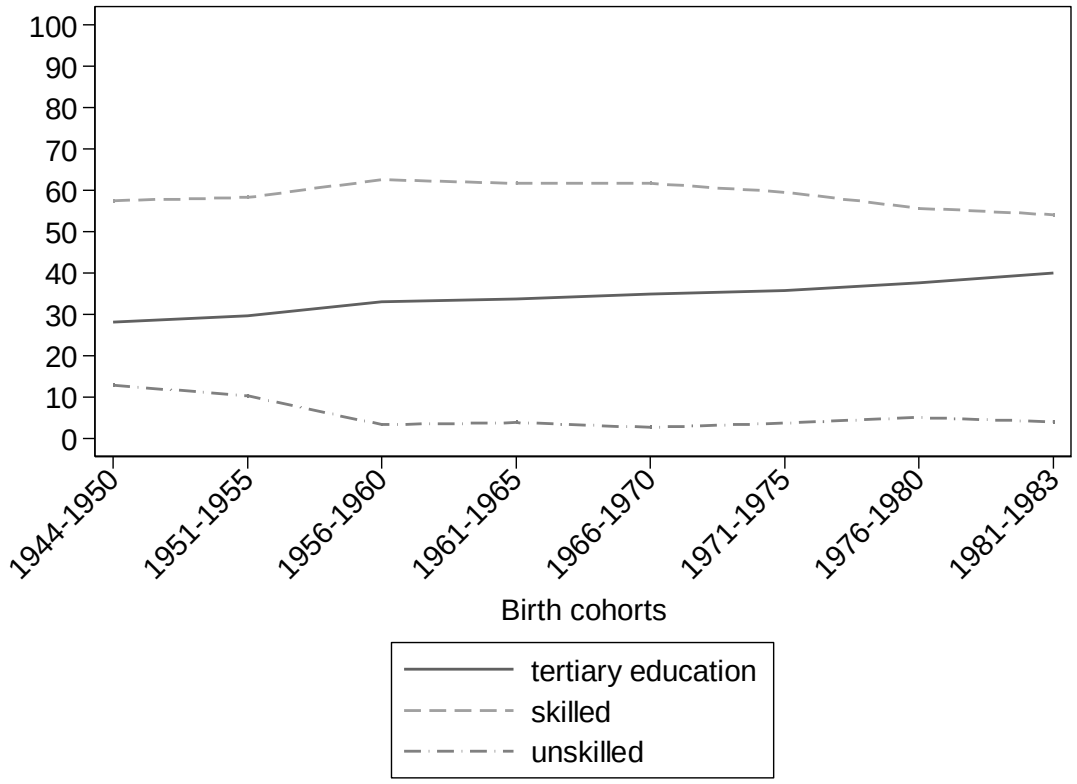
| | **Probability of making the transition from primary school to the non-academic track** | **Probability of obtaining a tertiary degree via the non-academic track** | **Total probability** |
|---|---|---|---|
| Lowest Social origin group 1 | | | |
| 1944 birth cohort | 0.91 | 0.08 | (0.91 × 0.08) = 0.07 |
| 1983 birth cohort | 0.81 | 0.09 | (0.81 × 0.09) = 0.08 |
| | | | |
| Highest Social origin group 6 | | | |
| 1944 birth cohort | 0.40 | 0.61 | (0.40 × 0.61) = 0.24 |
| 1983 birth cohort | 0.23 | 0.63 | (0.23 × 0.63) = 0.15 |

Source: Author's calculations using NEPS data

% from the 1944 to the 1986 birth cohort. Moreover, for these students the probability of obtaining a tertiary degree on the non-academic track has not increased much from 61 % to 63 % from the 1944 to the 1983 birth cohort. Thus, for children from the highest Social origin group 6, in total, the probability to obtain a tertiary degree via the non-academic track declines from 24 % to 15 % from the 1944 to the 1983 birth cohort.

Table 8-1 and Table 8-2 show that 12 % of children from the lowest Social origin group 1 from the 1944 birth cohort and 15 % from the 1983 birth cohort gain a tertiary degree via the academic and non-academic track (see for a similar procedure Schindler 2015: 515). Thus, the proportion of children from the lowest Social origin group 1 who obtain a tertiary degree has not changed much across birth cohorts given the many

**Figure 8-1:** Change across birth cohorts in the probabilities of leaving the educational system with no qualification, with a vocational training or higher education entry certificate and with a tertiary degree

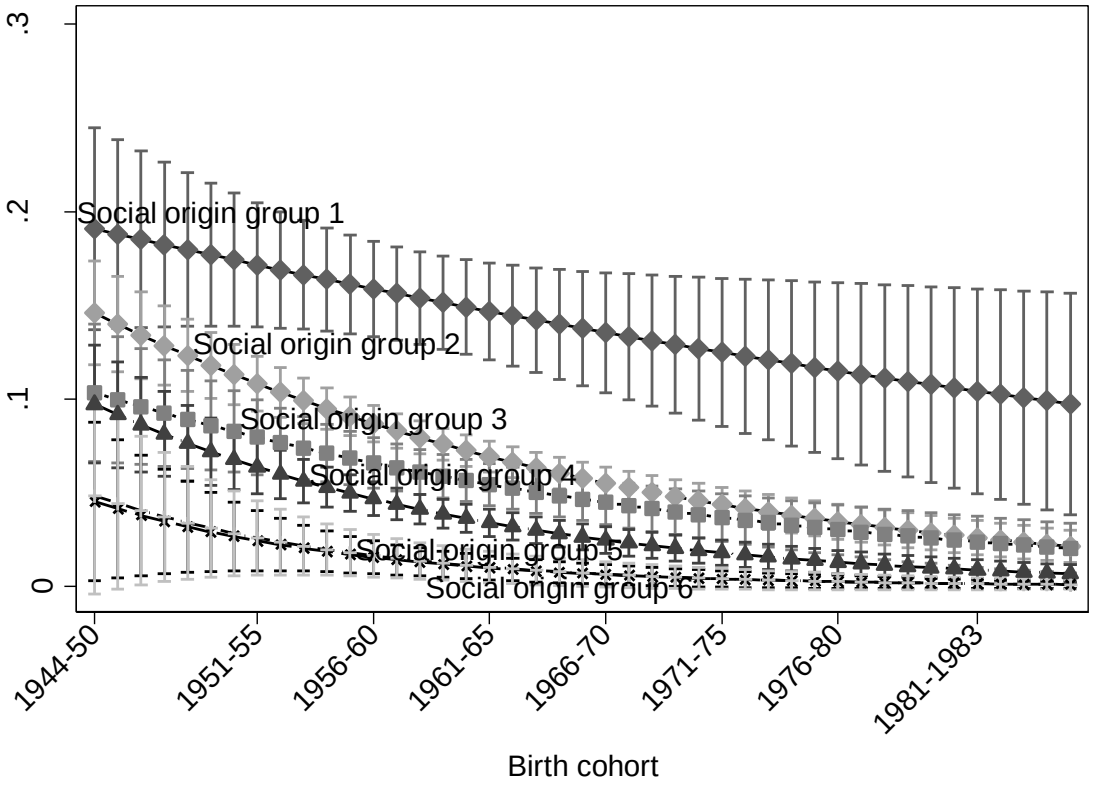



Source: Author's portrayal with the NEPS

educational interventions that were implemented during this period to particularly improve the opportunities of disadvantaged children. In contrast, 76 % of children from the highest Social origin group 6 from the 1944 birth cohort complete a tertiary degree and 73 % from the youngest 1983 birth cohort. Hence, the proportion of children from the highest Social origin group 6 who attain a tertiary degree has also not changed much across birth cohorts even in a period of massive educational expansion and educational reforms.

Now, I study the overall association between social origin and the three major highest educational attainment levels in the German educational system and ask how the probability that individuals from different social origins will attain these levels has changed across cohorts. I distinguish three major educational groups: (1) the unskilled (no

**Figure 8-2:** Probability of leaving the educational system without qualifications by the six social origin groups

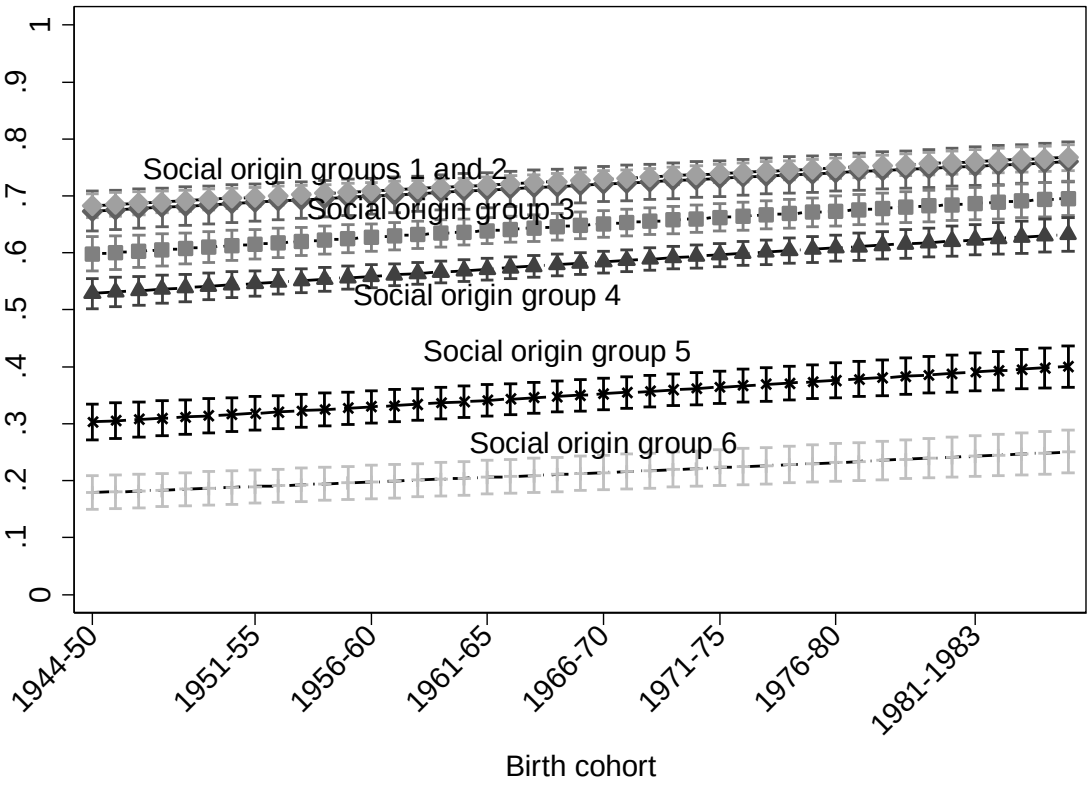



Source: Author's portrayal using NEPS data

educational certificate, a ‘Hauptschulabschluss’ or ‘Mittlere Reife’ without any vocational training), (2) the skilled (individuals with vocational training also including individuals that only have a higher education entry certificate) and (3) people with tertiary education. I include in my analysis East and West Germans aged 30 and over using data from the NEPS.

As Figure 8-1 shows, the share of East and West Germans who leave the educational system as unskilled has declined from 13 % (the ‘1944–50’ birth cohort) to 4 % (the ‘1981– 83’ birth cohort). Thus, unskilled school leavers have become a relatively small group today. The proportion of skilled individuals has slightly increased from 58 % (the ‘1944–50’ birth cohort) to 63 % (the ‘1956–60’ birth cohort) and then declined to 54 %

**Figure 8-3:** Probability of obtaining a vocational training or higher education entry certificate as highest educational degree by six social origin groups




Source: Author’s portrayal using NEPS data

(the ‘1981–83’ birth cohort). Finally, the share of students with a tertiary degree has increased monotonically from 28 % (the ‘1944–50’ birth cohort) to 40 % (the ‘1981–83’ birth cohort).

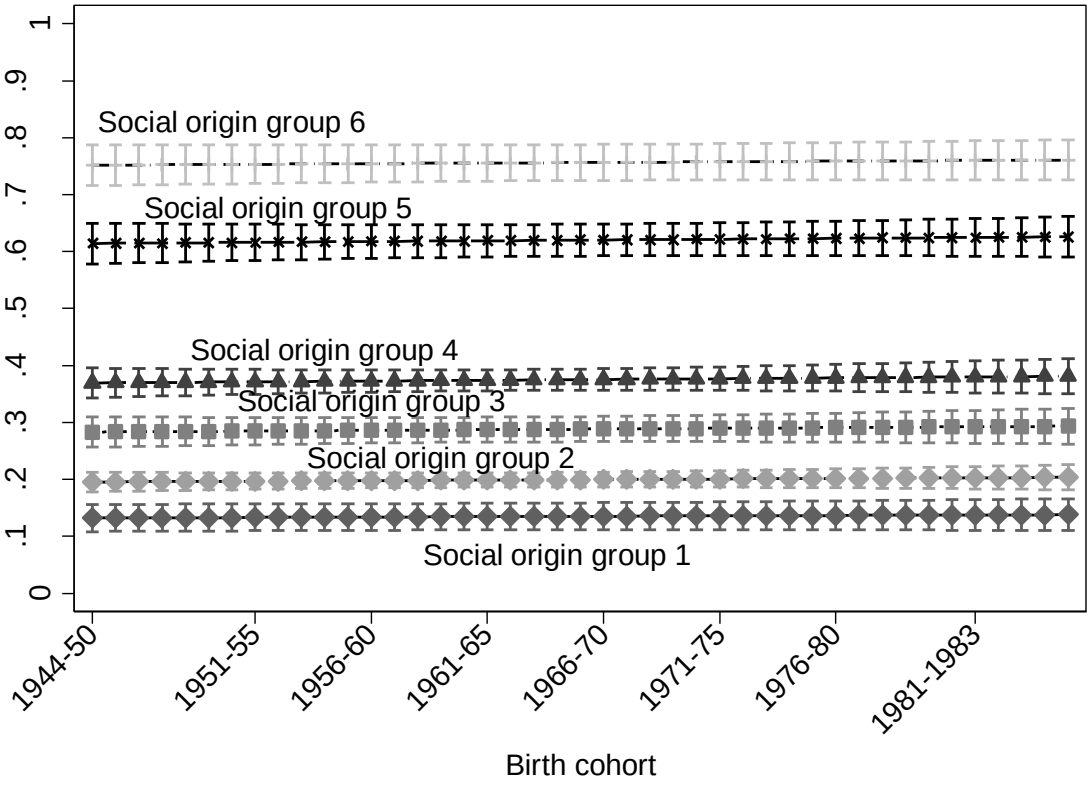
First, I estimate a logit model for the probability of leaving the educational system as an unskilled individual (see Table 8-20 in the appendix). All individuals are ‘at risk’. I include the cohort trend, the social origin groups and an interaction term between the cohort trend and the social origin groups. I compute the changes in the predicted probabilities across cohorts. Figure 8-2 demonstrates that the probability of leaving the educational system as an unskilled individual declines across birth cohorts for all social origin groups. However, the interaction effects between the social origin groups and the cohort trend are significant and demonstrate that children from the most disadvantaged families become increasingly separated from the other social origin groups over time. Their likelihood of leaving the educational system as unskilled individuals is declining, but is much higher compared to the other social origin groups. This confirms my earlier conclusion that there is a strong degree of inheritance among the unskilled.

Second, I estimate a logit model for the probability of leaving the educational system as a skilled individual (see Table 8-21 in the appendix). All individuals are ‘at risk’. I include the cohort trend and the social origin groups. The interaction terms between the cohort trend and the social origin groups are not statistically significant. I compute changes in the predicted probabilities across cohorts. Figure 8-3 shows that across birth cohorts, all social origin groups increase their probability of leaving the educational system as skilled individuals to the same extent. However, children from the two most advantaged Social origin groups 5 and 6 are much less likely to leave the educational system as skilled individuals. *The important theoretical implication is that Nida-Rümelin’s assumption that people no longer want to complete vocational training is wrong. The non-*

*monotonic shape of the proportion of skilled people (first increasing than decreasing) suggests that there is a change in the composition of social origin groups* (see Figure 8-5*). Although all social origin groups have an increasing probability of completing vocational training, the social origin groups with a low demand to complete vocational training increase and the social origin groups with a high demand to obtain a vocational training certificate decrease across birth cohorts (see* Figure 8-5*).*

Finally, I also estimate a logit model for the probability of leaving the educational system with a tertiary education (see Table 8-22 in the appendix). All individuals are 'at risk'. I include the cohort trend and the social origin groups. The interaction term between the cohort trend and the social origin groups is not statistically significant. In Figure 8-4, I compute the changes in the predicted probabilities across cohorts. This figure

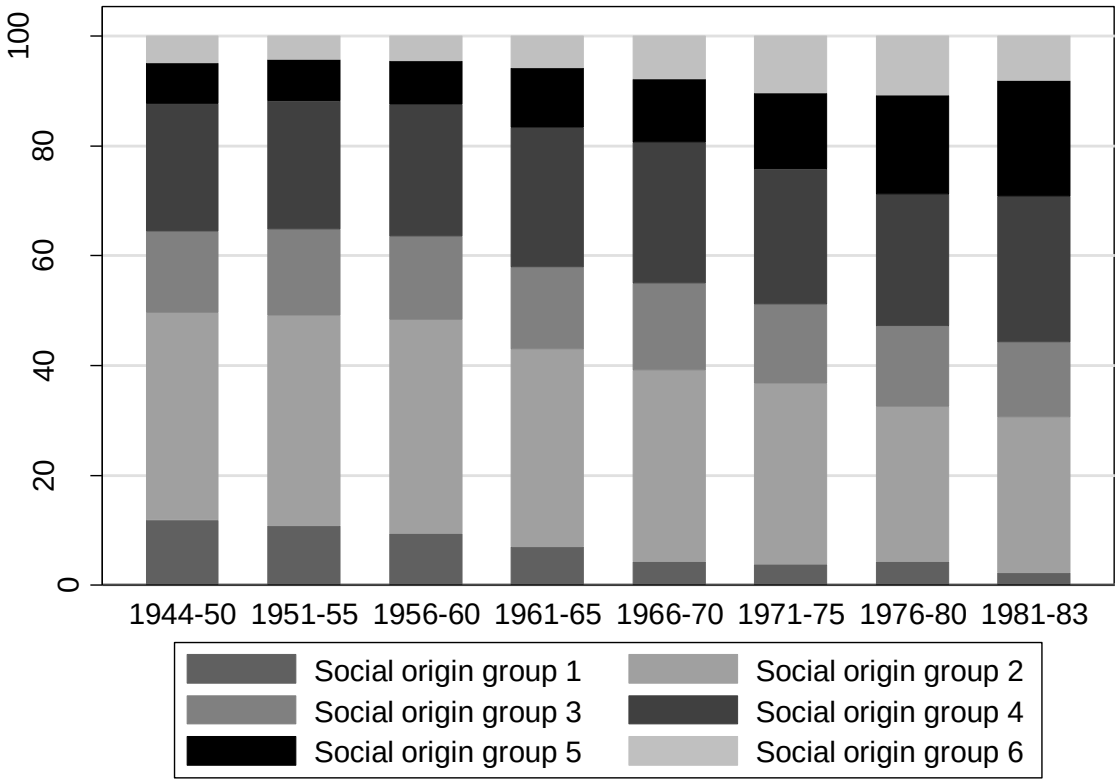
**Figure 8-4:** Probability of obtaining a tertiary degree by six social origin groups




Source: Author's portrayal using NEPS data

demonstrates that the differences in obtaining a tertiary education between social origin groups are stable across birth cohorts. *The theoretical implication of this result is that despite a large number of educational reforms and an increasing permeability in the vocational training system and post-secondary education, the outcome is persistent inequality in tertiary education. How is it possible for the proportion of individuals with a tertiary degree to increase (see* Figure 8-1*), while the probabilities for the various social origin groups remained unchanged (see* Figure 8-4*)? The explanation is again that the composition of the social origin groups has changed enormously across birth cohorts. The social origin groups with a low demand to complete tertiary education have declined and the social origin groups with a high demand for tertiary education have increased across birth cohorts (see* Figure 8-5*). Thus, the expansion of education in Germany is driven mainly by the changing composition of social origin groups.*

**Figure 8-5:** Distribution of the six social origin groups across birth cohorts




Source: Author's portrayal using NEPS data

An example might illustrate the impact of the changing composition of social origin groups. Table 8-3 shows that the proportion of the lowest Social origin groups 1 and 2, which generally have low aspirations for their children to obtain a tertiary degree, shrank from about 50 % to about 30 %. At the same time, the proportion of the two highest Social origin groups 5 and 6, with the highest educational aspirations for their children to obtain a tertiary degree, has increased from about 10 % to 30 % across birth cohorts (see Table 8-3). If I multiply the proportion of parents with a tertiary education in the six social origin groups (see Table 8-3) by the proportion of respondents who obtain a tertiary educational degree for the oldest birth cohort (see Table 8-3), I obtain approximately

**Table 8-3:** Percentage of members of different social origin groups aged 30 and over attaining a tertiary degree in the oldest (1944–50) and youngest (1981–83) cohorts and the distribution of parents across the six social origin groups for the oldest (1944–50) and youngest (1981–83) birth cohorts for respondents aged 30 and over

| | **1944–50 birth cohort** | **1981–83 birth cohort** |
|---|---|---|
| **Children attaining a final tertiary educational degree** | | |
| Social origin group 1 | 13.23 % | 13.81 % |
| Social origin group 2 | 19.56 % | 20.36 % |
| Social origin group 3 | 28.32 % | 29.34 % |
| Social origin group 4 | 36.94 % | 38.11 % |
| Social origin group 5 | 61.43 % | 62.60 % |
| Social origin group 6 | 75.18 % | 76.10 % |
| **Distribution of parents across the six social origin groups** | | |
| Social origin group 1 | 11.77 % | 2.26 % |
| Social origin group 2 | 37.85 % | 28.33 % |
| Social origin group 3 | 14.81 % | 13.60 % |
| Social origin group 4 | 23.16 % | 26.63 % |
| Social origin group 5 | 7.41 % | 20.96 % |
| Social origin group 6 | 5.0 % | 8.22 % |
| **Overall probability to obtain a tertiary degree** | $(0.12 \times 0.13) + (0.38 \times 0.20) + (0.15 \times 0.28) + (0.23 \times 0.37) + (0.07 \times 0.61) + (0.05 \times 0.75) = 0.30$ | $(0.02 \times 0.14) + (0.28 \times 0.20) + (0.14 \times 0.29) + (0.27 \times 0.38) + (0.21 \times 0.63) + (0.08 \times 0.76) = 0.40$ |

Source: Author's calculations using NEPS data

the overall probability of respondents attaining a tertiary degree (see Figure 8-1). If I multiply the proportion of parents with a tertiary education in the six social origin groups (see Table 8-3) by the proportion of respondents who obtain a tertiary educational degree for the youngest birth cohort (see Table 8-3), I obtain approximately the overall probability of respondents to attain a tertiary degree (see Figure 8-1). Thus, it is the changing structure of social origin that leads to an increase in the proportion of respondents with a tertiary education.

## 8.3 Limitations and future research

As with every empirical study, also my thesis has limitations which could not be addressed properly because of data and time constraints. In the following, I present three major limitations of my thesis and suggestions for future research.

1. *Misreporting of information.* In my empirical analyses, I rely on retrospective information of the PIAAC and NEPS. Thus, I acknowledge that my findings might be biased by potential recall errors with regard to educational states, the sequencing of educational events, and the timing of educational transitions. For example, in the NEPS data, older East German respondents experienced a massive change in educational regulations, credentials and institutions after reunification. Thus, it is likely that particularly those individuals misreported, misclassified or omitted important educational events. However, there is research on autobiographical memory and retrospective measurement that demonstrates that these errors are particularly small if respondents have to remember significant life events (Reimer, 2001). In addition, close controlling and cooperation between the NEPS team and the Institute for Applied Social Sciences (infas) are ensuring high standards of retrospective data collection. Much more research needs to be done to validate the prospective and retrospective data from modern panel studies.

2. *Lack of information on family resources and student's abilities*. A second issue refers to the limited information available in the used data. Particularly, PIAAC did not have information on parental class and parental status as it is available in the NEPS data. However, my analysis on Germany with a more detailed approach of parental resources revealed that not only parental education, but also parental class and parental status are important for individual's educational attainment. The PIAAC and NEPS datasets also do not allow me to include parents' income as an additional social origin dimension in my analysis. Not including parental income in my analyses might lead to an under estimation of the overall influence of social origin. However, Bukodi et al. (2014) found in a previous study that the inclusion of parental income did not change the effects of parental education, parental class, and parental status in the United Kingdom and Sweden. Future research should test this finding also for Germany using a dataset that provides information on parental income. I used the CAMSIS scale as a measure of social networks, friendship and culture of the origin family. Of course, the CAMSIS scale is only a proxy variable with limitations (see Section 3.4). It would be valuable to develop better measures of the status concept in the Weberian sense in the future.

   The Adult Cohort (SC6) of the NEPS still lacks information on children's, youth's and adult's cognitive and non-cognitive abilities. Thus, unfortunately, I cannot distinguish between primary and secondary effects in my empirical analyses as done with, for example, the two short-term panels in the BiKS study that analysed the transition from primary to secondary school for two recent cohorts. However, the results of the short-term BiKS study confirm all my findings in Chapter 5 for the youngest birth cohorts. Furthermore, the decomposition of primary and secondary effects is based on the assumption that these two effects are independent (Jackson, 2013, p. 17). However, empirical studies demonstrated that

this is not the case (Erikson & Rudolphi, 2010; Jackson et al., 2007). These analyses indicate that abilities also depend on educational aspirations and later taken educational decisions. Future waves of the prospective NEPS panels will provide information on competence levels, teacher assessments, grades, ability and aspirations. The available NEPS panels are still too short to study transitions that may last several years. In addition, there will be competence tests conducted for participants of the Adult Cohort (SC6) in the future. All in all, the NEPS will offer excellent opportunities to deepen and enrich future analyses addressing the topics of this thesis.

3. *Lack of information on time-varying welfare regime policies and educational reforms*. In my first empirical chapter, I was unfortunately not able to include a time-varying variable for long-term changes in taxation, redistribution and changes in educational expenditures in the six welfare regimes which might be an appropriate proxy for differences in the equality of condition in the six welfare regimes. Unfortunately, to the best of my knowledge, there is no data for such a long historical period available yet. Thus, I was not able to investigate in more detail which social policy measures reduce educational inequality. In addition, more research needs to be done to manifest that welfare regimes are a good categorization reducing the complexity of large-scale country-comparisons on educational inequality (Busemeyer, 2015, p. 93).

Furthermore, for the analyses on educational transitions in East and West Germany, I was not able to control precisely for time-varying educational regulations (e. g. I had no information about the probation phases at the ‘Gymnasium’, the regulations regarding which grades are needed to move up to the academic track or that force a child on the non-academic track and I also have no information on changes in financial investments of governments on higher education (Jacob &

Solga, 2015, p. 163)) and economic conditions. Access to and availability of vocational training positions is highly dependent on economic conditions (Jacob & Solga, 2015, p. 163). Thus, more children from lower social origin might be diverted to vocational training, if the economic situation in East and West Germany is improving, and more children from higher social origin might decide to continue to higher education, if the economic condition is bad and vocational training places are rare. In sum, it is important to take account of these institutional constrains and economic situations because they might also affect families' educational decisions. Future research should address these issues.

4. *Implications for the labour market*. Finally, this study focused on the analysis of how alternative educational pathways influence educational inequality. A logical next step of my research will be to examine whether the new alternative educational pathways affect entry to the labour market and the later occupational career.

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# A Appendix

## A.1 Appendix Chapter 3

**Table 8-4:** Comparison of the distributions of the main analysis variables for the unit non-response sample and the analysis sample

| **Unit non-response sample** | | | **Analysis sample** | | |
|---|---|---|---|---|---|
| | N | % | | N | % |
| *Birth cohort* | | | | | |
| 1944-1950 | 38 | 9% | 1944-1950 | 1,580 | 14% |
| 1951-1955 | 21 | 5% | 1951-1955 | 1,522 | 13% |
| 1956-1960 | 38 | 9% | 1956-1960 | 1,942 | 17% |
| 1961-1965 | 84 | 20% | 1961-1965 | 2,046 | 18% |
| 1966-1970 | 66 | 15% | 1966-1970 | 1,686 | 14% |
| 1971-1975 | 46 | 11% | 1971-1975 | 950 | 8% |
| 1976-1980 | 53 | 12% | 1976-1980 | 851 | 7% |
| 1981-1986 | 83 | 19% | 1981-1986 | 1,102 | 9% |
| Total | 429 | 100% | Total | 11,679 | 100% |
| *Gender* | | | | | |
| Male | 218 | 51% | Male | 5,864 | 50% |
| Female | 211 | 49% | Female | 5,815 | 50% |
| Total | 429 | 100% | Total | 11,679 | 100% |
| *East/West Germany* | | | | | |
| East | 86 | 20% | East | 2,582 | 22% |
| West | 343 | 80% | West | 9,097 | 78% |
| Total | 429 | 100% | Total | 11,679 | 100% |
| *Education* | | | | | |
| No educational degree | | | No educational degree | 307 | 3% |
| Hauptschule/ Realschule | 25 | 6% | Hauptschule/ Realschule | 365 | 3% |
| Hauptschule/ Realschule with vocational training | 209 | 48% | Hauptschule/ Realschule with vocational training | 5,659 | 48% |
| Fachhochschulreife/ Abitur | 12 | 3% | Fachhochschulreife/ Abitur | 194 | 2% |
| Fachhochschulreife/ Abitur with vocational training | 58 | 14% | Fachhochschulreife/ Abitur with vocational training | 1,279 | 11% |
| Fachhochschulabschluss | 45 | 11% | Fachhochschulabschluss | 1,506 | 13% |
| University degree | 80 | 18% | University degree | 2,369 | 20% |
| Total | 429 | 100% | Total | 11,679 | 100% |
| *Parental education* | | | | | |
| Low | 22 | 6% | Low | 852 | 7% |
| Intermediate | 284 | 76% | Intermediate | 8,721 | 75% |
| High | 69 | 18% | High | 2,106 | 18% |
| Total | 429 | 100% | Total | 11,679 | 100% |

Source: Author's calculations using NEPS SC6 data

## A.2 Appendix Chapter 5

**Table 8-5:** Descriptive statistics

| Variables | West Germany | | | | | East Germany | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Minimum | Maximum | Mean | SD | N | Minimum | Maximum | Mean | SD | N |
| *Dependent variable* | | | | | | | | | | |
| Academic track | 0 | 1 | 0.35 | 0.48 | 9097 | 0 | 1 | 0.16 | 0.36 | 2582 |
| *Independent variables* | | | | | | | | | | |
| Cohort in years | 0 | 42 | 19.37 | 10.82 | 9097 | 0 | 30 | 14.80 | 8.22 | 2080 |
| Cohort in years in East Germany after German unification | | | | | | 0 | 11 | 5.58 | 3.29 | 502 |
| *Parental education* | | | | | | | | | | |
| Lowest educational level | 0 | 1 | 0.08 | 0.28 | 9097 | 0 | 1 | 0.04 | 0.18 | 2582 |
| Middle educational level | 0 | 1 | 0.76 | 0.43 | 9097 | 0 | 1 | 0.71 | 0.46 | 2582 |
| Highest educational level | 0 | 1 | 0.16 | 0.37 | 9097 | 0 | 1 | 0.26 | 0.44 | 2582 |
| *Mother's education* | | | | | | | | | | |
| Same education as father | 0 | 1 | 0.43 | 0.50 | 9097 | 0 | 1 | 0.49 | 0.50 | 2582 |
| Mother's education higher than father's | 0 | 1 | 0.12 | 0.32 | 9097 | 0 | 1 | 0.14 | 0.35 | 2582 |
| Mother's education lower than father's | 0 | 1 | 0.45 | 0.50 | 9097 | 0 | 1 | 0.37 | 0.48 | 2582 |
| Parental status | 20 | 99 | 50.81 | 15.64 | 9097 | 20 | 99 | 52.93 | 16.39 | 2582 |
| *Parental status categorical* | | | | | | | | | | |
| Low | 0 | 1 | 0.37 | 0.48 | 9097 | 0 | 1 | 0.39 | 0.49 | 2582 |
| Intermediate | 0 | 1 | 0.55 | 0.50 | 9097 | 0 | 1 | 0.51 | 0.50 | 2582 |
| High | 0 | 1 | 0.08 | 0.27 | 9097 | 0 | 1 | 0.10 | 0.31 | 2582 |
| *Parental class* | | | | | | | | | | |
| Unskilled workers | 0 | 1 | 0.16 | 0.36 | 9097 | 0 | 1 | 0.14 | 0.35 | 2582 |
| Lower grade routine non-manual workers | 0 | 1 | 0.16 | 0.36 | 9097 | 0 | 1 | 0.19 | 0.39 | 2582 |
| Skilled manual workers | 0 | 1 | 0.04 | 0.19 | 9097 | 0 | 1 | 0.03 | 0.18 | 2582 |
| Higher grade routine non-manual workers | 0 | 1 | 0.02 | 0.13 | 9097 | 0 | 1 | 0.01 | 0.11 | 2582 |
| Lower grade technicians | 0 | 1 | 0.11 | 0.31 | 9097 | 0 | 1 | 0.03 | 0.17 | 2582 |
| Small proprietors without employees | 0 | 1 | 0.04 | 0.20 | 9097 | 0 | 1 | 0.03 | 0.17 | 2582 |
| Small proprietors with employees | 0 | 1 | 0.07 | 0.25 | 9097 | 0 | 1 | 0.11 | 0.32 | 2582 |
| Lower service class | 0 | 1 | 0.22 | 0.41 | 9097 | 0 | 1 | 0.22 | 0.41 | 2582 |
| Higher service class | 0 | 1 | 0.20 | 0.40 | 9097 | 0 | 1 | 0.24 | 0.43 | 2582 |
| *Reduced parental class categories* | | | | | | | | | | |
| Low | 0 | 1 | 0.35 | 0.48 | 9097 | 0 | 1 | 0.36 | 0.48 | 2582 |
| Intermediate | 0 | 1 | 0.23 | 0.42 | 9097 | 0 | 1 | 0.19 | 0.39 | 2582 |
| High | 0 | 1 | 0.41 | 0.49 | 9097 | 0 | 1 | 0.45 | 0.50 | 2582 |
| Female | 0 | 1 | 0.50 | 0.50 | 9097 | 0 | 1 | 0.50 | 0.50 | 2582 |

Source: Author's calculations using NEPS SC6 data

**Table 8-6:** Changes in the proportions of fathers, mothers and parents with tertiary education and educational matching patterns of mothers in West Germany

| Cohort of respondent | Tertiary education father | Tertiary education mother | Proportion parental tertiary education | Matching patterns from the perspective of the mother | | |
|---|---|---|---|---|---|---|
| | | | | Down | lateral | up |
| 1944–1950 | 11.98 | 1.84 | 12.14 | 0.17 | 1.68 | 10.30 |
| 1951–1955 | 9.08 | 2.14 | 9.53 | 0.45 | 1.69 | 7.39 |
| 1956–1960 | 10.99 | 2.43 | 11.25 | 0.26 | 2.17 | 8.82 |
| 1961–1965 | 13.09 | 3.59 | 13.95 | 0.85 | 2.74 | 10.35 |
| 1966–1970 | 15.30 | 4.53 | 16.12 | 0.82 | 3.71 | 11.59 |
| 1971–1975 | 19.65 | 6.68 | 20.45 | 0.80 | 5.88 | 13.77 |
| 1976–1980 | 22.54 | 12.22 | 25.40 | 2.86 | 9.37 | 13.17 |
| 1981–1986 | 26.50 | 13.66 | 29.92 | 3.42 | 10.25 | 16.25 |

Source: Author's calculations using NEPS SC6 data

**Table 8-7:** Changes in the proportions of fathers, mothers and parents with tertiary education and educational matching patterns of mothers in East Germany

| Cohort of respondent | Tertiary education father | Tertiary education mother | Proportion parental tertiary education | Matching patterns from the perspective of the mother | | |
|---|---|---|---|---|---|---|
| | | | | down | lateral | up |
| 1944–1950 | 12.69 | 2.33 | 13.21 | 0.52 | 1.81 | 10.88 |
| 1951–1955 | 17.04 | 4.01 | 18.55 | 1.50 | 2.51 | 14.54 |
| 1956–1960 | 16.18 | 4.24 | 17.51 | 1.33 | 2.92 | 13.26 |
| 1961–1965 | 25.25 | 10.40 | 27.97 | 2.72 | 7.67 | 17.57 |
| 1966–1970 | 28.82 | 12.94 | 32.35 | 3.53 | 9.41 | 19.41 |
| 1971–1975 | 32.67 | 22.77 | 38.12 | 5.45 | 17.33 | 15.35 |
| 1976–1980 | 29.86 | 23.08 | 38.01 | 8.14 | 14.93 | 14.93 |
| 1981–1986 | 22.13 | 26.09 | 35.57 | 13.44 | 12.65 | 9.49 |

Source: Author's calculations using NEPS SC6 data

**Table 8-8:** Changes in the proportions of fathers, mothers and parents from the higher service class and class matching patterns of mothers in West Germany

| Cohort of respondent | Service higher class father | Service higher class mother | Parental higher service class[66] | Matching patterns from the perspective of the mother | | |
|---|---|---|---|---|---|---|
| | | | | down | lateral | up |
| 1944–1950 | 17.56 | 4.71 | 17.67 | 1.28 | 3.43 | 14.13 |
| 1951–1955 | 15.02 | 5.53 | 16.38 | 2.37 | 3.16 | 11.86 |
| 1956–1960 | 14.96 | 4.94 | 16.81 | 3.30 | 1.65 | 13.31 |
| 1961–1965 | 17.22 | 3.84 | 19.37 | 1.04 | 2.80 | 14.42 |
| 1966–1970 | 20.76 | 3.10 | 20.06 | 1.67 | 1.43 | 19.33 |
| 1971–1975 | 21.80 | 5.60 | 23.40 | 2.40 | 3.20 | 18.60 |
| 1976–1980 | 17.10 | 4.11 | 19.37 | 1.73 | 2.38 | 14.72 |
| 1981–1986 | 26.03 | 5.24 | 26.62 | 2.22 | 3.02 | 23.02 |

Source: Author's calculations using NEPS SC6 data

**Table 8-9:** Changes in the proportions of fathers, mothers and parents from the higher service class and class matching patterns of mothers in East Germany

| Cohort of respondent | Service class father | Service class mother | Parental service class | Matching patterns from the perspective of the mother | | |
|---|---|---|---|---|---|---|
| | | | | down | lateral | up |
| 1944–1950 | 17.18 | 3.44 | 17.36 | 1.91 | 1.53 | 15.65 |
| 1951–1955 | 18.24 | 4.72 | 21.05 | 2.83 | 1.89 | 16.35 |
| 1956–1960 | 14.73 | 7.21 | 19.36 | 4.70 | 2.51 | 12.23 |
| 1961–1965 | 21.37 | 6.55 | 23.76 | 3.42 | 3.13 | 18.23 |
| 1966–1970 | 28.90 | 9.30 | 30.24 | 3.99 | 5.32 | 23.59 |
| 1971–1975 | 23.46 | 7.82 | 25.74 | 2.79 | 5.03 | 18.44 |
| 1976–1980 | 24.00 | 7.50 | 28.51 | 5.00 | 2.50 | 21.50 |
| 1981–1986 | 21.05 | 11.40 | 29.64 | 8.77 | 2.63 | 18.42 |

Source: Author's calculations using NEPS SC6 data

[66] The proportions of the parental higher service class are not higher than the single proportions of father's and mother's higher service classes because I applied the dominance approach. In this case also mothers without an EGP information are included via their husbands class position. However, for the proportions of the higher service class of mothers I only included working mothers for which I have information on their EGP classes.

**Table 8-10:** Changes in the proportions of fathers, mothers and parents who have at least a 64 status score and higher status matching patterns of mothers in West Germany

| Cohort of respondent | Father's status | Mother's status | Parental status[67] | Matching patterns from the perspective of the mother | | |
|---|---|---|---|---|---|---|
| | | | | down | lateral | up |
| 1944-1950 | 15.06 | 5.93 | 14.74 | 1.72 | 4.20 | 10.86 |
| 1951-1955 | 10.81 | 6.53 | 13.54 | 3.38 | 3.15 | 7.66 |
| 1956-1960 | 13.98 | 9.84 | 15.27 | 2.41 | 4.14 | 9.84 |
| 1961-1965 | 16.06 | 6.56 | 17.66 | 2.94 | 3.62 | 12.44 |
| 1966-1970 | 20.53 | 9.07 | 20.51 | 2.52 | 6.55 | 13.98 |
| 1971-1975 | 22.43 | 13.00 | 22.73 | 1.89 | 9.43 | 13.00 |
| 1976-1980 | 24.83 | 15.17 | 25.56 | 4.14 | 11.03 | 13.79 |
| 1981-1986 | 25.77 | 17.62 | 30.62 | 6.36 | 11.26 | 14.52 |

Source: Author's calculations using NEPS SC6 data

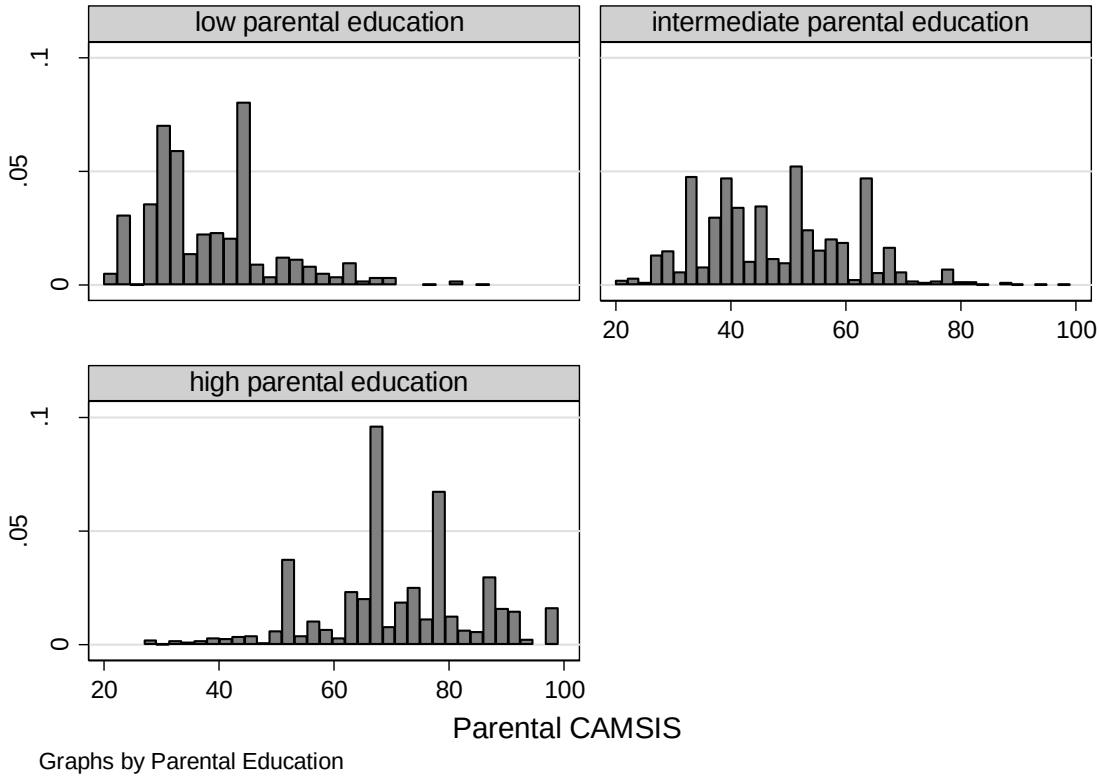
**Table 8-11:** Changes in the proportions of fathers, mothers and parents who have at least a 64 status score and higher status matching patterns of mothers in East Germany

| Cohort of respondent | Father's status | Mother's status | Parental status | Matching patterns from the perspective of the mother | | |
|---|---|---|---|---|---|---|
| | | | | Down | lateral | up |
| 1944-1950 | 11.24 | 9.02 | 14.51 | 2.81 | 1.20 | 10.04 |
| 1951-1955 | 14.60 | 7.94 | 18.30 | 5.40 | 2.54 | 12.06 |
| 1956-1960 | 14.38 | 10.22 | 19.89 | 6.07 | 4.15 | 10.22 |
| 1961-1965 | 21.45 | 14.20 | 27.48 | 7.54 | 6.67 | 14.78 |
| 1966-1970 | 25.33 | 15.67 | 30.59 | 5.67 | 10.00 | 15.33 |
| 1971-1975 | 27.53 | 19.66 | 31.68 | 6.74 | 12.92 | 14.61 |
| 1976-1980 | 24.00 | 17.50 | 33.03 | 10.00 | 7.50 | 16.50 |
| 1981-1986 | 17.70 | 19.91 | 30.04 | 13.72 | 6.19 | 11.50 |

Source: Author's calculations using NEPS SC6 data

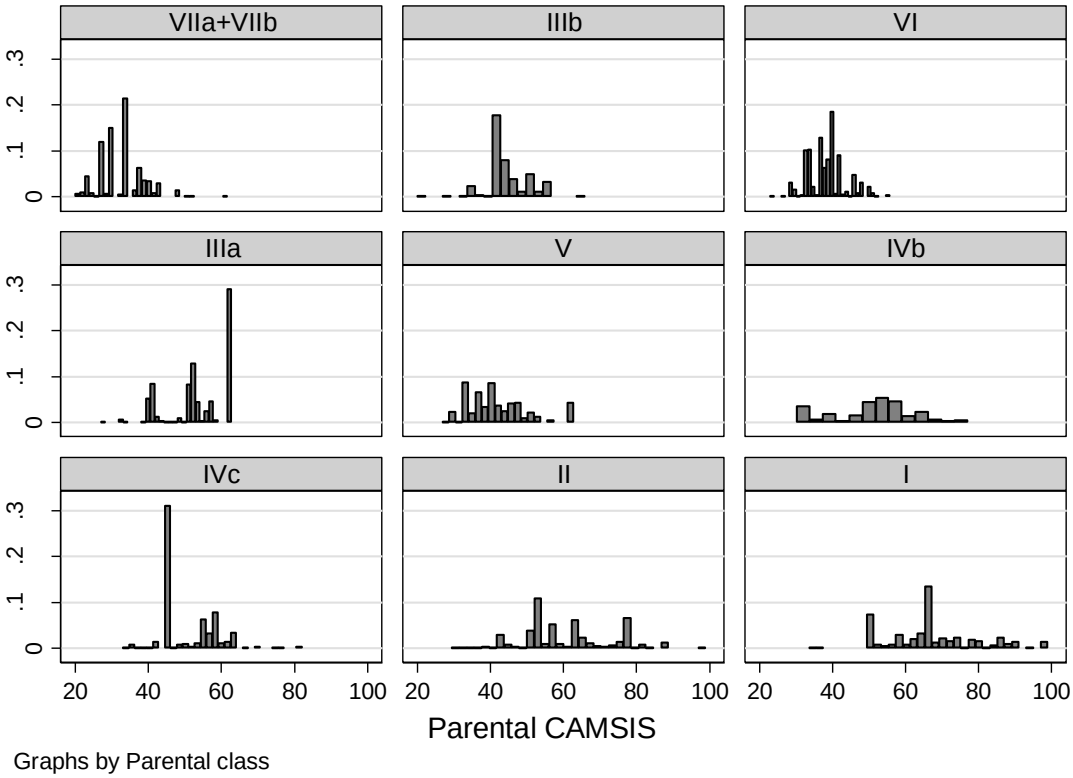
[67] The proportions of the parental status are not always higher than the single proportions of father's and mother's higher status because I applied the dominance approach. In this case also mothers without a status information are included via their husbands status position. However, for the proportions of the high-status mothers I only included working mothers for which I have information on their status.

**Figure 8-6:** Distributions of parental status in different parental educational groups



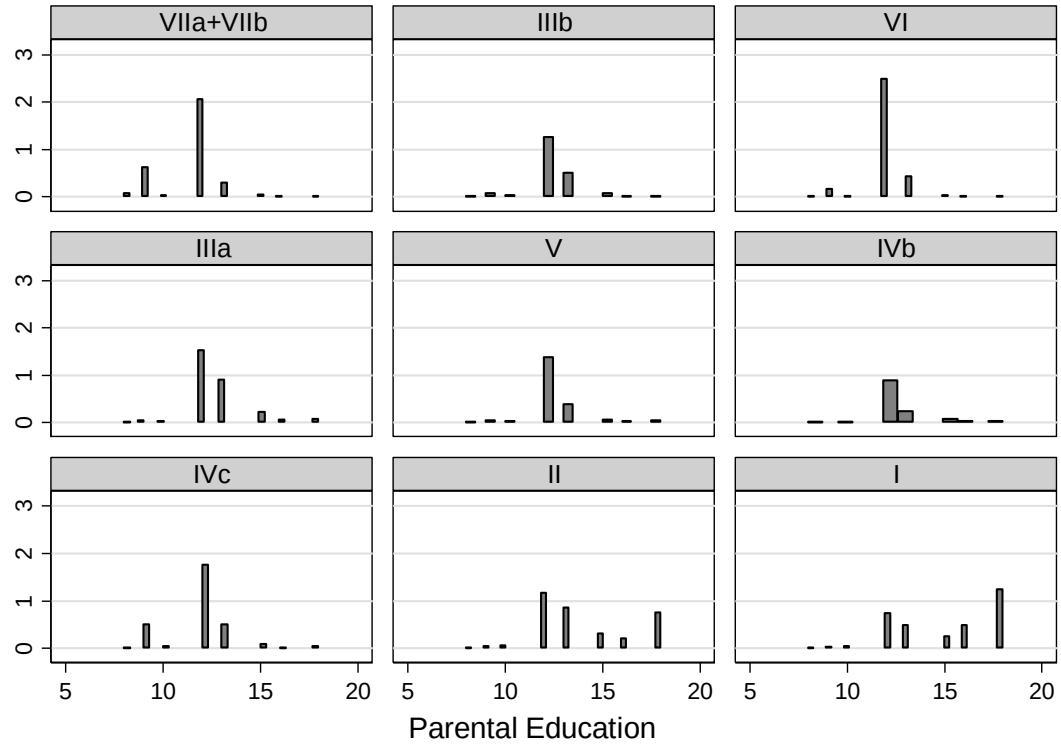

Source: Author's calculations using NEPS SC6 data

**Figure 8-7:** Distributions of parental status in different parental classes




Source: Author's calculations using NEPS SC6 data

**Figure 8-8:** Distributions of parental education (in yrs) in different parental classes




Source: Author's calculations using NEPS SC6 data

**Table 8-12:** Association between parental education and the transition probability to the academic track without cohort trend interaction terms

| **Variables** | **West** | **East before** | **East after** |
|---|---|---|---|
| | **(1)** | **(2)** | **(3)** |
| Cohort trend | 0.02*** | -0.10*** | 0.16*** |
| | (0.002) | (0.01) | (0.03) |
| *Parental education (Ref.: Low educational level)* | | | |
| Intermediate educational level | 0.97*** | 0.91 | 0.39 |
| | (0.11) | (0.53) | (1.15) |
| High educational level | 3.10*** | 2.32*** | 1.54 |
| | (0.13) | (0.55) | (1.16) |
| *Mother's education (Ref.: same education as father)* | | | |
| Mother's education higher than father's | 0.33*** | -0.07 | -0.43 |
| | (0.08) | (0.27) | (0.26) |
| Mother's education lower than father's | -0.22*** | -0.07 | -0.22 |
| | (0.06) | (0.17) | (0.26) |
| Constant | -2.26*** | -2.15*** | -2.25 |
| | (0.12) | (0.52) | (1.16) |
| Pseudo-$R^2$ | 0.13 | 0.11 | 0.08 |
| N of observations | 9,097 | 2,080 | 502 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

**Table 8-13:** Association between parental class and the transition probability to the academic track without cohort trend interaction term

| Variables | West (1) | East before (2) | East after (3) |
|---|---|---|---|
| Cohort trend | 0.03*** | -0.09*** | 0.15*** |
| | (0.002) | (0.01) | (0.03) |
| *Parental class (Ref.:Unskilled worker)* | | | |
| Lower grade routine non-manual workers | 0.66*** | 0.38 | 1.02 |
| | (0.14) | (0.80) | (0.69) |
| Skilled manual workers | 0.11 | 0.86** | -0.07 |
| | (0.11) | (0.40) | (0.49) |
| Higher grade routine non-manual workers | 1.17*** | 1.71*** | 0.45 |
| | (0.11) | (0.41) | (0.48) |
| Lower grade technicians | 0.14 | 0.28 | -1.19 |
| | (0.17) | (0.80) | (1.11) |
| Small proprietors without employees | 1.11*** | 2.17*** | 0.74 |
| | (0.19) | (0.66) | (0.85) |
| Small proprietors with employees | 0.63*** | 1.73*** | -0.04 |
| | (0.11) | (0.47) | (0.90) |
| Lower service class | 1.79*** | 1.81*** | 1.09*** |
| | (0.09) | (0.37) | (0.45) |
| Higher service class | 2.09*** | 2.32*** | 1.64*** |
| | (0.09) | (0.36) | (0.43) |
| Constant | -2.26*** | -2.57*** | -2.36*** |
| | (0.09) | (0.35) | (0.44) |
| Pseudo-$R^2$ | 0.13 | 0.12 | 0.11 |
| N of observations | 9,097 | 2,080 | 502 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

**Table 8-14:** Association between parental status and the transition probability to the academic track without cohort trend interaction term

| Variables | West (1) | East before (2) | East after (3) |
|---|---|---|---|
| Cohort trend | 0.02*** | -0.09*** | 0.16*** |
| | (0.002) | (0.01) | (0.03) |
| Parental status | 0.06*** | 0.04*** | 0.04*** |
| | (0.002) | (0.004) | (0.01) |
| Constant | -4.27*** | -3.21*** | -3.86** |
| | (0.10) | (0.27) | (0.48) |
| Pseudo-$R^2$ | 0.15 | 0.11 | 0.10 |
| Observations | 9,097 | 2,080 | 502 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

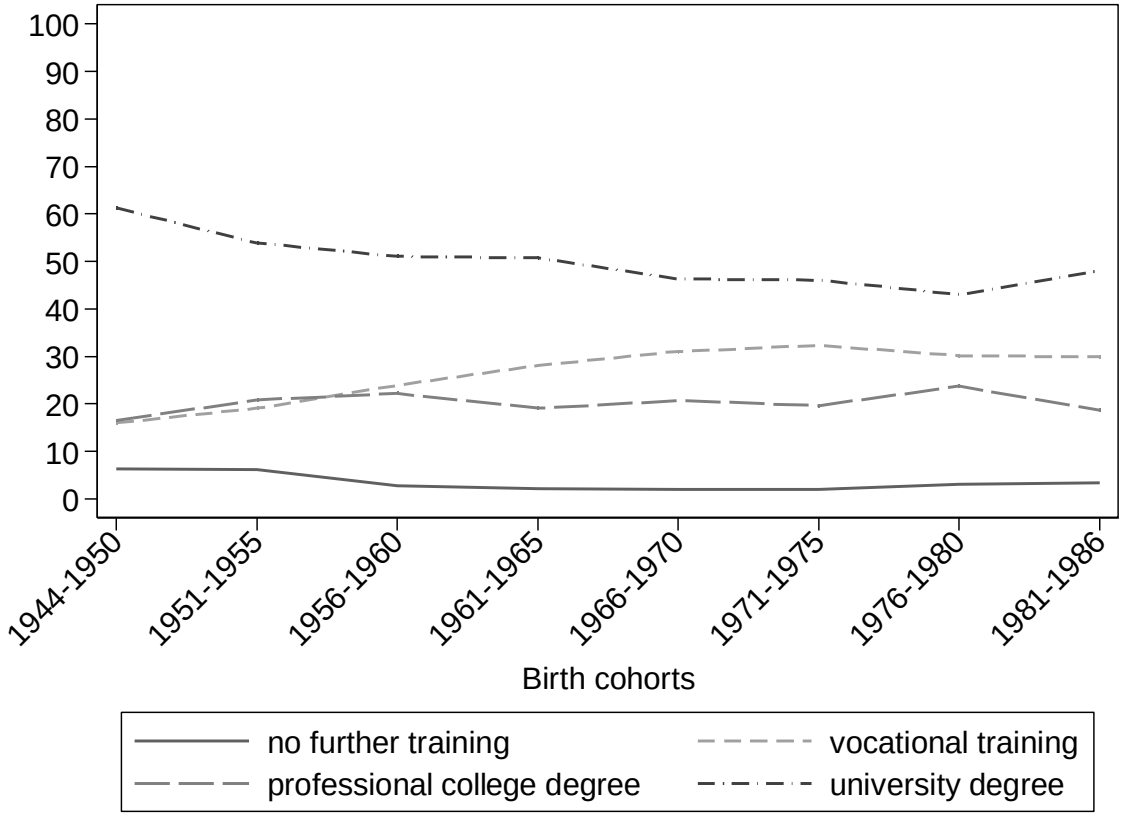
**Table 8-15:** Influence of parental education, parental class and parental status on the transition to the academic track

| Variables | West | East before | East after |
|---|---|---|---|
| Cohort trend | 0.02*** | -0.10*** | 0.16*** |
| | (0.002) | (0.01) | (0.03) |
| *Parental education (Ref.: Lowest educational level)* | | | |
| Intermediate educational level | 0.62*** | 0.52 | 0.35 |
| | (0.12) | (0.54) | (1.21) |
| Highest educational level | 1.86*** | 1.42*** | 0.80 |
| | (0.14) | (0.57) | (1.22) |
| *Parental status (Ref.: low status)* | | | |
| Intermediate parental status | 0.68*** | 0.52 | 0.32 |
| | (0.08) | (0.29) | (0.38) |
| High parental status | 1.38*** | 0.91*** | 0.58 |
| | (0.13) | (0.35) | (0.51) |
| *Parental class (Ref.:Workers)* | | | |
| Intermediate | 0.15 | 0.66 | -0.11 |
| | (0.09) | (0.31) | (0.41) |
| Salariat | 0.67*** | 0.55 | 0.73 |
| | (0.09) | (0.32) | (0.42) |
| Constant | -2.71*** | -2.47*** | -7.67*** |
| | (0.12) | (0.53) | (1.70) |
| Pseudo-$R^2$ | 0.17 | 0.13 | 0.10 |
| Observations | 9,097 | 2,080 | 502 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

## A.3 Appendix Chapter 7

**Figure 8-9:** Changes in the proportions of young adults that age 30 and over with a higher education entry certificate who do not additionally acquire further education, who complete a vocational training certificate, a university of applied sciences degree or a university education across birth cohorts




Source: Author's portrayal using NEPS data

**Table 8-16:** Multinomial logistic regression for respondents that age 30 and over with a higher education entry certificate

| Variables | NFC (Ref.: tertiary degree) | VOC (Ref.: tertiary degree)) | FHS degree (Ref.: No tertiary education) | UNI degree (Ref.: No tertiary education) |
|---|---|---|---|---|
| Cohort trend | -0.06*** | 0.04*** | -0.01 | -0.03*** |
| | (0.01) | (0.006) | (0.007) | (0.006) |
| *Parental education (Ref.: Low educational level)* | | | | |
| Intermediate educational | -0.16 | -0.009 | 0.13 | -0.05 |
| Level | (0.44) | (0.19) | (0.25) | (0.21) |
| High educational level | -0.33 | -0.63*** | 0.49 | 0.60*** |
| | (0.49) | (0.22) | (0.27) | (0.23) |
| *Parental class (Ref.: workers)* | | | | |
| Intermediate | 0.66 | -0.09 | -0.12 | 0.09 |
| | (0.34) | (0.14) | (0.17) | (0.15) |
| Salariat | 0.46 | -0.14 | -0.20 | 0.25 |
| | (0.36) | (0.14) | (0.17) | (0.15) |
| *Parental status (Ref. low parental status)* | | | | |
| Intermediate | -0.34 | -0.06 | 0.21 | 0.03 |
| | (0.31) | (0.13) | (0.16) | (0.14) |
| High | 0.83 | -0.53*** | 0.49*** | 0.54*** |
| | (0.44) | (0.19) | (0.23) | (0.19) |
| Traditional academic track | -0.32 | -0.76*** | -0.14 | 1.05*** |
| | (0.18) | (0.08) | (0.10) | (0.08) |
| Female (ref. male) | 0.14 | 0.56*** | -0.62*** | -0.45*** |
| | (0.18) | (0.08) | (0.09) | (0.08) |
| East German (ref. West | -0.60*** | -1.19*** | 1.07*** | 1.12*** |
| German) | (0.30) | (0.15) | (0.16) | (0.14) |
| German unification | 1.18*** | -0.45*** | 0.19 | 0.28 |
| | (0.38) | (0.14) | (0.18) | (0.15) |
| German unification×East | 0.82 | 1.30*** | -1.09*** | -1.29*** |
| Germany | (0.55) | (0.24) | (0.28) | (0.25) |
| Constant | -1.91*** | -1.06*** | -0.21 | 0.21 |
| | (0.49) | (0.22) | (0.27) | (0.23) |
| Events | 134 | 1,113 | 854 | 2,093 |
| Observations | 4,194 | 4,194 | 4,194 | 4,194 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

## A.4 Appendix Chapter 8

**Table 8-17:** Making the transition to the academic track for individuals that age 30 and above

| Variables | Transition to the academic track |
|---|---|
| Cohort trend | 0.02*** |
| | (0.002) |
| *Social origin (Ref.: group 1)* | |
| Group 2 | 0.22 |
| | (0.12) |
| Group 3 | 0.90*** |
| | (0.12) |
| Group 4 | 1.39*** |
| | (0.12) |
| Group 5 | 1.97*** |
| | (0.12) |
| Group 6 | 2.70*** |
| | (0.14) |
| Constant | -2.28*** |
| | (0.11) |
| Pseudo-$R^2$ | 0.11 |
| Observations | 10,918 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

**Table 8-18:** Obtaining a tertiary degree via the academic track for individuals that age 30 and above

| Variables | Obtaining a tertiary degree via the academic track |
|---|---|
| Cohort trend | -0.02*** |
| | (0.004) |
| *Social origin (Ref.: group 1)* | |
| Group 2 | 0.14 |
| | (0.22) |
| Group 3 | 0.32 |
| | (0.22) |
| Group 4 | 0.44*** |
| | (0.21) |
| Group 5 | 1.18*** |
| | (0.22) |
| Group 6 | 1.62*** |
| | (0.23) |
| Constant | 0.28 |
| | (0.21) |
| Pseudo-$R^2$ | 0.05 |
| Observations | 3,210 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

**Table 8-19:** Obtaining a tertiary degree via the non-academic track for individuals that age 30 and above

| Variables | Obtaining a tertiary degree via the non-academic track |
|---|---|
| Cohort trend | 0.002 |
| | (0.003) |
| *Social origin (Ref.: group 1)* | |
| Group 2 | 0.57*** |
| | (0.14) |
| Group 3 | 0.92*** |
| | (0.15) |
| Group 4 | 1.26*** |
| | (0.15) |
| Group 5 | 2.30*** |
| | (0.16) |
| Group 6 | 2.85*** |
| | (0.19) |
| Constant | -2.41*** |
| | (0.14) |
| Pseudo-$R^2$ | 0.07 |
| Observations | 7,708 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

**Table 8-20:** Logit model for the unskilled individuals that age 30 and above

| Variables | West |
|---|---|
| Cohort trend | -0.02 |
| | (0.01) |
| *Social origin (Ref.: group 1)* | |
| Group 2 | -0.32 |
| | (0.21) |
| Group 3 | -0.72*** |
| | (0.27) |
| Group 4 | -0.78 |
| | (0.26) |
| Group 5 | -1.60*** |
| | (0.53) |
| Group 6 | -1.53 |
| | (0.61) |
| *Interaction effects:* | |
| Cohort trend×Social origin group 2 | -0.03*** |
| | (0.01) |
| Cohort trend×Social origin group 3 | -0.02 |
| | (0.02) |
| Cohort trend×Social origin group 4 | -0.05*** |
| | (0.02) |
| Cohort trend×Social origin group 5 | -0.07*** |
| | (0.04) |
| Cohort trend×Social origin group 6 | -0.07 |
| | (0.04) |
| Constant | -1.44*** |
| | (0.18) |
| Pseudo-$R^2$ | 0.08 |
| Observations | 10,918 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

**Table 8-21:** Logit model for the skilled individuals that age 30 and above

| Variables | West |
|---|---|
| Cohort trend | -0.01*** |
| | (0.002) |
| *Social origin (Ref.: group 1)* | |
| Group 2 | 0.04 |
| | (0.08) |
| Group 3 | -0.33*** |
| | (0.09) |
| Group 4 | -0.61*** |
| | (0.09) |
| Group 5 | -1.56*** |
| | (0.10) |
| Group 6 | -2.25*** |
| | (0.12) |
| Constant | -1.44*** |
| | (0.18) |
| Pseudo-$R^2$ | 0.07 |
| Observations | 10,918 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

**Table 8-22:** Logit model for the individuals with a tertiary education that age 30 and above

| Variables | West |
|---|---|
| Cohort trend | 0.001 |
| | (0.002) |
| *Social origin (Ref.: group 1)* | |
| Group 2 | 0.47*** |
| | (0.11) |
| Group 3 | 0.95*** |
| | (0.12) |
| Group 4 | 1.35*** |
| | (0.11) |
| Group 5 | 2.35*** |
| | (0.12) |
| Group 6 | 2.99*** |
| | (0.14) |
| Constant | -1.88*** |
| | (0.11) |
| Pseudo-$R^2$ | 0.1070 |
| Observations | 10,918 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

**Table 8-23:** Logit model for the individuals with a tertiary education that age 30 and above (27 social origin groups)

| Variables | West |
|---|---|
| Cohort trend | 0.001 |
| | (0.002) |
| *Social origin (Ref.: social origin 1)* | |
| Social origin 5 | 0.15 |
| | (0.23) |
| Social origin 10 | 0.47*** |
| | (0.13) |
| Social origin 11 | 0.78*** |
| | (0.16) |
| Social origin 13 | 0.43*** |
| | (0.17) |
| Social origin 14 | 0.99*** |
| | (0.13) |
| Social origin 16 | 0.96*** |
| | (0.21) |
| Social origin 17 | 1.37*** |
| | (0.13) |
| Social origin 18 | 1.88*** |
| | (0.19) |
| Social origin 23 | 2.13*** |
| | (0.21) |
| Social origin 26 | 2.41*** |
| | (0.14) |
| Social origin 27 | 3.03*** |
| | (0.15) |
| Constant | -1.92*** |
| | (0.12) |
| Pseudo-$R^2$ | 0.1089 |
| Observations | 10,918 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

## A.5 Immigrants in my empirical analysis

This thesis makes empirical analyses on the long-term trends of educational careers in overall Germany. This means that it includes the German majority population and immigrants in the analysis. In the literature, there is the distinction between different types of immigrant generations. The *first generation immigrants* are those people who arrived in the receiving country as adults. These people have already left the educational system and do not go to school in Germany anymore. They are therefore not part of my analysis. The *1.5 generation immigrants* arrived in the receiving country between the age of 0 to 18 (Olczyk, Will and Kristen 2014: 4). I want to differentiate here two populations: First, those immigrants who arrive at the age of compulsory schooling. They are a very particular group, because they enter the school system at any school age and only partly participate in their educational career in the German educational system. Those immigrants are not included in my analyses, since I am interested in individuals who have experienced their whole educational career in the German educational system. Second, there is the group of immigrants which is born abroad and arrives in Germany before the age of six. In the Adult Cohort (SC6) of the NEPS, there are only 15 individuals that came to Germany before the school entry age of six. I have also excluded these immigrants from my analysis.

Finally, I have included the so-called *second and 2.5 generation immigrants*. These are children who were born in Germany and who have at least one parent who was born abroad (Olczyk, Will and Kristen 2014: 5). These immigrants have experienced their whole educational career in the German educational system. In my analyses, I included individuals who were born in either East or West Germany. Thus, my analyses in the thesis include the second and 2.5 generation immigrants. I have N=890 of those immigrants in my NEPS dataset.

Table 8-24 (see below) shows the number of observations and percentages for the various dependent variables in my analyses for *second and 2.5 generation immigrants* and Germans with German parents. As the numbers of observations for immigrants show there are not enough cases to plot changes in most of the dependent variables across cohorts specifically for second and 2.5 generation immigrants. Thus, I am not able to plot changes in school drop-out rates across the eight birth cohorts for immigrants (N=16+1=17). In addition, if one compares the percentages of experiencing certain school events (e.g. transition to the academic track, school drop-out from the non-academic track etc.) one has to conclude that the percentages are very similar between second and 2.5 generation immigrants and Germans with German parents. There are only differences for individuals with a 'Hauptschulabschluss' or 'Mittlere Reife' who upgrade an educational degree (see Table 8-24 below). Second and 2.5 generation immigrants are more likely to additionally complete a higher education entry certificate (HEEC) instead of a vocational training certificate (VOC) than Germans with German parents. Moreover, second and 2.5 generation immigrants are less likely to additionally obtain a vocational training certificate (VOC) than Germans with German parents. I tested in Table 8-28 and Table 8-29 in the appendix, whether there is a significant difference between second or 2.5 generation immigrants and Germans with German parents. Table 8-28 and Table 8-29 in the appendix show that there are no significant differences. Furthermore, second and 2.5 generation immigrants are slightly less likely than Germans with German parents to complete a tertiary education after a vocational training (see Table 8-24). I estimated all my analyses again and controlled for second and 2.5 generation immigrants and there was no significant difference between immigrants and Germans with German parents (see Table 8-24, right column and Table 8-25 to Table 8-32 in the appendix).

**Table 8-24:** Relative and absolute numbers of observations of immigrants born in Germany (second and 2.5 generation immigrants) and Germans with German parents for the various dependent variables

| **Second and 2.5 generation immigrants** | | | **Germans with German parents** | | **Significant difference to Germans with German parents (ns=not significant)** |
|---|---|---|---|---|---|
| | N | % | N | % | |
| *Transition to the academic track* | | | | | |
| Yes | 305 | 34% | 3,292 | 31% | |
| No | 585 | 66% | 7,497 | 69% | |
| *School drop-out from non-academic track* | | | | | |
| Yes | 16 | 3% | 266 | 3% | ns |
| No | 569 | 97% | 7,231 | 97% | |
| *School drop-out from academic track* | | | | | |
| Yes | 1 | 0.33% | 24 | 0.73% | ns |
| No | 304 | 99% | 3,268 | 99% | |
| *Downward mobility* | | | | | |
| Yes | 34 | 11% | 345 | 11% | ns |
| No | 270 | 89% | 2,918 | 89% | |
| *Upward mobility* | | | | | |
| Yes | 33 | 6% | 336 | 5% | ns |
| No | 536 | 94% | 6,895 | 95% | |
| *Atypical degree non-academic track* | | | | | |
| Yes | 6 | 1% | 54 | 0.75% | ns |
| No | 564 | 99% | 7,186 | 99% | |
| *Atypical degree academic track* | | | | | |
| Yes | 47 | 16% | 478 | 15% | ns |
| No | 256 | 84% | 2,776 | 85% | |
| ***Individuals with 'Hauptschulabschluss' or 'Mittlere Reife'*** | | | | | |
| **No further degree** | **50** | **8%** | **484** | **6%** | **ns** |
| **VOC** | **410** | **67%** | **5,754** | **75%** | **ns** |
| **HEEC** | **151** | **25%** | **1,426** | **19%** | **ns** |
| *Individuals with 'Fachhochschulreife' or 'Abitur'* | | | | | |
| NFC | 19 | 5% | 175 | 4% | ns |
| VOC | 108 | 26% | 1,171 | 27% | ns |
| FHS | 78 | 19% | 871 | 21% | ns |
| UNI | 208 | 50% | 2,039 | 48% | ns |
| *Individuals with vocational training that continue to tertiary education* | | | | | |
| Yes | 22 | 5% | 483 | 8% | ns |
| No | 388 | 95% | 5,271 | 92% | |

Source: Author's calculations using NEPS data

**Table 8-25:** School drop-outs from the non-academic and academic track with a Dummy variable for second and 2.5 generation immigrants

| **Variables** | **Non-academic track** | **Academic track** |
|---|---|---|
| Cohort trend | -0.04*** | -0.13*** |
| | (0.007) | (0.03) |
| *Parental education (Ref.: Low educational level)* | | |
| Intermediate educational | -0.62*** | -0.97 |
| Level | (0.16) | (0.66) |
| High educational level | -1.62*** | -1.24 |
| | (0.45) | (0.86) |
| *Parental class (Ref.: workers)* | | |
| Intermediate | -0.32 | -0.17 |
| | (0.20) | (0.69) |
| Salariat | -0.34 | -0.82 |
| | (0.24) | (0.74) |
| *Parental status (Ref. low parental status)* | | |
| Intermediate | -0.26 | 0.55 |
| | (0.20) | (0.70) |
| High | -0.47 | 0.61 |
| | (0.57) | (1.01) |
| Female (ref. male) | -0.54*** | -0.81 |
| | (0.13) | (0.45) |
| East German (ref. West | 0.28*** | -0.31 |
| German) | (0.14) | (0.64) |
| **Immigrant (ref. individuals with** | **-0.19** | **-0.68** |
| **German parents)** | **(0.27)** | **(1.04)** |
| Constant | -1.59*** | -1.63*** |
| | (0.18) | (0.78) |
| Changes of state | 282 | 25 |
| Observations | 8,082 | 3,597 |

Standard errors: *** *p<0.01*, ** *p<0.05*
Source: Author's calculations using NEPS data

**Table 8-26:** Downward and upward mobility with a Dummy variable for second and 2.5 generation immigrants

| Variables | Downward mobility | Upward mobility |
|---|---|---|
| Cohort trend | 0.01 | 0.02*** |
| | (0.009) | (0.008) |
| *Parental education (Ref.: Low educational level)* | | |
| Intermediate educational | -0.38 | 0.27 |
| Level | (0.27) | (0.32) |
| High educational level | -1.03*** | 1.33*** |
| | (0.31) | (0.35) |
| *Parental class (Ref.: workers)* | | |
| Intermediate | -0.06 | 0.04 |
| | (0.21) | (0.22) |
| Salariat | -0.16 | 0.35 |
| | (0.21) | (0.23) |
| *Parental status (Ref. low parental status)* | | |
| Intermediate | -0.08 | 0.38 |
| | (0.20) | (0.21) |
| High | -0.008 | 0.94*** |
| | (0.27) | (0.26) |
| Female (ref. male) | -0.31*** | 0.35*** |
| | (0.11) | (0.11) |
| East German (ref. West | -1.06*** | 1.24*** |
| German) | (0.37) | (0.13) |
| **Immigrant (ref. individuals with** | **0.03** | **0.37** |
| **German parents)** | **(0.19)** | **(0.20)** |
| German unification | -0.18 | -0.79*** |
| | (0.21) | (0.31) |
| German unification*East | 0.80 | 0.73*** |
| Germany | (0.48) | (0.33) |
| Constant | -1.44*** | -5.04*** |
| | (0.31) | (0.34) |
| Changes of state | 379 | 369 |
| Observations | 3,567 | 7,800 |

Standard errors: *** *p<0.01,* ** *p<0.05*
Source: Author's calculations using NEPS data

**Table 8-27:** Leaving the academic track with a 'Hauptschulabschluss' or 'Mittlere Reife' with a Dummy variable for second and 2.5 generation immigrants

| **Variables** | **'atypical degree' from academic track** |
|---|---|
| Cohort trend | -0.03*** |
| | (0.007) |
| *Parental education (Ref.: Low educational level)* | |
| Intermediate educational | 0.06 |
| Level | (0.27) |
| High educational level | -0.74*** |
| | (0.28) |
| Upward mobility to the academic track | -0.23 |
| | (0.20) |
| Female (ref. male) | 0.12 |
| | (0.10) |
| East German (ref. West | -0.99*** |
| German) | (0.22) |
| **Immigrant (ref. individuals with** | **0.12** |
| **German parents)** | **(0.17)** |
| German unification | 0.32 |
| | (0.20) |
| German unification×East German | 1.00*** |
| | (0.33) |
| Constant | -0.94*** |
| | (0.29) |
| Changes of state | 525 |
| Observations | 3,557 |

Standard errors: *** *p<0.01, ** p<0.05*
Source: Author's calculations using NEPS data

**Table 8-28:** Binary logistic regression of leaving the education system with only 'Hauptschulabschluss' or 'Mittlere Reife' with a Dummy variable for second and 2.5 generation immigrants

| **Variables** | **NFC** |
|---|---|
| Cohort trend | -0.04*** |
| | (0.01) |
| *Parental education (Ref.: Low educational level)* | |
| Intermediate educational | -0.68*** |
| Level | (0.14) |
| High educational level | -0.61*** |
| | (0.23) |
| *Parental class (Ref.: workers)* | |
| Intermediate | 0.18 |
| | (0.15) |
| Salariat | -0.06 |
| | (0.17) |
| *Parental status (Ref. low parental status)* | |
| Intermediate | -0.23 |
| | (0.14) |
| High | -0.05 |
| | (0.28) |
| *Mobility before the general education school leaving certificate (Ref.: Remaining on the academic track)* | |
| Downward mobility to the non-academic track | -0.75 |
| | (1.03) |
| Remaining on the non-academic track | -0.37 |
| | (0.24) |
| Upward mobility to the academic track | -0.71** |
| | (0.35) |
| Female (ref. male) | 1.63*** |
| | (0.12) |
| East German (ref. West German) | 0.89*** |
| | (0.11) |
| **Immigrant (ref. individuals with German parents)** | **0.21** |
| | **(0.16)** |
| German unification | 1.15*** |
| | (0.21) |
| German unification×East | -1.50*** |
| Germany | (0.37) |
| Constant | -2.81*** |
| | (0.17) |
| Events | 534 |
| Observations | 8,275 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

**Table 8-29:** Multinomial logistic regression of completing vocational training or obtaining a higher education entry certificate after obtaining a 'Hauptschulabschluss' or 'Mittlere Reife' as the first school degree with a Dummy variable for second and 2.5 generation immigrants

| **Variables** | **VOC (Ref.: No further schooling)** | **HEEC (Ref.: No further schooling)** |
|---|---|---|
| Cohort trend | 0.03*** | 0.06*** |
| | (0.01) | (0.01) |
| *Parental education (Ref.: Low educational level)* | | |
| Intermediate educational | 0.63*** | 1.13*** |
| Level | (0.14) | (0.18) |
| High educational level | 0.39 | 1.61*** |
| | (0.23) | (0.27) |
| *Parental class (Ref.: workers)* | | |
| Intermediate | -0.18 | -0.11 |
| | (0.15) | (0.17) |
| Salariat | 0.03 | 0.28 |
| | (0.17) | (0.19) |
| *Parental status (Ref. low parental status)* | | |
| Intermediate | 0.18 | 0.57*** |
| | (0.14) | (0.16) |
| High | -0.06 | 0.58+ |
| | (0.28) | (0.31) |
| *School track after the first educational transition (Ref.: Non-academic track)* | | |
| Academic track | 0.28 | 0.97*** |
| | (0.20) | (0.21) |
| Female (ref. male) | -1.57*** | -1.97*** |
| | (0.12) | (0.13) |
| East German (ref. West German) | -0.78*** | -1.80*** |
| | (0.11) | (0.14) |
| **Immigrant (ref. individuals with German parents)** | **-0.28** | **0.10** |
| | **(0.17)** | **(0.19)** |
| German unification | -1.24*** | -1.17*** |
| | (0.21) | (0.23) |
| German unification×East | 1.52*** | 2.05*** |
| Germany | (0.37) | (0.40) |
| Constant | 2.73*** | 0.14 |
| | (0.18) | (0.22) |
| Events | 6,164 | 1,577 |
| Observations | 8,275 | 8,275 |

Standard errors: *** p<0.01, ** p<0.05
Source: Author's calculations using NEPS data

**Table 8-30:** Multinomial logistic regressions for individuals with a higher education entry certificate with a Dummy variable for second and 2.5 generation immigrants

| Variables | NFC (Ref.: tertiary degree) | VOC (Ref.: tertiary degree)) | FHS degree (Ref.: No tertiary education) | UNI degree (Ref.: No tertiary education) |
|---|---|---|---|---|
| Cohort trend | -0.03*** | 0.04*** | -0.01*** | -0.04*** |
| | (0.01) | (0.006) | (0.01) | (0.01) |
| *Parental education (Ref.: Low educational level)* | | | | |
| Intermediate educational | -0.05 | -0.01 | 0.11 | -0.05 |
| Level | (0.44) | (0.19) | (0.24) | (0.20) |
| High educational level | -0.21 | -0.65*** | 0.45 | 0.61*** |
| | (0.47) | (0.21) | (0.26) | (0.22) |
| *Parental class (Ref.: workers)* | | | | |
| Intermediate | 0.55 | -0.18 | -0.03 | 0.17 |
| | (0.31) | (0.13) | (0.16) | (0.14) |
| Salariat | 0.51 | -0.23 | 0.12 | 0.31*** |
| | (0.32) | (0.13) | (0.16) | (0.14) |
| *Parental status (Ref. low parental status)* | | | | |
| Intermediate | -0.37 | -0.04 | 0.17 | 0.02 |
| | (0.27) | (0.12) | (0.15) | (0.13) |
| High | 0.59 | -0.41*** | 0.33 | 0.41*** |
| | (0.36) | (0.18) | (0.21) | (0.18) |
| Traditional academic track | -0.22 | -0.77*** | -0.10 | 1.10*** |
| | (0.16) | (0.07) | (0.09) | (0.08) |
| Female (ref. male) | 0.001 | 0.51*** | -0.57*** | -0.37*** |
| | (0.15) | (0.07) | (0.09) | (0.07) |
| East German (ref. West | -0.52 | -1.20*** | 1.08*** | 1.13*** |
| German) | (0.30) | (0.15) | (0.16) | (0.14) |
| **Immigrant (ref. individuals with German parents)** | **0.09** | **-0.18** | **0.002** | **0.20** |
| | **(0.25)** | **(0.13)** | **(0.15)** | **(0.13)** |
| German unification | 1.38*** | -0.44*** | 0.18 | 0.19 |
| | (0.31) | (0.14) | (0.17) | (0.14) |
| German unification×East | 0.70 | 1.42*** | -1.24*** | -1.36*** |
| Germany | (0.40) | (0.22) | (0.24) | (0.22) |
| Constant | -2.52*** | -1.02*** | -0.16 | 0.23 |
| | (0.49) | (0.21) | (0.26) | (0.22) |
| Changes of state | 194 | 1,279 | 949 | 2,247 |
| Observations | 4,669 | 4,669 | 4,669 | 4,669 |

Standard errors: *** *p<0.01*, ** *p<0.05*
Source: Author's calculations using NEPS data

**Table 8-31:** Obtaining a tertiary level education after vocational training with a Dummy variable for second and 2.5 generation immigrants

| **Variables** | **Tertiary educational degree** |
|---|---|
| Cohort trend | -0.03*** |
| | (0.01) |
| *Parental education (Ref.: Low educational level)* | |
| Intermediate educational | 0.64*** |
| Level | (0.28) |
| High educational level | 1.19*** |
| | (0.32) |
| *Parental class (Ref.: Unskilled workers)* | |
| Lower grade routine non-manual workers | 0.39 |
| | (0.29) |
| Skilled manual workers | -0.01 |
| | (0.18) |
| Higher grade routine non-manual workers | 0.27 |
| | (0.25) |
| Lower grade technicians | -0.15 |
| | (0.33) |
| Small proprietors without employees | 0.28 |
| | (0.41) |
| Small proprietors with employees | -0.14 |
| | (0.30) |
| Lower service class | 0.30 |
| | (0.24) |
| Higher service class | 0.62*** |
| | (0.25) |
| *Parental status (Ref. low parental status)* | |
| Intermediate | 0.21 |
| | (0.17) |
| High | 0.22 |
| | (0.27) |
| *Mobility before the general education school leaving certificate (Ref.: Remaining on the academic track)* | |
| Downward mobility to the non-academic track | 0.58 |
| | (0.73) |
| Remaining on the non-academic track | 0.91*** |
| | (0.21) |
| Upward mobility to the academic track | 0.41 |
| | (0.31) |
| Female (ref. male) | -0.05 |
| | (0.10) |
| East German (ref. West | 2.17*** |
| German) | (0.12) |
| **Immigrant (ref. individuals with German parents)** | **-0.31 (0.24)** |
| German unification | 0.42 |
| | (0.29) |
| German unification×East | -2.21*** |
| Germany | (0.45) |
| Constant | -3.88*** |
| | (0.30) |
| Changes of state | 505 |
| Observations | 6,164 |

Standard errors: *** *p<0.01*, ** *p<0.05*
Source: Author's calculations using NEPS data

**Table 8-32:** Leaving the non-academic track with 'Fachhochschulreife' or 'Abitur' with a Dummy variable for second and 2.5 generation immigrants

| **Variables** | **A 'Fachhochschulreife' or 'Abitur' degree on the non-academic track** |
|---|---|
| Cohort trend | -0.02 |
| | (0.02) |
| *Parental education (Ref.: Low educational level)* | |
| Intermediate educational | -0.35 |
| Level | (0.49) |
| High educational level | -0.23 |
| | (0.62) |
| *Parental class (Ref.: workers)* | |
| Intermediate | 0.45 |
| | (0.45) |
| Salariat | 0.46 |
| | (0.49) |
| *Parental status (Ref. low parental status)* | |
| Intermediate | -0.05 |
| | (0.42) |
| High | 0.52 |
| | (0.62) |
| Downward mobility to the non-academic track | 1.72*** |
| | (0.35) |
| Female (ref. male) | 0.03 |
| | (0.26) |
| East German (ref. West | 1.04*** |
| German) | (0.33) |
| **Immigrant (ref. individuals with** | **0.34** |
| **German parents)** | **(0.45)** |
| German unification | 1.41*** |
| | (0.55) |
| German unification×East | -0.64 |
| Germany | (0.62) |
| Constant | -5.27*** |
| | (0.56) |
| Changes of state | 60 |
| Observations | 7,810 |

Standard errors: *** *p<0.01*, ** *p<0.05*
Source: Author's calculations using NEPS data