Kick It Like Özil? Second Generation Migrants' Initial Disadvantage and the Failure of the Education System*

Annabelle Krause
IZA

Ulf Rinne
IZA

Simone Schüller
DIW Berlin

February 15, 2011

PRELIMINARY DRAFT

Abstract

We investigate second generation migrants and natives in Germany's education system. We determine at what stage the persistent native-migrant gap in labor market and schooling outcomes emerges. Controlling for family background and other characteristics, we employ a matching approach in order to account for the fact that migrants and natives are different. We find that second generation migrants are initially disadvantaged due to both their socioeconomic family background and the education system. We also find that comparable natives, in terms of family background, face similar difficulties. Thus, Germany's education system fails to provide equal opportunities for all initially disadvantaged individuals.

Keywords: Migration; Education; Human Capital; Germany; Tracking; Propensity Score Matching

JEL Classification: J15; J24; I21

*The data used in this paper were made available by the German Socio-Economic Panel Study (GSOEP) at the German Institute for Economic Research (DIW Berlin). Financial support from the German Research Foundation (*Deutsche Forschungsgemeinschaft*, DFG) for the project on "Ethnic Diversity and Labor Market Success" in the DFG-Priority Program "Flexibility in Heterogeneous Labor markets" (*Flexibilisierungspotenziale bei heterogenen Arbeitsmärkten*) is gratefully acknowledged. We would like to thank Daniela Geppert for excellent research assistance. All remaining errors are our own.

1 Introduction

Native-migrant gaps in economic outcomes are present in many countries, but in particular in Western European countries (OECD, 2006). This is *per se* not very surprising—given that migrants are selected groups (Roy, 1951; Borjas, 1987), that their human capital may not be entirely transferable (Chiswick, 1978; Borjas, 1985), that their language skills may be insufficient (Dustmann and Fabbri, 2003), and that they may face discrimination in the labor market (Bertrand and Mullainathan, 2004). But the extent to which those gaps are persistent over migrant generations is surprising. For example, Algan et al. (2010) document the lack of intergenerational improvement among migrants in terms of economic outcomes for the United Kingdom, France and Germany.

This paper focuses on education as a potential explanation for the persistent migrant-native gaps in economic outcomes. Education is moreover widely perceived as the main channel through which migrant families could economically catch up with natives. We thus study the education outcomes of second generations migrants in Germany and compare them to those of natives. Second generation migrants were born in the host country, and they thus undergo schooling and vocational education in the same system as native children. Therefore, one could expect differences in human capital—which may exist between first generation migrants and natives, e.g., due to migrant self-selection—to diminish, if not to disappear when comparing second generation migrants and natives.

Second generation migrants appear to follow their parents' footsteps and do not entirely catch up with the native population in terms of education outcomes. Although for example Algan et al. (2010) find considerable intergenerational progress for second generation migrants in France, Germany and the United Kingdom, the performance deficits in comparison to native peers remain substantial.[1] This is more and more a concern, both from an academic and a policy perspective. In the course of the past century, many countries have accumulated sizeable stocks of migrants and their descendants. Germany can be considered as an interesting example in this regard. It has received relatively large migration inflows over a long period, and therefore sizeable stocks of both first and second generation migrants are present. In 2007, almost 19 percent of the German population (or 15.4 million persons) had a migration background. Among children aged 5 and below, the share is even higher: around one third is descended from a family with a migration background. Turks are by far the largest group of individuals with a migration background (about

[1] See also OECD (2006) on this matter.

2.5 million in 2007), followed by Poles, Russians and Italians (Rühl, 2009).

Our empirical approach explicitly takes into account that the migrant population is a selected group of individuals. Although second generation migrants were born in the host countries, their parents as first generation migrants were not. They decided at a certain point to migrate from their country of origin to the chosen destination country, and they are thus a self-selected group. Given the substantial extent to which education outcomes transmit between generations (Solon, 1999) and the importance of parental input for child education (Becker and Tomes, 1976), it is therefore crucial to adequately control for immigrant parents' self-selection. We apply a propensity score matching approach to address this issue, and are thus able to compare a number of education outcomes of migrant children with those of *comparable* native children. By doing so, we are able to isolate the potentially different effect of the education system on migrant and native children from the effect that those groups are different when entering school. The main concern is that the parental background differs in important aspects between the two groups. Such aspects include for example household characteristics, parental human capital, and socioeconomic status.

Our results show that second generation migrants are both, initially disadvantaged and disadvantaged by the education system. They differ in important characteristics when entering school, and this appears responsible for most of the differences in enrollment rates at different secondary school types. However, we also find that comparable natives face similar difficulties. When we carefully take into account the issue of migrant self-selection in a propensity score matching framework, comparable natives show similar education outcomes. This finding indicates a general failure of Germany's education system to provide equal opportunities for initially disadvantaged individuals rather than a migrant-specific problem. Our findings thus contradict the conclusions drawn in OECD (2006, p. 60 ff.).[2] However, our results are for example in line with Frick and Wagner (2001) who also find that the native-migrant gap in education outcomes is mainly due to the relatively more advantaged socioeconomic family background of natives.

The remainder of this paper is organized as follows. Section 2 briefly describes the background of this paper and reviews the related literature. After we describe our data and our sample in Section 3, we outline and discuss our empirical approach

[2]See in particular OECD (2006, p. 69): "The section above indicates that performance differences between immigrant and non-immigrant students persist in many countries even after accounting for parents' level of education and occupational status. This suggests that these performance differences are, in part, specifically associated with students' immigrant background."

in Section 4 and present our results in Section 5. A sensitivity analysis is performed in Section 6 and, finally, Section 7 concludes.

2 Background and Related Literature

This section describes the situation of migrants in Germany, with a particular focus on second generation migrants. Since we analyze the education system as the main channel of migrant children's economic advancement, we also describe Germany's education system and its peculiarities. Finally, we briefly review the related literature and highlight some important previous findings.

Migrants in Germany

Germany's migration history after World War II started during the post-war economic boom, in which the country focused on the recruitment of low-skilled foreign labor. Many of these guest workers from Southern European countries, who arrived until 1973, settled and were joined by their spouses. The group which is nowadays referred to as second generation migrants mainly consists of the offspring of those migrants. In the late 1980s and early 1990s, Germany experienced massive immigration flows of ethnic Germans from Eastern Europe. Afterwards, Germany also received a comparatively large number of humanitarian migrants; and particularly after the enlargement of the European Union (EU) in 2004 and 2007, migration streams from Central and Eastern European countries have been substantial and increasing.[3]

Today's composition of migrants in Germany is therefore dominated by five groups of migrants: *a*) guest workers and their spouses, *b*) their offspring, *c*) ethnic Germans from Eastern Europe, *d*) recent immigrants from the EU and accession countries, and *e*) humanitarian migrants.

While the labor market integration of foreign men is relatively favorable by international standards, migrant women have relatively low employment rates (Liebig, 2007). Furthermore, the situation of second generation migrants is a concern, as this group shows relatively low educational outcomes when compared to native peers. This may however be related to the particular selection process which affected their parents, i.e., the guest workers who arrived in Germany until 1973. In contrast to

[3] See, e.g., Kahanec and Zimmermann (2009) for a comprehensive analysis of the consequences of east-west labor migration for the old and new EU member states.

other countries, the selection process has not been a positive selection when compared to the native population. The aim was to fill temporary shortages of low-skilled labor, and thus primarily low-skilled workers were recruited.

Germany's Secondary Education System

In Germany's education system, crucial decisions are taken relatively early. One important point in time is the transition from primary to secondary schooling. Usually at around the age of 10 years, i.e., after four years of primary education, pupils are tracked into three different types of secondary schooling.[4]

Traditionally, secondary schooling in Germany is divided into the following three types: *a*) a lower secondary school (*Hauptschule*), which is designed to prepare pupils for manual professions, *b*) an intermediate secondary school (*Realschule*), which prepares students for administrative and lower white-collar jobs, and *c*) an upper secondary school (*Gymnasium*), the most prestigious school type which prepares for higher education. Only the latter track allows for direct access to universities. All three types are typically public and tuition-free.

The decision of secondary school placement is taken jointly by parents and teachers. Primary school teachers recommend which secondary track to choose, but these recommendations are not binding in most federal states.[5] Secondly, this early tracking system runs the risk of cementing educational careers at early age, especially since different curricula for the different school types leave only little room for later upward or downward mobility.[6]

Related Literature

The international literature on the educational attainment of second generation migrants is relatively large and growing (Borjas, 1992; van Ours and Veenman, 2003; Nielsen et al., 2003; Djajic, 2003; Colding, 2006; Cobb-Clark and Nguyen, 2010; Belzil and Poinas, 2010; Algan et al., 2010). There are moreover several studies for Germany documenting a persistent migrant-native gap in education outcomes

[4]Some variation across the federal states exists in this regard as education legislation is made by the federal states. For example, in Berlin and Brandenburg primary school covers six years and in a few federal states (e.g., Hesse, Bremen and Lower-Saxony) some school types exist in which tracking is postponed for two years.

[5]Exceptions are the federal states of Saxony, Brandenburg, Thuringia, Bremen, Baden-Wuerttemberg and Bavaria.

[6]Changing tracks after the initial placement is in principle possible, but it rarely occurs.

(Haisken-DeNew et al., 1997; Gang and Zimmermann, 2000; Riphahn, 2003, 2005; Luthra, 2010; Algan et al., 2010).

The central question to explain the persistent migrant-native differences in education outcomes is as follows. Do second generation migrants have an initial disadvantage due to their parental background and household characteristics, or are they disadvantaged due to ethnicity or migrant-specific characteristics? For Germany, there are basically two answers present in the literature. First, a relatively large part of the literature argues that it is the initial disadvantage of migrants which leads to those persistent gaps. Consequently, only little ethnic inequality should remain after controlling for the families' social background. For example, Frick and Wagner (2001) do not find migration background per se to account for observable differences in immigrant children's educational enrollment, but rather other socioeconomic factors, i.e. they do not find formal discrimination of migrant children by the German education system. However, they still observe low educational attainment levels being transferred from one migrant generation to the next. Similarly, Entorf and Tatsi (2009), who examine educational performance, attribute a large part of the native-migrant gap to the less favorable socioeconomic background of migrant children. In contrast, there are other scholars who argue that the performance differences are, at least in part, specifically associated with the children's migration background through factors such as institutional discrimination, school segregation or language ability (see, e.g., OECD, 2006), even after controlling for socioeconomic background.

The study of Luthra (2010) highlights the importance of comparing the children of immigrants to the children of natives who share similar background characteristics. In contrast to earlier studies, she finds a migrant *advantage* over native children, which is moreover strongly concentrated among those pupils with the lowest educated parents. In other words, the second generation appears to experience less of a negative effect from low parental education than native Germans. Against this background, the present paper provides a further assessment of the current understanding of second generation educational attainment in Germany by explicitly comparing second generation and native youth of the same socioeconomic background.

3 Data

The data of this study stem from the German Socio-Economic Panel Study (GSOEP).[7] The GSOEP is a representative longitudinal study of private households in Germany. Its first wave started in 1984 and currently wave 26 is available which covers 2009.

The focus of this paper is on children in the education system. We thus draw our sample from a particular group of individuals, namely those for which answers to the youth questionnaire are available. This questionnaire was for the first time included in 2001.[8] Typically, respondents are 17 years old when interviewed. In subsequent waves those individuals enter the regular GSOEP and answer the usual questionnaire. The youth questionnaire includes retrospective questions about the school career, music education and sport activities. This includes for example information about recommendations for secondary schooling and grade repetition, which are rarely available in other datasets.[9] Furthermore, there are a number of questions about the current situation as well as about plans and expectations for future career and family.

Besides using information available in the respective youth questionnaire we use information about parental characteristics when the children were 6 years old. This is the mandatory school entrance age in Germany and thus the point in time when essentially all children enter primary school. This reduces our sample as only those children are included who are observed in the GSOEP when they were 6 years old. We obtain this information from the household questionnaire in the respective wave.

Furthermore, we focus on individuals living in West Germany as the share of migrants in East Germany is still relatively low. We drop observations with missing information in important characteristics. Our final sample consists of 516 individuals, among those 351 native children and 165 children with a migration background. We define children with migration background as children who are either *a*) German-born, but not German citizens or at least one of their parents is not German-born, or *b*) not German-born, but migrated to Germany when they were younger than 6 years.

Table 1 displays summary statistics of individual and household characteristics in our sample by immigrant status. It appears that second generation migrants indeed have an initial disadvantage when they enter school. This turns out to be the case

[7] See Wagner et al. (2007) for a comprehensive description of this data set.

[8] A pre-test of the youth questionnaire was conducted in 2000.

[9] Recommendations for secondary schooling are also included in an extension to the German PISA 2000 study (PISA-E, see Jürges and Schneider, 2007).

with respect to most household and family characteristics. For example, the household income of migrants is on average lower than in native households. On the other hand, the average household size is larger and there are more children present in migrant households. But especially the difference with respect to the parents' years of education is substantial: on average, native parents spent 1.5 years more in education than migrant parents. Mothers of migrants are less likely to work. Also their fathers are less likely to be employed—and if they are, most of them are employed as blue-collar workers. In terms of their parents' age, both immigrant fathers and mothers are on average slightly younger than their native counterparts. Finally, whereas basically every native child has attended pre-school education, only about 85 percent of migrant children have done so.

Table 1 about here

Table 2 shows the distribution of individuals in our sample across Germany's federal states and according to the population size of the respective region of residence. First, the distribution shows that migrants are more likely to live in the city-states of Hamburg and Berlin and in the state of Baden-Wuerttemberg, a relatively prosperous and industrialized state in Germany's south-west. This is in line with the second observation that migrants are also more likely to live in relatively densely populated regions. Therefore, the regional distribution of migrants indicates important differences when compared to natives. Those differences are probably not random but due to migrant self-selection.

Table 2 about here

The information displayed in Table 3 shows that almost 70 percent of the migrant children in our sample have a migration background originating in one of the former guest worker countries. Roughly one third are of Turkish origin. Comparatively large fractions stem from other guest worker countries such as the former Yugoslavia, Italy, Greece and Spain.

Table 3 about here

The education outcomes of migrant children and native children are depicted in Table 4. The distribution of recommendations which the children receive at the end of their primary school show important differences between migrant and native children. Whereas one in two native children is recommended to attend upper secondary school, this is the case for only about one in four migrant children.

In contrast, about one in three migrant children are recommended to enter lower secondary school. Only about one in five native children receive such a recommendation. It thus appears that a sizeable larger share of migrant children receive recommendations for lower types of secondary schooling. This picture changes only slightly when looking at which type of secondary school the children actually attend. More than 40 percent of the migrant children in our sample enroll in lower secondary school, whereas only 25 percent of native children do so. On the other hand, almost one in two native children transfer to an upper secondary school. This share is less than 30 percent for migrant children. Moreover, the average grade in mathematics according to the last report card is higher for native children than for migrant children.[10]

Table 4 about here

It therefore appears that migrant children have a comparative disadvantage vis-à-vis native children when they enter school, and that they show lower education outcomes in a number of dimensions. Our subsequent analysis isolates the latter effect by carefully controlling for socioeconomic family background.

[10]In Germany grades are measured on a scale from 1 to 6, where 1 is the best and 6 the worst grade.

4 Empirical Approach

One important aspect when analyzing and comparing education outcomes of migrants' children with those of native children is to adequately take into account the issue of migrant self-selection. In our case, this is important as parental characteristics could be potentially very different. Second generation migrants may grow up in households which may substantially differ from the average native household. Furthermore, their parents' human capital endowment and socioeconomic status may be very different from average native parents'. As those characteristics are important determinants of education outcomes, this may induce an initial disadvantage of migrant children. Without taking this issue adequately into account, it is thus not clear whether the education system leads to differential education outcomes of migrants and natives, or rather different household characteristics of migrants (and their parents) when entering school result in the observed differences.

To isolate the effect of the education system on migrants and natives from the effect that those groups are *a priori* not comparable, we employ a matching approach in which we control for family background and other observed characteristics at preschool ages. This approach is common in the literature on the evaluation of active labor market programs (see, e.g, Rinne et al., 2008, 2010, for applications in the German context). Aleksynska (2007) also follows a matching approach to address the issue of migrant self-selection.

In our context, we would ideally like to compare the education outcomes of migrant children (Y^1) with the education outcomes of the same individuals if they were native children (Y^0). If D indicates a migration background, with $D = 1$ if a person has one and $D = 0$ otherwise, the actual outcome for individual i can be written as:

$$Y_i = Y_i^1 \cdot D_i + Y_i^0 \cdot (1 - D_i) \; . \tag{1}$$

The individual treatment effect would then be given by the difference $\Delta_i = Y_i^1 - Y_i^0$. However, it is impossible to calculate this difference because one of the outcomes is counterfactual. Instead, the evaluation literature concentrates on population average gains from treatment—usually on the average treatment effect on the treated (ATT or Δ_{ATT}), which is formally given by:

$$\Delta_{ATT} = E(\Delta | D = 1) = E(Y^1 | D = 1) - E(Y^0 | D = 1) \; . \tag{2}$$

It is the principle task of any evaluation study to find a credible estimate for the second term on the right hand side of equation (2), which is unobservable.

One possible solution could be to simply compare the mean education outcomes of migrant and native children. However, if $E(Y^0|D=1) \neq E(Y^0|D=0)$, estimating the ATT from the difference between the sub-population means of these two groups would yield a selection bias. On the other hand, if treatment assignment is *strongly ignorable*, i.e., if selection is on observable characteristics X (conditional independence assumption) and if observable characteristics of migrant and native children overlap (common support), the matching estimator is an appealing choice to estimate the desired counterfactual (Rosenbaum and Rubin, 1983). Under these conditions, the distribution of the counterfactual outcome Y^0 for migrant children is the same as the observed distribution of Y^0 for the comparison group of native children *conditional on the vector of covariates* X.

Formally,

$$E(Y^0|X, D=1) = E(Y^0|X, D=0) \ . \tag{3}$$

Entering this relation into equation (2) allows the ATT to be estimated by comparing mean education outcomes of matched migrant and native children. Rosenbaum and Rubin (1983) show that if treatment assignment is strongly ignorable *given* X, it is also strongly ignorable *given any balancing score that is a function of* X.[11] One possible balancing score is the propensity score $P(X)$, which is the probability of participating in a given program.

There are several propensity score matching methods suggested in the literature, see, e.g., Caliendo and Kopeinig (2008) for an overview. Based on the characteristics of our data, we apply Kernel matching.[12] This nonparametric matching algorithm has the advantage of using weighted average of (nearly) all individuals in the control group to construct the counterfactual outcome. We choose a bandwidth of 0.06. The variances of the treatment effects are calculated based on the following formula suggested by Lechner (2001):

$$Var(\hat{\theta}_{ATT}) = \frac{1}{N_1} Var(Y^1|D=1) + \frac{\sum_{i\epsilon(D=0)} (w_i)^2}{(N_1)^2} Var(Y^0|D=0) \ , \tag{4}$$

where N_1 is the number of matched migrant children and w_i the weight given to individual i from the control group. This approximation assumes independent observations, fixed weights, homoscedasticity of the variances of the outcome variables within treatment and control group, and that these variances do not depend

[11] When there are many covariates, it is impractical to match directly on covariates because of the curse of dimensionality. See, e.g., Zhao (2008) for some comments on this problem.

[12] We will assess the sensitivity of our results with respect to the matching algorithm in a future version of this paper.

on the propensity score. We checked the accuracy of this approximation by employing bootstrapped variances, which did not change our results. Another justification for this approach is Lechner (2002) who finds little difference between bootstrapped variances and the variance approximation.

The matching method we apply is based on the conditional independence assumption. This is in general a very strong assumption and, hence, its plausibility is crucial. Caliendo et al. (2008) provide a good example of a careful discussion of this issue. The implementation of matching estimators requires choosing a set of variables simultaneously influencing the participation decision or, in our case, the probability of having a migration background, and the outcome variables. Our set of variables should thus include variables which adequately take into account the issue of migrant self-selection and influence education outcomes. We thus include a set of variables capturing the particular regional distribution of migrants across the federal states and the population density of the respective region of residence. Both are supposedly also important determinants of education outcomes, as education legislation is made by the federal states and the availability of particular types of secondary schools may differ with population density. Another set of variables includes individual, parental and household characteristics in which migrants and natives differ and which influence education outcomes.

Based on this set of variables, we first estimate a binary probit model conditional on a number of observable characteristics where an indicator of the children's migration background is the dependent variable. These characteristics include regional characteristics as well as individual and household characteristics when the respective child was 6 years old (i.e., before entering school). Table 5 reports the results of this regression. The results underlying the propensity scores basically confirm the impression from the descriptive statistics. The coefficient estimates on regional characteristics underline the pattern highlighted above, namely that migrants are heterogeneously distributed across German states and that they are more likely to live in more densely populated regions. Similar statements can be made with respect to individual and household characteristics. The coefficient estimates on parents' years of education and occupation status of the father (where not working is the reference) are all negative and significantly different from zero.

Table 5 about here

After estimating the propensity score we match each migrant child with native

children based on Kernel matching.[13] In general, the overlap between the group of migrant children and native children is sufficient in our sample. Nonetheless, in some cases migrant children lack comparable native children. A visual inspection of the propensity score distribution confirms this, see Figure 1. Those individuals are dropped from our pool of migrant children. This applies to 4 individuals out of the 165 migrant children in our sample (i.e., slightly less than 3 percent).

Figure 1 about here

One way to assess the matching quality is to compare the standardized difference before matching, SD^b, to the standardized difference after matching, SD^a. The standardized differences are defined as

$$SD^b = \frac{(\overline{X}_1 - \overline{X}_0)}{\sqrt{0.5 \cdot (V_1(X) + V_0(X))}} \;\; ; \;\; SD^a = \frac{(\overline{X}_{1M} - \overline{X}_{0M})}{\sqrt{0.5 \cdot (V_1(X) + V_0(X))}} \,, \qquad (5)$$

where X_1 (V_1) is the mean (variance) in the treated group before matching and X_0 (V_0) the analogue for the comparison group. X_{1M} and X_{0M} are the corresponding means after matching (Rosenbaum and Rubin, 1985). The mean standardized difference should be reduced after matching. This is the case for basically all of the covariates, see Table 6. Moreover, significant differences in the means of the covariates, which existed in the unmatched sample, disappear after matching.

Table 6 about here

Following the suggestion of Sianesi (2004) we also re-estimate the propensity score on the matched sample to compute the pseudo-R^2 before and after matching. The pseudo-R^2 indicates how well the observable characteristics X explain the probability of being treated. After matching the pseudo-R^2 should be low because there should be no systematic differences between the treated and not treated individuals. Table 7 summarizes the overall matching quality. Those measures suggest that the quality of our matching procedure is quite satisfactory.

Table 7 about here

We are thus confident that our following results adequately take into account the issue of migrant self-selection.

[13] The matching algorithm is implemented using the PSMATCH2 Stata ado-package by Leuven and Sianesi (2003).

5 Results

This section presents our empirical results. Table 8 summarizes the differences in the outcome variables before and after matching. While the results before matching indicate the raw differences in mean outcomes between migrant and native children that exist in our sample, the average treatment effects on the treated (ATT) are the respective differences when we only compare the outcomes of migrant children with those of *comparable* native children. The initial disadvantage of migrant children in terms of individual and household characteristics are thus accounted for in this approach.

Table 8 about here

The outcome variables which we consider are first the recommendation each child receives when he or she leaves primary school. Second, we look at the actual transition of the child to one of the three different secondary schooling types. This outcome is measured when the child is between 11 and 13 years old. Finally, we investigate the grade in mathematics from the last report card. This information is available in the youth questionnaire for the respective child.

Recommendation for Secondary School

The raw differences in recommendations when leaving primary school are substantial and significantly different from zero. Migrant children are about 13 percentage points less likely to receive a recommendation for either upper or intermediate secondary school, and they are 23 percentage points less likely to receive a recommendation for upper secondary school.

However, after matching these differences decrease and become statistically insignificantly different from zero. Although statistical significance disappears, some economic significance remains: our point estimates indicate that migrant children are still about 7 percentage points less likely to be recommended for either upper or upper/intermediate secondary school.

Secondary School Enrolment

When considering actual secondary school enrolment, the raw differences in mean outcomes are again substantial and significantly different from zero. Migrant children are 15 percentage points more likely be tracked into lower secondary school, and they are 20 percentage points less likely to transfer to upper secondary school.

In contrast to our findings with respect to recommendations, the average treatment effects on the treated when considering actual school enrolment not only become statistically insignificant, but also virtually zero. This is especially the case when considering upper and intermediate secondary school enrolment versus lower school enrolment. Contrasting upper secondary school with intermediate and lower secondary school enrolment, a (statistically insignificant) difference of about 2 percent remains. However, these results indicate that migrant children are basically tracked into the same types of secondary school when differences in background characteristics which existed before entering the education system are carefully controlled for.

Grade in Mathematics

With respect to the grade in mathematics both, the raw difference and the average treatment effect on the treated are statistically significantly different from zero. Moreover, the magnitude of the difference after matching is even higher than before matching.

This finding could indicate that migrants perform worse at school even after controlling for background characteristics. However, our estimates do not take into account at which type of secondary school the respective grade was obtained, and thus a straightforward interpretation of this effect is not possible. This aspect thus deserves further investigations.

6 Sensitivity Analysis

In order to check the robustness of our results, we conduct three sensitivity analyses concerning the composition of our sample. First, we only consider migrant children whose parents' country of origin is a guest worker country. This group of migrants is the largest in our sample and also the one with a less favorable family background (e.g., with respect to parental years of education) than migrants from other origins. We therefore check whether only considering this group of migrants—and thus taking into account the possible heterogeneity of our migrant sample—yields different results. Second, for families with more than one child in our sample, we only consider the first born child. For these families, we observe the same background characteristics for more than one individual. This may induce a bias in our results. Third, we only consider children who attended kindergarten or some sort of preschool education, since this is usually considered to be an important determinant of

a child's education progress in Germany. Moreover, we observe that migrants are about 12 percentage points less likely to attend pre-school education than natives—and almost every native child attends pre-school education. By excluding those individuals who did not attend pre-school education, we thus rule out any possible bias arising from this difference.

Children from Guest Worker Countries

When we only consider children whose parents migrated from guest worker countries, our sample decreases to 467 individuals. Among these are 116 migrant children, from which 18 lack comparable native children. Average treatment effects on the treated for this sub-sample are displayed in Table 9.

Table 9 about here

Some differences compared to the baseline results arise. First, the magnitude of the raw means in recommendations is lower for migrant children in the guest worker sample. This indicates that they are less often recommended to upper and/or intermediate secondary schools than migrants in the baseline sample. Moreover, when contrasting upper and intermediate with lower secondary school recommendation, the ATT remains significant at 10 percent as opposed to the baseline results. This means that even after matching, guest worker children are more likely recommended to lower secondary school. A potential explanation for this finding could be that second generation migrants from guest worker countries face discrimination by teachers and are treated differently than natives or other migrant children. However, there may also be other processes potentially affecting this group of migrant children differently. This issue thus deserves further investigations.

When looking at the actual secondary school enrolment, ATT remain statistically insignificant. However, they show some economic significance as our point estimates indicate differences in outcomes of about 5-6 percentage points between guest worker children and comparable native children. Furthermore, the results with respect to the grade in mathematics not only differ in magnitude, but also in significance from our baseline results. The ATT is not statistically significantly different from zero.

First Sibling

Our sample decreases to 376 individuals when we drop children who are not the first born child in the respective family. This sub-sample consists of 257 native and

119 migrant children. Among those, only one migrant child is not in the common support region. Table 10 displays the results.

Table 10 about here

With respect to statistical significance, the results concerning recommendations and actual school attendance are robust compared to the baseline. The magnitudes of the point estimates change slightly. The ATT for grade in mathematics is not statistically significant, opposed to the baseline result. Overall, our baseline results thus appear robust to including multiple observations per family.

Pre-school Education

The sub-sample of children who attended pre-school education consists of 481 children: 343 native children and 138 migrant children. One migrant child lacks comparable native children. Table 11 displays the results.

Table 11 about here

All results remain virtually the same as in our baseline sample. This indicates that pre-school education attendance is not a driving factor of our main results.

7 Conclusions

Education is widely perceived as the main channel through which migrant families could economically catch up with natives. Although there is some intergenerational progress in education outcomes for second generation migrants, the performance deficits in comparison to native peers remain substantial. The question this paper addresses is thus whether second generation migrants have an initial disadvantage due to their parental background and household characteristics, or whether they are disadvantaged by the education system.

To answer this question, we apply a matching approach to adequately control for migrants' self-selection. By doing so, we are able to isolate the potentially different effect of the education system on migrant and native children from the effect that those groups are different when entering school.

Our results show that second generation migrants are both, initially disadvantaged and disadvantaged by the education system. They differ in important characteristics when entering school, and this appears to induce most of the differences

in enrollment rates at different secondary school types. However, we also find that comparable natives face similar difficulties. When taking into account the issue of migrant self-selection, comparable natives show similar education outcomes. This finding indicates a general failure of Germany's education system to provide equal opportunities for initially disadvantaged individuals rather than a migrant-specific problem. For this reason, the failure of the education system thus appears to be a migrant-specific problem. This group is by and large initially disadvantaged, but we show that the effects on initially disadvantaged native children are very similar.

We conduct a number of sensitivity analyses to check whether our results are robust in different sub-samples. Our findings suggest that our main results are generally robust. However, a sensitivity analysis concerning children of migrants from guest worker countries shows that these children are statistically significantly more likely to be recommended to lower secondary school—even after matching. Discrimination and other processes can potentially explain this finding, but this issue deserves further investigations.

There are some characteristics of Germany's education system that appear related to our findings (see, e.g, Crul and Vermeulen, 2003). For example, the age at which education begins is relatively late in Germany compared to other countries. Children enter school at the age of 6 years, and thus a very important stage in the children's development process has already passed. Moreover, most children attend school on a half-day basis and face-to-face contact hours with teachers are therefore below average. Germany also tracks relatively early by international standards, and initially disadvantaged children are thus given little time to pull themselves out of their disadvantaged starting position. Finally, Germany is well below average with respect to the amount of supplementary help and support available to children inside and outside school.

References

Aleksynska, M. (2007). Civic Participation of Immigrants: Culture Transmission and Assimilation. MPRA Paper 7674, University Library of Munich, Munich.

Algan, Y., C. Dustmann, A. Glitz, and A. Manning (2010). The Economic Situation of First- and Second-Generation Immigrants in France, Germany, and the United Kingdom. *The Economic Journal 120*(542), 4–30.

Becker, G. S. and N. Tomes (1976). Child Endowments and the Quantity and Quality of Children. *Journal of Political Economy 84*(4), S143–S162.

Belzil, C. and F. Poinas (2010). Education and Early Career Outcomes of Second-Generation Immigrants in France. *Labour Economics 17*(1), 101–110.

Bertrand, M. and S. Mullainathan (2004). Are Emily and Greg more Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination. *American Economic Review 94*(4), 991–1013.

Borjas, G. (1985). Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants. *Journal of Labor Economics 3*(4), 463–489.

Borjas, G. (1987). Self-Selection and the Earnings of Immigrants. *American Economic Review 77*(4), 531–553.

Borjas, G. J. (1992). Ethnic Capital and Intergenerational Mobility. *Quarterly Journal of Economics 107*(1), 123–150.

Caliendo, M., R. Hujer, and S. L. Thomsen (2008). The Employment Effects of Job Creation Schemes in Germany: A Microeconometric Evaluation. In D. L. Millimet, J. A. Smith, and E. J. Vytlacil (Eds.), *Estimating and Evaluating Treatment Effects in Econometrics*, Volume 21 of *Advances in Econometrics*, pp. 383–430. Bingley: Emerald Group Publishing.

Caliendo, M. and S. Kopeinig (2008). Some Practical Guidance for the Implementation of Propensity Score Matching. *Journal of Economic Surveys 22*(1), 31–72.

Chiswick, B. R. (1978). The Effect of Americanization on the Earnings of Foreign-born Men. *Journal of Political Economy 86*(5), 897–921.

Cobb-Clark, D. A. and H. T. Nguyen (2010). Immigration Background and the Intergenerational Correlation in Education. IZA Discussion Paper 4985, Institute for the Study of Labor (IZA), Bonn.

Colding, B. (2006). A Dynamic Analysis of Educational Progression of Children of Immigrants. *Labour Economics 13*(4), 479–492.

Crul, M. and H. Vermeulen (2003). The Second Generation in Europe. *International Migration Review 37*(4), 965–986.

Djajic, S. (2003). Assimilation of Immigrants: Implications for Human Capital Accumulation of the Second Generation. *Journal of Population Economics 16*(4), 831–845.

Dustmann, C. and F. Fabbri (2003). Language Proficiency and Labour Market Performance of Immigrants in the UK. *The Economic Journal 113*(489), 695–717.

Entorf, H. and E. Tatsi (2009). Migrants at School: Educational Inequality and Social Interaction in the UK and Germany. IZA Discussion Paper 4175, Institute for the Study of Labor (IZA), Bonn.

Frick, J. R. and G. G. Wagner (2001). Economic and Social Perspectives of Immigrant Children in Germany. In E. Currle and T. Wunderlich (Eds.), *Deutschland – ein Einwanderungsland? Rückblick, Bilanz und neue Fragen*. Stuttgart.

Gang, I. N. and K. F. Zimmermann (2000). Is Child like Parent? Educational Attainment and Ethnic Origin. *Journal of Human Resources 35*(3), 550 –569.

Haisken-DeNew, J., F. Büchel, and G. G. Wagner (1997). Assimilation and Other Determinants of School Attainment in Germany: Do Immigrant Children Perform as Well as Germans? *Vierteljahrshefte zur Wirtschaftsforschung 66*(1), 169–179.

Jürges, H. and K. Schneider (2007). What Can Go Wrong Will Go Wrong: Birthday Effects and Early Tracking in the German School System. CESifo Working Paper 2055, CESifo Group, Munich.

Kahanec, M. and K. F. Zimmermann (Eds.) (2009). *EU Labor Markets After Post-Enlargement Migration*. Berlin et al.: Springer.

Lechner, M. (2001). Identification and estimation of causal effects of multiple treatments under the conditional independence assumption. In M. Lechner and F. Pfeiffer (Eds.), *Econometric Evaluation of Labour Market Policies*, pp. 43–58. Heidelberg: Physica.

Lechner, M. (2002). Some Practical Issues in the Evaluation of Heterogeneous Labour Market Programmes by Matching Methods. *Journal of the Royal Statistical Society, Series A, Statistics in Society 165*(1), 59–82.

Leuven, E. and B. Sianesi (2003). PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing. Statistical Software Components, Boston College Department of Economics. Available at http://ideas.repec.org/c/boc/bocode/s432001.html.

Liebig, T. (2007). The Labour Market Integration of Immigrants in Germany. OECD Social, Employment and Migration Working Papers 47, OECD, Directorate for Employment, Labour and Social Affairs, Paris.

Luthra, R. R. (2010). Assimilation in a New Context: Educational Attainment of the Immigrant Second Generation in Germany. ISER Working Paper 2010-21, Institute for Social and Economic Research (ISER), Essex.

Nielsen, H. S., M. Rosholm, N. Smith, and L. Husted (2003). The School-to-Work Transition of 2nd Generation Immigrants in Denmark. *Journal of Population Economics, 2003, vol. 16, issue 4, pages 16*(4), 755–786.

OECD (2006). *Where Immigrant Students Succeed: A Comparative Review of Performance and Engagement in PISA 2003*. Paris: Organization for Economic Cooperation and Development (OECD).

Rühl, S. (2009). Grunddaten der Zuwandererbevölkerung in Deutschland. Working Paper 27, Bundesamt für Migration und Flüchtlinge, Nuremberg.

Rinne, U., M. Schneider, and A. Uhlendorff (2010). Do the Skilled and Prime-Aged Unemployed Benefit More from Training? Effect Heterogeneity of Public Training Programs in Germany. *Applied Economics* (forthcoming).

Rinne, U., A. Uhlendorff, and Z. Zhao (2008). Vouchers and Caseworkers in Public Training Programs: Evidence from the Hartz Reform in Germany. IZA Discussion Paper 3910, Institute for the Study of Labor (IZA), Bonn.

Riphahn, R. T. (2003). Cohort Effects in the Educational Attainment of Second Generation Immigrants in Germany: An Analysis of Census Data. *Journal of Population Economics 16(4)*, 711–737.

Riphahn, R. T. (2005). Are there Diverging Time Trends in the Educational Attainment of Nationals and Second Generation Immigrants? *Journal of Economics and Statistics 225*(3), 325–346.

Rosenbaum, P. R. and D. B. Rubin (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika 70*(1), 41–55.

Rosenbaum, P. R. and D. B. Rubin (1985). Constructing a Control Group Using Multivariate Matched Sampling Methods that Incorporate the Propensity Score. *The American Statistican 39*(1), 33–38.

Roy, A. D. (1951). Some Thoughts on the Distribution of Earnings. *Oxford Economic Papers 3*(2), 135–146.

Sianesi, B. (2004). An Evaluation of the Active Labor Market Programmes in Sweden. *The Review of Economics and Statistics 86*(1), 133–155.

Solon, G. (1999). Intergenerational Mobility in the Labor Market. In O. Ashenfelter and D. E. Card (Eds.), *Handbook of Labor Economics*, Volume 3A, Chapter 29, pp. 1761–1800. Elsevier.

van Ours, J. C. and J. Veenman (2003). The Educational Attainment of Second-Generation Immigrants in the Netherlands. *Journal of Population Economics 16*(4), 739–753.

Wagner, G. G., J. R. Frick, and J. Schupp (2007). The German Socio-Economic Panel Study (SOEP) – Scope, Evolution and Enhancements. *Schmollers Jahrbuch 127*(1), 139–169.

Zhao, Z. (2008). Sensitivity of Propensity Score Methods to the Specifications. *Economics Letters 98*(3), 309–319.

Table 1: Descriptive Statistics I (Individual and Household Characteristics)

	Natives	**Migrants**
Male	0.4843	0.4424
	(0.5005)	(0.4982)
Logarithm household income	8.0012	7.9215
	(0.3807)	(0.4063)
Number of persons in household	4.2564	4.8303
	(1.0127)	(1.9805)
Number of children in household	2.2108	2.4485
	(0.9387)	(1.3986)
Single parent household	0.0541	0.0727
	(0.2266)	(0.2605)
Parents' years of education	12.1638	10.5697
	(2.4179)	(2.2380)
Mother working	0.5214	0.3818
	(0.5003)	(0.4873)
Father not working	0.0313	0.1091
	(0.1745)	(0.3127)
Father blue-collar worker	0.3476	0.6121
	(0.4769)	(0.4888)
Father self-employed	0.1197	0.0788
	(0.3250)	(0.2702)
Father employee	0.3989	0.1758
	(0.4904)	(0.3818)
Father civil service	0.1026	0.0242
	(0.3038)	(0.1543)
Mother's age	34.1111	32.5939
	(4.4940)	(5.7709)
Father's age	36.6724	35.7455
	(5.5171)	(6.8926)
Pre-school education	0.9772	0.8546
	(0.1495)	(0.3536)
# Observations	351	165

Source: GSOEP, own calculations.
Note: Natives: German-born and German citizen, and parents German-born; migrants: German-born, but not German citizen or at least one parent not German-born, or not German-born, but migrated to Germany when younger than 6 years. Standard deviations in parentheses.

Table 2: Descriptive Statistics II (Regional Characteristics)

	Natives	**Migrants**
Berlin	0.0171	0.0303
	(0.1298)	(0.1719)
Schleswig-Holstein	0.0684	0.0061
	(0.2528)	(0.0779)
Hamburg	0.0029	0.0303
	(0.0534)	(0.1719)
Lower Saxony	0.0940	0.1030
	(0.2923)	(0.3049)
North Rhine-Westphalia	0.3077	0.2667
	(0.4622)	(0.4436)
Hesse	0.0627	0.0424
	(0.2427)	(0.2022)
Rhinel.-Palatinate, Saarl.	0.0883	0.0849
	(0.2842)	(0.2795)
Baden-Wuerttemberg	0.1966	0.3212
	(0.3980)	(0.4684)
Bavaria	0.1624	0.1152
	(0.3693)	(0.3202)
Region of residence population <20.000	0.4815	0.2727
	(0.5004)	(0.4467)
Region of residence population 20.000–100.000	0.2279	0.3333
	(0.4201)	(0.4728)
Region of residence population 100.000–500.000	0.1823	0.2364
	(0.3867)	(0.4261)
Region of residence population >500.000	0.1083	0.1576
	(0.3112)	(0.3655)
# Observations	351	165

Source: GSOEP, own calculations.
Note: Natives: German-born and German citizen, and parents German-born; migrants: German-born, but not German citizen or at least one parent not German-born, or not German-born, but migrated to Germany when younger than 6 years. No individual lives in Bremen, therefore this federal state is not listed. Standard deviations in parentheses.

Table 3: Descriptive Statistics III (Migrants' Country of Origin)

	Percent
Turkey	34.55
Former Yugoslavia	10.91
Greece	5.45
Italy	13.33
Spain	3.64
Russia/Former Soviet Republics	3.03
Poland	4.85
Others	21.82
# Observations	165

Source: GSOEP, own calculations.
Note: Natives: German-born and German citizen, and parents German-born; migrants: German-born, but not German citizen or at least one parent not German-born, or not German-born, but migrated to Germany when younger than 6 years. 4 observations have missing information for this variable.

Table 4: Descriptive Statistics IV (Education Outcomes)

	Natives	**Migrants**
Recommendation for Lower Secondary School	0.1738	0.3030
	(0.3750)	(0.4610)
Recommendation for Intermediate Secondary School	0.3191	0.4182
	(0.4668)	(0.4948)
Recommendation for Upper Secondary School	0.5071	0.2788
	(0.5007)	(0.4498)
Enrolment in Lower Secondary School	0.2678	0.4182
	(0.4435)	(0.4948)
Enrolment in Intermediate Secondary School	0.2536	0.3091
	(0.4357)	(0.4635)
Enrolment in Upper Secondary School	0.4786	0.2727
	(0.5003)	(0.4467)
Grade Mathematics Last Report Card	2.9003	3.1879
	(1.0843)	(0.9975)
# Observations	351	165

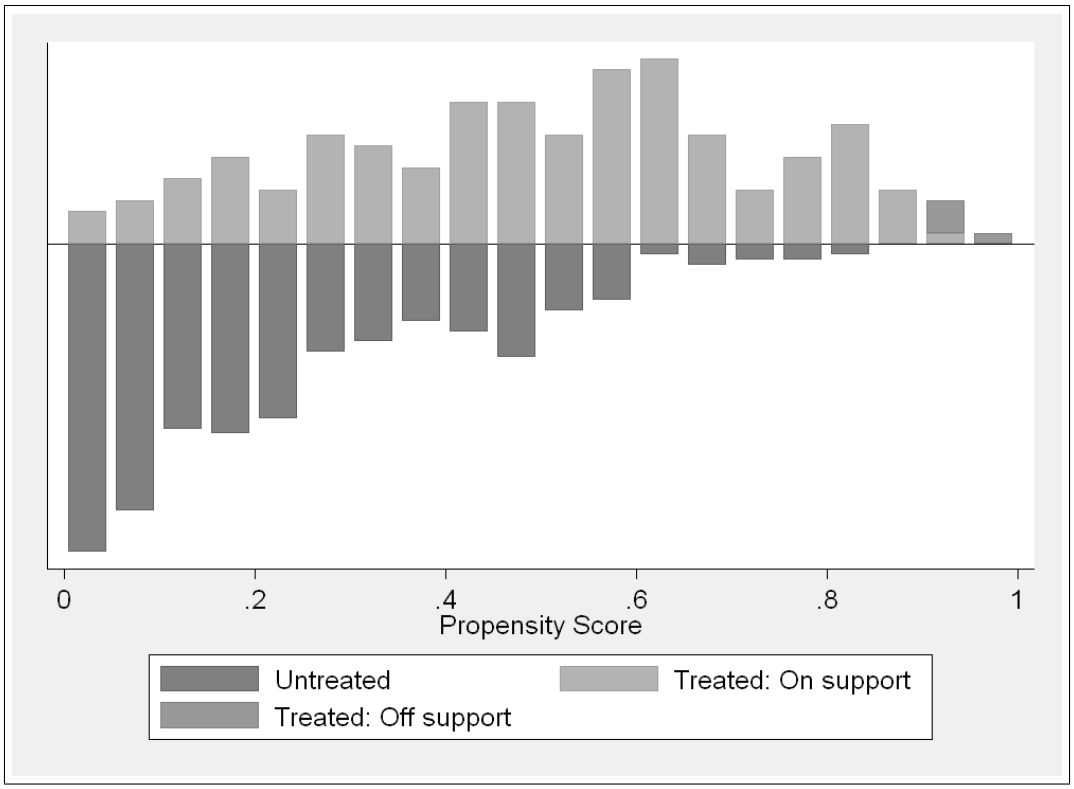
Source: GSOEP, own calculations.
Note: Natives: German-born and German citizen, and parents German-born; migrants: German-born, but not German citizen or at least one parent not German-born, or not German-born, but migrated to Germany when younger than 6 years. Standard deviations in parentheses. Grade in mathematics is measured on a scale from 1 to 6, where 1 is the best and 6 is the worst grade.

Table 5: Probit Estimates

	Coefficient	**SE**
Bavaria	reference	reference
Schleswig-Holstein	–1.4928***	0.5673
Hamburg	0.9484	0.7101
Lower Saxony	0.0249	0.2813
North Rhine-Westphalia	–0.1068	0.2233
Hesse	–.2231	0.3655
Rhinel.-Palatinate, Saarl.	0.3946	0.2833
Baden-Wuerttemberg	0.5894***	0.2222
Berlin	0.3773	0.4815
Region of residence population <20.000	reference	reference
Region of residence population 20.000–100.000	0.7880***	0.1757
Region of residence population 100.000–500.000	0.5912***	0.1938
Region of residence population >500.000	0.8439***	0.2573
Male	–0.1120	0.1314
Logarithm household income	0.4576**	0.2289
Number of children in household	0.0671	0.0652
Single parent	0.4901*	0.2892
Parents' years of education	–0.1327***	0.0352
Mother working	–0.3132**	0.1487
Father not working	reference	reference
Father blue-collar worker	–0.8309***	0.3064
Father self-employed	–1.3638***	0.3742
Father employee	–1.4965***	0.3390
Father civil service	–1.7472***	0.4234
Age mother	–0.0044	0.0191
Age father	–0.0013	0.0157
Constant	–1.9817	1.6168
Log Likelihood	–248.2952	
# Observations	516	

Source: GSOEP, own calculations.
Note: Probit regressions. Dependent variable equals one if respondent is a migrant.
*** significant at 1%; ** significant at 5%; * significant at 10%.

Figure 1: Distribution of Propensity Scores



Source: GSOEP, own calculations.

Table 6: Equality of Means Before and After Matching

	Sample	Treated	Control	% Bias	t-value
Schleswig-Holstein	Unmatched	0.0061	0.0684	–33.3	–3.10
	Matched	0.0062	0.0095	–1.8	–0.34
Hamburg	Unmatched	0.0303	0.0029	21.6	2.73
	Matched	0.0248	0.0135	8.9	0.74
Lower Saxony	Unmatched	0.1030	0.0940	3.0	0.32
	Matched	0.0994	0.0875	4.0	0.37
North Rhine-Westphalia	Unmatched	0.2667	0.3077	–9.1	–0.95
	Matched	0.2733	0.2894	–3.6	–0.32
Hesse	Unmatched	0.0424	0.0627	–9.1	–0.93
	Matched	0.0435	0.0256	8.0	0.88
Rhinel.-Palatinate, Saarl.	Unmatched	0.0849	0.0883	–1.2	–0.13
	Matched	0.0870	0.0995	–4.5	–0.39
Baden-Wuerttemberg	Unmatched	0.3212	0.1966	28.7	3.13
	Matched	0.3168	0.3146	0.5	0.04
Berlin	Unmatched	0.0303	0.0171	8.7	0.97
	Matched	0.0311	0.0340	–1.9	–0.15
ROR[a] population 20.000–100.000	Unmatched	0.3333	0.2279	23.6	2.55
	Matched	0.3354	0.3699	–7.7	–0.65
ROR population 100.000–500.000	Unmatched	0.2364	0.1823	13.3	1.43
	Matched	0.2298	0.2754	–11.2	–0.94
ROR population >500.000	Unmatched	0.1576	0.1083	14.5	1.59
	Matched	0.1553	0.1143	12.1	1.07
Male	Unmatched	0.4424	0.4843	–8.4	–0.89
	Matched	0.4472	0.4742	–5.4	–0.48
Logarithm household income	Unmatched	7.9215	8.0012	–20.3	–2.17
	Matched	7.9194	7.9376	–4.6	–0.41
Number of children in household	Unmatched	2.4485	2.2108	20.0	2.28
	Matched	2.4224	2.2844	11.6	1.01
Single parent	Unmatched	0.0727	0.0541	7.6	0.83
	Matched	0.0745	0.0929	–7.5	–0.59
Parents' years of education	Unmatched	10.570	12.164	–68.4	–7.15
	Matched	10.562	10.929	–15.7	–1.62
Mother working	Unmatched	0.3818	0.5214	–28.3	–2.98
	Matched	0.3851	0.4392	–11.0	–0.98
Father blue-collar worker	Unmatched	0.6121	0.3476	54.8	5.83
	Matched	0.6273	0.5544	15.1	1.33
Father self-employed	Unmatched	0.0788	0.1197	–13.7	–1.40
	Matched	0.0808	0.0720	2.9	0.29
Father employee	Unmatched	0.1758	0.3989	–50.8	–5.15
	Matched	0.1801	0.1998	–4.5	–0.45
Father civil service	Unmatched	0.0242	0.1026	–32.5	–3.13
	Matched	0.0248	0.0307	–2.4	–0.32
Age mother	Unmatched	32.594	34.111	–29.3	–3.26
	Matched	32.677	33.247	–11.0	–0.98
Age father	Unmatched	35.745	36.672	–14.8	–1.64
	Matched	35.832	36.040	–3.3	–0.29

Source: GSOEP, own calculations. [a] Region of Residence.

Table 7: Summary of Matching Quality

	Before Matching	**After Matching**
Mean Standardized Difference	22.3831	6.9215
Median Standardized Difference	19.9533	5.3981
Pseudo-R^2	0.232	0.029

Source: GSOEP, own calculations.

Table 8: Average Treatment Effect on the Treated

Outcome	**Sample**	**Treated**	**Controls**	**Difference**	**SE**
Recommendation A[a]	Unmatched	0.6970	0.8262	–0.1292***	0.0384
	ATT	0.6894	0.7647	–0.0752	0.0552
Recommendation B[b]	Unmatched	0.2788	0.5071	–0.2283***	0.0458
	ATT	0.2733	0.3424	–0.0691	0.0649
Secondary School A[a]	Unmatched	0.5818	0.7322	–0.1504***	0.0435
	ATT	0.5839	0.5904	–0.0066	0.0620
Secondary School B[b]	Unmatched	0.2727	0.4786	–0.2059***	0.0457
	ATT	0.2671	0.2850	–0.0179	0.0647
Grade Mathematics[c]	Unmatched	3.1879	2.9003	0.2876***	0.0998
	ATT	3.2112	2.8722	0.3390**	0.1415
# Observations Total			516		
# Observations On Support			512		

Source: GSOEP, own calculations.
[a] Recommendation A for upper and intermediate secondary school vs. lower secondary school or secondary school enrolment A at upper and intermediate secondary school vs. lower secondary school at ages 11, 12 or 13 (information provided by household head).
[b] Recommendation B for upper secondary school vs. intermediate and lower secondary school or secondary school enrolment B at upper secondary school vs. intermediate and lower secondary school at ages 11, 12 or 13 (information provided by household head).
[c] Grade in mathematics from last report card, measured on a scale from 1 to 6, where 1 is the best and 6 is the worst grade.
*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 9: Average Treatment Effect on the Treated (Guest Worker Sample)

Outcome	Sample	Treated	Controls	Difference	SE
Recommendation A[a]	Unmatched	0.6035	0.8262	–0.2228***	0.0439
	ATT	0.5918	0.7047	–0.1129*	0.0677
Recommendation B[b]	Unmatched	0.2069	0.5071	–0.3002***	0.0513
	ATT	0.2245	0.2927	–0.0682	0.0738
Secondary School A[a]	Unmatched	0.4741	0.7322	–0.2581***	0.0491
	ATT	0.4694	0.5323	–0.0629	0.0737
Secondary School B[b]	Unmatched	0.1810	0.4786	–0.2976***	0.0508
	ATT	0.2041	0.2521	–0.0480	0.0729
Grade Mathematics[c]	Unmatched	3.1035	2.9003	0.2032*	0.1137
	ATT	3.1633	3.0125	0.1508	0.1648
# Observations Total			467		
# Observations On Support			449		

Source: GSOEP, own calculations.
[a] Recommendation A for upper and intermediate secondary school vs. lower secondary school or secondary school attendance A at upper and intermediate secondary school vs. lower secondary school at ages 11, 12 or 13 (information provided by household head).
[b] Recommendation B for upper secondary school vs. intermediate and lower secondary school or secondary school attendance B at upper secondary school vs. intermediate and lower secondary school at ages 11, 12 or 13 (information provided by household head).
[c] Grade in mathematics from last report card, measured on a scale from 1 to 6, where 1 is the best and 6 is the worst grade.
*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 10: Average Treatment Effect on the Treated (First Sibling Sample)

Outcome	Sample	Treated	Controls	Difference	SE
Recommendation A[a]	Unmatched	0.6891	0.8560	–0.1670***	0.0434
	ATT	0.6864	0.7632	–0.0768	0.0619
Recommendation B[b]	Unmatched	0.2773	0.5525	–0.2752***	0.0536
	ATT	0.2712	0.3402	–0.0691	0.0754
Secondary School A[a]	Unmatched	0.5546	0.7432	–0.1886***	0.0508
	ATT	0.5593	0.5971	–0.0378	0.0721
Secondary School B[b]	Unmatched	0.2689	0.5175	–0.2486***	0.0537
	ATT	0.2712	0.2608	0.0104	0.0757
Grade Mathematics[c]	Unmatched	3.1597	2.9066	0.2531**	0.1175
	ATT	3.1610	2.9268	0.2342	0.1659
# Observations Total			376		
# Observations On Support			375		

Source: GSOEP, own calculations.
[a] Recommendation A for upper and intermediate secondary school vs. lower secondary school or secondary school attendance A at upper and intermediate secondary school vs. lower secondary school at ages 11, 12 or 13 (information provided by household head).
[b] Recommendation B for upper secondary school vs. intermediate and lower secondary school or secondary school attendance B at upper secondary school vs. intermediate and lower secondary school at ages 11, 12 or 13 (information provided by household head).
[c] Grade in mathematics from last report card, measured on a scale from 1 to 6, where 1 is the best and 6 is the worst grade.
*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 11: Average Treatment Effect on the Treated (Pre-school Education Sample)

Outcome	Sample	Treated	Controls	Difference	SE
Recommendation A[a]	Unmatched	0.7102	0.8309	–0.1208***	0.0403
	ATT	0.7080	0.7873	–0.0793	0.0576
Recommendation B[b]	Unmatched	0.3044	0.5102	–0.2059***	0.0494
	ATT	0.3066	0.3612	–0.0546	0.0690
Secondary School A[a]	Unmatched	0.6015	0.7405	–0.1391***	0.0458
	ATT	0.6058	0.6296	–0.0237	0.0649
Secondary School B[b]	Unmatched	0.2826	0.4840	–0.2014***	0.0491
	ATT	0.2847	0.3125	–0.0279	0.0685
Grade Mathematics[c]	Unmatched	3.1522	2.8980	0.2542**	0.1072
	ATT	3.1533	2.8434	0.3099**	0.1497
# Observations Total			481		
# Observations On Support			480		

Source: GSOEP, own calculations.
[a] Recommendation A for upper and intermediate secondary school vs. lower secondary school or secondary school attendance A at upper and intermediate secondary school vs. lower secondary school at ages 11, 12 or 13 (information provided by household head).
[b] Recommendation B for upper secondary school vs. intermediate and lower secondary school or secondary school attendance B at upper secondary school vs. intermediate and lower secondary school at ages 11, 12 or 13 (information provided by household head).
[c] Grade in mathematics from last report card, measured on a scale from 1 to 6, where 1 is the best and 6 is the worst grade.
*** significant at 1%; ** significant at 5%; * significant at 10%.