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Intergenerational Educational Mobility among Immigrants and Natives in Germany

by

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This study examines the intergenerational educational mobility among immigrants and natives in Germany. Three regression models are estimated to investigate potential differences in the transmission of human capital from parents to their children between immigrants and natives. First, a linear regression model is used to assess the strength of the association between parental and individual educational attainment. Second, a multinomial logistic regression model is estimated to examine the probability of attaining different educational levels based on parental education background. Third, three univariate probit regression models are employed to investigate the probability of upward mobility, downward mobility, and immobility. The results reveal that immigrants generally exhibit higher degrees of mobility than natives. Moreover, compared to Germans, Southern Europeans have a higher probability of being upward mobile, while Central-Eastern Europeans have a higher probability of being downward mobile. In addition, highly educated immigrants from Central-Eastern Europe and Other regions seem to experience more difficulty in passing on their educational advantage to their children than natives. These findings highlight the importance of implementing effective policies to support immigrants and their descendants, thereby ensuring equal educational opportunities for all individuals in Germany.

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1 Introduction

One of the primary objectives of inclusive societies is to ensure equal opportunities for all members and promote social mobility (OECD, 2017). This pursuit is driven not only by considerations of fairness but also by the conviction that impeding individuals from developing their talents and attaining their full potential will result in economic inefficiency (Bauer & Riphahn, 2006). However, socioeconomic advantages and disadvantages are often passed from one generation to another within families. Empirical research generally reveals a high correlation between the socioeconomic status of parents and their children, indicating that individual educational and economic achievements are to some extent predetermined by the background of one's parents (Schneebaum, Rumplmaier & Altzinger, 2016). Consequently, when the intergenerational transmission of human capital is high, children from disadvantaged families face a higher probability of also being disadvantaged as adults. This perpetuates inequalities and can have far-reaching consequences for an individual's life, as education plays a pivotal role in determining lifelong well-being and labor market outcomes in later life (Bauer & Riphahn, 2006).

Although intergenerational persistence poses challenges for individuals across society, certain populations face greater difficulties in "escaping the educational track predetermined by their parents' own educational success (or lack thereof) than others" (Schneebaum et al., 2016, p.239). One group that deserves particular attention in this context is immigrants and their descendants. This group not only frequently confronts multiple disadvantages simultaneously but also constitutes a growing proportion of the population in many European countries (OECD, 2017). For instance, in Germany, nearly one in four individuals had an immigrant background in 2022 (Bundeszentrale für politische Bildung, 2023b).

In Germany, immigrants generally exhibit lower levels of educational attainment compared to natives. However, as their children grow up and attend school in Germany, it may be expected that they would encounter equal opportunities as their German counterparts. Consequently, one might anticipate a convergence in educational outcomes over time between the children of immigrants and natives (Luthra, 2010). However, due to their lower starting point on the "social ladder", the children of immigrants need to experience greater mobility than natives to overcome their initial disadvantage (Schneebaum, Rumplmaier & Altzinger, 2016). This highlights the significance of educational achievement as a key factor determining the extent

and pace of social and economic integration of immigrants and their descendants (Dustmann & Glitz, 2011). Their integration and assimilation in the host country, in turn, is important for several reasons. Firstly, the labor market success of immigrants directly influences their economic and fiscal contributions to the host country, which may impact the attitudes of natives towards them. Secondly, the absence of economic success among immigrants can lead to their social and economic exclusion, potentially resulting in social unrest (Algan et al., 2010).

Consequently, the subsequent analysis aims to explore the strength of intergenerational persistence in educational outcomes among immigrants and natives, along with its implications for the educational opportunities available to individuals from different backgrounds in Germany. The primary research question to be addressed is as follows: "**To what extent do immigrants and natives in Germany exhibit differences in intergenerational educational mobility?**". Understanding the patterns of intergenerational persistence and mobility among different population groups in Germany is crucial to be able to formulate evidence-based policy recommendations that foster economic growth, social cohesion, and promote equal opportunities (OECD, 2017).

The following analysis is limited to Germany as it is currently one of the most popular destinations for immigrants worldwide (OECD, 2022). However, despite Germany's status as an immigration country and the consequent relevance of the topic, there is comparatively little research on intergenerational educational mobility among immigrants and natives in the country (Algan et al., 2010). Therefore, this study aims to contribute to a more comprehensive understanding of the disparities in the transmission of human capital across generations. Given Germany's longstanding history of immigration, the insights derived from this analysis will also offer valuable guidance to countries for which large-scale immigration represents a more recent and emerging phenomenon.

The present paper is organized as follows. First, a general introduction to the German educational system and history of immigration is given. Next, relevant theoretical frameworks are presented. This includes a conceptualization of intergenerational mobility and a discussion of theoretical models that elaborate on how human capital is transmitted across generations and why this might operate differently for immigrants and natives. This is followed by a review of the literature, with a particular focus on Germany. Subsequently, the data and variables used for the empirical analysis and the methodological approach are discussed. After that, the main

results are presented, checked for robustness, and then critically evaluated and discussed. Finally, a conclusion is drawn reflecting upon the main findings.

2 Context

2.1 The educational system in Germany

The German educational system is highly stratified and is divided into several parallel tracks with different performance requirements (Heineck & Riphahn, 2009). The school system differs somewhat by region, as educational authority lies within the competencies of the federal states. However, the most common case is that all children attend primary school from the age of 6 and are streamed into different secondary school tracks after four years. In some federal states, a certain school track is recommended by the child's primary school teacher and parents are expected to follow this recommendation. In other states, the tracking decision lies fully with the child and his or her parents. The most common options for secondary schooling tracks are Hauptschule, Realschule, and Gymnasium. The track choice determines the type of secondary education individuals will be able to obtain and whether their degree will entitle them only to vocational or apprenticeship-based post-secondary education, or whether they will be able to attend university (Dustmann, 2008).

The lowest secondary track is Hauptschule, where general topics are covered from grades 5 to 9 or 10. The degree that individuals obtain at the end of their secondary education is called Hauptschulabschluss and has a comparatively low value in the labor market. It is the basis for further vocational training. The Realschule represents the intermediate secondary track, encompassing grades 5 to 10. It offers a more comprehensive and detailed curriculum in general education. The final degree of this intermediate track (Realschulabschluss) enables individuals to pursue vocational training or obtain higher education entrance qualifications. The highest track is called Gymnasium. It is academically oriented and comprises upper-secondary educational levels. After completing grades 5 to 12 or 13 and receiving their degree (Abitur or Fachhochschulreife), individuals possess the necessary credentials to access tertiary education (Luthra, 2010). In the current school year, 2022/23, approximately 370,000 children attend a Hauptschule, 770,000 children attend a Realschule, and 2.28 million children attend a Gymnasium (Statistisches Bundesamt, 2023).

The choice of secondary track and educational achievements of a child in Germany are strongly correlated with their parental background. Moreover, the association between the parents' socioeconomic class and the track choice of the child translates into considerable differences in earnings in later life (Dustmann, 2004). As for the differences in this regard between immigrants and natives, research has shown that children with a migration background are more likely to attend the basic secondary track and less likely to obtain a high schooling degree than the children of natives. This difference is largely explained by the lower socioeconomic status of their parents. However, for some immigrant groups, educational attainment remains lower even after their parental background is controlled for (Kristen & Granato, 2007).

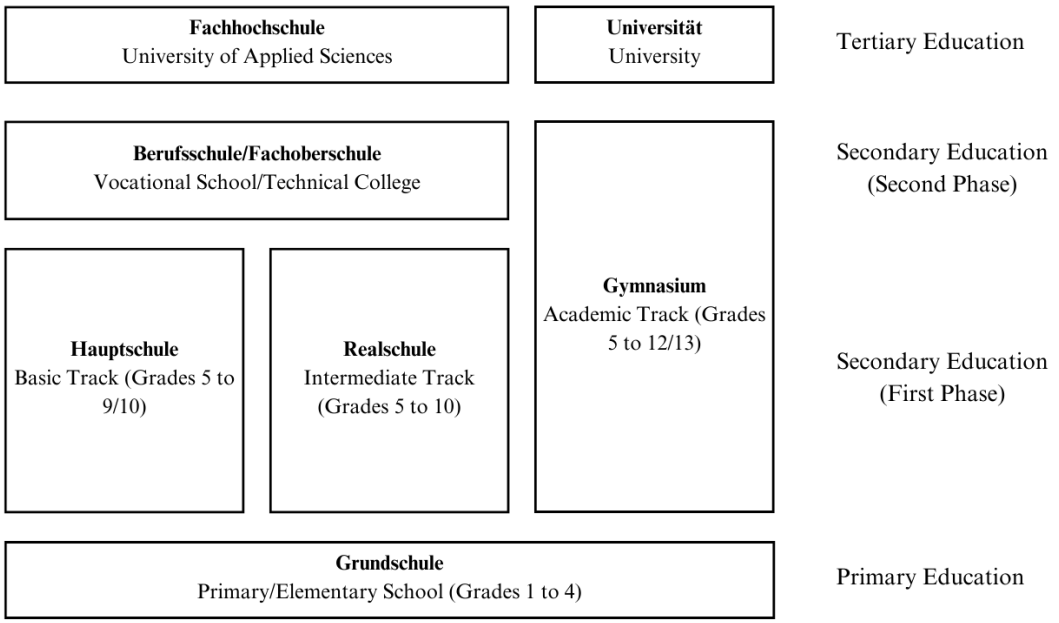

Figure 1 The German Educational System

Notes: The graphical overview of the German educational system is inspired by that presented in Grewenig (2021).

2.2 Immigration to Germany

After the end of the Second World War, the number of immigrants arriving in Germany increased steadily. Since then, the country experienced more immigration per capita than the U.S. almost every year (Schmidt & Zimmermann, 1992). There are several historical waves of immigration and major groups of immigrants to Germany. They will be introduced in detail in the following section.

The first immigration wave began around 1955 when, due to a shortage of labor and a simultaneous upward swing in economic growth, several bilateral recruitment agreements were

signed with Greece, Italy, Portugal, Spain, Turkey, and Yugoslavia to attract new workers to the German labor market. This led to a large inflow of immigrants (Dustmann, 2008). Initially, the German government presumed that this labor migration would be temporary and that workers would only stay as long as the conditions of the German labor market required (Gang & Zimmermann, 2000). Thus, when the active recruitment of "guest workers" ended in the early 1970s, the government was trying to incentivize former guest workers to return to their home countries through return migration incentive schemes and restrictive naturalization laws. Despite this, many guest workers settled permanently and were joined by their families through family immigration and reunification. Since the guest worker migrants were recruited mainly for manual labor and arrived from countries that had less developed education systems and lower average levels of education than Germany, many immigrants from this group were relatively uneducated (Gang & Zimmermann, 2000; Luthra, 2010). Moreover, guest workers were discouraged by the temporary nature of their employment from learning the German language or networking with natives (Diehl & Schnell, 2006; Dustmann, 1999). At the same time, their initial employment primarily in blue-collar jobs marginalized them in the German labor market and impeded their labor mobility over time (Constant & Massey, 2005; Fertig & Schmidt, 2001).

The second major wave of migration to Germany was a consequence of the changing political situation in Europe in the late 1980s and mainly consisted of immigrants from Eastern Europe and Russia (Aldashev, Gernandt & Thomsen, 2012). A considerable part of this group of immigrants were ethnic Germans, whose ancestors had emigrated from Germany in the 18th and 19th centuries. On arrival in Germany, ethnic Germans automatically received German nationality based on their ancestry (Gang & Zimmermann, 2000). In addition, ethnic Germans had access to integrative services, such as language assistance, housing support, and recognition of foreign diplomas (Luthra, 2010). However, although the legal and social reception of ethnic German immigrants in Germany was more positive than that of guest workers, the returns to their education in the labor market were comparatively low (Kreyenfeld & Konietzka, 2001). Therefore, it seems that for many ethnic Germans, the disruption in their careers and social environment due to the process of migration ultimately outweighed the positive context of their reception (Luthra, 2010).

In addition to these two large waves of immigration, two other groups of immigrants can be distinguished. However, their immigration to Germany happened relatively continuously and it

is, therefore, more difficult to determine a clear time of arrival for those groups. The first group consists of migrants from the EU. These individuals have the right to live and work in Germany and generally enjoy a high degree of social acceptance. Many of them are very well educated and work as highly skilled workers or business owners. This contrasts with the second group, which is made up of immigrants from third countries, the majority of whom have come to Germany as asylum seekers or in the course of associated family reunification. Among the main countries of origin of individuals from third countries are Iraq, Iran, Vietnam, the Soviet Union, and former Yugoslavia (Luthra, 2010). Moreover, in 2015, Germany experienced a large inflow of asylum seekers, that originate mainly from Afghanistan, Syria, and Iraq. During that year the number of immigrants reached the highest level in the history of the Federal Republic of Germany (Hanewinkel & Oltmer, 2018). Despite the heterogeneity of the group of third-country individuals and the consequent difficulty to make general statements about them, it can be noted that many non-EU immigrants work in the service sector and that individuals from this group are more likely to be unemployed. In addition, the legal situation of non-EU migrants is less stable and their political and social reception less positive than that of ethnic Germans or EU nationals (Luthra, 2010). As a result, it has been more difficult for them to integrate into the German labor market.

Overall, the number of foreigners in Germany experienced a notable increase, rising from 700,000 individuals residing in West Germany in 1961 to 10.6 million individuals living across the entire nation in 2020 (Bundeszentrale für politische Bildung, 2022).[1] Today, 22.6 million people (27.5% of the total population) in Germany have a migration background, i.e., they themselves or at least one parent did not acquire German citizenship by birth. Around two-thirds of them (14.17 million) are direct immigrants (first-generation) and one-third (8.48 million) are individuals without a direct migration experience. This latter group includes 1.67 million individuals who were born in Germany but do not have German citizenship (Bundeszentrale für politische Bildung, 2023b). This is due to the fact that traditionally German citizenship is not automatically conferred at birth but is inherited from one's parents (*ius*

[1] In the cited statistical report, all persons who do not have German citizenship are classified as foreigners. This categorization encompasses both direct immigrants and their descendants born in Germany, provided they have not obtained German citizenship.

sanguinis).[2] Consequently, in contrast to the descendants of ethnic Germans, the offspring of former guest workers and non-EU immigrants are less likely to hold German citizenship and thus to enjoy the privileges that come with it (general right to vote, EU freedom of movement, non-forfeitable right of residence, etc.).

Many of the native-born children of immigrants in Germany have now entered the education system or the labor market. Although these children were born and grew up in Germany, they often display differences in their educational outcomes compared to children of natives. In addition, disparities by ethnic background are also apparent. For example, various studies find that children of former Turkish guest workers perform worse than children of natives in both the school system and the labor market.[3] The children of migrants from former Yugoslavia, in turn, more closely resemble German natives in terms of their economic outcomes (Diehl & Granato, 2018). In the further course of the study, the existing disparities between the children of migrants and Germans in the education system as well as between children with different migration backgrounds will be examined in more detail. In doing so, the different educational backgrounds of their parents will also be addressed.

3 Theoretical Frameworks

3.1 Conceptual Framework of Intergenerational Mobility

To investigate how parental background might contribute to the disparities in educational outcomes between immigrant and native children in Germany, it is crucial to first define and better understand the key concept of the following analysis: intergenerational mobility. In the broadest sense, studies on intergenerational mobility are interested in inequalities in socioeconomic status without necessarily investigating the causes of why some people are better off than others. Research that is based on such a normative motivation is rather concerned with the notion of inequality of opportunity. Although the two concepts, intergenerational mobility and inequality of opportunity, are closely related, they are not the same (Stuhler, 2018).

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[2] The citizenship by bloodline (*ius sanguinis*), which for a long time was the only one applicable in Germany, was supplemented by the citizenship by birth (*ius soli*) in 2000. Since then, children born in Germany to foreign parents can, under certain conditions, obtain the German citizenship in addition to their parents' citizenship (Bundeszentrale für politische Bildung, 2023a).

[3] See, for example, Hartmann (2016) on early employment career patterns of children of Turkish immigrants in comparison to German natives, or Diehl et al. (2015) on ethnic inequalities in the German educational system.

Therefore, this study focuses exclusively on intergenerational mobility and thus on the comparison of an individual's socioeconomic status with that of his or her parents.

Research on intergenerational mobility distinguishes between absolute and relative mobility. Absolute mobility is closely related to economic growth and "refers to a general societal shift that impacts socioeconomic outcomes or living standards in absolute terms" (OECD, 2017, p.38f.). It measures how well individuals do in comparison to their parents (Stuhler, 2018). An illustration of absolute mobility is, for example, higher shares of university graduates or higher wages in the current generation compared to the previous one (OECD, 2017). In contrast, relative mobility compares individuals from the same generation and indicates how much their family background matters. It measures the economic performance of children from a lower socioeconomic background relative to children from a higher background and can provide insights into how easy or difficult it is for them to climb up the social ladder (OECD, 2017; Stuhler, 2018). This study examines both absolute and relative mobility in Germany.

Although it may seem that high mobility, or in other words a low correlation between parental background and individual economic outcomes, is desirable for a society, determining the "optimal" level of intergenerational mobility is not as straightforward as it may seem at first glance. While we may agree that children from less favorable family backgrounds should have the same opportunities to succeed as children from favorable backgrounds, zero intergenerational mobility should not be a desirable outcome or policy aim. One reason for this is that children who grow up in wealthy families tend to receive more investment in their human capital. Thus, if intergenerational mobility was zero, it would mean that there is essentially no return to human capital investment. Another reason why the level of intergenerational mobility is likely to be higher than zero is the transmission of genetic differences in ability from one generation to another, which is also likely to lead to intergenerational persistence in economic outcomes (Black & Devereux, 2011). At the same time, not only the magnitude of the intergenerational correlation is important, but also its direction. While it appears to be a positive development if children of parents with a low level of education have good chances of experiencing upward mobility, this is less the case if parents with a high level of education are unable to pass on their advantage to their children and as a result the latter experience downward mobility (OECD, 2017). In the context of studying the intergenerational mobility of individuals from minority versus majority groups, such a situation is referred to as "perverse openness". This term describes the phenomenon when economic advantages attained by parents from a

certain population group are not easily passed on to their children (Ferrare, 2016). Hence, when evaluating intergenerational mobility in a society, both the magnitude and the direction of the association between parents' and children's outcomes should be taken into account (OECD, 2017).

Intergenerational mobility is the object of interest of many different scientific disciplines, such as sociology, demography, and economics. Each has a slightly different understanding of the concept and different approaches to measuring intergenerational mobility. In economics, intergenerational mobility is usually measured in terms of one of the following socioeconomic outcomes: educational attainment, occupation or class, or income. Focusing on any of these outcomes has its advantages and disadvantages. The present analysis is restricted to educational intergenerational mobility. One reason for this is that it is easier to measure than occupational or income mobility since most people complete their education in their twenties and thus a single measurement in early life for both parents and the child is sufficient to analyze intergenerational mobility. In contrast, occupational and income measures may vary over the life cycle (Stuhler, 2018). Moreover, educational mobility is a more comprehensive measurement because, unlike income mobility, it does not exclude unemployed individuals. This is particularly important in the context of examining the relationship between immigrant background and intergenerational mobility, as immigrants, and in particular female immigrants, are less likely to be active in the German labor market than natives (OECD, 2018a). An additional reason to focus on educational mobility is that education has been shown to be an important mediator of economic success in later life and that it is positively correlated with outcomes such as health and longevity (Black & Devereux, 2011). However, an important limitation of using educational outcomes to assess intergenerational mobility is that educational outcomes might not be comparable across time or space (Shavit & Blossfeld, 1993). This is of practical importance because, first, education levels have risen significantly over the past decades and, second, the type and quality of education that immigrant parents received in their home country may not be comparable to that received by their children and other native-born individuals in the host country (Black & Devereux, 2011; OECD, 2017).

Nevertheless, studying the intergenerational educational mobility of immigrant children and comparing it with that of native children is a relevant research endeavor because it is important to understand if mobility patterns in a country differ between subgroups. The rationale behind this is that if a socioeconomically disadvantaged population group has lower levels of mobility

than the society as a whole (i.e., higher intergenerational persistence), this may translate into fewer opportunities compared to the rest of the population. The reverse applies to subgroups that exhibit higher levels of mobility (Bönke & Neidhöfer, 2018). For this reason, fair intergenerational mobility can be considered a good indicator of equality of opportunity and successful integration and can help promote social justice and achieve greater social cohesion. Since an individual's human capital tends to be correlated with that of his or her parents and immigrant parents are often at a disadvantage relative to natives due to a lack of language skills or social networks in the host country, the intergenerational mobility of immigrant children may differ from that of native children. This discrepancy may arise despite their upbringing in the same country and presumed equal access to education. Hence, if the children of immigrants are successful in terms of their educational outcomes, especially when they come from disadvantaged family backgrounds, this would suggest that initial disadvantage can be overcome and effective support structures are in place to help immigrant children achieve upward mobility (OECD, 2017).

3.2 Theoretical Models of Intergenerational Human Capital Transmission

The intergenerational mobility experienced by immigrants and natives can be analyzed in the context of different economic theories and models. Theories on intergenerational mobility are closely linked to theories of human capital investment, due to the fact that the human capital investments of the past generation have an effect on the human capital of the current generation (Fatimah, 2022).

The classic theory of intergenerational mobility was first presented by Becker and Tomes (1979, 1986). The model attempts to explain how wealth and human capital are transmitted from one generation to another. According to the model, the economic outcomes of a child are linked to his or her parents through the investments that the parents make into the child's human capital (e.g., education and training) given their preferences and constraints and the endowments that the child receives from them. These endowments can be transmitted genetically (e.g., ability) or through the family environment (e.g., family connections, knowledge, skills) and determine how productive the parental investment is in creating human capital. In the context of the model, intergenerational mobility reflects the impact of a family on the child's well-being. This impact is greater when the degree of inheritability of the endowments and the propensity of the parents

to invest in their child is high. Hence, if there are no capital market constraints, the degree of intergenerational mobility is equal to the inheritability of endowments. However, if parents are not able to choose the optimal level of investment into their child's human capital due to limited financial resources and the unavailability of loans, intergenerational mobility is determined not only by inheritability but also by the willingness and ability of the parents to self-finance investments in the human capital of their child. Thus, the degree of intergenerational mobility is affected by the parents' preferences, their income, and family size.

Solon (2004) builds on the theoretical framework of Becker and Tomes and describes intergenerational mobility as a function of parental and public investment in children's human capital. He extends their model by incorporating a rationalization of the intergenerational income regression, which is often estimated in the empirical literature, into the theory. The Solon model predicts that the degree of intergenerational mobility in a country is low if heritability is high, the productivity of human capital investment is high, returns to human capital are high, and progressive public investment in human capital is low. Those same parameters also tend to increase income inequality, suggesting that intergenerational mobility and inequality may be related to each other.

While the previous two theoretical frameworks describe the intergenerational transmission of human capital in general terms, other human capital theories stress that there may be differences in intergenerational mobility between different population groups. One such model is the optimal schooling model by Chiswick (1988), which tries to explain ethnic differences in human capital and economic outcomes. Chiswick (1988) argues that discrimination is not the primary driver of ethnic differences in schooling and return from schooling. Instead, he shows that group differences are linked to the demand for schooling, which varies with individual ability and returns to education. Differences in individual ability might arise from different investments in the child's human capital in the home environment or from ethnic influences (Riphahn, 2005). In addition, Chiswick (1988) finds that factors such as higher levels of parental human capital, fewer siblings competing for family resources, and mothers that stay at home when children are young to engage in childcare have a positive effect on the child's economic success in later life.

Another theoretical framework by Coleman (1988) introduces the concept of social capital and explains its importance in the process of human capital formation. Social capital arises in the context of relationships between people that facilitate productive activity. The concept

emphasizes the importance of social structure, information channels, trust, and norms. Both, social capital in the family and the community, play a role in the creation of a child's human capital. While the family background affects the educational outcomes of a child through the provision of physical resources (financial capital) and a cognitive environment for learning (human capital), another important factor is the relationship between the child and his or her parents and his or her community (social capital). Hence, social capital can increase children's human capital if, for example, there exist norms in a community that support and reward educational achievement.

Closely related to social capital is the notion of ethnic capital, which was first invoked by Borjas (1992, 1993) in the context of human capital formation. Ethnic capital can be viewed as the social capital that is distinctive for a particular ethnic group. It acts as an externality in the process of human capital formation. Therefore, a child's human capital depends not only on the investments his or her parents make but also on the quality of the ethnic environment in which they occur (ethnic capital), measured as the average skill level of the ethnic group. By shaping the values and incentives of the child and parents, the ethnic context affects the child's educational outcomes (Dustmann & Glitz, 2011). If the external effect of ethnicity is pronounced, ethnic differences in economic outcomes may persist across several generations. Thus, the theoretical framework suggests that ethnic capital may play an important role for the intergenerational mobility of children born to immigrants.

Based on the theoretical frameworks presented above, there are at least three groups of factors that can have an impact on the educational outcomes of immigrant children. First, the parental background and family environment. Second, the social and ethnic context in which immigrant children grow up. Third, the institutional setting and support structures of the education system. This last aspect receives less attention in the theoretical frameworks reviewed above than the other two but is touched upon in Solon's (2004) model. Nevertheless, it is important to include this factor when discussing the intergenerational mobility of immigrant children since even if public investment into human capital and access to educational institutions are the same across all population groups in a country, the same resources may affect children's outcomes in different ways. For example, immigrant children may be hindered from making use of the institutional setting and support structures if their parents lack strategic knowledge or familiarity with the education system but have to take decisions with respect to their child's education (e.g., which school track to choose) (Dustmann & Glitz, 2011; OECD, 2017).

In addition to these factors, there are other aspects that may be particularly relevant with regard to the intergenerational mobility experienced by children with a migration background. One of them is discrimination, which is evoked in Chiswick (1988) and Borjas (1992).[4] While discrimination is difficult to measure and to disentangle from other factors, it may nonetheless have a negative impact on the human capital formation of immigrant children and may help to explain potential differences with native children. For example, teachers may have different expectations or exhibit different treatment toward second-generation immigrants (OECD, 2017). Another aspect that may affect the intergenerational mobility of immigrant children via the investment that immigrant parents make into their child's human capital, is "where parents see their children's future" (Dustmann and Glitz, 2011, p.399). If immigrant parents intend to return to their home country in the future and skills acquired in the host country are not fully transferable, parents may decide to invest less into their child's human capital than they would in case of a permanent migration (Dustmann & Glitz, 2011).[5]

4 Previous Research

Previous research has confirmed the importance of family background for children's educational outcomes that has been outlined in the theoretical frameworks presented above. For example, Belzil and Hansen (2003) find that up to 85% of the explained variations in schooling attainments can be explained by an individual's family background. Moreover, parental background appears to have a greater impact on children's educational outcomes than school inputs or institutional features (Woessmann, 2004). For this reason, the relationship between family background and an individual's educational outcomes is a central topic of research on educational inequality. However, in addition to socioeconomic status and parental education, a person's migration background also appears to be an important factor in explaining educational disparities (Gries, Redlin & Zehra, 2022). As a consequence and due to the rising number of foreign-born individuals and their descendants in many countries, the interplay between migration and education is a rapidly growing area of research that has received increasing

[4] Borjas (1992) notes that it is possible that a statistically significant correlation between the average skill level of the parental ethnic group and the skills of a child may in fact reflect discrimination or other factors (lack of access to school or credit markets) rather than the effect of ethnic capital.

[5] See, for example, Dustmann (2008), who investigates the association between parental investment in children's education and the probability of a family's permanent migration in the context of Germany. The study finds that a son's earnings are positively correlated with the father's permanent migration probability.

attention in recent years (Dustmann & Glitz, 2011). Nonetheless, there is currently relatively little research on the social progress of migrants over time (i.e., comparing immigrant children's outcomes to those of their parents) and even less on the intergenerational mobility of immigrant children relative to native children.

While there is no clear consensus in the literature, studies on the intergenerational mobility of immigrants often report a weaker association with parental human capital for children with immigrant parents than for children with native parents (Aydemir, Chen & Corak, 2013; Bauer & Riphahn, 2006; Lowrey et al., 2021; OECD, 2017). Thus, it seems that children with immigrant parents are on average more mobile. However, this is closely linked to the overrepresentation of immigrant parents at the bottom of the educational distribution. Given their lower starting position and the overall educational progress, immigrant children have a lower threshold to pass than native children and are more likely to experience upward mobility. This highlights the importance of comparing individuals with a similar parental background to draw more nuanced conclusions about the mobility patterns of immigrants and natives (OECD, 2017).

Turning now to the case of Germany, a closer look at the relevant literature reveals that Germany is a society with comparatively low mobility and high persistence across generations (Heineck & Riphahn, 2009).[6] In particular, individuals from low-income families face many obstacles in Germany. According to a recent OECD report, climbing the social ladder is more difficult for these individuals in Germany than in any other industrialized country (OECD, 2018b). This is often attributed to prevailing tax and childcare policies and, in particular, to the education system with its early assignment of children to different school tracks (Hanushek & Wößmann, 2006; OECD, 2018b). Despite the passage of various educational reforms and the adoption of government measures to improve "equality of opportunity" and thereby ensure that all individuals have equal access to higher education regardless of their family background, the impact of parental background has not significantly declined in Germany over the past decades (Heineck & Riphahn, 2009).

[6] Germany is also the country with the strongest correlation between class origins and class destinations in Breen (2004) and among the countries with the lowest class mobility in Erikson and Goldthorpe (1992).

As for the interplay between education and migration, most studies on the educational performance and attainment of immigrants and their children in Germany report poor outcomes and identify significant educational disadvantages compared to natives (Diehl & Granato, 2018; Gang & Zimmermann, 2000; Lüdemann & Schwerdt, 2013; Riphahn, 2003). In addition, those disadvantages vary between countries of origin. They seem to be particularly pronounced for immigrants with an ethnic background that is more distant from the German language and culture (Gries, Redlin & Zehra, 2022).[7] Many studies attribute immigrants' poorer educational outcomes primarily to their disadvantaged socioeconomic background and lower parental education. If this is taken into account, ethnic inequalities tend to decrease considerably. Some researchers, however, argue that educational disparities between immigrants and natives are largely driven by immigrant-specific disadvantages such as institutional discrimination in the education system, school segregation, and the lack of German citizenship, even when socioeconomic background is controlled for (Luthra, 2010).[8] Another explanation for the gap in education between immigrants and natives stresses the "underequipment" of immigrants in terms of social and cultural resources, especially social ties to native Germans and good German language skills. Despite the consensus in the literature regarding the educational disparities between immigrants and natives, many studies also conclude that the offspring of immigrants manage to "catch up" with the native population and reduce the educational gap (Alba, Handl & Müller, 2017; Diehl & Granato, 2018). For example, Algan et al. (2010) show that while all groups of first-generation immigrants have significantly lower educational attainment than natives, the educational attainment of second-generation immigrants improves in all groups except those that were already highly educated (Central and Eastern Europe and EU countries). These findings suggest that educational attainment is converging toward that of the native population across immigrant generations (Gries, Redlin & Zehra, 2022).

While the evidence on the educational attainment of immigrants and their children compared to German natives is relatively clear and consistent, nothing can yet be inferred about the intergenerational educational mobility of immigrant children compared to native children. Is

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[7] Origin-related differences in educational outcomes may be related to the impact that an immigrant family's cultural, economic, and social capital has on parents' educational decisions for their children (Ramírez-Rodríguez & Dohmen, 2010).

[8] See, for example, Gomolla and Radtke (2002) on institutional discrimination of immigrant children in German schools; or Stanat (2006) on school segregation and the resulting multiple disadvantages for children with a migration background.

the association with parental human capital stronger or weaker for individuals with immigrant parents than for individuals with native parents? To get a better overview of the current state of research on this issue, the most important studies for Germany are reviewed in more detail in the following.

One of the first studies that investigate the educational mobility of second-generation immigrants in Germany is that by Gang and Zimmermann (2000). The authors base their analysis on SOEP data find that parental education has an independent effect on the education of native children but not on that of immigrant children.[9] In addition, the researchers observe that the effect of the father's education is stronger than that of the mother's education. They hypothesize that the lack of association in educational attainment between immigrant parents and their children may be due to the fact that "the shock of immigration removes the intergenerational transfer of human capital through this mechanism" (Gang and Zimmermann, 2000, p.560). In other words, the effect of immigrants' human capital seems to be "depreciated" due to the process of migration. This allows immigrant children to have a relatively equal start in the education system. Based on their findings, the authors argue that parental education may not be a good proxy for the parental influence of immigrant parents and that the immigration decision is a better indicator.

Similar to the precedent study, Riphahn (2005) estimates the probability of attaining advanced degrees for native-born with immigrant and native parents, while controlling for parental human capital. The analysis is also based on SOEP data. The estimation results show a significant positive effect of parental human capital, with the father's schooling having a larger effect than that of the mother. At the same time, the effect of the mother's vocational training is larger than that of the father. The interaction effects for second-generation immigrants are negative and mostly not significant, except for the mother's vocational training. However, the interactions are jointly highly significant. Thus, the author concludes that her results are in line with those of Gang and Zimmermann (2000) and support the assumption that immigrants' human capital is depreciated upon migration.

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[9] The authors control for parental education through the inclusion of dummy variables. The dummies for foreign-born mothers and fathers take a value of one if they completed at least basic schooling with a degree. The dummies for native-born mothers and fathers take a value of one if they obtained at least a high school degree.

Dustmann (2008) determines the intergenerational mobility of father-son pairs with native- and foreign-born fathers based on data from the German SOEP. The author estimates an ordered probit model of secondary school choice separately for natives and immigrants. Similar to Gang and Zimmermann (2000), he finds that for immigrant children the association between fathers' education and sons' education is small and insignificant (0.057). In contrast, the association for native children is larger and significant (0.219) and postulates that each year of additional parental education increases the probability that a child attends high school by 7.3 percentage points. An important difference to Gang and Zimmermann is that Dustmann (2008), similar to Riphahn (2005), only includes native-born individuals when estimating the intergenerational mobility of sons of foreign-born parents.[10] Dustmann relates the low association of educational outcomes between immigrant parents and their offspring to potential measurement errors due to the difficulty of comparing foreign and domestic educational attainment, which may downward bias the estimates. Another possible explanation is that permanent earnings rather than the educational achievements of fathers drive the educational outcomes of sons. Since the correlation between education and permanent earnings is generally lower for immigrants than for natives, this could also account for the lower intergenerational associations in education.

Kristen and Granato (2007) focus on the educational outcomes of immigrant and native children in terms of their relative chances of attending or completing the highest level of schooling (Abitur). Their study is based on data from the German Microcensus (GMC) and is limited to the descendants of classic labor migrants. The researchers find that the chances of attaining the highest level of schooling increase with parental educational attainment. When interactions between parental education and immigrant status are added to the model to examine whether immigrants benefit from higher parental education in a similar way as natives, the authors find no significant differences in the effect of parental education for immigrants and natives. The only exception are the children of Turkish immigrants, for whom higher parental education does not improve their chances of obtaining the Abitur as much as for natives. Kristen and Granato (2007) hypothesize that this may be related to a lack of familiarity with the German educational system or to discrimination.

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[10] In contrast, Gang and Zimmermann's (2000) definition of second-generation immigrants includes all persons who immigrated before the age of 16 and therefore acquired (part of) their education outside Germany.

Luthra's (2010) analysis of the educational attainment of second-generation immigrants reveals that parental education accounts for the largest amount of inequalities between immigrant and native children in terms of secondary school attainment. Moreover, after controls for parental education are included in the regression framework, an immigrant advantage over natives emerges for many of the ethnic groups observed. Further examinations show that this advantage is concentrated among immigrant children with the lowest educated parents and is much less pronounced for children with medium-educated parents, suggesting that the phenomenon should not be interpreted as universal. Nevertheless, the study establishes that immigrant children seem to be less adversely impacted by low-educated parents than natives. This leads to a higher convergence in educational outcomes between native and immigrant children than parental background alone would suggest.

Bönke and Neidhöfer (2018) focus on the intergenerational dimension of the integration and assimilation of Italian immigrants into German society. Their main analysis is based on data from the German SOEP and they validate their results using registry data provided by the Italian Embassy in Germany. The authors determine the degree of intergenerational educational mobility of immigrants and natives and report their results as intergenerational elasticities (β) and intergenerational correlations (ρ).[11] The estimates reveal that second-generation immigrants with Italian and other immigrant parents are more mobile than German natives. The authors also estimate intergenerational elasticities for other former guest worker groups and confirm their main results: Despite some small differences across immigrant groups, intergenerational mobility is higher for children of immigrants than for children of natives. Furthermore, they find that native females exhibit slightly lower educational outcomes than native males and vice versa for Italian second-generation immigrants when parental background is considered. Bönke and Neidhöfer (2018) also estimate the relative probability of achieving a high schooling degree given parental background characteristics. Their findings show that second-generation immigrants experience equal probabilities of achieving a high schooling degree as natives when controlling for parental education and that the effect of parental education on the probability of obtaining a high schooling degree is higher for natives than

[11] The value of the intergenerational elasticity corresponds to the coefficient of the regression of the child's log years of schooling on the parents' log years of schooling. The value of the intergenerational correlation is derived from a regression that employs standardized beta-coefficients for each subgroup considered and thus accounts for the changing distribution of educational attainment across generations (Bönke & Neidhöfer, 2018).

immigrants. The authors suggest that a possible explanation for the higher intergenerational mobility experienced by immigrant children may be that immigrants are positively selected in terms of unobservables such as motivation or abilities. Another reason could be the high investment in the child's education that immigrants already make in the course of the migration process but also in the country of arrival, especially if they envision their future there in the long term. Return migration of less integrated or successful immigrants may be an additional explanation for the observable patterns in educational mobility.

In summary, this literature review for Germany illustrates that there are not only differences in educational attainment between immigrants and natives but also in the association between parents' and children's educational attainment (i.e., intergenerational mobility). While the educational attainment of immigrant children is on average lower than that of native children and the literature identifies a persistent disadvantage in this regard, it seems that the children of immigrants simultaneously experience more educational mobility than the children of Germans. Most of the studies examined find either a weaker correlation between parents' and children's educational attainment for immigrants than for natives or no significant correlation at all. As pointed out earlier, this is partly related to the lower starting position of immigrants compared to natives and the resulting intergenerational "catch-up" that leads to a reduction of the gap between immigrants and natives in terms of educational attainment (Bönke & Neidhöfer, 2018). Additional explanations for the higher mobility among immigrants than among natives include measurement errors, return migration, human capital depreciation upon migration, positive selection, etc.

Although existing studies for Germany point in a similar direction, it is rather difficult to draw comparisons between the results of the different studies. The reason for this is not only that educational outcomes of parents and children are defined and measured differently depending on the study, but also that some studies are limited to the Western part of Germany or certain immigrant groups. Moreover, and even more importantly, intergenerational mobility is measured differently depending on the study. Sometimes intergenerational mobility for immigrants and natives is determined by including separate dummies (Gang & Zimmermann, 2000), sometimes by including interactions of parental human capital and immigrant status (Kristen & Granato, 2007), and in other cases by analyzing different subgroups separately (Dustmann, 2008). In addition, most research is limited to secondary education. However, it is important to look at intergenerational mobility in a more comprehensive way to get a holistic

picture of the current situation in Germany and to gain a better understanding of how mobility patterns differ between the children of immigrants and natives and between children with parents from different immigrant groups. This will help future policymakers to take informed decisions to improve equality of opportunity in the education system over the long term.

5 Data and Variables

5.1 Data

The analysis is based on a dataset drawn from the German Socio-Economic Panel (SOEP) 1984-2020 (SOEP v37). The German SOEP is a representative annual longitudinal survey of private households and individuals in Germany (Bönke & Neidhöfer, 2018). It is similar to the British Household Panel Study (BHPS) or the U.S. Panel Study of Income Dynamics (PSID) (Dustmann, 2008). Each year approximately 11,000 households and 30,000 individuals are surveyed by the German Institute for Economic Research (DIW), which produces and manages the database (Kroh, Siegers & Kühne, 2015). The annual interview includes all persons above the age of 16 living in one of the SOEP households. Information on children under 16 is provided by the household head. As soon as children reach the age of 16, they receive their own identification number and can be linked to their parents via pointers (Dustmann, 2008). In addition, all participants are asked to provide information about their parents' educational and occupational attainment, as well as their parents' country of origin, irrespective of whether the parents themselves are part of the panel or not. This provides the optimal ground for studying intergenerational mobility.

The SOEP is renowned for its high quality and low dropout rates and contains a wide range of variables on topics such as demographics, education, employment, social networks, and migration (Goebel et al., 2019; Kühne & Kroh, 2017)[12]. The panel is particularly suitable for investigations related to the topic of migration since the panel oversamples immigrants and includes many migration-specific variables, such as country of origin, nationality, year of immigration, immigrant generation, etc. Moreover, the SOEP provides information on a variety of individual and family characteristics that are relevant for studying intergenerational

[12] More detailed information on the data collection process, panel structure, response rates, and panel stability can be found in the SOEP Annual Report 2021.

educational mobility, such as the number of siblings or the location where an individual spent his or her childhood (Bönke & Neidhöfer, 2018). Furthermore, due to the length of its existence and the constant inclusion of new individuals in the survey, the SOEP offers a unique variety and quantity of data that allows examinations over a long period and even for small sub-populations.

The dataset that was compiled from the SOEP for the following analysis covers the period from 1984 to 2020, thereby including all 37 SOEP waves available. Since the focus of the study is on completed education, only one observation per individual is kept, namely their maximum level of education and the survey year in which it was reported for the first time. In the next step, the sample is limited to those individuals for whom information on the country of origin and education of at least one parent is available. This is done since an individual's migration background and their parents' education are among the main variables of interest. Given that the study is only concerned with the educational mobility of individuals who received their entire education in Germany, all individuals who immigrated after the age of 6 are excluded from the sample, as children in Germany typically start school at this age. To ensure comparability of the education systems experienced by different cohorts in Germany and that all individuals under observation have already completed education, the sample is restricted to people born between 1940 and 2002. The restrictions ultimately result in a final sample of 34,477 individuals of whom 48.45% are men and 51.55% are women.

5.2 Variables

The dependent variable is a person's educational attainment. Two different measures of educational attainment are investigated: total years of education and educational level. The total years of education variable is continuous. It is measured as regular years of education associated with the obtained schooling and professional degree.[13] In turn, educational level is an ordinal variable. Three levels are distinguished: the lowest level (less than high school), the medium level (high school), and the highest level (more than high school). The assignment to those

[13] The advantage of measuring educational attainment as regular education years rather than actual time spent in education is that it avoids distortions that might arise from late enrollment or repeating a grade. In the German context, this approach is also particularly suitable due to the early tracking, whereby children are assigned to school tracks with different regular years of schooling (Bönke & Neidhöfer, 2018).

categories was made based on the available information on an individual's completed schooling and professional training. The exact codification of both variables can be found in the appendix.

The main explanatory variables are those that reflect parental human capital and migration background. Parental human capital is measured in terms of total years of education and educational level. In both cases, the coding follows that of the corresponding variable for the child. Depending on the part of the analysis, parental human capital is considered either individually (two separate variables for mother and father) or jointly (one variable for both parents). The reason for this is that when using educational level instead of total years of education to investigate educational mobility, the correlation between mother's and father's education is very high. This leads to multicollinearity issues in the regression analysis. Consequently, when parental human capital is measured as the level of education rather than the total years of education, only the educational level of the parent with the highest education is considered. Most studies on intergenerational mobility focus either on the education of the father or the parent with the highest education throughout their whole analysis. Some studies also use the weighted average of both parents' education, giving more weight to the parent with more education. However, the rationale for considering maternal and paternal education separately in one part of the analysis is that, as pointed out in the literature review, there are presumably some differences in the effects of maternal and paternal education on an individual's educational attainment. To be able to detect these differences, it is important to consider maternal and paternal education also separately and not only jointly.

The variable indicating migration background or immigrant status is determined based on the country of birth of the respondent's parents. To ensure conciseness and prevent the size of subgroups from becoming too small, parental countries of origin are grouped by geographic region.[14] Children whose parents do not originate from one of the main three regions of origin or whose parents do not come from the same region are assigned to the "Other" category. In all parts of the analysis, children with German-born parents serve as the reference category. Children who have one German-born and one foreign-born parent are assigned to the category "German". While it is arguable whether these children are truly comparable to individuals with two German-born parents, grouping them with individuals with two foreign-born parents seems

[14] A detailed overview of the classification of the different parental countries of origin into regional groups can be found in the appendix.

even less appropriate. Particularly in the context of studying intergenerational mobility, children with only one foreign-born parent should not be considered jointly with children with two foreign-born parents, as evidence suggests that their experiences and outcomes may differ substantially (Karthick Ramakrishnan, 2004). For example, studies have shown that there are significant differences in the socioeconomic outcomes between the two groups. Moreover, research has pointed out that the presence of a native-born parent may provide children with greater opportunities for higher education and facilitate economic success, which may be linked to native-born parents having a better knowledge of the educational institutions and available opportunities and having access to social networks of native-born individuals (Karthick Ramakrishnan, 2004). However, there is also ample evidence that the so-called 2.5 generation differs from individuals without an immigrant background in terms of their experiences and socioeconomic outcomes. For this reason, they will be considered as a separate group within the robustness and sensitivity analysis.

From the above elaborations, the following delineations of the different subgroups emerge. When the empirical analysis part uses the term "Germans", it refers to individuals born in Germany with at least one German-born parent. In contrast, when the terms "second-generation immigrants", "immigrant children" or similar are used, it refers to individuals who have two foreign-born parents and who were either born in Germany or were born abroad but immigrated before the age of 7, and thus received all their education in Germany.[15] Foreign-born immigrants who came to Germany at a later point in time are not considered in the analysis because the transfer of parental human capital experienced by them does not or only partially occur in Germany. Note also that although the study often employs the term "children" to make a clear distinction between the parents' and children's generation, all individuals referred to as such have already completed their education and are thus at least 18 years old at the time of data collection.

Additional factors considered in the analysis are demographic controls, regional controls, and family background controls. The variables were selected based on the relevant literature and have been previously found to be associated with intergenerational educational mobility.

[15] The definition of second-generation immigrants in the literature is not uniform. However, similar approaches are used in the German literature on the intergenerational transmission of human capital. See, for example, Bönke and Neidhöfer (2018) or Casey and Dustmann (2008).

Hence, their inclusion in the analysis seems pertinent. *Demographic controls* include sex and year of birth. *Regional controls* consist of two different variables: the predominant place of childhood until 15 years and the federal state of residence. The place of childhood is a binary variable indicating whether an individual grew up in an urban environment or not. The federal state of residence is determined based on the place of residence of the respondent's original household, i.e., the household that he or she was part of when entering the panel. The federal state of Berlin is chosen as the reference category because in this region the composition of the group of people with a migration background is the most diverse and not dominated by one group of immigrants as it is in other regions. The last group of controls contains information on an individual's *family background*. The three different variables considered are the number of siblings, and the age of the father and the mother when the child was 10. The inclusion of the parents' age when the child is 10 follows the approach of Dustmann (2008) and is motivated by the fact that in Germany at age 10 an important decision regarding the child's further educational career is made (educational tracking).

6 Methodological Approach

To examine the association between educational mobility and migration background, the study applies different regression models. These models allow us to assess the impact of migration status on educational attainment as well as the intergenerational transmission of education. Moreover, they provide the ground to investigate disparities in education between immigrant and native children and to better understand the association between various factors and the educational attainment of individuals in Germany. Intergenerational mobility can be estimated in many different ways, depending on the research interest and focus. To provide a comprehensive overview of the intergenerational educational mobility of children with and without a migration background in Germany, three different mobility measures are employed. These measures were chosen in line with those typically used in the relevant literature and are outlined in detail below.

1) *Intergenerational elasticity and intergenerational correlation:*

In the first part of the analysis, I estimate intergenerational mobility using an OLS regression of the child's years of education on the mother's and father's years of education. In doing so, I follow the approach of Bönke and Neidhöfer (2018). The regression produces an

intergenerational educational elasticity. The basic estimation equation used to obtain the educational elasticity takes the following form:

$$\log(educ_{it}) = \alpha + \beta \log(educ_{it-1}) + \gamma' M + \delta'(\log(educ_{it-1}) \cdot M) + \omega' X_{it} + \varepsilon_{it} \quad (1)$$

where $educ_{it}$ denotes the educational attainment of the individual i and $educ_{it-1}$ the education of the parents. The mother's and father's education enter the regression as separate independent variables. For all family members, educational attainment is measured in log years of education. M is a vector that consists of four dummies m^i where the subscripts i = 1, 2, 3, 4 categorize the children of immigrants into four groups: Southern European, Northwestern European, Central-Eastern European, and Other. For children with German-born parents, all dummies are zero. Thus, in total five different subgroups are considered. The vector X_{it} controls for individual and family characteristics. For the analysis of intergenerational mobility, we are mainly interested in the regression coefficient β for children of natives and $\beta + \delta^i$ for children of immigrants. The parameter β indicates the percentage change in an individual's educational attainment that follows from a marginal change in parental education. In other words, it reflects the fraction of education that is on average transmitted across generations (Dustmann & Glitz, 2011). This parameter is known as the intergenerational elasticity or intergenerational regression coefficient and is the most widely used measure of intergenerational mobility (Emran & Shilpi, 2017). The coefficients of the interaction term δ^i reflect the difference in intergenerational elasticity of a specific immigrant group relative to the group of natives.

The drawback to the measure of intergenerational elasticity is that it does not abstract from changes in the variance of education across generations. That is, a change in elasticity cannot necessarily be attributed to a change in the association between the educational attainment of parents and their child (i.e., changing degree of mobility). Instead, it could simply be the result of a change in the distribution of educational attainment of either group (Schneebaum, Rumplmaier & Altzinger, 2016). Thus, when comparing different population groups, their elasticity coefficients may differ because of differences in the variance of educational attainment in the child's and parents' generation and not because the groups experience varying degrees of mobility. To account for the fact that the variance of educational attainment may differ over time and population groups, it is necessary to account for distributional differences. For this purpose, one can estimate another commonly used measure of intergenerational mobility, known as intergenerational correlation. In this case, indicators of educational

attainment are normalized by their standard deviation (Emran & Shilpi, 2017). Intergenerational correlations can be estimated from the following OLS regression:

$$\frac{\log(educ_{it})}{\sigma_{it}} = \rho_0 + \rho_1 \frac{\log(educ_{it-1})}{\sigma_{it-1}} + \rho_2{}'M + \rho_3{}'\left(\frac{\log(educ_{it-1})}{\sigma_{it-1}} \cdot M\right) + \rho_4{}'X_{it} + \varepsilon_{it} \quad (2)$$

where σ_{it-1} is the standard deviation of educational attainment of the parent's generation and σ_{it} is the standard deviation of educational attainment of the child's generation. The focus is on estimating the parameter ρ_1 for natives and the parameters $\rho_1 + \rho_3$ for immigrants. In contrast to the elasticity, the correlation is bounded between 0 and 1 (Black & Devereux, 2011). If the correlation is close to one, this suggests low mobility and high persistence across generations. Thus, a coefficient of one indicates perfect transmission of educational attainment, i.e., a person whose mother/father has 10 years of education also has 10 years of education. Conversely, the closer the correlation is to zero, the higher a person's intergenerational mobility and the lower the correlation with his or her parents' education (Dustmann & Glitz, 2011).

In recent decades, we have witnessed a considerable increase in educational attainment, and with that, the distribution of educational attainment has become more widely dispersed over time. This leads to larger elasticity coefficients but does not necessarily affect the correlation coefficients. Therefore, it is generally advisable to report both measures when studying intergenerational mobility (Black & Devereux, 2011). To better understand how the two measures relate to each other, note that the correlation is smaller than the elasticity if the variance of educational attainment in the parents' generation is smaller than in the child's generation and vice versa. However, if the variance in both generations is the same, then the correlation will correspond to the elasticity (Bönke & Neidhöfer, 2018).

2) <u>Probability of reaching a certain educational level:</u>

The drawback of measuring educational mobility using elasticity and correlation estimates is that they only indicate movements in the number of years of education without taking into account the level of education. Therefore, these measures are not suitable to allow conclusions about an individual's starting and ending points in terms of educational class (Schneebaum, Rumplmaier & Altzinger, 2016). For this reason, in the second part of the analysis, I use a multinomial logistic regression model to estimate the probability of attaining a certain level of education (low, medium, high), while keeping the parents' level of education constant. The following estimation approach is applied:

$$\Pr(educ_{it} = k|x_i) = \frac{\exp\alpha_k + \beta_k educ_{it-1} + \gamma_k' M + \delta_k'(educ_{it-1} \cdot M) + \omega_k' X_{it}}{\sum_{j=1}^{m} \exp\alpha_j + \beta_j educ_{it-1} + \gamma_j' M + \delta_j'(educ_{it-1} \cdot M) + \omega_j' X_{it}} \text{ with } k = 1,2,\dots,m \quad (3)$$

where $educ_{it}$ is the educational level of the individual *i* and $educ_{it-1}$ is the parental level of education. In contrast to the first part of the analysis, this model does not take into account the education of both parents, because by grouping educational attainment into three categories, a high correlation arises between the education of the father and the mother. This leads to multicollinearity issues when estimating the multinomial logistic regression model. To address this problem, only the education level of the parent with the highest education is considered in the present model. k denotes the different levels of education and is equal to 1 (high), 2 (medium), 3 (low). The last level of k is the reference level. For the purpose of the following analysis, low education level is chosen as the reference. Applying a logarithm to both sides of the equation, we obtain:

$$\log\left(\frac{p_k(x_i)}{p_m(x_i)}\right) = \beta_k educ_{it-1} + \gamma_k' M + \delta_k'(educ_{it-1} \cdot M) + \omega_k' X_{it} \quad (4)$$

Now, on the left-hand side of the equation, we have the logarithm of the ratio of two probabilities, e.g., the logarithm of the ratio of the probability of reaching the medium education level and the probability of reaching the low education level. To facilitate the interpretation of the results, the model's outputs will be reported as predicted probabilities of individual *i* reaching education level *k*, given that his or her parent has a low, medium, or high level of education. The predicted probabilities are reported by immigrant status. In addition, marginal effects of immigrant status are presented for different levels of parental education to gain a better understanding of potential disparities between subgroups in the probability of reaching a certain education level.

3) <u>Probability of being upward mobile, downward mobile, or immobile:</u>

In the third part of the analysis, I turn to the estimation of the probability of having more, less, or equally as much education as one's parents. To do so, I estimate three univariate probit models. The first model calculates the probability of having more education than one's parents. The second model estimates the probability of having less education than one's parents. The third model calculates the probability of having as much education as one's parents. The general estimation equation takes the following form:

$$\Pr(Y = 1|x_i) = \Phi(\alpha + \gamma' M + \omega' X_{it}) \quad (5)$$

where, in the first model, Y = 1 if the education of the child is higher than that of their parents and Y = 0 otherwise. In the second model Y = 1 if the education of the child is lower than that of the parents and in the third model Y = 1 if the education of the child equals that of the parents. All three dependent variables are binary variables determined with respect to the parent with the highest number of years of education. For example, the dependent variable in the first model takes the value 1 if an individual has more education in terms of total years of education than his or her most highly educated parent. The main coefficient of interest is γ, which indicates the difference in the probability of being upward mobile/downward mobile/immobile for different immigrant groups compared to the reference category (Germans). To determine whether these differences are statistically significant, in addition to the probit coefficients for the immigrant dummies, I report the marginal effects of a change in immigrant status on the probability of having more/less/as much education as one's parents.

In all three parts of the empirical analysis, I use robust standard errors clustered at the original household level to account for the dependence of observations (Longhi & Nandi, 2014). It is important to highlight that the estimation strategies adopted in this study only provide conditional descriptive statistics, inter alia, because important factors may be omitted (e.g., innate ability or neighborhood characteristics). For a review of methodological approaches aimed at establishing causality when examining intergenerational mobility, see Black and Devereux (2011).

7 Empirical Analysis

7.1 Descriptive Results

The following section provides a first descriptive analysis based on the SOEP sample used in the main analysis part. This intends to provide first insights into trends and differences between subgroups regarding educational attainment and the main independent variables. The descriptive results are reported in Figure 2, Figure 3, and Table 1.

To obtain a better understanding of the educational differences between immigrants and natives in Germany, Figure 2 describes the educational attainment of native and immigrant children and their parents. The educational attainment is displayed as the mean of total years of education by immigrant status. Several insights emerge from this illustration. First, the average educational attainment of mothers is lower than that of fathers across all subgroups. This provides support for the decision to look at the impact of both mothers' and fathers' human

capital on the child's educational outcomes. Second, the general increase in educational attainment in recent decades becomes apparent, as children in all groups have higher average levels of education than their parents. The increase is particularly pronounced in the case of Southern Europeans, the population group which is mainly composed of former guest workers who were generally low-skilled workers. This indicates that an intergenerational catch-up between first- and second-generation immigrants in terms of educational attainment has indeed taken place. Third, there are clear differences between the different subgroups. Except for the group of Northwestern Europeans, parents from all immigrant groups have lower average levels of education than German parents, although the differences are relatively small. As for the children's generation, two subgroups have a lower average educational level and two have a higher one than German children. This is surprising insofar as it does not support the hypothesis of a pronounced immigrant disadvantage in education put forward in the German literature but rather suggests a mixed picture. Another aspect that emerges when taking into consideration the standard deviations of educational attainment (reported in Table 1), is that there are substantial differences between generations and immigrant groups. This highlights the necessity to consider intergenerational correlation coefficients in addition to intergenerational elasticities (Bönke & Neidhöfer, 2018).

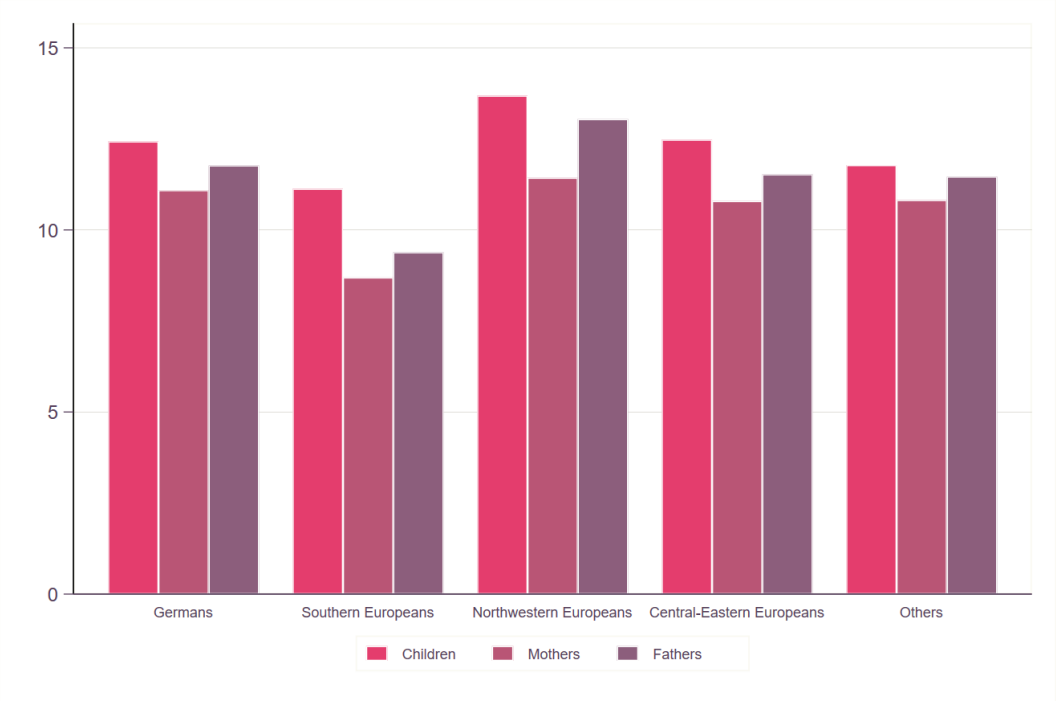

Figure 2 Mean of Years of Education by Immigrant Status (Children and Parents)

In contrast to the previous figure, Figure 3 focuses specifically on the generation of children and presents educational attainment in the form of the educational level attained. The graph

shows how the members of the different population groups are distributed across the three educational levels in percentage terms. With the exception of Northwestern Europeans, the percentage of individuals in the lowest educational category is higher in all immigrant groups than in the native group. A somewhat different pattern emerges when looking at the highest education category. Both in the group of Northwestern and Central-Eastern Europeans, there are more individuals in the highest educational category than in the group of Germans. In all subgroups, the medium educational category accounts for the largest share of individuals. Especially with respect to the native group, one can observe that the vast majority of Germans reach an intermediate level of education (62.89%). As for the parental generation, the figures in Table 1 indicate that mothers are also mainly represented in the medium category. However, this is not the case for Southern Europeans and Others, where most mothers are found in the lowest educational category. In the case of fathers, the situation is broadly the same, except that the group of Southern Europeans is the only one in which more fathers are to be found in the lowest than in the medium category.

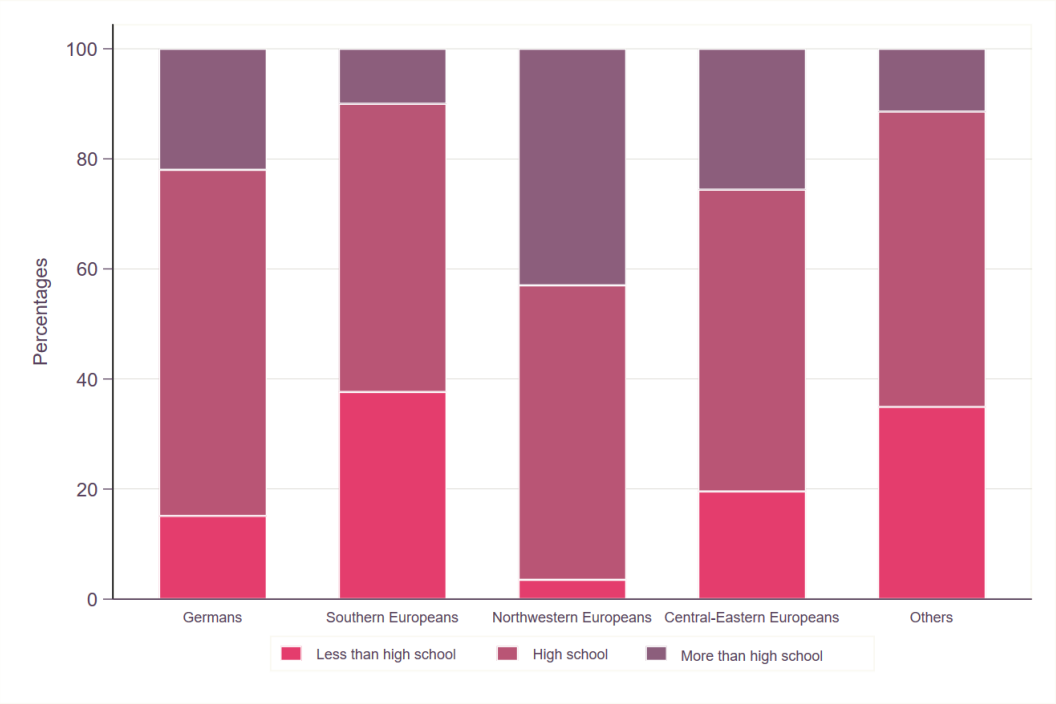

Figure 3 Level of Education by Immigrant Status in Percentages (Children)

In addition to descriptive statistics of educational attainment, Table 1 presents information on a variety of other variables. As can be seen from the table, in most population groups women are slightly overrepresented. The only exception is the group of Northwestern Europeans, where women make up only about one-third of the group. The number of siblings is higher in all immigrant groups than in the German group. Especially respondents in the Southern European

and Other category tend to have more siblings on average than Germans. Moreover, immigrant mothers are generally younger than native mothers. However, the same is not true for immigrant fathers, who are generally older than native fathers. With regard to the primary place of childhood, it can be seen that the proportion of individuals who spent their childhood in an urban environment is significantly higher among all immigrant groups than among Germans.

Table 1 Descriptive Statistics by Immigrant Status

	Total	Germans	Southern Europeans	Northwestern Europeans	Central-Eastern Europeans	Others
Years of education	12.46 (2.70)	12.52 (2.69)	11.13 (2.40)	13.87 (2.87)	12.61 (2.91)	11.83 (2.51)
Years of maternal education	11.11 (2.33)	11.22 (2.27)	8.82 (1.92)	11.74 (2.98)	10.99 (2.62)	10.94 (2.79)
Years of paternal education	11.82 (2.65)	11.93 (2.61)	9.70 (2.21)	13.17 (3.28)	11.76 (2.72)	11.65 (3.04)
Level of education						
Low	16.44	14.93	37.73	3.54	18.89	34.66
Medium	61.88	62.89	52.50	53.10	54.89	53.43
High	21.68	22.17	9.76	43.36	26.22	11.91
Mother's level of education						
Low	28.74	25.45	83.04	26.42	37.43	46.08
Medium	61.73	64.77	15.64	54.72	52.28	40.20
High	9.53	9.78	1.31	18.87	10.29	13.73
Father's level of education						
Low	13.93	10.92	61.14	7.62	20.36	35.21
Medium	70.94	73.39	36.19	60.00	65.18	47.86
High	15.12	15.69	2.66	32.38	14.46	16.93
Sex						
Female	51.55	51.84	50.09	33.63	47.03	55.96
Male	48.45	48.16	49.91	66.37	52.97	44.04
Number of siblings	1.87 (1.55)	1.83 (1.53)	2.59 (1.65)	1.93 (1.42)	1.97 (1.70)	2.69 (1.95)
Age of the mother when the child was 10	37.15 (5.67)	37.21 (5.66)	36.36 (5.80)	38.01 (5.97)	37.15 (5.67)	35.85 (5.49)
Age of the father when the child was 10	40.27 (6.57)	40.25 (6.58)	40.15 (6.12)	40.97 (6.73)	40.76 (6.84)	40.26 (6.63)
Location of childhood						
Urban	37.89	36.88	44.65	44.25	45.38	52.35
Rural	62.11	63.12	55.35	55.75	54.62	47.65
Observations	34,477	30,697	1,599	113	1,514	554

Notes: Percentages are reported for categorical variables and mean values for continuous variables. In addition, standard deviations are provided in parentheses for continuous variables.
Source: SOEP(v37), own calculations.

7.2 Empirical Results

7.2.1 Intergenerational Elasticity and Correlation

The estimation of the intergenerational elasticity (β) and intergenerational correlation (ρ) of educational attainment is based on equations (1) and (2), respectively. Table 2 summarizes the linear regression results. The specifications presented differ with respect to the characteristics for which they control. Successively, controls for survey year, demographic characteristics, region, and family background are included in the model. The following discussion of the results focuses mainly on the coefficients β and ρ. The influence of other factors on an individual's educational attainment is discussed only briefly. The complete set of results, including the coefficients of all independent variables included in the model, can be found in Table A1 in the Appendix.

The main finding that becomes immediately apparent when examining the coefficients is that immigrants generally seem to be more mobile than Germans. For all immigrant groups, the elasticity and correlation coefficients are lower than for natives. However, the differences are not always significant. In the case of Southern Europeans, the coefficients of the interaction terms are negative and statistically significant in all specifications for both mothers and fathers. For Central-Eastern Europeans, the same is true except for the first specification, where only the elasticity coefficient for mothers is significant. For the Others group, only the elasticities in the third model are statistically significant. As for Northwestern Europeans, their elasticities and correlations are not significantly different from those of native Germans in any of the three specifications. It can be also noted that the coefficients differ somewhat in magnitude between the different specifications, but in most cases, the differences are not substantial. Most importantly, the finding that immigrant groups, with the exception of Northwestern Europeans, are more mobile persists across all specifications.

Furthermore, we can observe that the relationship between elasticities and correlations changes depending on the subgroup. Bönke and Neidhöfer (2018) argue that "this […] is due to the different variances in educational attainments between the parents' and children's generation" (p.12f). While for Germans and Central-Eastern Europeans the correlations are smaller than the

elasticities, the reverse is true for the groups of Southern Europeans, Northwestern Europeans, and Others. However, it is important to emphasize that the differences in the intergenerational correlations with natives are not significant for the latter two groups. In the case of Germans and Central-Eastern Europeans, the dispersion of years of education is higher in the children's generation than in the parents' generation, and vice versa for Northwestern Europeans and Others. However, the Southern European group does not fully fit this interpretation of the results. For this group, the variance is also higher in the children's generation, but the correlation coefficients are larger than the elasticities, albeit only slightly.

Let us now turn to the preferred specification (Column 3), which includes all relevant controls, to get a better idea of the magnitude of the coefficients and the differences between Germans and immigrants. For the native group, the elasticities indicate that a 1% increase in the mother's years of education is associated with an average change of 0.235% in an individual's educational attainment. For the same increase in the father's education, the average change in the educational attainment of the child is 0.267%. In contrast, for Southern Europeans, the average change associated with an increase in maternal education is 0.105% ($0.235 - 0.130 = 0.105$), and in paternal education is 0.151% ($0.267 - 0.116 = 0.151$). For Central-Eastern Europeans, the outcome changes on average by 0.1365% if maternal education increases and 0.2095% if paternal education increases by 1%. For the Others group, the increases are 0.104% for maternal and 0.137% for paternal education. Finally, for the Northwestern European group, the elasticities are also lower than for Germans, but the difference is not statistically significant. Hence, the general picture that emerges is that an increase in maternal education is associated with a lower increase in an individual's educational attainment than an increase in paternal education for all subgroups. Moreover, the association between parental and child's education is the lowest for Southern Europeans and Others. For Central-Eastern Europeans, in particular, the association with maternal education is significantly lower than for natives, while the association with paternal education is more similar to that observed for natives.

An examination of the coefficients of additional factors, which are presented in Table A1, provides some further insight into educational attainment in Germany and its determinants. In particular, it reveals that when parental education and other individual and family characteristics are controlled for, the educational attainment of all immigrant groups is significantly higher than that of Germans. Moreover, the coefficient of the binary variable that controls for sex, indicates that women's educational attainment is slightly higher than that of

men. However, the difference becomes insignificant in the third specification. As for the primary location of childhood, the results show that growing up in an urban environment has a statistically significant negative effect on education. The same applies to the number of siblings. If the number of siblings increases by 1, the educational attainment of an individual is on average reduced by 1.76%. With respect to parental age when the child was 10, it appears that an increase in maternal and paternal age is associated with a small but statistically significant positive effect on education.

Table 2 OLS Regression Model: Intergenerational Elasticities and Intergenerational Correlations

		(1)	(2)	(3)
Germans				
Mother	*Elasticity*	0.204***	0.252***	0.235***
		(0.00774)	(0.00766)	(0.00802)
	Correlation	0.180***	0.222***	0.207***
		(0.00682)	(0.00675)	(0.00707)
Father	*Elasticity*	0.291***	0.277***	0.267***
		(0.00714)	(0.00683)	(0.00715)
	Correlation	0.276***	0.263***	0.253***
		(0.00678)	(0.00648)	(0.00678)
Southern Europeans				
Mother	*Elasticity*	-0.121***	-0.144***	-0.130***
		(0.0354)	(0.0345)	(0.0424)
	Correlation	-0.0959***	-0.113***	-0.101**
		(0.0357)	(0.0349)	(0.0429)
Father	*Elasticity*	-0.213***	-0.204***	-0.116***
		(0.0332)	(0.0327)	(0.0404)
	Correlation	-0.190***	-0.183***	-0.0870**
		(0.0363)	(0.0358)	(0.0442)
Northwestern Europeans				
Mother	*Elasticity*	-0.0206	-0.0501	-0.0583
		(0.0883)	(0.0844)	(0.105)
	Correlation	0.0325	0.0118	-0.00225
		(0.103)	(0.0982)	(0.122)
Father	*Elasticity*	-0.0938	-0.0738	-0.0744
		(0.0929)	(0.0853)	(0.0988)
	Correlation	-0.0444	-0.0239	-0.0276
		(0.109)	(0.100)	(0.116)
Central-Eastern Europeans				
Mother	*Elasticity*	-0.0578*	-0.0925***	-0.0985***
		(0.0305)	(0.0286)	(0.0321)
	Correlation	-0.0353	-0.0628**	-0.0723**
		(0.0302)	(0.0284)	(0.0321)
Father	*Elasticity*	-0.00384	-0.0549*	-0.0575*

		(0.0326)	(0.0291)	(0.0311)
	Correlation	-0.00487	-0.0586**	-0.0617**
		(0.0307)	(0.0274)	(0.0294)
Others				
Mother	*Elasticity*	-0.0151	-0.0714	-0.131**
		(0.0511)	(0.0503)	(0.0558)
	Correlation	0.0551	0.00320	-0.0751
		(0.0631)	(0.0622)	(0.0689)
Father	*Elasticity*	-0.0747	-0.124***	-0.130**
		(0.0475)	(0.0453)	(0.0528)
	Correlation	-0.00298	-0.0668	-0.0759
		(0.0596)	(0.0568)	(0.0662)
Controls				
Survey year		Yes	Yes	Yes
Demographics		No	Yes	Yes
Region		No	Yes	Yes
Family background		No	No	Yes
Observations		32,078	32,078	27,423

Notes: The elasticity values for Germans correspond to the regression coefficient of the maternal or paternal log years of education obtained in linear regressions in which the individual's log years of education are the dependent variable. For non-German individuals, the elasticity reports the interaction effect of maternal/paternal log years of education with a dummy for the immigrant group. The intergenerational correlations correspond to the regression coefficients using standardized beta coefficients for each subgroup. ***, **, and * represent statistical significance of the regression coefficients at the 1, 5, and 10 percent level, respectively. Robust standard errors clustered by the household of origin are reported in parentheses. Complete results are reported in Table A1.
Source: SOEP(v37), own calculations.

7.2.2 Probability of Reaching a Certain Educational Level

The results obtained in the first part of the analysis suggest that children of immigrants are more mobile in educational terms than children of natives. However, the type of examination conducted in this part does not allow to distinguish between different parental education levels. Thus, it may be that the main reason why immigrant children appear more mobile is because on average their parents have a lower educational background than native parents, while they themselves have educational attainments that are more similar to those of children of native parents. Thus, this would simply indicate a catch-up between the first and second immigrant generations or a convergence of educational attainment toward the level of natives.

Consequently, the question that arises is, what happens when we compare immigrant and native children of parents from the same educational strata? For example, among children with parents in the lowest educational category, are there significant differences between immigrants and natives in terms of their chances of reaching a higher educational level than their parents? And what do we find when we focus on children with parents in the highest category, is it easier or

harder for immigrant parents than for native parents to pass on their educational advantage to their children?

A multinomial logistic regression model that predicts individuals' belonging to one of three educational categories (low, medium, high) can provide some guidance for answering these questions. The results of this model are summarized in Tables 3 and 4. Table 3 reports the predicted probabilities of reaching a low, medium, or high education level for each combination of parental educational category and migration status and holding the rest of the predictors at their mean values. In turn, Table 4 displays the marginal effects of a change in immigrant status while holding parental education at a constant level on the probability of each of the three possible outcomes.

The predicted probabilities reported in Table 3 are all statistically significant, with some exceptions for the Northwestern European group. When focusing on individuals with low educated parents, we can see that the predicted probability of also only reaching low educational attainment is somewhat higher for Southern Europeans (23.4%) and Central-Eastern Europeans (21.8%) than for Germans (21.2%). In contrast, the probability of reaching high education conditional on parental education being low is lower for two immigrant groups (Others and Central-Eastern Europeans) than for natives but higher for Southern Europeans.

Turning to children with medium educated parents, the estimated results indicate that Germans have the lowest predicted probability (9.8%) of attaining only low education, whereas all immigrant groups, except for Northwestern Europeans, have higher probabilities (11.7% for Central-Eastern Europeans, 11.8% for Others, and 15.5% for Southern Europeans). Conversely, Germans (14.0%) and Northwestern Europeans (14.8%) have the highest probabilities of achieving high education when their parents have intermediate education. The predicted probabilities of attaining high education for all other immigrant groups are somewhat lower, ranging from 9.7% to 12.2%.

Focusing on individuals with highly educated parents, German children exhibit the lowest predicted probability (2.99%) of being in the lowest educational category. In contrast, immigrant children with highly educated parents from Central-Eastern Europe, Southern Europe, and Other regions have higher predicted probabilities: 5.3%, 5.8%, and 8.1% respectively. At the same time, children whose parents are from Central-Eastern Europe or Other regions, have the highest predicted probabilities of reaching a medium educational

outcome, 68.2% and 68.0%, respectively. Finally, it can also be seen that German children have the highest predicted probability of being in the highest educational category, given that their parents are also in this category (40.8%). The predicted probabilities for Central-Eastern Europeans (26.6%) and Others (23.2%), in turn, are considerably smaller.

This analysis of the educational mobility of natives and immigrants provides initial evidence regarding educational disparities between different subgroups in Germany. It shows that immigrants with low-educated parents are more likely to end up in the lowest category themselves than Germans and, at the same time, are less likely to reach the highest category than Germans. A surprising exception is the group of Southern Europeans, who have a slightly higher probability of getting to the highest level given that their parents are in the lowest category than natives. A similar picture prevails for individuals with medium and highly educated parents. I find that the children of highly educated immigrants have a higher probability of ending up in the lowest category and a lower probability of attaining the highest category than children of highly educated natives. However, based on the predicted probabilities, it is not possible to determine whether these differences between natives and immigrants are statistically significant. The marginal effects presented in Table 4 provide some insights into this matter.

Table 3 Multinomial Logistic Regression Model of Child Educational Attainment Conditional on Parental Education: Predicted Probabilities

	Low education	Medium education	High education
Low educated parents			
Germans	0.212***	0.720***	0.0678***
	(0.0128)	(0.0131)	(0.00567)
Southern Europeans	0.234***	0.691***	0.0753***
	(0.0220)	(0.0236)	(0.0135)
Northwestern Europeans	2.25e-07	0.615*	0.385
	(4.30e-07)	(0.337)	(0.337)
Central-Eastern	0.218***	0.719***	0.0632***
Europeans	(0.0455)	(0.0402)	(0.0224)
Others	0.170***	0.775***	0.0550*
	(0.0398)	(0.0480)	(0.0331)
Medium educated parents			
Germans	0.0982***	0.762***	0.140***
	(0.00293)	(0.00395)	(0.00330)
Southern Europeans	0.155***	0.723***	0.122***
	(0.0202)	(0.0254)	(0.0188)
Northwestern Europeans	0.0955	0.756***	0.148*
	(0.0862)	(0.145)	(0.0779)

Central-Eastern	0.117***	0.766***	0.117***
Europeans	(0.0134)	(0.0165)	(0.0125)
Others	0.118***	0.785***	0.0970***
	(0.0182)	(0.0285)	(0.0244)
High educated parents			
Germans	0.0299***	0.562***	0.408***
	(0.00217)	(0.00821)	(0.00835)
Southern Europeans	0.0576**	0.586***	0.357***
	(0.0251)	(0.116)	(0.120)
Northwestern Europeans	3.79e-08	0.666**	0.334
	(3.23e-08)	(0.303)	(0.303)
Central-Eastern	0.0526***	0.682***	0.266***
Europeans	(0.0165)	(0.0352)	(0.0347)
Others	0.0881***	0.680***	0.232***
	(0.0241)	(0.0476)	(0.0471)

Notes: The estimated model is a multinomial logistic regression, where the dependent variable is the categorical variable indicating the highest educational degree obtained by an individual. The reported values are the predicted probabilities obtained after estimating the multinomial logistic model. They estimate the probability that the outcome variable equals 1, setting immigrant status and parental education to specific values and holding the rest of the predictors at their mean values. The regression model includes controls for survey year, demographics, region, and family background. ***, **, and * represent statistical significance of the predicted probabilities at the 1, 5, and 10 percent level, respectively. Robust standard errors are reported in parentheses.
Source: SOEP(v37), own calculations.

The marginal effects in Table 4 indicate the change in the probability of being in a particular educational category associated with a change in immigrant status, while holding parental education constant at different levels and all other covariates at their mean values. The first thing that can be noted is that many of the marginal effects are not statistically significant, i.e., there is insufficient evidence to conclude that there is a significant difference in the probability of reaching a certain educational level between immigrants and natives conditional on their parents' education. Nevertheless, some of the marginal effects do indicate significant differences.[16] For example, the predicted probability of reaching the lowest educational level when having medium-educated parents increases by 5.6 percentage points for Southern Europeans compared to natives. Similarly, the probability of having high education given that parental education is medium-level is 2.3 percentage points lower for Central-Eastern

[16] While the marginal effects for Northwestern Europeans are statistically significant in two cases, they are not elaborated upon due the predicted probabilities shown in Table 3 being very small and insignificant in both cases. Nevertheless, both marginal effects can be interpreted in a meaningful way. They suggest that the probability of Northwestern Europeans being in the lowest educational category, conditional on having low or highly educated parents, respectively, is significantly lower than for Germans.

Europeans and 4.4 percentage points lower for Others compared to Germans. Most of the significant differences between Germans and immigrants arise when individuals with parents with a high educational background are considered. Conditional on high parental education, individuals with parents from Other regions have 5.8 percentage points higher probability of being in the lowest educational category, 11.5 percentage points higher probability of being in the medium category, and 17.3 percentage points lower probability of being in the highest educational category. A similar pattern emerges for Central-Eastern Europeans. When having highly educated parents, the probability of being in the medium educational category is 11.8 percentage points higher for Central-Eastern Europeans than for natives. The probability of reaching the highest educational level, in turn, is 14.0 percentage points lower than for natives.

Thus, it appears that in particular children with parents from Central-Eastern Europe and Other regions are somewhat disadvantaged in comparison to Germans. Their probability of reaching the highest educational level conditional on having medium or highly educated parents is significantly lower than that of Germans. Moreover, individuals belonging to these subgroups and having highly educated parents have a significantly higher probability than Germans to end up in an educational category that is lower than their parents'. This finding suggests that highly educated immigrants from Central-Eastern Europe and Other regions, may face more challenges in transferring their educational advantages to their children than Germans.

Table 4 Multinomial Logistic Regression Model of Child Educational Attainment Conditional on Parental Education: Marginal Effects

	Low education	Medium education	High education
Low educated parents			
Southern Europeans	0.0244	-0.0311	0.00670
	(0.0273)	(0.0281)	(0.0136)
Northwestern Europeans	-0.241***	-0.0729	0.314
	(0.0133)	(0.335)	(0.335)
Central-Eastern	0.00671	-0.00231	-0.00440
Europeans	(0.0513)	(0.0454)	(0.0218)
Others	-0.0458	0.0574	-0.0116
	(0.0462)	(0.0519)	(0.0316)
Medium educated parents			
Southern Europeans	0.0560***	-0.0376	-0.0184
	(0.0199)	(0.0256)	(0.0193)
Northwestern Europeans	-0.00263	-0.00567	0.00830
	(0.0851)	(0.145)	(0.0792)
Central-Eastern	0.0182	0.00513	-0.0233*
Europeans	(0.0131)	(0.0166)	(0.0129)
Others	0.0200	0.0239	-0.0439*

	(0.0179)	(0.0288)	(0.0251)
High educated parents			
Southern Europeans	0.0276	0.0232	-0.0508
	(0.0251)	(0.115)	(0.119)
Northwestern Europeans	-0.0299***	0.104	-0.0739
	(0.00218)	(0.297)	(0.297)
Central-Eastern	0.0223	0.118***	-0.140***
Europeans	(0.0165)	(0.0353)	(0.0347)
Others	0.0574**	0.115**	-0.173***
	(0.0239)	(0.0472)	(0.0463)

Notes: The estimated model is a multinomial logistic regression, where the dependent variable is the categorical variable indicating the highest educational degree obtained by an individual. The reported values are the marginal effects obtained after estimating the multinomial logistic model. They indicate the change in the probability of being in a particular educational category associated with a change in parental educational level by immigrant status while holding the rest of the variables at their mean values. ***, **, and * represent statistical significance of the predicted probabilities at the 1, 5, and 10 percent level, respectively. Robust standard errors are reported in parentheses.
Source: SOEP(v37), own calculations.

7.2.3 Probability of Being Upward Mobile, Downward Mobile, or Immobile

While in the previous parts of the analysis, the strength of the association between the parents' and the child's education as well as the probability of reaching a certain level of education conditional on the parents' level of education were examined, this part investigates the probability of having more, less, or equally as much education as one's parents. The results of the different probit models are presented in Table 5. The top panel displays the probit coefficients and the bottom panel shows the marginal effects obtained after estimating the probit models. The marginal effects indicate the change in the probability of being upward mobile, downward mobile, or immobile associated with a change in immigrant status, while holding all other covariates at their mean values.

The first model estimates the predicted probability of being upward mobile compared to being downward mobile or immobile. The probit coefficients for this model indicate that Southern Europeans have a higher and Northwestern Europeans have a lower predicted probability of being upward mobile than Germans. The corresponding marginal effect for Southern Europeans reveals that the difference with natives is statistically significant. More concretely, the marginal effect indicates that the probability of being upward mobile is 23.4 percentage points higher for Southern Europeans than for Germans. At the same time, the predicted probability of being

upward mobile is 12.6 percentage points lower for Northwestern Europeans than Germans. While these figures may seem counterintuitive at first glance, they are well consistent with the fact that the average educational attainment of parents from Southern Europe is substantially lower than that of parents from Northern Europe. Accordingly, the gap to be closed between Southern European immigrants and their children is greater than that between Northern European immigrants and their children. The second model, in turn, estimates the predicted probability of being downward mobile compared to being upward mobile or immobile. The probit coefficients obtained from this model indicate that the probability of being downward mobile is lower for Southern Europeans than for Germans. This is consistent with what we just established regarding the upward mobility of this population group. Since the parents in this group tend to be in the lower part of the distribution of educational attainment, their children are more likely to move upward in the distribution compared to them. The marginal effect for this immigrant group implies that the predicted probability of being downward mobile is 11.9 percentage points lower than for natives. By contrast, the results for the Northwestern European group are more unexpected, since they reveal that the probability of having less education than one's parents is 17.9 percentage points higher for Northwestern Europeans compared to Germans. In addition to the two groups already discussed, this model also identifies a significant effect for another immigrant group. Namely, the analysis demonstrates that the probability of being downward mobile is higher by 6.1 percentage points for Central-Eastern Europeans compared to Germans. This is in line with the observation made in the second part of the analysis that highly educated parents from Central-Eastern Europe seem to encounter some barriers to passing on their educational advantage to their children. Finally, the last model estimates the probability of being immobile compared to being upward or downward mobile. The results indicate that, with the exception of Northwestern Europeans, all immigrant groups are less likely to be immobile than Germans. In concrete terms, the probability of being immobile is 10.1 percentage points lower for Southern Europeans, 5.3 percentage points lower for Central-Eastern Europeans, and 5.8 percentage points lower for Others than for German natives. This finding suggests that immigrant children who grow up and obtain their education in Germany are generally more mobile than Germans, both downward and upward. Hence, the differences in educational attainment between immigrant children and their parents tend to be larger than for natives.

Table 5 Univariate Probit Model of Being Upward Mobile, Downward Mobile, or Immobile: Probit Coefficients and Marginal Effects

	Upward mobile (1)	Downward mobile (2)	Immobile (3)
Probit coefficients			
Southern Europeans	0.606***	-0.398***	-0.392***
	(0.0558)	(0.0595)	(0.0609)
Northwestern Europeans	-0.329**	0.476***	-0.128
	(0.138)	(0.147)	(0.156)
Central-Eastern	-0.0388	0.170***	-0.186***
Europeans	(0.0477)	(0.0494)	(0.0517)
Others	0.0805	0.0691	-0.207**
	(0.0770)	(0.0789)	(0.0874)
Marginal effects			
Southern Europeans	0.2341***	-0.1190***	-0.1013***
Northwestern Europeans	-0.1259**	0.1790***	-0.03701
Central-Eastern Europeans	-0.01535	0.0606***	-0.0526***
Others	0.03201	0.02406	-0.0580***

Notes: The estimated models are three univariate probit estimations, where the dependent variable is having more education than one's parents, less education than one's parents, and as much education as one's parents, respectively. The reported values are the probit coefficients and the marginal effects obtained after estimating the probit models. The latter indicate the change in the probability of being upward mobile, downward mobile, or immobile associated with a change in immigrant status from the reference category (Germans) while holding the rest of the variables at their mean values. The regression model includes controls for survey year, demographics, region, and family background. ***, **, and * represent statistical significance of the predicted probabilities at the 1, 5, and 10 percent level, respectively. Robust standard errors are reported in parentheses.
Source: SOEP(v37), own calculations.

7.3 Robustness and Sensitivity Checks

In this section, I test some alternative specifications to examine the robustness of my estimates. All robustness checks refer to the estimation of intergenerational elasticities based on equation (1). This is done for illustrative purposes. It is assumed that if the results for the intergenerational elasticities do not change considerably when using an alternative model specification for estimation, the same should hold true for the other analyses conducted in this paper. The findings of the robustness and sensitivity checks are summarized in the Appendix.

First, I examine whether the intergenerational elasticities change when only German-born children of immigrants are included in the study sample. That is, all foreign-born children who immigrated to Germany before the age of 7 are now excluded from the analysis. The results are presented in Table A2. It can be observed that the elasticity coefficients remain mostly unchanged. In particular, it is noteworthy that the elasticities for natives demonstrate a

substantial resemblance to those obtained in the primary analysis, both in terms of significance and magnitude. In turn, the coefficients of the interaction terms for the different immigrant groups differ slightly from those obtained in the main analysis. For example, when focusing on the preferred specification in column 3, we can observe that the interaction term for Southern European mothers increases slightly in magnitude (-0.146 vs. -0.130). Hence, the association between the mother's and the child's educational attainment decreases somewhat compared to the main analysis. The elasticity coefficient now indicates that a 1% increase in the mother's years of education is associated with an average change of 0.089% instead of 0.105% in an individual's educational attainment. In contrast, the association between the educational attainment of Southern European fathers and their children increases slightly. The coefficients suggest that if the education of a Southern European father increases by 1%, the average change in the education of their child is 0.183% instead of 0.151%. For Central-Eastern European mothers, a similar pattern can be observed as for Southern European mothers: the association between their education and that of their child decreases slightly compared to the main analysis. However, the only really notable difference in elasticities is found for Central-Eastern European fathers. Compared to the main analysis, the coefficient of the interaction term in specification 3 is not only somewhat smaller in magnitude, but it is also no longer significant. That means, there is no longer a significant difference in the association between the father's and the child's educational attainment from Germans. Yet, even in the primary analysis, the coefficient of the interaction term for Central-Eastern European fathers is significant only at the 10% level. Thus, this result does not represent a major change compared to the main analysis. Overall, it can be concluded that the results are largely robust to the exclusion of foreign-born children of immigrants. In particular, the main finding that the association between parental education and child education is smaller for immigrants than for natives remains.

In the second step, I investigate whether the results change when individuals with one German-born and one foreign-born parent (2.5 generation) are considered separately from the group of Germans. The results are presented in Table A3. Similar to the previous robustness analysis, it can be noted that while there are slight changes in the magnitude of certain coefficients, the significance of the main findings remains unaltered. As for the group of 2.5 generation immigrants, the interaction coefficient indicates that for mothers there is no significant difference in the association between their education and that of their child compared to Germans with two German-born parents. However, regarding the transmission of the father's education, the elasticity is significantly lower for the 2.5 generation group than for the native

group (0.219 vs. 0.271). Thus, it appears that individuals belonging to the 2.5 immigrant generation assume somewhat of an intermediary position between individuals with two native-born and individuals with two foreign-born parents.

In a final step, I examine whether the main findings change considerably when immigrants are grouped differently. For this purpose, I separate Turkish immigrants from the group of Southern Europeans and include a separate dummy variable for this subgroup when estimating the linear regression to obtain the elasticities. Moreover, I modify the composition of the Northwestern European group by adding immigrants from other Western countries (USA, Canada, Australia, and New Zealand) to it. The rationale behind this is to increase the group size and to verify if the significance of the coefficients of the interaction terms changes. The findings are summarized in Table A4. First, it can be noted that for Southern European mothers the elasticity coefficient decreases considerably when Turkish immigrants are excluded from the group. Instead of an average increase of 0.105% in an individual's educational attainment if the mother's education increases by 1%, under the new grouping the average increase is 0.034%. Moreover, the interaction term for Southern European fathers becomes insignificant, thus indicating that there is no significant difference in the transmission of the father's education to the child between Germans and Southern Europeans. For immigrants from Other regions, there is no considerable change in the elasticities. Lastly, the interaction term for Turkish mothers is also not significant. Hence, there is no statistically significant difference between the elasticity coefficients of native and Turkish mothers. However, it can be noted that the elasticity for Turkish fathers is statistically different from the coefficient for German fathers. The finding suggests that for a 1% increase in the education of a Turkish father, the average change in the child's educational attainment is 0.105%. Nevertheless, the main results remain stable also in this robustness check.

In addition to the robustness and sensitivity checks discussed, I also test whether the elasticities change when controlling for cohorts instead of year of birth or when keeping all cohorts available in the sample and not just those from 1940 onward. In both cases, the results remain stable. Moreover, I examine whether the fact that the association between the parents' and the child's educational attainment is smaller for most immigrant groups than for Germans changes if parental human capital is measured in a different way. Thus, instead of considering maternal and paternal educational attainment separately, I re-estimate the elasticities using the educational attainment of the parent with the highest education and using the mean of parental

educational attainment. In both cases, the elasticities are significantly lower for immigrants than for natives. The results of these additional estimations are not reported in this paper but are available upon request. Overall, the robustness and sensitivity analysis suggests that the results obtained in the primary analysis are very stable.

8 Discussion

The preceding analysis yields a series of findings that provide insight into the intergenerational educational mobility among immigrants and natives in Germany. The results of the first part of the analysis reveal that children with immigrant parents are generally more mobile than children with native parents. This is especially true for Southern Europeans and Central-Eastern Europeans, for whom both the elasticities and correlations are significantly lower than for Germans. Moreover, the magnitude of the differences is considerable in many cases. As for the group of Northwestern Europeans, the coefficients of the intergenerational elasticities and correlations indicate no statistically significant difference in educational persistence compared to Germans. Thus, it seems that like natives, the highly educated and socially well-accepted group of Northwestern Europeans experiences comparatively low mobility. Regarding the children of immigrants from Other regions, the findings are more mixed. While the elasticities reveal a significantly lower association with their parents' education than for natives, the correlations are not statistically significant. However, it must be noted that this is a very heterogeneous immigrant group, and it is therefore difficult to determine the causes of this observation. Another finding that emerges is that an increase in the father's education is associated with a larger average change in individual education than an increase in the mother's education across all subgroups. This seemingly larger effect of paternal education on an individual's educational attainment is in line with previous findings on intergenerational mobility in Germany. The finding that immigrants generally seem to be more mobile than Germans contrasts with the results of several studies that were conducted in the early 2000s. These studies mostly find a significant association between parental and child education for Germans, but not for immigrants (Dustmann, 2008; Gang & Zimmermann, 2000; Riphahn, 2005). However, the finding is in line with evidence presented in more recent papers, such as Bönke and Neidhöfer (2018). Moreover, much of the international literature on educational mobility also finds a weaker relationship between parental and child education among immigrants than among natives. The reason for this difference in mobility is difficult to determine. Bönke and Neidhöfer (2018) hypothesize that the lower educational persistence for

immigrants might be due to immigrants being positively selected in terms of motivation and ability. Another reason could be the high investment in children's education that immigrants make through the process of migration and in the host country. Alternatively, the higher mobility of immigrants could also be a consequence of the higher return migration of less integrated or successful individuals (Bönke & Neidhöfer, 2018). However, it might also be the case that immigrants just appear to be more mobile because of their overrepresentation at the bottom of the educational distribution and thus the lower threshold that immigrant children have to pass compared to native children. Thus, the higher degree of intergenerational mobility observed among immigrants may be primarily due to immigrant children closing the educational gap between their parents and natives. Nevertheless, based on the results of the present analysis, no conclusive statement can be made about the underlying causes of the different degrees of mobility among immigrants and natives.

The findings of the first analysis part motivate a comparison of individuals with a similar parental background. This is necessary to be able to draw more nuanced conclusions about the mobility patterns of different subgroups in Germany. For this reason, the probability of reaching a certain educational level given different parental education is examined by immigrant status. The results show that the predicted probabilities of achieving only a low educational level are generally lower for Germans than for immigrants, regardless of which educational category the parents are in. This does not apply to the group of Northwestern Europeans, for whom the predicted probabilities are not significant in most cases. At the same time, the predicted probabilities of obtaining the highest level of education are mostly higher for natives than for immigrants, irrespective of the parental educational background. The only important exception are the children of low educated Southern European immigrants, who have a higher predicted probability of obtaining the highest level of education than Germans with a similar background. However, the marginal effects suggest that many of the differences between immigrants and Germans are not statistically significant. For Southern Europeans, the only statistically significant finding is that they are more likely than Germans to have a low level of education if their parents have intermediate education. Hence, Southern Europeans do not seem to experience any advantages over natives in reaching high levels of education. In contrast, there are clear differences relative to natives that can be observed for Central-Eastern Europeans and Others. Having medium educated parents, these immigrants have a significantly lower probability of climbing up the social ladder (i.e., reaching the highest category) than Germans. At the same time, conditional on having highly educated parents, these immigrants are less

likely to end up in the highest educational category than Germans and more likely to end up in a lower category. Therefore, it seems that especially highly educated immigrants from Central-Eastern Europe and Other countries face barriers when trying to pass on their educational advantage to their children. This supports the "perverse openness" hypothesis, which states that for marginalized groups it can be more difficult to transmit the advantages they have achieved than for the majority society. This could be related to a lack of familiarity with the German education system or discrimination (Kristen & Granato, 2007). For Central-Eastern Europeans in particular, the findings are also consistent with the observation made in previous studies that immigrants from this region often receive comparatively low returns to their education in the labor market and that the disruptions in their careers and social environment seem to outweigh the positive context of their reception (Luthra, 2010). Furthermore, the results are in line with Kristen and Granato's (2007) finding that for Turkish immigrants higher parental education does not increase the probability of obtaining a high schooling degree as much as for natives. However, for all other immigrant groups and parental levels of education, the authors find no significant differences in the probability of reaching the highest level of education between immigrants and natives. This contrasts with the results obtained in the present study. That said, it should be noted that Kristen and Granato's (2007) analysis is limited to children still living in the parental household and is restricted to the subgroup of guest workers. Therefore, the results are not necessarily comparable. But there are also other studies that observe no difference in the opportunities that immigrants and natives have to obtain a high schooling degree (Bönke & Neidhöfer, 2018). Some researchers even conclude that immigrants seem to be less adversely affected by low parental education than natives (Luthra, 2010). However, these studies usually only consider secondary education. This is an important distinction from the present analysis.

The examination of the predicted probabilities of being upward mobile, downward mobile, and immobile compared to one's parents reveals additional interesting insights. The findings reflect that all immigrants except for Northwestern Europeans are more likely to be mobile, both downward and upward, than natives. This is not very surprising, considering that immigrant parents are on average lower educated than native parents. Consequently, to "catch up" with the generally higher educational attainment of Germans, the children of immigrants need to experience higher degrees of mobility. A closer look at the direction of mobility reveals that Southern Europeans have a significantly higher probability of being upward mobile and a lower probability of being downward mobile than Germans. Again, this is likely related to the lower threshold that Southern Europeans have to pass. This suggests that the initial disadvantage can

be overcome. For the group of Northwestern Europeans, the results show that they are less likely to be upward mobile and more likely to be downward mobile than Germans. This latter observation is somewhat surprising, as one might expect the children of Northwestern Europeans, who are already at the upper end of the educational distribution, to be more likely than Germans to be immobile but not downward mobile. There is no good explanation for this finding, though it should not be overinterpreted given the small group size of Northwestern Europeans and the estimates often being non-significant for this group. Finally, the analysis reveals a certain disadvantage for the group of Central-Eastern Europeans compared to Germans. Immigrants from this group are significantly more likely to be downward mobile than Germans. This supports the finding made earlier that highly educated parents from this region have difficulties in passing on their educational advantage to their children.

Despite the numerous insights gained in this study into the patterns of intergenerational educational mobility among immigrants and natives, the present analysis also has some limitations. A general difficulty in studying intergenerational mobility is finding a suitable data source that allows linking children to their parents. Although this is possible in the SOEP using pointers, the data set one obtains in this way is relatively small and does not allow a detailed examination of different immigrant groups. Therefore, in this study, I use the information on the parents' education and origin that is reported for each respondent in the SOEP. However, this means that potentially important independent variables cannot be included in the analysis (e.g., language use, social connections, or parents' degree of assimilation). Another important limitation of this study is that education received abroad may not be fully comparable to education received in Germany, which can lead to problems in estimating intergenerational mobility among immigrants and natives. Finally, it is also important to emphasize that the present analysis can only assess the correlation between the educational attainment of the parents and the child. However, the causal mechanisms underlying this relationship cannot be identified with the methods employed. Nor can the underlying reasons for mobility differences between immigrants and natives be conclusively determined.

Despite its limitations, the present study possesses notable strengths that set it apart from previous research. Specifically, to the best of my knowledge, it is the only study for Germany that undertakes such a detailed examination of intergenerational mobility among immigrants and natives. By including a wide range of mobility measures, various immigrant groups, the entire German territory, and the whole educational trajectories of individuals, this study strives

to achieve a thorough understanding of the patterns of intergenerational persistence and mobility, as well as disparities across population groups. Moreover, the analysis draws upon a sizable data sample, which enhances the accuracy and reliability of the findings. Another strength lies in the inclusion of both maternal and paternal educational attainment, allowing for a more nuanced comprehension of the transmission of human capital from parents to offspring. Lastly, a multitude of robustness and sensitivity checks confirm the stability of the results.

9 Conclusion

Immigrants and their children represent a growing share of the German population. Their assimilation and integration into German society is therefore the object of interest of many scientific studies. However, while there are numerous studies examining the educational attainment of immigrants in comparison to natives, there is still relatively little research on intergenerational educational mobility among immigrants and natives. In light of this, the objective of the present analysis is to obtain a better understanding of the association between parental and individual education for immigrants and natives in Germany.

The results obtained in this study reveal that the association between the educational attainment of parents and children is significantly lower for most immigrant groups than for natives. Thus, immigrants generally exhibit higher degrees of educational mobility. This is particularly the case for immigrants from Southern European countries. A possible explanation for this might be the on average lower starting point of immigrants. Immigrants may appear more mobile because the threshold that they have to pass is lower than for natives. Thus, this finding might mainly reflect an intergenerational "catch-up" in education. An exception in this regard is the group of Northwestern Europeans. For immigrants from this group, the intergenerational persistence in education does not significantly differ from that of natives. In addition, it can be observed that across all population groups, an increase in the father's education is associated with a larger average change in individual educational attainment than an increase in the mother's education.

The comparison of individuals with a similar parental education background suggests that native children generally have a lower predicted probability of obtaining a low level of education and a higher probability of reaching a high level than immigrants. This holds true across all levels of parental education. This result indicates a slight disadvantage for immigrants compared to Germans. However, with a few exceptions, the differences are not substantial and,

in many cases, not statistically significant. The largest differences are apparent for individuals with highly educated parents from Central-Eastern Europe and Other regions. For both groups, the probability of reaching the highest educational level is significantly lower than for Germans with highly educated parents. This suggests that highly educated immigrant parents from these regions face more challenges in passing on their educational advantage to their children than similarly educated native parents. This could be linked to a lack of familiarity with the education system or discrimination.

Finally, the analysis reveals that, with the exception of Northwestern Europeans, immigrants are less likely to be immobile relative to their parents than natives. In addition, the children of immigrants from Southern Europe have a significantly higher probability of being upward mobile than Germans. In contrast, Central-Eastern European and Northwestern European immigrant children are significantly more likely to be downward mobile than natives. For Southern Europeans, this observation is most likely linked to their generally lower starting point and for Central-Eastern Europeans to the phenomenon of "perverse openness".

Future research should extend beyond the identification of mere correlations and strive to establish causality, thereby facilitating a more comprehensive analysis of intergenerational mobility and potential variations across immigrant statuses. Moreover, future investigations should examine not only educational but also occupational and income mobility. Such a multifaceted approach would advance our understanding of the intergenerational transmission of human capital. Additionally, forthcoming studies may benefit from the inclusion of other control variables, such as language use, parental degree of assimilation, or neighborhood attributes. Such an expanded analytical framework would enable the exploration of heterogeneity in intergenerational mobility.

Based on the findings of the present study, it is advisable for policymakers to prioritize efforts aimed at supporting the social and economic integration of immigrant parents, which could be accomplished through targeted education and training programs. Such initiatives would not only benefit immigrant parents but via the transmission of human capital also their offspring (OECD, 2017). Additionally, it is crucial to provide increased support to immigrants during the transition from elementary to secondary school, as this represents a pivotal decision point in an individual's education. To facilitate informed decision-making, immigrant parents and their children should be provided with information on various schooling options and receive assistance to overcome barriers that may hinder them from accessing their preferred school type

(Gries, Redlin & Zehra, 2022). Furthermore, implementing counseling or mentorship programs could prove beneficial in enhancing immigrants' familiarity with the educational system and helping them expand their professional networks (OECD, 2017). Lastly, it is crucial to introduce effective policies to protect immigrants from discrimination and structural racism in the educational system (Gries, Redlin & Zehra, 2022). Adopting these and similar measures is essential to ensure equal educational opportunities for all population groups in Germany.

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Appendix

Table A1 OLS Regression Model: Intergenerational Elasticities (Complete Results)

	(1)	(2)	(3)
Intergenerational elasticity			
Germans			
ln(Years of maternal education)	0.204***	0.252***	0.235***
	(0.00774)	(0.00766)	(0.00802)
ln(Years of paternal education)	0.291***	0.277***	0.267***
	(0.00714)	(0.00683)	(0.00715)
Other ethnicities			
ln(Years of maternal education) x Southern European	-0.121***	-0.144***	-0.130***
	(0.0354)	(0.0345)	(0.0424)
ln(Years of maternal education) x Northwestern European	-0.0206	-0.0501	-0.0583
	(0.0883)	(0.0844)	(0.105)
ln(Years of maternal education) x Central-Eastern European	-0.0578*	-0.0925***	-0.0985***
	(0.0305)	(0.0286)	(0.0321)
ln(Years of maternal education) x Other	-0.0151	-0.0714	-0.131**
	(0.0511)	(0.0503)	(0.0558)
ln(Years of paternal education) x Southern European	-0.213***	-0.204***	-0.116***
	(0.0332)	(0.0327)	(0.0404)
ln(Years of paternal education) x Northwestern European	-0.0938	-0.0738	-0.0744
	(0.0929)	(0.0853)	(0.0988)
ln(Years of paternal education) x Central-Eastern European	-0.00384	-0.0549*	-0.0575*
	(0.0326)	(0.0291)	(0.0311)
ln(Years of paternal education) x Other	-0.0747	-0.124***	-0.130**
	(0.0475)	(0.0453)	(0.0528)
Dummies for immigrant status			
Southern European	0.753***	0.781***	0.572***
	(0.0732)	(0.0715)	(0.0896)
Northwestern European	0.346	0.298	0.327
	(0.250)	(0.218)	(0.244)
Central-Eastern European	0.153**	0.324***	0.350***
	(0.0751)	(0.0698)	(0.0771)
Other	0.175*	0.448***	0.624***
	(0.105)	(0.107)	(0.117)
Additional controls			

Female		0.00375**	0.00259
		(0.00187)	(0.00200)
Childhood in an urban environment		-0.00284	-0.00611**
		(0.00235)	(0.00246)
Number of siblings			-0.0176***
			(0.000779)
Age of the mother when the child was 10			0.00188***
			(0.000301)
Age of the father when the child was 10			0.00153***
			(0.000253)
Constant	1.207***	1.090***	1.123***
	(0.0182)	(0.0228)	(0.0267)
Survey year	Yes	Yes	Yes
Year of birth	No	Yes	Yes
Federal state	No	Yes	Yes
R^2	0.193	0.265	0.277
Observations	32,078	32,078	27,423

Notes: This table presents the results of a linear regression model. The dependent variable is an individual's log years of education. ***, **, and * represent statistical significance of the regression coefficients at the 1, 5, and 10 percent level, respectively. Robust standard errors clustered by household of origin are reported in parentheses.
Source: SOEP(v37), own calculations.

Table A2 Robustness Check: Intergenerational Elasticities (Sample restricted to German-born individuals)

	(1)	(2)	(3)
Germans			
Mother	0.205***	0.252***	0.235***
	(0.00779)	(0.00773)	(0.00808)
Father	0.291***	0.277***	0.267***
	(0.00718)	(0.00687)	(0.00719)
Southern Europeans			
Mother	-0.145***	-0.173***	-0.146***
	(0.0407)	(0.0385)	(0.0470)
Father	-0.184***	-0.174***	-0.0839*
	(0.0380)	(0.0366)	(0.0438)
Northwestern Europeans			
Mother	-0.103	-0.134	-0.190
	(0.0995)	(0.0893)	(0.124)
Father	-0.0148	-0.0261	0.000293
	(0.104)	(0.0963)	(0.126)
Central-Eastern Europeans			
Mother	-0.0687**	-0.115***	-0.127***
	(0.0339)	(0.0322)	(0.0363)
Father	0.0101	-0.0541*	-0.0486
	(0.0345)	(0.0313)	(0.0349)
Others			
Mother	0.0232	-0.0397	-0.130*
	(0.0664)	(0.0638)	(0.0709)

Father	-0.0870	-0.152***	-0.157**
	(0.0583)	(0.0544)	(0.0654)
R^2	0.188	0.261	0.276
Observations	31,075	31,075	26,767

Notes: This table presents the results of a linear regression model. The dependent variable is an individual's log years of education. ***, **, and * represent statistical significance of the regression coefficients at the 1, 5, and 10 percent level, respectively. Robust standard errors clustered by household of origin are reported in parentheses.
Source: SOEP(v37), own calculations.

Table A3 Robustness Check: Intergenerational Elasticities (Including a separate dummy for 2.5 immigrant generation)

	(1)	(2)	(3)
Germans			
Mother	0.199***	0.251***	0.235***
	(0.00815)	(0.00809)	(0.00840)
Father	0.298***	0.284***	0.271***
	(0.00753)	(0.00722)	(0.00749)
Southern Europeans			
Mother	-0.117***	-0.143***	-0.130***
	(0.0355)	(0.0346)	(0.0424)
Father	-0.220***	-0.211***	-0.120***
	(0.0333)	(0.0328)	(0.0404)
Northwestern Europeans			
Mother	-0.0160	-0.0489	-0.0585
	(0.0882)	(0.0844)	(0.105)
Father	-0.101	-0.0810	-0.0793
	(0.0929)	(0.0853)	(0.0989)
Central-Eastern Europeans			
Mother	-0.0534*	-0.0914***	-0.0987***
	(0.0306)	(0.0288)	(0.0322)
Father	-0.0107	-0.0620**	-0.0623**
	(0.0327)	(0.0292)	(0.0312)
Others			
Mother	-0.0102	-0.0701	-0.131**
	(0.0512)	(0.0505)	(0.0560)
Father	-0.0817*	-0.132***	-0.135**
	(0.0476)	(0.0454)	(0.0528)
2.5 generation			
Mother	0.0421*	0.0110	-0.00286
	(0.0253)	(0.0230)	(0.0253)
Father	-0.0638***	-0.0678***	-0.0525**
	(0.0232)	(0.0215)	(0.0236)
R^2	0.193	0.265	0.277
Observations	32,078	32,078	27,423

Notes: This table presents the results of a linear regression model. The dependent variable is an individual's log years of education. ***, **, and * represent statistical significance of the regression coefficients at the 1, 5, and 10 percent level, respectively. Robust standard errors clustered by household of origin are reported in parentheses.
Source: SOEP(v37), own calculations.

Table A4 Robustness Check: Intergenerational Elasticities (Including a separate dummy for Turkish immigrants)

	(1)	(2)	(3)
Germans			
Mother	0.204***	0.252***	0.235***
	(0.00774)	(0.00766)	(0.00802)
Father	0.291***	0.277***	0.267***
	(0.00714)	(0.00683)	(0.00715)
Southern Europeans			
Mother	-0.161***	-0.202***	-0.201***
	(0.0502)	(0.0481)	(0.0666)
Father	-0.164***	-0.162***	-0.0422
	(0.0475)	(0.0458)	(0.0638)
Northwestern Europeans			
Mother	0.00697	-0.0252	-0.0452
	(0.0873)	(0.0827)	(0.102)
Father	-0.120	-0.0940	-0.0978
	(0.0890)	(0.0805)	(0.0925)
Central-Eastern Europeans			
Mother	-0.0577*	-0.0925***	-0.0985***
	(0.0305)	(0.0286)	(0.0321)
Father	-0.00377	-0.0548*	-0.0576*
	(0.0326)	(0.0291)	(0.0311)
Others			
Mother	-0.0185	-0.0741	-0.133**
	(0.0513)	(0.0507)	(0.0563)
Father	-0.0699	-0.120***	-0.125**
	(0.0481)	(0.0460)	(0.0538)
Turkish			
Mother	-0.113**	-0.116**	-0.0828
	(0.0486)	(0.0478)	(0.0549)
Father	-0.242***	-0.231***	-0.162***
	(0.0447)	(0.0447)	(0.0512)
R^2	0.193	0.265	0.277
Observations	32,078	32,078	27,423

Notes: This table presents the results of a linear regression model. The dependent variable is an individual's log years of education. ***, **, and * represent statistical significance of the regression coefficients at the 1, 5, and 10 percent level, respectively. Robust standard errors clustered by household of origin are reported in parentheses.
Source: SOEP(v37), own calculations.

Table A5 Codification of Parental Years of Education (SOEP variables: *msedu, fsedu, mprofedu, fprofedu*)

Schooling	Years	Additional occupational training (including university)	Years
No degree	7	No additional training	0
Lower school degree (Hauptschule)	9	Apprenticeship, Civil servants apprenticeship, Trained in a foreign company	1.5
Intermediary school (Realschule, Mandatory schooling abroad)	10	Technical schools (incl. health)	2
Degree for a professional college (Fachoberschule)	12	Higher technical college	3
High school degree (Abitur, Continuing schooling abroad)	13	University degree	5
Other	10	Other	1.5

Notes: The codification of the variable follows the official SOEP codification of the variable "pgbilzeit", which is part of the "pgen" dataset and used for the children. The school years and additional occupational training (including university) are added together.

Table A6 Codification of Level of Education (SOEP variables: *pgpsbil, pgpbbil01*, *pgpbbil02*, *msedu*, *mprofedu*, *fsedu*, *fprofedu*)

Level of education	
Low *(less than high school)*	Intermediate secondary school (Realschule), Lower secondary school (Hauptschule), Other, None
Medium *(high school)*	High school degree (Abitur, Fachhochschulreife), Apprenticeship, Specialized vocational school (Berufsfachschule)
High *(more than high school)*	School of health care, Civil service training (Beamtenausbildung), Specialized college (Fachhochschule), College (Hochschule, Universität)

Notes: The codification of the variable follows the official SOEP codification of the variable "D11108$$", which is part of the "pequiv" dataset.

Table A7 Codification of the Parents' Countries of Origin as the Child's Immigrant Status (SOEP variables: *morigin*, *corigin*)

Immigrant status	Countries of origin
German	Germany
Central and Eastern Europe	Albania, Armenia, Azerbaijan**,** Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Eastern Europe, Estonia, Ex-Yugoslavia, Georgia**,** Hungary, Kosovo, Kosovo-Albania, Latvia, Lithuania, Macedonia, Moldavia, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Ukraine
South Europe	Cyprus, Greece, Italy, Portugal, Spain, Turkey
North and West Europe	Austria, Belgium, Benelux, Denmark, Finland, France, Great Britain, Ireland, Luxemburg, Monaco, Netherlands, Norway, Sweden, Switzerland
Other	Afghanistan, Africa, Algeria, Angola, Argentina, Australia, Bahamas, Bahrain, Bangladesh, Belize, Benin, Bhutan, Bolivia, Botswana, Brazil, Burkina Faso, Cambodia, Cameroon, Canada, Cap Verde, Chad, Chile, China, Colombia, Congo, Costa Rica, Cuba, Djibouti, Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Eritrea, Ethiopia, Ethnic Minority, Gambia, Ghana, Grenada, Guatemala, Guinea, Guyana, Haiti, Honduras, Hong Kong, India, Indonesia, Iran, Iraq, Israel, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Korea, Kurdistan, Kuwait, Kyrgyzstan, Laos, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Maldives, Mali, Mauritius, Mexico, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, New Zealand, Nicaragua, Niger, Nigeria, No Nationality, Oman, Pakistan, Palestine, Panama, Paraguay, Peru, Philippines, Puerto Rico, Qatar, Rwanda, Samoa, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, Somalia, South Africa, Sri Lanka, Sudan, Surinam, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Trinidad-Tobago, Tunisia, Turkmenistan, UAE, Uganda, Uruguay, USA, Uzbekistan, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe

Notes: Individuals who have one German-born and one foreign-born parent are coded as being German. Individuals whose parents belong to different immigrant groups are included in the "Other" group.