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Beyond the Average: Ethnic Capital Heterogeneity and Intergenerational Transmission of Education[☆]

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Abstract

Estimating the effect of ethnic capital on human capital investment decisions is complicated by the endogeneity of immigrants' location choice, unobserved local correlates and the reflection problem. We exploit the institutional setting of a rare immigrant settlement policy in Germany, that generates quasi-random assignment across regions, and identify the causal impact of heterogeneous ethnic capital on educational outcomes of children. Correcting for endogenous location choice and correlated unobservables, we find that children of low-educated parents benefit significantly from the presence of high-educated parental peers of the same ethnicity. High educated parental peers from other ethnicities do not influence children's learning achievements. Our estimates are unlikely to be confounded by the reflection problem since we study the effects of parental peers' human capital which is pre-determined with respect to children's outcomes. Our findings further suggest an increase in parental aspirations as a possible mechanism driving the heterogeneous ethnic capital effects, implying that profiling peers or ethnic role models could be important for migrant integration policies.

Keywords: Education; Ethnic Capital; Germany; Peer Effects; Policy Experiment

JEL Codes: R23, J15, I21

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1. Introduction

In this paper we use a rare immigrant settlement policy in Germany to estimate the non-linear effect of local ethnic capital on the extent to which immigrant parents invest towards their children's education. An overwhelming proportion of research in labor and migration economics involves the economic assimilation of immigrants. Education is unequivocally considered to be the most important facilitator in the assimilation process. Interest in immigrants' educational attainment has been on the rise in recent decades. This is particularly true for Europe where past research has shown a lack of educational integration of second-generation immigrants from certain ethnicities (Österberg, 2000; Nielsen et al., 2003; Van Ours and Veenman, 2004). Coupled with this, the evidence on low intergenerational education and earnings mobility has led to a widely held belief that low-skilled immigrants are particularly unlikely to assimilate with the native population (Hammarstedt and Palme, 2006). For instance, a dominant perception in Germany, evident in media, public discourse, and opinion polls, is that of a failed integration of some immigrant groups. Evidence from other regions suggests a similar experience. In the US, educational differentials observed for Italians, Scottish and Mexicans with respect to natives in 1910 persisted 60 years later (Leon, 2005).

On the other hand, evidence suggests that the rate of intergenerational persistence varies significantly across immigrants from different ethnicities. In Canada, for instance, second-generation immigrants from Mexico and some South American countries show much lower levels of intergenerational mobility compared to Asians and Africans, who fare better than natives in terms of both educational achievements and labor market outcomes (Finnie and Mueller, 2009).[1] A large section of academic research attributes these differences in intergenerational transmission rates to nurture, genetic or cultural factors (Crul and Vermeulen, 2003; Black et al., 2005).

However, a second strand of literature points to the importance of childhood

[1]Dissimilar convergence rates are also observed across the different *Aussiedler* ethnicities in Germany who are subject of our study. Figure A1 in Online Appendix shows that intergenerational persistence in education varies significantly across immigrants coming from different source countries.

environment, in addition to parental influence, in determining children's education outcomes. Borjas (1995) notes that individuals raised in advantageous ethnic environments are more likely to experience better economic outcomes. The presence of ethnic externalities affects the skill acquisition of subsequent immigrant generations and this may lead to a delay in the convergence of ethnic differentials in education.[2] If indeed 'ethnic capital' explains differences in skill acquisition across generations of different ethnic groups, then it would provide a rationale for policies that affect immigrants' location choice. While there is a large literature providing experimental or quasi-experimental estimates of the impact of residential segregation on adult labor market outcomes, there is a paucity of literature when it comes to the causal estimation of local ethnic peer effects on children's economic mobility (Chetty and Hendren, 2016).[3] This is despite the fact that migrant children hold a key position with respect to migrants' long-term economic progression and integration in the host country (Åslund et al., 2011). Studies that directly estimate the ethnic capital effect on children's education include Borjas (1995), Cortes (2006), and Åslund et al. (2011). While Borjas (1995) introduces 'ethnic-capital', Cortes (2006) uses propensity score matching to estimate ethnic capital effects across schools. Åslund et al. (2011) are the first to provide quasi-experimental estimates by estimating the effect of the higher part of the ethnic-capital distribution on immigrant children's education outcomes.

We use a quasi-experimental setup to estimate the effect of the distribution of ethnic capital on immigrant children's education achievement in Germany. We measure ethnic capital as the education composition of parental peers. With respect to an immigrant child, this refers to the group of people immigrating from the same country, of the same age cohort and located in the same geographic region as the

[2] We observe a similar pattern amongst *Aussiedler* immigrants in Germany. In Figure A2 in the Online Appendix, children exhibit a higher probability of high educational attainment if their ethnic group has a higher fraction of high-educated individuals.

[3] See Cutler and Glaeser (1997), Bertrand et al. (2000) or Åslund and Fredriksson (2009) for the effect of residential segregation on adult outcomes.

child's parents (see Section 4.1 for further details).[4] We test for the sensitivity of our results to the alternative definitions of ethnic capital by allowing for more flexible peer-ethnicity (Section 5.3.3), and narrower geographic levels (Section 5.3.2). Our preferred specification rests on the broader geographic unit as the number of observations in our data are much lower at narrower levels. Note that the variance of local effects across these broad geographies is a lower bound for the total variance of ethnic capital effects in the more immediate geographic neighborhood (Chetty and Hendren, 2016).[5]

We contribute to the ethnic capital literature in the following ways. First, our quasi-experimental setting helps us to address the three identification concerns raised by Manski (1993, 2003): (a) 'Endogenous group membership' complicates the identification of local peer effects since individuals tend to co-reside with those who have shared attributes. We address this by exploiting the 'Assigned Place of Residence Act' (*Wohnortzuweisungsgesetz*) in Germany which exogenously assigned *ethnic German* immigrants to various locations of Germany according to which pre-specified quotas.[6] This helps us to identify the effect of ethnic capital, i.e. skill composition of the parental generation on the children of newly arrived ethnic German immigrants. (b) 'Correlated unobservables' raise the possibility of incorrectly attributing the influence of shared environment to the influence of parental peers. We compare outcomes across ethnicities and within regions to eliminate the possibility of shared correlates. (c) The 'reflection problem' makes it difficult to identify the direction of peer effects within a group. In our case, the possibility of a reflection problem does unlikely arise since we estimate the effect of pre-determined

[4]Our interest in this paper is to study the effect of ethnic capital. Wherever we have used the term 'parental peers', we imply ethnic capital, i.e. the human capital of the group of people that immigrant parents refer to when deciding on educational investment on their children.

[5]Similar to e.g. Chetty and Hendren (2016), we specify ethnic capital (or parental peer) effects at two geographic levels: *Anpassungsschichten*, which are regional units comprising an urban center and the respective hinterland, roughly similar to commuting zones in the U.S., and the more aggregate NUTS-2 districts (*Regierungsbezirke*). The variance of local effects across these broad geographies is a lower bound for the total variance of ethnic capital effects in the more immediate geographic neighborhood.

[6]Strictly speaking, we exploit a modified version of the policy introduced in 1996 as detailed in Section 2. Glitz (2012) exploits the same policy to estimate the effect of ethnic German immigrant inflows on natives' labor market outcomes.

human capital of parental peers on children's outcomes.

Second, we estimate the effect of local peer *heterogeneity*, unlike the previous ethnic capital literature focusing on either the average effect of the peer group (Borjas, 1995) or only on the fraction of high-educated peers (Åslund et al., 2011).[7] The extreme tails in the distribution of neighborhood ability might generate different peer effects. These effects are likely to latch on to the estimate of the effect of average ability when only the latter is observed (Lavy et al., 2012). Consider, for instance, three different distributions of peer ability represented by Population-1 (P1), Population-2 (P2), and Population-3 (P3) in Figure 1 and Figure 2. Suppose distributions P1 and P2 have the same mean but P1 has a higher probability mass on the right tail than P2. In the extreme case, P2 could have the entire mass located at the mean. Borjas (1995) implicitly assumes that P1 and P2 would have identical effects. However, it is entirely possible that the relevant peers who affect parental expectations and aspirations are only the very highly educated, located in the right tail of P2. Next, consider P3 with a higher mean than P1 or P2 but identical to P1 in terms of the mass in the higher tail. Åslund et al. (2011) restrict P3 and P1 to have the same peer effect, which need not be the case since P3 and P1 are not comparable distributions in terms of their masses in the lower tail. In other words, the composition in the distribution's lower tail might have independent peer effects that, when not controlled for, become confounded with the higher tail. Our specifications allow the low and high ends of the parental-peer education distribution to have different effects on children's educational attainment.

Figure 1 about here

Figure 2 about here

Third, individuals' overall educational attainment is an important instrument for policies targeting greater immigrant integration. However, educational attainment of adolescents could be a joint decision of the parents and the children themselves,

[7] Although not in the ethnic capital literature, asymmetries in peer effects coming from different parts of the distribution have been shown in the context of classroom or school peers (Lyle, 2009; Duflo et al., 2011; Lavy et al., 2012; Carrell et al., 2013).

driven either by parental aspirations or by the child's own expected returns to education. It becomes difficult to disentangle the two mechanisms when we observe children at ages close to completion of their education. Yet, identifying the effect of each component is important since policies that aim to improve immigrant children's educational attainment via information provision need to be targeted effectively (Giustinelli, 2010). The context of Germany provides a unique possibility to identify the role played by parental peers in affecting children's education outcomes through the channel of parental aspirations. Since Germany follows a tracking system in lower secondary school, an individual's long-run educational outcome is strongly correlated with the school type he or she is tracked into at the age of ten, approximately. Under the assumption that parental influence matters more at early ages, our estimates reflect the effect of ethnic peers on parental investment in children.[8]

Finally, previous research uses refugee settlement policies to identify immigrant peer effects (Åslund et al., 2011). However, refugees form a very specific group that cannot be generalized as regular labor migrants. The policy intervention in our case focuses on ethnic German immigrants (so-called *Aussiedler*) in Germany. This group, living in large numbers in Central and Eastern Europe and the former Soviet Union, had the opportunity to immigrate to Germany at the end of the Cold War. Importantly, unlike refugees, *Aussiedler* immigrants are similar to other immigrants in Germany in terms of their reasons to migrate and German language skills. Using data from the German Socio-Economic Panel (SOEP) we find that ethnic German immigrants, whose migration is mainly motivated by economic opportunities, closely resemble the group of regular labor migrants. On the other hand, refugee immigrants differ significantly from regular migrants on these counts (see Table A1 and A2 in the Online Appendix; see also Haug (2005), p.270).

Overall, we find that the average education of the parental peers does not affect immigrant children's educational outcomes. However, these children benefit signif-

[8]Note that parental investment in children in the case of tracking can happen in multiple ways. Parents might spend more time to teach children at home so that they attain higher tracks, invest in private coaching, or simply try to influence the school teacher to recommend the children to higher grades.

icantly from the presence of high-educated parental peers, after controlling for the peer group's average education. On the other hand, the presence of low-educated parental peers does not adversely affect children's educational achievements. These results are robust to a range of flexible definitions of the peer group. Cunha and Heckman (2007) suggest that the impact of environment is more pronounced in disadvantaged families. We find a similar effect when we conduct the above analysis separately for different levels of parental education. We find that the primary beneficiaries of a 'good' parental peer are households located in the lower part of the education distribution.

After addressing the 'endogenous group membership' issue, our estimates suggest that a one-percent higher fraction of high-educated parental peers increases the probability of attending the highest education track by 3.5 percent for children whose parents are relatively low-educated. After correcting for the possibility of 'correlated unobservables', the estimated effect falls to 2 percent underscoring the importance of correcting for each of these identification problems to unveil the true peer effect.

Further investigation reveals a set of interesting evidence. First, *Aussiedler* parents learn only from peers immigrating from the same country of origin and not from other immigrants. Second, the positive influence of the high-educated parents on low-educated parents is stronger in more polarized groups. Third, most of the positive peer effects seem to be driven by the effect of female parental-peers on female children.

The paper is organized as follows: Section 2 narrates the historical background of the policy. Section 3 outlines the empirical framework. Section 4 provides information on data sources and Section 5 reports the results. Section 6 concludes.

2. Policy Background

2.1. Historical Background

This study focuses on the ethnic German immigrants to Germany. This group consists of individuals of German descent who lived in the pre-1945 German Reich eastern territories and Germans whose ancestors had emigrated from Germany in the 18th century to Eastern Europe, mainly to Romania and the former Soviet

Union. After the end of World War II and the following repartitions, about 15 million German citizens became refugees or expellees (Zimmermann, 2000). While most of them moved back to Germany in the immediate postwar period, many German citizens and ethnic Germans decided not to move or were restricted from resettling with the post-World-War-II isolation of Eastern European countries and the construction of the Berlin Wall in 1961, which brought resettlement movements practically to a standstill.

By the end of the 1980s, the fall of the Iron Curtain caused a resurgence of ethnic German migrations with immediate and massive inflows from the former Soviet Union and Warsaw Pact countries. Within five years, from 1988 to 1992, more than 1.4 million ethnic Germans emigrated from these countries to Germany (Herbert, 2001). Among this earlier wave of ethnic German immigration, the main source countries were Poland and Romania (only about 7 percent came from the former Soviet Union). In the mid-1990s the inflows were strongly dominated by immigrants from the former Soviet Union, mainly Kazakhstan, Kyrgyzstan, Uzbekistan, the Russian Federation and Ukraine (Haug and Sauer, 2007) (see Figure 3).[9] This switch in the composition of sending countries was caused by a law passed in 1993, which set the yearly quota of ethnic German immigrants to 225,000. The law also required immigrants from countries other than the former Soviet Union to prove they had been subject to discrimination due to their German ethnicity (Dietz, 2010; BAMF, 2013).

Figure 3 about here

2.2. Institutional Setting – The "Assigned Place of Residence Act"

Ethnic German immigration to Germany has been unique in several aspects. For example, upon arrival in Germany ethnic German immigrants automatically gained German citizenship. Ethnic Germans with an intention to migrate to Germany had to apply in their country of origin for admission and provide proof of their German

[9] In the period 1990 to 2011 most ethnic German immigrants came from Kazakhstan (926,367), the Russian Federation (699,395), Poland (206,846), Romania (187,925), Kyrgyzstan (73,807) and Ukraine (41,198) (BAMF, 2013).

ethnicity in terms of descent and language skills. In the early years, the inflow of ethnic Germans represented a highly unbalanced in-migration to specific regions accelerated by chain migration and family reunification. This caused considerable housing shortages in some regions while facilities in other, more rural areas remained empty (Haug and Sauer, 2007). To avoid capacity overload and to ensure a more even distribution across Germany, the allocation of Ethnic Germans to various parts of Germany was centrally regulated starting from 1989. The legal basis of this allocation process was §8 of the *Bundesvertriebenengesetz* (BVFG) as well as the Assigned Place of Residence Act (*Wohnortzuweisungsgesetz* - WoZug, effective until 31.12.2009) established in 1989. Once admission had been granted, all immigrants arrived at a central admission center in Lower Saxony, where they were registered and allocated to one of the federal states according to pre-defined quotas. These quotas, defined in the Königsteiner Distribution Key, at the federal level were determined by a weighted combination of tax base and population size with two-thirds and one-third weights respectively (§8 Abs.3 BVFG – *Königsteiner Schlüssel*).[10] Within each federal state, they were then further allocated to specific counties (*Kreise*) based on quotas that were determined by the region's population share. Importantly, quotas did not depend on demographic characteristics of the incoming immigrants.

However, until 1996, non-compliance to the official allocation was not costly for an immigrant family in that entitlement to financial and social assistance was not conditional on compliance. Therefore, in practice the law was ineffective. To fix the loop-hole, the Assigned Place of Residence Act was substantially modified in February 1996 (WoZuG 1996). Post 1996, ethnic German immigrants were entitled to receive earmarked financial and social benefits only if they complied with

[10]The quotas according to the Königsteiner Distribution Key since 1993 were: Baden-Württemberg 12.3%, Bavaria 14.4%, Berlin 2.7%, Brandenburg 3.5%, Bremen 0.9%, Hamburg 2.1%, Hesse 7.2%, Mecklenburg-Pomerania 2.6%, Lower Saxony 9.2%, North Rhine-Westphalia 21.8%, Rhineland Palatinate 4.7%, Saarland 1.4%, Saxony 6.5%, Saxony-Anhalt 3.9%, Schleswig-Holstein 3.3%, and Thuringia 3.5% (Glitz, 2012).

the allocation decision (Haug and Sauer, 2007, §3a Abs.1 WoZuG 1996).[11] Exceptions were the federal states of Rhineland-Palatinate and Bavaria, which chose not to implement the new law (see Table 1). Lower Saxony and Hesse adopted the law later on: Lower Saxony in April 1997 and Hesse in January 2002 (Glitz, 2012). Similarly, the East-German states of Brandenburg, Saxony-Anhalt an, Thuringa and Mecklenburg-West Pomerania adopted the law with some delay. We hence exclude Rhineland-Palatinate and Bavaria from our analysis since the allocation decision was not binding there. For those federal states which experienced a delayed implementation (Lower Saxony and Hesse and most East-German states), we exclude those years in which the law was not (yet) binding.

Table 1 about here

In terms of compliance with the official allocation decision, the modified Assigned Place of Residence Act was deemed successful by the Ministry of the Interior as well as the Association of German Cities and Towns (Glitz, 2012). The Assigned Place of Residence Act was in effect until the end of 2009 without a successor legislation, implying that the regulations defined in this law have had no legislative basis since 2010. We hence restrict our analysis to ethnic Germans who immigrated to Germany in the period from 1996 to 2009.

2.3. Non-compliance and Post-assignment Mobility

The post 1996 legislation of the Assigned Place of Residence Act provides a quasi-experimental setting for the purpose of our study in as much as the location of ethnic German immigrants to different regions in Germany is exogenous. Importantly for our study, the immigrants' own skill level did not play any role at any point in the allocation process; nor was the skill composition of the destination county's population decisive of the allocation within federal states (Dietz, 2010).

In theory however, there are two potential threats to the exogeneity assumption of the 1996 policy: exemption from the allocation assignment and post-assignment

[11] Our back of the envelope estimations, based on the 2011 round of the German Socio-Economic Panel data, suggests that ethnic German immigrants receive monthly transfers of approximately 2,394 Euros.

mobility. First, immigrants could be exempt from the allocation assignment if they could prove that they had sufficient housing space and a permanent job, education or apprenticeship position elsewhere. They could also provide location preference to join family members who entered Germany before 1996. According to a survey study of ethnic German immigrants, initiated in 2006 by the Federal Office for Migration and Refugees (BAMF), only about 8 percent of post-1996 immigrants had not been subject to the Assigned Place of Residence Act. The predominant reason for exemption, indicated by this group, was co-location with relatives already residing in Germany. This raises sorting possibilities as well. If the relatives sorted in to specific neighborhoods, then the new immigrants would also be sorted in to these neighborhoods. However, the BAMF estimates suggest that this group forms only 3 percent of the entire sample of ethnic Germans who migrated post 1996. Only about 1.7 percent of the incoming migrants were assigned on the basis of some economic or educational preference (Haug and Sauer, 2007, p.117–118). Hence, sorting on skill composition of the destination county's population is unlikely to have driven allocation of incoming ethnic German immigrants post 1996.

A second threat could be post-assignment mobility. Following an amendment act from June 2000 (BGBl I p.775), the regional allocation of ethnic German immigrants became void three years after initial placement. Given that our observation period starts in 2007, it leaves some scope for endogenous movement of the ethnic Germans from the official assignment between 2000, when the assignment act was relaxed, and 2007, when we observe them. Various survey estimates , however, suggest very low rates of post-assignment mobility among ethnic Germans even before the policy was modified in 1996. Only about 3.4 percent moved from the originally assigned federal state and more than two-thirds of households even stayed within the same county (Mammey, 2003, p.114). The 2006 BAMF survey confirms the finding of rather low regional mobility. They find that 17 years after the beginning of the massive ethnic German in-migration, over two thirds of the survey respondents (comprising both pre and post 1996 immigrants) still lived in the very locality to which they had been initially assigned (Haug and Sauer, 2007, p.88).

Moreover, the assumption of low post-assignment mobility (of post 1996 immigrants) is more likely to hold at higher levels of aggregation. Hence, our analysis

is based at the level of administrative districts, i.e. at a more aggregate level than counties, the level at which allocation took place. Since immigrants were required to stick to the originally allocated county, they were effectively also bound to a larger geographic area, the administrative districts. If anything, sorting is likely to be lower across larger geographic areas. Moreover, administrative district aggregation helps us in capturing a whole range of parental peers. Parental peers can be friends in the immediate geographic neighborhood, parents of other children in school and people whom parents meet at other public places, e.g. at church or at the doctors. Measuring co-ethnic peers at the administrative district level averages over all potential spheres and frequent local meeting places (see Section 4.1 for more details).

To allay our concerns further, we provide a test of the exogeneity assumption based on the data used in our analysis. Table 2 provides descriptive evidence on the correlation between the (predetermined) education level of ethnic German parents who immigrated after 1996 and the education level of their local peers (see Section 4 for definition of parental peers). In other words, we examine whether the probability to reside in a district with a relatively high (above-median) share of highly educated peers is systematically related to pre-determined individual characteristics. Specifically we include mothers' and fathers' education levels, their age, household size as well as age at immigration of the child. We find no indication of any systematic associations. On the other hand, when we repeat this exercise for the sample of ethnic Germans who immigrated to Germany before 1996, and hence were outside the purview of the exogenous allocation, we find evidence of sorting. Mothers are more likely to be high educated in regions with a higher share of high educated co-ethnic Germans (results are reported in Table A3 in the Online Appendix). This lends further support to our assumption that the majority of ethnic German parents complied with the assigned (exogenous) placement at arrival and that regional mobility after assignment was low.

Table 2 about here

Together with the survey evidence and policy documentation discussed above, these findings suggest that the low rates of non-compliance to the 1996 legislation

and the low regional mobility in the post-assignment period are unlikely to have generated systematic sorting of incoming ethnic Germans to regions across Germany. Hence, the 1996 Assigned Place of Residence Act can be regarded as a quasi-experiment in which the education levels of incoming ethnic German immigrant families is exogenous to the local co-ethnic human capital composition. Our main findings in Section 5.2 provide further evidence that our estimates are unlikely to be driven by sorting of higher educated parents into regions with pre-existing high-educated co-ethnic individuals.

3. Empirical Specification

Our identification strategy rests on the exogenous allocation of ethnic German immigrants with respect to their peer composition. In identifying the effect of parental peers' skill composition on children's education outcomes we address the problem of sorting or 'endogenous group formation' by exploiting the exogenous placement of ethnic German immigrants, who arrived in Germany after 1996, across the different regions of Germany. Since the government exogenously determined the ethnic German households' location, the pre-existing ethnic capital distribution, faced by an ethnic German household at the time of entry, in the region where the household is allocated, is likely to be independent of the household's choices. Specifically, the policy exogeneity allows us to assume that parental investment decisions for children's education are orthogonal to location choice of the ethnic German parents who arrived in Germany post 1996. Regression equation (1) captures the identification coming from the exogenous allocation policy.

$$Y_{icry} = \alpha + \beta^{H} PA^{H}_{ry} + \beta^{L} PA^{L}_{ry} + \beta^{Mean} PA^{Mean}_{ry} + X_i + X_r + D_c + D_a + \varepsilon_{icry} \qquad (1)$$

Y_{icry} is a dummy variable indicating that child i, belonging to birth cohort c with year-of-immigration y and located in region r is tracked into higher education. The assignment policy allows us to assume that location 'r' is not an outcome of choice made by the ethnic German immigrant household. PA^{H}_{ry} is the fraction of immigrants from ethnic German origin countries with a high educational degree

who are already residing in region r in year y. Analogously, PA^{L}_{ry} is the fraction of immigrants from ethnic German origin countries with low or no educational degree in region r and year y. PA^{Mean}_{ry} is the mean education of immigrants from ethnic German origin countries in region r and year y. Together, PA^{L}_{ry}, PA^{H}_{ry} and PA^{Mean}_{ry} capture the composition of the local peer group. Our coefficients of interest are β^{H}, reflecting the effect of the highly educated parental peers, β^{L}, reflecting the effect of the low-educated peers, and β^{Mean}, which is the average peer quality effect. X_rs include various regional level characteristics like population size of immigrants from ethnic German origin countries and native Germans' mean educational level. X_is contain individual level controls such as gender and parental education. D_c captures cohort-of-birth fixed effects and D_a captures age-at-migration fixed effects. Effectively, the comparison is across children with the same years of exposure to the German education system, but with different peer compositions in different regions in which they are located, at the time of immigration.

In equation (1), the interpretation of the βs as causal estimates of ethnic capital effects rests on the absence of 'correlated unobservables'; in other words, regions with a higher ethnic capital are similar to regions with a lower ethnic capital in every other way. However, since this parental peer group includes immigrants and ethnic Germans who entered Germany prior to 1996, they were not affected by the 1996 modification of the Assigned Place of Residence Act and were not obliged to follow the exogenous assignment. Hence, they were likely to have sorted on the basis of various regional characteristics. For instance, high-educated individuals might have settled in regions with better labor markets. These pre-existing unobserved differences across regions might be correlated with the observed differences in educational outcomes of the ethnic German children in equation (1). To address this concern we turn to *within*-region differences in ethnic capital *across* various ethnic groups.[12] Specifically, we exploit differences in skill composition across different ethnicities, within the same region, to identify the effect of ethnic capital

[12] We are, however, unable to introduce district fixed effects due to insufficient variations in ethnic capital over time across various immigration years (of the child) within the same district. This is driven by the low influx of new immigrants relative to existing immigrants in the years after 1996.

on the children's education outcomes, according to Model (2).[13] The underlying assumption is that the peer effects flow from individuals of the same ethnicity. We revisit this assumption in Section 5.3.3.

$$Y_{icrye} = \alpha + \beta^H PA^H_{rye} + \beta^L PA^L_{rye} + \beta^M PA^M_{rye} + X_i + D_a + D_c + D_r + D_e + \varepsilon_{icrye} \quad (2)$$

Y_{icrye} is a dummy variable indicating that child i, belonging to birth cohort c with year-of-immigration y, located in region r and of ethnicity e is tracked into higher education. PA^H_{rye} is the fraction of co-ethnic parental peers with high educational degrees in region r and year y. PA^L_{rye} is the fraction of co-ethnics with low or no educational degrees in region r and year y. PA^M_{rye} is the mean education of co-ethnics in region r and year y. D_r are region fixed effects and D_e ethnicity fixed effects. All other controls are the same as in Model (1). Model (2) is our preferred specification.

4. Data

The microcensus is an annual one-percent household survey representative of the resident population in Germany. The survey has been carried out annually since 1957 and in the "new" federal states including East Berlin since 1991. It provides statistical information in a detailed subject-related and regional breakdown on the population's demographic structure as well as on the economic and social situation in terms of employment, education, housing and health. The microcensus covers about 390,000 households including 830,000 individuals in total each year.[14] In this paper, we use pooled data from the microcensus years 2007 to 2011. An important feature of the microcensus is that since 2007 it has been possible to identify ethnic

[13] Since non-linear models are known to have inconsistencies in the presence of fixed effects, we report the estimates from a linear probability model. However, as a sensitivity test we also compute the marginal effects from a probit estimation. Overall, the results from the non-linear specification are similar to the ones obtained in the linear model.

[14] The organizational and technical preparation takes place in the Federal Statistical Office. The Statistical Offices of the Federal States conduct the interviews and process the results. The Labour Force Survey of the European Union forms an integral part of the microcensus. For more information see DESTATIS (2012).

German immigrants.[15] The 2007 microcensus contained for the first time information on the way individuals assumed German citizenship, whether it was by birth, as an ethnic German immigrant, or through the usual naturalization process.[16] We define individuals as ethnic German immigrants if they immigrated from one of the typical origin countries of ethnic Germans and gained German citizenship within the first three years after migration. The 2007 microcensus also introduced survey questions on previous citizenship before naturalization, which allows us to identify ethnic German immigrants' countries of origin (DESTATIS, 2009).

Our estimation sample is restricted to children whose both parents immigrated after the Assigned Place of Residence Act was modified in 1996.[17], [18] Since the federal states of Rhineland-Palatinate and Bavaria chose not to implement the modified act at all (see Table 1), we exclude these from our analysis. For those federal states which implemented the modified act with delay (Lower Saxony and Hesse and most East-German states), we exclude the years in which the law was not (yet) binding. The Assigned Place of Residence Act was in effect until the end of 2009. Hence we further restrict our analysis to ethnic German parents who immigrated to Germany up until 2009.

Our objective is to observe secondary school enrollment of ethnic German children. Since the official age of tracking in to secondary school varies between 10 and 12 depending on the federal state, we want to observe children who are 12 years or older at the time their education outcome is reported.[19] Furthermore, since tracking

[15] In previous rounds ethnic German immigrants, who are automatically granted German citizenship upon arrival, were indistinguishable from Germans born in Germany ('native Germans') due to the lack of country-of-birth information.

[16] Because ethnic German status granted welfare eligibility, misreporting is unlikely.

[17] The sample used for ethnic-capital calculation is different and explained in details in Section 4.1 below.

[18] We define ethnic group membership on the basis of parents' citizenship, either previous citizenship before naturalization or information on second citizenship. In the case of missing information or non-*Aussiedler* background for one parent, we rely on information from the respective other parent (32.81 percent of the sample). In cases of parental pairs from two different *Aussiedler* countries (1.69 percent of the sample), we assign the country of origin according to the child's citizenship information; if unavailable (0.31 percent of the sample), we use maternal information.

[19] In our data, 96.5 percent of total sample of children and 95.6 percent of *Aussiedler* children are enrolled in secondary school by age 12.

depends on prior educational investment on the child, we want to study children who entered Germany before the age of 12. Effectively, our estimation sample consists of children who were either born in Germany or migrated to Germany before age 12 and had at least one ethnic German immigrant parent.[20] Overall, this translates in to a lower bound of 12 years when we observe the child between 2007-2011.

A further restriction that we had to impose is on the upper bound of age when we observe the child. Any ethnic German child who entered Germany after 1996 and was below 12 years of age at the time of entry, is potentially affected by the allocation policy. However, when we observe them in 2007-2011, many of them are much older and might have left the parental household. Yet, we need information on the parent-child pair that are only observable as long as children live in the parental household. The choice of an upper bound at age 22 is driven by the fact that by this age the majority (approximately 80 percent) of ethnic German immigrant youths still live at home with their parents.[21] Effectively, we retain children in the 12-22 age group, at the time of observation in 2007-2011, with at least one ethnic German parent and who was either born in Germany or migrated to Germany before age 12.

We study educational outcomes of ethnic German child immigrants at the secondary schooling level. The German schooling system is based on an ability tracking system which allocates children to traditionally three types of secondary schools: a lower secondary school (*Hauptschule*), which is designed to prepare pupils for manual professions, an intermediate secondary school (*Realschule*), which prepares students for administrative and lower white-collar jobs, and an upper secondary school (*Gymnasium*), the school type which prepares for higher education. Only the last track allows for direct access to universities. All three types are typically public and tuition-free. Tracking takes place after four years of primary education,

[20] Among the children born to ethnic-German parents, German-born children represent roughly 10 percent of the sample (see Table 3). We conducted sensitivity tests by excluding the children born in Germany from our sample. The results are similar to the ones reported using the full sample.

[21] To test whether our results are sensitive to this age cut-off, we conduct the main analysis on the sample of up to 19-year-olds. About 96.1 percent of ethnic German immigrant youths in this age group cohabit with their parents. We find the results to be remarkably robust (see Table A5 in the Online Appendix). However, the sample size is considerably reduced.

when children are around 10 years old.[22] Parents and teachers jointly make the placement decision. Primary school teachers recommend a secondary school track, but these recommendations are not binding in most federal states. The early tracking decision in the German education system determines to a large extent further scholarly careers and labor market outcomes (e.g. Dustmann, 2004). While upward mobility after tracking is *de jure* possible, only very few pupils *de facto* switch tracks. One reason might be the different curricula for the respective school types that leave little room for later upward mobility. Our outcome of interest is the probability to hold an upper secondary degree (i.e., to have graduated from *Gymnasium*). The early tracking system allows us to also analyze children who are too young to have graduated from secondary school, but currently attend secondary schooling. For these individuals, the outcome is defined as the probability to currently attend the upper secondary schooling track.

4.1. Parental Peers

We define parental peers according to several dimensions, including ethnicity, geographic proximity, year of immigration and age. Since parental peer quality and child outcomes are both measured based on information from the microcensuses 2007–2011, we want to ensure that education of the peer group is pre-determined and not affected by the children's human capital, hence avoiding reflection problems. Thus for each *Aussiedler* child we define the respective parental peers as a group of individuals: a) who immigrated from the same country of origin as the child's parents, and were b) older than 30 years at the time the child's family immigrated.[23] The ethnic groups covered by our sample include the Russian Federation and Kazakhstan, followed by other Commonwealth of Independent States (CIS) states (that we group together), Poland, Ukraine, Hungary, Former Yugoslavia and Romania (see also Table 3). Importantly, our ethnic peer definition includes not

[22] Note that some variation exists since the federal states make education legislation. The tracking age might vary between 10 and 12.

[23] We also estimated our baseline specification using parental-peers when the child is 7 years of age. We find slightly larger ethnic-capital effects possibly because this alternate definition also captures parental-peers who arrived several years after the ethnic German household in some cases. Results available from authors upon request.

solely those immigrants that hold "ethnic German" status but all immigrants from these origin countries who moved to Germany before or after 1996. By choosing peers from the same country of origin, our implicit assumption is that parents associate more with immigrants from the same country of origin compared to natives and immigrants from other countries of origin, especially in the years immediately after immigration. By choosing peers older than 30, we focus specifically on a group of individuals whose education has been completed and who most likely served as a reference group for incoming immigrant parents.[24]

Furthermore, we define parental peers placed in the same geographic area as the child.[25] Specifically, our focus is on German administrative districts (*Regierungsbezirke*, or NUTS-2 regions). Germany has about 38 administrative districts, each averaging about 2 million residents. This level of aggregation helps us in capturing a whole range of relevant reference groups for immigrant parents - not only acquaintances in the immediate geographic neighborhood, but also, for example, parents of other children in school, co-ethnics whom parents meet at work, in church or at other public places.

Some qualitative and anecdotal evidence supports the idea of active social interaction among *Aussiedler* immigrants at regional levels beyond the immediate neighbourhood. For example, a number of non-denominational churches have been founded by Aussiedler immigrant groups and provide regular meeting spaces (Ens, 2017). Also, ethnic shops, supermarkets and restaurants represent opportunities for social interaction. "In the 'Russian supermarket' Aussiedler migrants and post-soviet migrants can exchange information on Russian-speaking doctors or (Russian) movies and books, but also news, anecdotes or shared experiences" (Flack, 2018). There are also cultural events in many regions (e.g. concerts, folklore dancing) that

[24] One potential risk is that Ethnic Germans included in the parental peer group could misreport education levels to influence their allocation. However, since the assignment rule or exemption from the assignment rule did not depend on educational attainment, this is unlikely. In addition, most of the ethnic Germans in our peer-sample arrived much before 2007 and hence their allocation was already complete at the time of the survey.

[25] To make the peer estimates meaningful, we restrict our sample to children for whom the parental peer education estimate is based on at least 10 observations. This results in varying sample sizes across various peer definitions used in Section 5.

speak particularly to a transnational Russian-speaking audience (Wallem, 2017), as well as Russian-speaking newspapers that are often free of charge distributed at Russian-speaking shops or doctors' (Kharitonova-Akhvlediani, 2011). It is important to note that in the context of ethnic capital parents do not need to know their peers in person; peers can be locally visible "role models" (successful migrants of 'my' ethnicity, who have made it and are visible in the local society, politics, sports club etc.). Measuring co-ethnic parental peers at the administrative district level averages over all potential spheres and frequent meeting places.

A more aggregated analysis also avoids the risk of an exacerbated measurement error in peer variables due to reduced numbers of peer observations in region-ethnicity cells. In fact, it is also preferred in terms of sorting considerations. Our approach assumes that ethnic German immigrants did not move across regional areas between the year of immigration and the years we observe them (2007–2011). This assumption is more plausible at higher levels of aggregation. While assuming that individuals do not move across administrative districts, we allow for any kind of sorting within these entities. Our approach is similar to Chetty and Hendren (2016). In our case, the variation in ethnic capital effects across administrative districts forms a lower bound. The total variance in ethnic capital effects would include the variation at a narrower geographic specification. Having said this, as a robustness check, we also conduct our main analysis at a more disaggregate geographical level, *Anpassungsschichten*, which are regional units comprising an urban center and the respective hinterland. There are 123 such regional units in Germany with an average population sizes between roughly 100,000 and 500,000 (DESTATIS, 2009).

We construct peer quality measures based on educational qualification according to the International Standard Classification of Education (ISCED) which uses information on the highest educational level obtained including secondary as well as vocational and tertiary degrees.[26] An important focus of our analysis is to ex-

[26]ISCED-levels are on a 6-point scale: 1 for no secondary degree, drop-out; 2 lower secondary degree; 3 upper secondary degree; 4 post-secondary, non-tertiary degree; 5 short-cycle tertiary degree (typically practically oriented and occupationally specific); 6 tertiary degree (academically based, including advanced degrees such as Ph.D.).

plore the effects of the heterogenous ethnic capital distribution. Accordingly, we we construct several measures to represent the ethnic capital distribution. First, to represent the average ethnic capital we compute the mean ISCED-level of the relevant local parental peer group. Second, to represent the high end of the ethnic capital distribution we compute the share of highly educated among the parental peers, defining highly educated as those who completed academic tertiary education (i.e., ISCED-level 6). Third, we compute the share of the low-educated parental peers, that is, the share of individuals among parental peers with at most a lower secondary education and no further vocational or other post-secondary degree (i.e., ISCED-levels 1 and 2).

4.2. Description of the Sample

Table 3 provides summary statistics of the estimation sample, which contains a total of 3,253 observations. The track attendance in *Gymnasium* is with 23.3 percent somewhat lower for ethnic German children in comparison to an average child in Germany. Among all students in Germany, the equivalent number ranges between 31 and 36 percent.[27] There are slightly more boys than girls in the sample (53 percent). About 17 percent of the parents hold no or only a lower secondary degree ('low educated'), 62 percent have upper-secondary education and/or some post-secondary non-tertiary degree ('mid-educated'), which means that around 21 percent of parents are highly educated with some tertiary education.[28]

We observe a clear variation in sending countries that mirrors the hierarchy of ethnic German inflow countries outlined in Section 2.1 (also see Figure 3). The two largest groups originate from Russia (41.7 percent) and Kazakhstan (35 percent). The remaining 23.3 percent have arrived from different Eastern and Southeastern European countries.

Table 3 about here

[27] In 2005/06 (2011/12), about 31 (36) percent of all students in Germany attend *Gymnasium* in 8th grade (Federal Statistical Office, 2006 and 2012, *Fachserie* 11.1).

[28] Parents' education level is defined as 'low' if *both* father and mother hold no or only a lower secondary degree. We define parents to be 'highly' educated if *at least one* of the parents holds some tertiary degree. The remaining individuals are defined as 'mid-educated'.

Furthermore, the descriptive statistics in Table 3 show that the observed size of local ethnic German populations in administrative districts, on which our peer calculations are based, is substantial. There is an average of 2,253 individuals from ethnic German origin countries in an administrative district. The mean education level in terms of the ISCED-classification (that is, the average parental peer education) is level 3, which corresponds to an upper secondary degree without further post-secondary education. This is only slightly lower than the average education level of about 3.2 among local native peers.

5. Results

5.1. Peers Originating from any Aussiedler-Country

Column 1 of Table 4 replicates previous studies that estimate the effect of mean peer education. Analogous to previous findings, the point estimate indicates a significant positive effect of the mean parental peer-education on the education of children brought up in the same district. Next we proceed towards specifications that allow for differences in peer-education distribution.

Column 2 provides the results from Model (1). The point estimates suggest that having more parental peers from the top of the education distribution improves children's educational achievement; meanwhile, growing up in an environment with more parental peers from the bottom of the education distribution does not significantly affect the children's educational achievement. A one percentage point increase in the fraction of very high-educated parental peers leads to a 1.7 percentage point higher probability for the child to be tracked to an upper secondary school. In addition, we find that the average peer education does not have any significant impact on the children's educational outcomes after controlling for the top and the bottom of the peer-education distribution.

5.2. Peers Originating from Same Country of Origin

The exogenous placement of ethnic German immigrants effectively addresses the possibility that higher educated parents sorted into higher educated districts. To the extent that a region's peer quality is the only feature affecting children's education outcomes, the above specifications estimate the causal effect of peer quality on

children's education. However, this might not be a reasonable assumption, particularly because the ethnic German immigrants who comprise the peer group were not part of a binding assignment policy. Hence it remains possible that higher educated parental peers sorted into regions with greater labor market opportunities when they moved to Germany. This in turn implies that unobserved regional characteristics might be correlated with parental investment decisions on children's education in that region. To address this, we estimate within-region specifications by exploiting variations in educational attainment across different ethnic peer groups within the same region. The results from these specifications, as described in Model (2), are reported in Columns 3–6 of Table 4. For the full sample, the results are reported in Column 3. The coefficients indicate that no segment of the peer education distribution – high, low, or mean – has any impact on children's education outcomes. The estimates are all close to zero and insignificant.

Cunha and Heckman (2007) suggest large benefits of good environment accrue to people from disadvantaged families. Accordingly in what follows, we analyze whether the different parts of the peer education distribution have differential effects on children coming from different backgrounds. Particularly, if the positive effect of the higher educated peers reflects a learning process by parents then we expect the relatively lower educated parents to gain more from a good quality environment compared to the high-educated parents. Hence we estimate Model (2) separately for children of low, middle, and highly educated parents. Results are reported in Columns 4–6 of Table 4. For the subsample of children of low educated parents, the point estimates suggest that having more parental peers from the top of the education distribution improves children's educational achievement; however, growing up in an environment with more parental peers from the bottom of the education distribution does not significantly affect the children's educational achievement. The estimated impact indicates that a one percentage point increase in the fraction of very high-educated parental peers leads to a roughly 2.4 percentage

point higher probability of children being tracked to an upper secondary school.[29][30] At the sample average,this implies that for a one percent increase in the share of the highly educated in the peer group, the probability of going to *Gymnasium* increases by approximately 1.2 percent (or 0.7 standard deviations) for the children of low-educated parents.[31]

The positive effect of very high-educated parental peers is seen across all groups, although the effect is statistically insignificant for the mid and high educated parents. A Chi-Square test rejects the equality of the coefficients (effect of high-educated peers) between low and middle-educated parents and between low and high-educated parents. On the other hand, it fails to reject equality between middle and highly educated parents. These findings also suggest that our estimates are unlikely to be driven by the sorting of higher educated parents into higher educated areas and vice-versa. If anything, presence of sorting would imply that children of high educated parents would benefit more from the presence of high educated parental peers. The results in Columns 4–6 suggest just the opposite.

Table 4 about here

5.3. Robustness

Since the construction of the peer-group is subjective, our results could be driven by the way we define the parental peers. Below we conduct a set of sensitivity checks to see if our estimates are robust to alternate peer definitions (Sections 5.3.1 to 5.3.3).

5.3.1. Size of the Peer Group

One of the main inputs in our empirical specification is the peer-education variable. Since a peer-group cell, in Model (2), is defined by the intersection of region, eth-

[29] We also included secular trends at the regional and ethnic group level and results remain unchanged (see Table A6 in the Online Appendix).

[30] This is as opposed to a 3.5 percentage point higher probability of being tracked to upper secondary school without controlling for unobserved regional correlates as estimated using equation (1). Results are reported in Online Appendix Table A4.

[31] The mean probability of being tracked in *Gymnasium* is 0.232 (with a standard deviation of 0.422 and the mean share of high-educated co-ethnic peers is 0.121 for the sub-sample of low-educated parents.

nicity and year of immigration, some cells are likely to be thinly populated, making the estimates less precise. Hence, in Table 5 we restrict our estimation to only those children for whom the parental-peer-education measure is based on at least 50 observations. This reduces our overall sample size from 3,253 to 2,935. The magnitude of the high-educated peer effect is the same as in our main specification, although the estimates are now less precise.[32]

Table 5 about here

5.3.2. Alternate Definition of Geographic Area

Our construction of the peer measure rests on the assumption that an administrative district (*Regierungsbezirk*) forms the relevant geographic area within which individuals interact the most. Given the subjectivity involved in defining a geographic area, we conduct sensitivity tests using peer measures at a geographic unit smaller than the administrative district, the *Anpassungsschicht* (see Section 4.1). The results from this analysis are reported in Table 6. They indicate, as before, a positive effect of the high-educated peers and no effect coming from either the average peer education or the lower part of the peer education distribution. Once again, the effects are all concentrated on the lowest educated parental sample with no influence on more educated parents. In comparison to the results based on our preferred specification in Table 4, the coefficient is more precisely estimated and of lower magnitude. This attenuation of the impact of high-educated peers is consistent with the presence of greater residential sorting (of low educated parents into low education areas) at the *Anpassungsschicht* level. [33]

Table 6 about here

[32] We additionally restricted our sample to individuals for whom the peer education measure is based on at least 15, 75, and 100 observations; we found similar results but insignificant when restricting to at least 100 observations.

[33] Similarly, Chetty and Hendren (2016) find attenuated effects of local peer effects on low-income children's outcomes at the county level (in comparison to the more aggregated level of commuting zones).

5.3.3. Who Are the Most Influential Peers?

In our construction of the peer variable, in Model (2) we implicitly assume that the *Aussiedler* parents learn only from other individuals coming from the same country of origin and residing in their district of residence. In Columns 1 and 2 of Table 4 we show that, indeed, native Germans' average education does not affect the education outcomes of the *Aussiedler* children. In columns 3—6 of Table 4, these effects are included as part of the administrative district fixed effect. However, it could still be the case that immigrants as a group learn from each other irrespective of their specific ethnicities. In fact, the results in column 2 of Table 4 imply a combined peer effect coming from high-educated individuals of any *Aussiedler* country-of-origin. To understand who the most influential peers are, we estimate a more flexible specification. We regroup the peers according to whether they come from the same country as the respective family (i.e. child) or from a different *Aussiedler* origin country. We estimate the following equation:

$$\begin{aligned} Y_{icrye} = \alpha + \beta_e^H PA_{rye}^H + \beta_e^L PA_{rye}^L + \beta_e^{Mean} PA_{rye}^{Mean} \\ \beta_{(-e)}^H PA_{ry(-e)}^H + \beta_{(-e)}^L PA_{ry(-e)}^L + \beta_{(-e)}^{Mean} PA_{ry(-e)}^{Mean} \\ + X_i + D_a + D_c + D_r + D_e + \varepsilon_{icrye}, \quad (3) \end{aligned}$$

where Y_{icrye} is the probability of being tracked into higher education of individual i of year-of-migration y in region r and of ethnicity e. PA_{rye}^H is the fraction of parental peers with a high educational degree in region r, year y and the same country-of-origin as the parents, e. PA_{rye}^L is, analogously, the fraction of peers of own-ethnicity with low or no educational degree and PA_{rye}^{Mean} is the mean education of the peer-group. Additionally, we now include $PA_{ry(-e)}^H$ and $PA_{ry(-e)}^L$ which are the fractions of high and low-educated potential-peers in region r, year y but are not of the same ethnic origin as the parents, e. All other controls are the same as in Model (2).

Results from this estimation are reported in Table 7. As before, the high-educated peers of the same ethnicity as the parents have a strong positive influence on the educational outcomes of the *Aussiedler* children. The magnitude of the ef-

fect is almost identical to the ones reported in column 4 of Table 4. On the other hand, the potential parental peers residing in the same region but belonging to other ethnicities do not have any significant influence on the *Aussiedler* children.

While this is an interesting finding in its own right, it also lends support to our assumption (and much of the previous immigrant literature) that the most relevant peers for immigrants are people belonging to the same country of origin.

Table 7 about here

5.4. The Possibility of a Reflection Problem

Our main findings suggest that human capital of parental peers affects children's education. Since these findings are obtained only for the low-educated parents, one potential mechanism is that high educated peers influence aspirations of low educated parents who then increase human capital investments in their children. Another way to think about a potential mechanism is that education investment decisions of parents might not only be affected by the predetermined human capital of parental peers, but by the human capital of the children of these peers. In other words, regions that have a high share of high-educated adult peers would also have a high share of highly motivated children of these peers. This in turn raises the possibility of a reflection problem: parental education investment decisions might simultaneously affect and be affected by education investment decision of the peers on their children.

To ensure that we capture only the effect of predetermined human capital of local co-ethnic peers on parental investment decisions, we construct the peer group based only on co-ethnic adults with no children in the age range 0-16. The results are reported in Table 8.

Table 8 about here

The positive effect of very high-educated adult peers, without children, is only observed for children of the low-educated parents, as in our main specification in column 4 of Table 4. Similar to our main findings, the effect of high-educated adult peers is insignificant for the sample of mid and high-educated parents. On the other

hand, for children whose parents are very low-educated, a one percentage point increase in the fraction of very high-educated adult peers leads to a 1.5 percentage point higher probability of being tracked to an upper secondary school. This effect, after eliminating the possibility of parents influencing the investment decision of the peers, is lower than our main estimate of 2.4 percentage points (see Section 5.2). Note that this reduction could either be due to correcting the reflection problem in investment decision of the parent, or it could simply reflect a lower effect coming from non-parent adult peers. The latter would be true if parents are more likely to learn from other parents than from other adults without children. This implies that the 1.5 percentage point effect forms a lower bound for the parental learning effect after addressing the identification issues raised by Manski (1993, 2003).

5.5. Polarization

Overall, our results suggest that peer-education heterogeneity has a beneficial effect on the children of low-educated parents. Our findings of non-linear peer effects are consistent with the previous literature on classroom peer effects (Duflo et al., 2011; Lyle, 2009; Carrell et al., 2013). From a policy perspective it implies that children in the lower part of the parental education distribution would gain more in a polarized group, in other words if high-educated peers replaced middle educated peers. However, quite on the contrary, Carrell et al. (2013) find that low ability students are negatively affected by high ability peers in completely polarized groups with no middle ability category. They argue that low and high ability students do not interact in polarized groups. These findings have particular relevance in the context of immigrant peer effects. If some ethnicities have immigrants only from the very low and very high ends of the education distribution (in the case of guest workers for instance), then the low-skilled immigrants are less likely to overcome intergenerational persistence.

While we cannot find clear bimodal groups in our data, we construct various measures of polarization to test whether the peer effect magnitude varies across these samples. In Table 9 we report the results from this analysis. We restrict our attention to the sample of low-educated parents here. Column 1 restricts to groups in which more than 80 percent of the peers are either high or low-educated.

The results are consistent with our primary findings: Children of low-educated parents benefit significantly from high-educated parental peers. Column 2 restricts to groups with more than 40 percent of low-educated parents but no restriction on the remaining distribution of middle and high-educated. In this case, the size of the positive effect is also comparable to our main findings but the coefficient is imprecisely estimated. In Column 3 we construct a measure of polarization and restrict to cases with high levels of polarization.[34] Once again, the results reflect our baseline findings. However, in all three samples, with varying definitions of polarization, the magnitude of the effect of high-educated peers on children of low-educated parents is higher than our baseline findings in Table 4. This suggests that learning effects might be stronger in more polarized environments for immigrants.

Table 9 about here

5.6. Gender

Finally, we turn to the question of gender heterogeneity in peer effects. There are two related issues: a) whether there is any difference in parental-peer influence for boys versus girls, and b) who do parents learn from when the child is male and who are the relevant peers for a female child.

Table 10 shows the results from four separate regressions. Once again, we focus only on the low-educated parental sample. Columns 1 and 2 estimate the influence coming from male peers on male and female children respectively. Male peers do not seem to exert any significant influence on children's educational outcomes. On the other hand, high educated female peers have a positive effect on both boys and girls, although the effect on boys is insignificant. Our findings on gender heterogeneity are, in part, similar to Lavy et al. (2012), who also find a strong positive influence of the high-educated peers on girls but a relatively weaker effect on boys.[35]

[34] We follow Montalvo and Reynal-Querol (2005, 2008) to construct the index of discrete polarization; higher than median values of this index indicate a high level of polarization.

[35] However, our approach is distinct from Lavy et al. (2012) in our construction of gender-specific peer groups. We also estimated the effect of the overall peer group separately on girls and boys. These results are more directly comparable to Lavy et al. (2012). Also here our estimates suggest a strong positive influence of high-educated peers on girls but no comparable effect on boys. The presence of low-educated peers continues to be insignificant.

Table 10 about here

6. Conclusion

In this paper we estimate the effect of parental peer quality on children's educational attainment by using the 'Assigned Place of Residence Act' in Germany. According to the Act, the German government assigned a place of residence to ethnic Germans. After a substantial modification of the law in 1996, adherence to the assigned location was ensured by ineligibility to welfare programs of households who failed to follow the assignment. This *de-facto* exogenous assignment, after the 1996 modification, helps us to address sorting biases while estimating peer effects that originate from endogenous location choice. In addition, we estimate the effect of purely adult peers whose completed education levels are unlikely to be affected by the children under study, eliminating possibilities of a reflection problem. Moreover, this policy allows us to study immigrant groups who are more likely to be generalized as regular labor migrants, rather than refugee migrants, who have been subject of previous studies exploiting settlement policies.

We find that the educational attainment of children is not affected by the average educational attainment of the peer group. Our findings imply that it is important to look beyond the average. There is a significant positive effect coming from the probability mass in the upper end of the peer distribution. Children have a higher probability of attending upper secondary school when parents are exogenously placed in districts with a high fraction of very high-educated ethnic peers. In contrast, we do not find any negative influence from the low-educated peers. In addition, we find that the low-educated parents benefit most from being exposed to a high-educated peer group while the mid- or high-educated parents do not seem to benefit from the presence of high-educated districts. Our estimates suggest that among low-educated parents a one-percent higher fraction of high-educated adults in the peer group leads to a 1.9 percent higher probability of their children opting for the highest education track in Germany. Our results are robust to a range of alternate definitions of the relevant peer group and are larger in more polarized groups. Further investigation reveals that the positive peer effect is restricted to female children and is driven by the educational outcome of female parental peers.

No significant effects are observed for male children.

Another interesting finding relates to the relevant peer group. While most of the literature on ethnic capital assumes that people of one's own ethnicity are the ones relevant for immigrants' socio-economic outcomes, there is to date no empirical evidence on this assumption's validity. On the other hand, past evidence finds a positive correlation between native peer quality and immigrant outcomes. We directly test for the possibility of whether it is mainly the peers sharing the same ethnicity who affect immigrants' outcomes or whether the peer effect flows from any immigrant in the residential district. Our findings support the assumption that immigrants predominantly learn from people of the same ethnicity.

Exogenous allocation policies have been widely practiced in school settings to produce desired educational outcomes among children (Carrell et al., 2013). However, in the debate around immigrant assimilation and integration, these kinds of policies are rarely practiced. Our findings suggest that policies which prevent endogenous sorting are likely to benefit the low-ability immigrants significantly in terms of intergenerational mobility, with no significant adverse effects on the high-ability immigrants.

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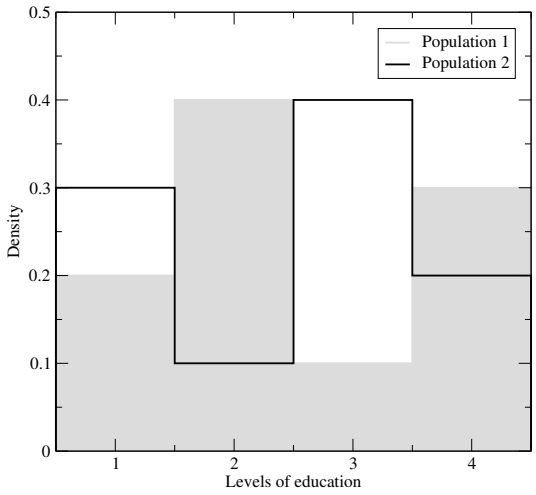
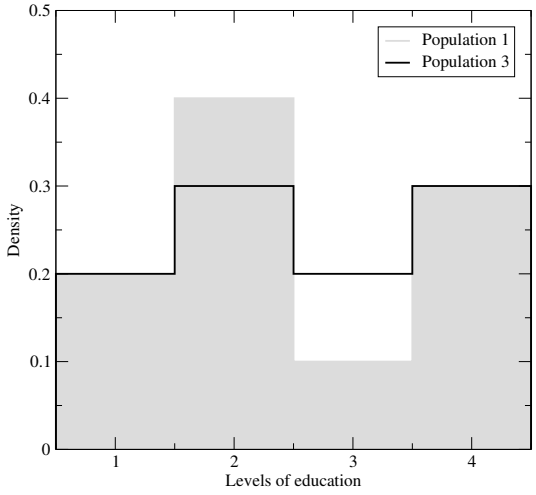
Figure 1: Compositional Differences in Peers - A



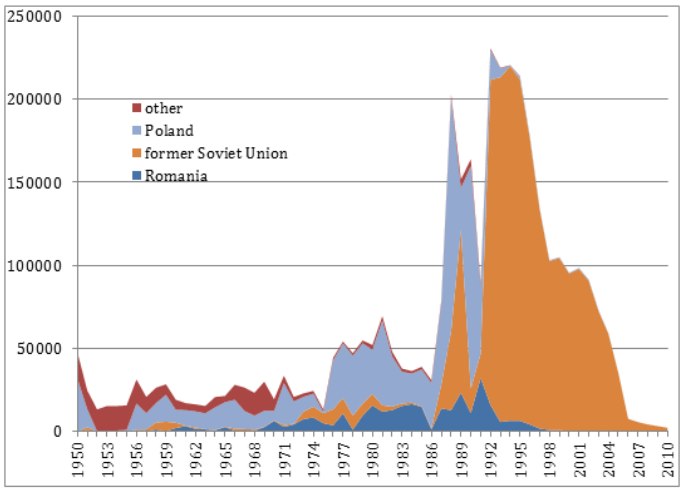
Notes: Population-1 and Population-2 have the same mean but Population-1 has a higher probability mass on the right tail than Population-2.

Figure 2: Compositional Differences in Peers - A



Notes: Population-3 has a higher mean than Population-1 but has the same probability mass as Population-1 in the higher tail.

Figure 3: Immigration of Ethnic Germans to Germany by Source Country (1950–2010)



Source: Federal Administration Office, BAMF 2013.

Table 1: German Federal States and their Implementation of the Modified "Assigned Place of Residence Act"

Federal State	Nr. of Districts	State Quota (%)	Law Implemented	Date of Implementation	In Sample
North Rhine-Westphalia	5	21.59	yes	1/3/1996	yes
Bavaria	7	14.90	no	-	no
Baden-Württemberg	4	12.80	yes	1/3/1996	yes
Lower Saxony	4	9.17	yes	7/3/1997	yes, from 1997
Hesse	3	7.31	yes	1/1/2002	yes, from 2002
Saxony	1	5.28	yes	1/3/1996	yes
Berlin	1	4.95	yes	1/3/1996	yes
Rhineland-Palatinate	3	4.70	no	-	no
Schleswig-Holstein	1	3.34	yes	1/3/1996	yes
Brandenburg	1	3.12	yes	17/12/1996	yes, from 1997
Saxony-Anhalt	3	3.08	yes	21/1/1998	yes, from 1998
Thuringa	1	2.90	yes	15/7/1998	yes, from 1998
Mecklenburg-West Pomerania	1	2.13	yes	1/1/2002	yes, from 2002
Hamburg	1	2.52	yes	1/3/1996	yes
Saarland	1	1.24	yes	11/3/1996	yes
Bremen	1	0.90	yes	1/3/1996	yes

Source: Haug and Sauer, 2007; Glitz, 2012.

Table 2: Correlation between Local Ethnic German Peer Education and Parental Human Capital

Dependent variable: Above-median share high-educated local co-ethnic peers in district	
Mother education (ref.: ISCED 1)	
ISCED 2	0.014
	(0.065)
ISCED 3	0.043
	(0.064)
ISCED 4	-0.025
	(0.079)
ISCED 5	0.053
	(0.072)
ISCED 6	0.050
	(0.069)
Father education (ref.: ISCED 1)	
ISCED 2	-0.058
	(0.067)
ISCED 3	0.011
	(0.066)
ISCED 4	-0.009
	(0.086)
ISCED 5	0.011
	(0.077)
ISCED 6	0.098
	(0.073)
Mother age	0.0003
	(0.0026)
Father age	0.0006
	(0.0025)
Family size	-0.016
	(0.010)
Child's age at migration	-0.003
	(0.003)
N	2,554

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.

Notes: Probability of a household residing in a high-educated vs. low-educated district as a function of mothers' education and fathers' education after controlling for survey year fixed effects, ethnicity fixed effects, age at migration, parental age, immigration year dummies and household size. Sample consists of *Aussiedler* households affected by the modified "Assigned Place of Residence Act" according to Table 1 with at least one child aged 0-12 at migration and of age 12-22 when observed in microcensus 2007-2011 (see Section 4 for more details). The unit of interest here is the household whereas in the following analysis it is the individual (child). ISCED-levels: (1) no secondary degree, drop-out; (2) lower secondary degree; (3) upper secondary degree; (4) post-secondary, non-tertiary degree; (5) short-cycle tertiary degree; (6) tertiary degree.

Table 3: Summary Statistics of Selected Sample Characteristics

	Mean	Std. Dev.
Tracking probability into *Gymnasium*	0.233	0.423
Male	0.526	0.499
Age at migration	6.457	3.717
German-born	0.103	0.304
Parents low educated	0.166	0.372
Parents mid educated	0.622	0.485
Mean education among local ethnic German peers	3.034	0.191
Mean education among local native peers	3.218	0.112
Population size of local ethnic German peers	2,253	1,338
Share high educated among local ethnic German peers	0.128	0.048
Share low educated among local ethnic German peers	0.324	0.057
Population size of local *co-ethnic* peers	321	311
Share high educated among local *co-ethnic* peers	0.141	0.094
Share low educated among local *co-ethnic* peers	0.354	0.105
Population size of local *co-ethnic* peers *w/o children age 0–16*	193	198
Share high educated among local *co-ethnic* peers *w/o children age 0–16*	0.142	0.105
Share low educated among local *co-ethnic* peers *w/o children age 0–16*	0.419	0.120
CIS-Russian Federation	0.417	0.493
CIS-Kazakhstan	0.350	0.477
CIS-Other	0.093	0.291
Poland	0.076	0.264
Ukraine	0.035	0.185
Former Yugoslavia	0.008	0.087
Romania	0.005	0.072
Other Central and Eastern Europe	0.015	0.121
N	3,253	

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.

Notes: Apart from the Russian Federation and Kazakhstan, other official member states of the Commonwealth of Independent States (CIS) are Armenia, Azerbaijan, Belarus, Kyrgyzstan, Moldova, Tajikistan, and Uzbekistan. Parents' education level is defined as 'low' if *both* father and mother hold no or only a lower secondary degree. We define parents to be 'highly' educated if *at least one* of the parents hold some tertiary degree. The remaining are defined as 'mid-educated'. Mean peer education is computed as the mean ISCED-level of the relevant peer group. 'Highly' educated peers are those who completed academic tertiary education (i.e., ISCED-level 6), while 'low' educated peers are those with at most lower secondary education and no further vocational or other post-secondary degree (i.e., ISCED-levels 1 and 2). Age at migration is set to zero for those children born in Germany.

Table 4: Main Results: Effect of Ethnic Capital on Children's Education

Dependent variable: Tracking probability into upper secondary school						
Parental Peer Definition:	...from any *Aussiedler* country		...from same country of origin			
				Split-Samples by Parental Education		
	(1)	(2)	(3)	Low (4)	Middle (5)	High (6)
Mean education co-ethnics	0.352**	-0.161	-0.135	-0.722	0.034	-0.232
	(0.139)	(0.340)	(0.185)	(0.569)	(0.232)	(0.363)
Share high educated co-ethnics		1.687**	0.264	2.382**	-0.094	0.569
		(0.812)	(0.419)	(1.204)	(0.547)	(0.775)
Share low educated co-ethnics		-0.450	-0.416	-0.804	-0.335	-0.727
		(0.555)	(0.353)	(0.955)	(0.436)	(0.772)
Mean education native peers	-0.290	-0.249				
	(0.192)	(0.193)				
Year of birth FE	√	√	√	√	√	√
Age at migration FE	√	√	√	√	√	√
District FE	–	–	√	√	√	√
Ethnicity FE	–	–	√	√	√	√
N	3,253	3,253	3,218	537	2,001	680
R^2	0.101	0.105	0.136	0.212	0.116	0.200

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.

Notes: Linear probability models. Standard errors in parentheses, adjusted for clustering at the district/immigration-year level in Columns 1–2 and at the district/country-of-origin/immigration-year level in Columns 3–6. The sample consists of children to at least one ethnic German parent whose both parents arrived not earlier than 1996 at child's age of 0-12 and who were of age 12-22 when observed in microcensus 2007-2011. Additionally the sample is restricted to those individuals affected by the modified "Assigned Place of Residence Act" according to Table 1. Furthermore in Columns 3–6, the sample is restricted to individuals for whom the parental-peer-education measure is based on at least 10 observations (35 observations dropped). All regressions control for the subject's gender, the local population size of immigrants from the same origin country as the subject. Columns 1–3 additionally includes dummies for parental education (three levels). Parents' education level is defined as 'low' if both father and mother hold no or only a lower secondary degree. We define parents to be 'highly' educated if at least one of the parents hold some tertiary degree. The remaining are defined as 'mid-educated'.

*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 5: Robustness: Number of Observations in Peer Cells > 50

Dependent variable: Tracking probability into upper secondary school				
		Split-Samples by Parental Education		
	Full	Low	Middle	High
	(1)	(2)	(3)	(4)
Mean education co-ethnics	-0.055	-0.907	0.243	0.116
	(0.239)	(0.628)	(0.277)	(0.587)
Share high educated co-ethnics	0.301	2.470*	-0.324	-0.205
	(0.589)	(1.444)	(0.693)	(1.494)
Share low educated co-ethnics	-0.250	-1.325	-0.009	0.213
	(0.444)	(1.093)	(0.540)	(1.079)
Year of birth FE	√	√	√	√
Age at migration FE	√	√	√	√
District FE	√	√	√	√
Ethnicity FE	√	√	√	√
N	2,935	512	1,843	580
R^2	0.142	0.195	0.118	0.213

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.
Notes: Linear probability models. Standard errors in parentheses, adjusted for clustering at district/country-of-origin/immigration-year level. Here: sample restricted to individuals for whom the parental-peer-education measure is based on at least 50 observations (318 observations dropped). Covariates according to Table 4.
*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 6: Robustness: *Anpassungsschicht*

Dependent variable: Tracking probability into upper secondary school				
		Split-Samples by Parental Education		
	Full	Low	Middle	High
	(1)	(2)	(3)	(4)
Mean education co-ethnics	-0.050	-0.170	0.055	-0.184
	(0.118)	(0.218)	(0.158)	(0.334)
Share high educated co-ethnics	0.128	1.656***	-0.049	0.575
	(0.289)	(0.627)	(0.381)	(0.762)
Share low educated co-ethnics	-0.124	0.315	-0.163	0.308
	(0.226)	(0.397)	(0.281)	(0.689)
Year of birth FE	√	√	√	√
Age at migration FE	√	√	√	√
Anpassungsschicht FE	√	√	√	√
Ethnicity FE	√	√	√	√
N	3,026	517	1,896	613
R^2	0.163	0.339	0.161	0.288

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.
Notes: Linear probability models. Standard errors in parentheses, adjusted for clustering at *Anpassungsschicht*/country-of-origin/immigration-year level. Sample and covariates according to Table 4.
*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 7: Who Parents Learn From: Co-ethnic vs. Non-co-ethnic Peers

Dependent variable: Tracking probability into upper secondary school				
		Split-Samples by Parental Education		
	Full	Low	Middle	High
	(1)	(2)	(3)	(4)
Mean education co-ethnics	-0.126	-0.700	0.174	-0.340
	(0.192)	(0.567)	(0.238)	(0.384)
Mean education non co-ethnics	0.060	0.002	0.661	-0.765
	(0.284)	(0.372)	(0.409)	(0.692)
Share high educated co-ethnics	0.243	2.402**	-0.365	0.603
	(0.435)	(1.203)	(0.552)	(0.763)
Share high educated non co-ethnics	-0.156	1.005	-1.064	-0.549
	(1.236)	(3.345)	(1.562)	(3.108)
Share low educated co-ethnics	-0.401	-0.731	-0.125	-0.998
	(0.366)	(0.968)	(0.459)	(0.806)
Share low educated non co-ethnics	0.199	0.931	1.776	-4.194
	(1.068)	(2.224)	(1.169)	(2.804)
Year of birth FE	√	√	√	√
Age at migration FE	√	√	√	√
District FE	√	√	√	√
Ethnicity FE	√	√	√	√
N	3,218	537	2,001	680
R^2	0.136	0.213	0.119	0.208

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.
Notes: Linear probability models. Standard errors in parentheses, adjusted for clustering at district/country-of-origin/immigration-year level. Sample and covariates according to Table 4.
*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 8: Parental Learning: Adult Peers without Children

Dependent variable: Tracking probability into upper secondary school				
		Split-Samples by Parental Education		
	Full	Low	Middle	High
	(1)	(2)	(3)	(4)
Mean education co-ethnics	0.067	-0.542	0.099	0.223
	(0.154)	(0.392)	(0.207)	(0.310)
Share high educated co-ethnics	-0.290	1.461*	-0.369	-0.658
	(0.353)	(0.792)	(0.491)	(0.747)
Share low educated co-ethnics	-0.107	-0.921	-0.187	0.055
	(0.317)	(0.833)	(0.419)	(0.600)
Year of birth FE	√	√	√	√
Age at migration FE	√	√	√	√
District FE	√	√	√	√
Ethnicity FE	√	√	√	√
N	3,159	536	1,967	656
R^2	0.140	0.212	0.115	0.199

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.

Notes: Linear probability models. Standard errors in parentheses, adjusted for clustering at district/country-of-origin/immigration-year level. Peer measures are constructed excluding adults with children in the age-range 0-16. Sample and covariates according to Table 4.

*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 9: Polarization

Dependent variable: Tracking probability into upper secondary school			
	Sample of low-educated parents: Sub-Samples according to degree of polarization		
	share mid edu peers<=20% (1)	share lo edu peers>=40% (2)	above/equal median polarization index (3)
Mean education co-ethnics	-0.764	-0.445	-0.754
	(0.737)	(1.689)	(0.649)
Share high educated co-ethnics	3.221**	2.739	3.303**
	(1.520)	(3.273)	(1.358)
Share low educated co-ethnics	0.428	-0.597	-0.588
	(0.949)	(2.915)	(0.878)
Year of birth FE	√	√	√
Age at migration FE	√	√	√
District FE	√	√	√
Ethnicity FE	√	√	√
N	302	232	292
R^2	0.327	0.248	0.301

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.

Notes: Linear probability models. Standard errors in parentheses, adjusted for clustering at district/country-of-origin/immigration-year level. Covariates according to Table 4.

*** significant at 1%; ** significant at 5%; * significant at 10%.

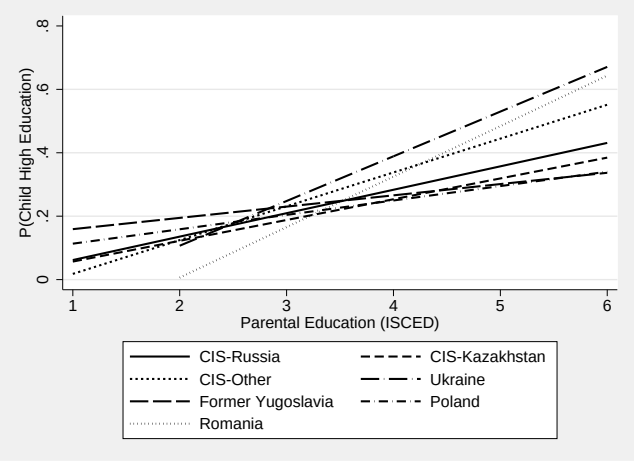
Table 10: Gender

Dependent variable: Tracking probability into upper secondary school				
	Sample: Low-educated parents			
	Male (1)	Female (2)	Male (3)	Female (4)
Mean education male co-ethnics	-0.314	0.257		
	(0.658)	(0.644)		
Share high educated male co-ethnics	0.456	0.120		
	(1.534)	(1.707)		
Share low educated male co-ethnics	-0.589	0.415		
	(1.015)	(0.949)		
Mean education female co-ethnics			-0.840	-0.594
			(0.650)	(0.574)
Share high educated female co-ethnics			1.935	2.323*
			(1.497)	(1.364)
Share low educated female co-ethnics			-0.706	-0.747
			(1.474)	(1.166)
Year of birth FE	√	√	√	√
Age at migration FE	√	√	√	√
District FE	√	√	√	√
Ethnicity FE	√	√	√	√
N	296	234	296	239
R^2	0.285	0.331	0.294	0.357

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.
Notes: Linear probability models. Standard errors in parentheses, adjusted for clustering at district/country-of-origin/immigration-year level. Covariates according to Table 4.
*** significant at 1%; ** significant at 5%; * significant at 10%.

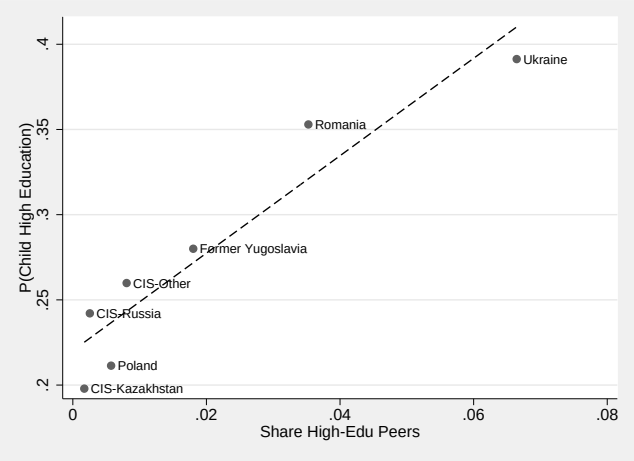
Online Appendix

Figure A1: Intergenerational Education-persistence among *Aussiedler* Immigrants in Germany



Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.
Notes: Tracking probability of an *Aussiedler* child immigrant into upper secondary school as a linear function of parental education, estimated separately by ethnic group. Parents' education level is defined as the highest ISCED level among parents. ISCED-levels: (1) no secondary degree, drop-out; (2) lower secondary degree; (3) upper secondary degree; (4) post-secondary, non-tertiary degree; (5) short-cycle tertiary degree; (6) tertiary degree. Sample as in main analysis (see Section 4 and notes to Table 4).

Figure A2: Ethnic Capital and Educational Attainment among *Aussiedler* Children



Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.
Notes: Tracking probability of an *Aussiedler* child immigrant into upper secondary school as a linear function of national fraction of high educated among co-ethnic peers. Sample as in main analysis (see Section 4 and notes to Table 4).

Table A1: Economic Reason to Migrate by Immigration Status

	Mean	Std.Dev.	*N*
Asylum seeker	0.069*	0.254	247
Ethnic German	0.130	0.336	1,158
Other	0.144	0.351	987
Total	0.129	0.335	2,392
Subsample: age at migration $>$ *18*			
Asylum seeker	0.079*	0.271	177
Ethnic German	0.177	0.382	789
Other	0.167	0.373	690
Total	0.162	0.369	1,656

Source: SOEP 1994–2009, own calculations.
Notes: The variable economic reason to migrate stems from the SOEP biography questionnaire and equals one when migrant states that "I wanted to work and earn money in Germany to support my family and save money". Each SOEP respondent answers the biographical questionnaire only once (at first contact).
* Statistically different from other-immigrant mean at 5 percent confidence level.

Table A2: Very Good German Language Skills by Immigration Status

	Mean	Std.Dev.	*N*
Oral skills			
Asylum seeker	0.237*	0.427	118
Ethnic German	0.357	0.480	465
Other	0.349	0.477	539
Total	0.340	0.474	1,122
Written skills			
Asylum seeker	0.203	0.404	118
Ethnic German	0.289	0.453	462
Other	0.277	0.448	538
Total	0.274	0.446	1,118

Source: SOEP 2003, own calculations.
Notes: * Statistically different from other-immigrant mean at 5 percent confidence level.

Table A3: Correlation between Local Ethnic German Peer Education and Parental Human Capital for Pre- and Post-1996 Immigration Years

Dependent variable: Above-median share high-educated local co-ethnic peers in district		
	(1) Analysis Sample (Post-1996)	(2) Pre-1996 Sample
Mother education (ref.: ISCED 1)		
ISCED 2	0.015	0.098
	(0.065)	(0.064)
ISCED 3	0.043	0.140**
	(0.064)	(0.063)
ISCED 4	-0.023	0.098
	(0.079)	(0.070)
ISCED 5	0.054	0.075
	(0.072)	(0.071)
ISCED 6	0.052	0.128*
	(0.069)	(0.069)
Father education (ref.: ISCED 1)		
ISCED 2	-0.058	-0.029
	(0.067)	(0.071)
ISCED 3	0.011	-0.007
	(0.066)	(0.070)
ISCED 4	-0.010	-0.049
	(0.086)	(0.080)
ISCED 5	0.011	0.038
	(0.077)	(0.076)
ISCED 6	0.097	0.038
	(0.073)	(0.077)
N	2,554	3,504

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.

Notes: Probability of a household residing in a high-educated vs. low-educated district as a function of mothers' education and fathers' education after controlling for survey year fixed effects, ethnicity fixed effects, age at migration, parental age, immigration year dummies and household size. Column 1: Sample as in Table 2. Column 2: Sample consists of *Aussiedler* households with pre-1996 immigration year, at least one child aged 0-12 at migration and of age 12-22 when observed in microcensus 2007-2011. The unit of interest here is the household whereas in the main analysis it is the individual (child). ISCED-levels: (1) no secondary degree, drop-out; (2) lower secondary degree; (3) upper secondary degree; (4) post-secondary, non-tertiary degree; (5) short-cycle tertiary degree; (6) tertiary degree.

Table A4: Parental Peer Definition: Peers Originating from any *Aussiedler* Country

Dependent variable: Tracking probability into upper secondary school					
			Split-Samples by Parental Education		
	Full (1)	Full (2)	Low (3)	Middle (4)	High (5)
Mean education parental peers	0.352**	-0.161	-0.720	0.071	-0.283
	(0.139)	(0.340)	(0.721)	(0.455)	(0.562)
Share high educated parental peers		1.687**	3.518*	1.433	1.506
		(0.812)	(1.800)	(1.022)	(1.269)
Share low educated parental peers		-0.450	0.023	-0.346	-0.995
		(0.555)	(1.374)	(0.684)	(1.191)
Mean education native peers	-0.290	-0.249	0.092	-0.452*	-0.278
	(0.192)	(0.193)	(0.371)	(0.230)	(0.305)
Year of birth FE	√	√	√	√	√
Age at migration FE	√	√	√	√	√
N	3,253	3,253	540	2,023	690
R^2	0.101	0.105	0.113	0.074	0.101

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.

Notes: Linear probability models. Standard errors in parentheses, adjusted for clustering at the district/immigration-year level. The sample consists of children to at least one ethnic German parent whose both parents arrived not earlier than 1996 at child's age of 0-12 and who were of age 12-22 when observed in microcensus 2007-2011. Additionally the sample is restricted to those individuals affected by the modified "Assigned Place of Residence Act" according to Table 1. All regressions control for the subject's gender and the population size of immigrants from ethnic German origin countries in the respective district. Columns (1) and (2) additionally include dummies for parental education (three levels). Parents' education level is defined as 'low' if both father and mother hold no or only a lower secondary degree. We define parents to be 'highly' educated if at least one of the parents hold some tertiary degree. The remaining are defined as 'mid-educated'.

*** significant at 1%; ** significant at 5%; * significant at 10%.

Table A5: Robustness: Sample of Individuals up to Age 19

Dependent variable: Tracking probability into upper secondary school				
		Split-Samples by Parental Education		
	Full	Low	Middle	High
	(1)	(2)	(3)	(4)
Mean education co-ethnics	-0.251	-0.804	-0.179	-0.334
	(0.195)	(0.545)	(0.245)	(0.390)
Share high educated co-ethnics	0.420	2.755**	0.263	0.406
	(0.445)	(1.155)	(0.550)	(0.891)
Share low educated co-ethnics	-0.561	-0.832	-0.576	-1.067
	(0.368)	(0.855)	(0.457)	(0.792)
Year of birth FE	√	√	√	√
Age at migration FE	√	√	√	√
District FE	√	√	√	√
Ethnicity FE	√	√	√	√
N	2,663	460	1,652	551
R^2	0.128	0.218	0.113	0.212

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.

Notes: Linear probability models. Standard errors in parentheses, adjusted for clustering at district/country-of-origin/immigration-year level. The sample consists of children to at least one ethnic German parent whose both parents arrived not earlier than 1996 at child's age of 0-12 and who were of age 12-19 when observed in microcensus 2007-2011. Additionally the sample is restricted to those individuals affected by the modified "Assigned Place of Residence Act" according to Table 1. Furthermore, the sample is restricted to individuals for whom the parental-peer-education measure is based on at least 10 observations (35 observations dropped). All regressions control for the subject's gender, the local population size of immigrants from the same origin country as the subject. Column (1) additionally includes dummies for parental education (three levels). Parents' education level is defined as 'low' if both father and mother hold no or only a lower secondary degree. We define parents to be 'highly' educated if at least one of the parents hold some tertiary degree. The remaining are defined as 'mid-educated'.

*** significant at 1%; ** significant at 5%; * significant at 10%.

Table A6: Controlling for Secular Trends by Region and by Ethnicity

Dependent variable: Tracking probability into upper secondary school				
	Sub-Sample: 'Low' Parental Education			
	Baseline	Birth Cohort Trends by District	Birth Cohort Trends by Ethnicity	Cohort Trend by District and by Ethnicity
	(1)	(2)	(3)	(4)
Mean education co-ethnics	-0.722	-0.826	-0.785	-0.883*
	(0.569)	(0.503)	(0.575)	(0.517)
Share high educated co-ethnics	2.382**	2.134*	2.687**	2.471**
	(1.204)	(1.149)	(1.170)	(1.154)
Share low educated co-ethnics	-0.804	-1.316	-0.766	-1.254
	(0.955)	(0.820)	(0.986)	(0.841)
Year of birth FE	√	√	√	√
Age at migration FE	√	√	√	√
District FE	√	√	√	√
Ethnicity FE	√	√	√	√
Cohort Trend × *District*	–	√	–	√
Cohort Trend × *Ethnicity*	–	–	√	√
N	537	537	537	537
R^2	0.212	0.305	0.233	0.317

Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Microcensus (2007–2011), own calculations.
Notes: Linear probability models. Standard errors in parentheses, adjusted for clustering at district/country-of-origin/immigration-year level. Sample and covariates according to Table 4 (Column 4).
*** significant at 1%; ** significant at 5%; * significant at 10%.