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School Choice in German Primary Schools: How Binding are School Districts?¹

Abstract

The paper analyzes school choice in primary schools in Germany. The data used is from Wuppertal, a major city in North-Rhine Westphalia (NRW), where primary school districts existed before 2008. It is shown that it is not uncommon to attend a primary school that is not the assigned public school. Parents choose schools based upon the achievement level and the socioeconomic composition of the school, and upon the distance between the school and their home. Compared to families from advantaged neighborhoods, families from disadvantaged neighborhoods more often send their children to the assigned school. A high percentage of immigrants and/or economically disadvantaged families in the school district is likely to induce parents to choose another school. While advantaged families make choices leading to segregation, the direction of choice is not as clear-cut for disadvantaged families. We found that choice has a negative external effect on the composition of the assigned school and a high level of segregation in primary schools, which exceeds the level of residential segregation.

Keywords

education system, segregation, school choice, denominational school, migration, socioeconomic status

Schulwahl in deutschen Grundschulen: Wie verbindlich sind Schulbezirke?

Zusammenfassung

In dieser Untersuchung wird die Wahl der Grundschule in Deutschland betrachtet. Die Daten stammen aus Wuppertal. In Nordrhein-Westfalen existierten bis einschließlich des Schuljahres 2007/08 für alle öffentlichen Grundschulen Schulbezirke. Wie die Analyse zeigt, ist es jedoch trotz bestehender Schulbezirke nicht ungewöhnlich, dass die Schülerinnen und Schüler nicht die zuständige Gemeinschaftsgrundschule

1 Funding by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) (SCHN 632/3-1) is gratefully acknowledged. The authors would like to thank the town council, the statistics department, the department for geological data, the supervisory school authority, and the principals of the primary schools in Wuppertal for their advice, encouragement, and patience, and for providing the data used in this research.

besuchen. Bei ihrer Schulwahl berücksichtigen die Eltern die Entfernung von ihrem Wohnhaus zur Schule, die Schulqualität und die sozioökonomische Zusammensetzung der Schülerschaft. Im Gegensatz zu begünstigten Familien tendieren Familien, die in benachteiligten Nachbarschaften leben, häufiger dazu, ihre Kinder zur zuständigen Gemeinschaftsschule zu schicken. Ist hingegen die Ausländerquote und/oder der Anteil sozial benachteiligter Familien im Schulbezirk groß, führt dies mit einer größeren Wahrscheinlichkeit dazu, dass die Eltern für ihr Kind eine andere Schule wählen. Auffällig ist auch, dass die Schulwahl begünstigter Familien zur Erhöhung der Segregation führt, während die Wahl benachteiligter Familien keine eindeutige Richtung aufweist. Der negative externe Effekt der Schulwahl auf die Schülerzusammensetzung auf der zuständigen Schule ist jedoch signifikant. Insgesamt kann herausgestellt werden, dass an den Grundschulen ein hohes Segregationsniveau besteht, welches das Niveau der residentiellen Segregation übersteigt.

Schlagworte

Bildungssystem, Segregation, Schulwahl, Bekenntnisschulen, Migration, sozio-ökonomischer Status

1. Introduction

Unlike in other countries, school choice is not a prominent topic in education research in Germany. One reason might be that choice appears to be rather limited because of the existence of school districts at the primary school level. Nevertheless, school choice and ethnic school segregation do exist in German primary schools, as demonstrated by Kristen (2005); clearly, these topics deserve more attention.

Past research, as well as the political discussion of the rigid tracking system, has shown that the German school system leads to social and ethnic disintegration, with socioeconomic background having a strong effect on performance in school (Entorf & Minoiu, 2005). Interestingly, both past research and the political debate have focused more upon tracking and selection among secondary schools (Dustmann, 2004) or even tertiary institutions, and less on sorting in primary education. This is a shortcoming, as recent literature points to the importance of early education and the high returns associated with it (Cunha, Heckman, Lochner, & Masterov, 2006). Pre-primary and primary education is important for educational success, especially for that of disadvantaged groups. Hence, we intend to contribute to the literature on sorting in primary education, focusing particularly on the determinants and effects of primary school choice in Germany.

The German education system is strongly influenced by the federal structure of Germany. Each federal state can determine its own schooling system. This has led to 16 more or less different educational systems in Germany, with a great deal of variation between the federal states. For instance, each state decides on whether or not there should be central exit exams (Jürges & Schneider, 2010) and how many tracks there are in secondary education. Even the number of years in elementary

school differs between the federal states, and there is no trend of convergence to a common educational system in Germany. While the federal system entails many disadvantages, the diversity within Germany leads to numerous quasi-experimental situations that can be exploited for research.

One interesting feature of German federalism in schooling that we exploit in this study is that two German states – North-Rhine Westphalia (NRW) and Lower Saxony (but only in some smaller regions) – allow for public denominational schools, that is schools that are fully publicly funded, like other public schools, but which are also (typically) Catholic or Protestant. This gives parents the option not to choose the assigned public school, even though there are school districts. The initial intention of public denominational schools was to allow parents to send their children to a school that best corresponds to their (Christian) religious beliefs. In addition, parents can apply to another school if, for instance, the after-school childcare is located in another school district. Hence, unlike in other countries, the German schooling system does not support parental school choice based on arguments pertaining to school quality or the ethnic and socioeconomic composition of the school. While the official school choice policy is rather restrictive and does not encourage segregation, here we attempt to understand the underlying motives behind school choice and its effect on segregation.

In this study, we look at school choice in NRW. With its population of 18 million inhabitants, NRW is the most populous German state. In addition, it is also very densely populated (528 inhabitants per square km). Moreover, in 2005 the government of NRW decided to allow for more choice by abolishing school districts in order to allow for more competition between schools. Critics have argued that increased parental choice will further contribute to segregation and disadvantage children from lower income families and children of non-German ethnicity. In this paper we evaluate school choice before school districts were abolished to better understand how binding school districts were in practice, how denominational schools affect the sorting of students, and which criteria parents utilize in choosing a primary school for their children. Since the data needed to analyze parental choice is not available for all communities in NRW, we focus on Wuppertal, one major city in NRW.

The paper is organized as follows. In Section 2 the theoretical background and the research hypotheses are developed. Some information about the administrative details of school choice is given in Section 3, along with a description of the data. In Section 4, we explain our analytical strategy. The results are presented in Section 5, and we conclude in Section 6.

2. Background and Research Hypotheses

School choice has been analyzed in numerous international studies. Choice is thought to have a positive impact on competition between schools and might therefore increase the quality of schooling (Hoxby, 2003). Moreover, choice can give

parents a chance to find the school which best suits their educational preferences (Clausen, 2006). The issue of school choice has drawn considerable attention in the US in particular, where the intention of increased school choice by means of charter school programs was to reduce racial and social segregation and to improve the educational opportunities of more disadvantaged groups (Fryer & Levitt, 2004; Hanushek, Kain, & Rivkin, 2009). The results of many studies suggest the opposite, however, because increased school choice has potentially negative effects as well (Bifulco, Ladd, & Ross, 2009; Lankford & Wyckoff, 2001). For instance, school choice tends to increase social and ethnic segregation rather than to decrease it (Burgess & Briggs, 2006). Walsh (2009) does not argue against these findings of increased segregation, but claims that even without choice, within-school heterogeneity is so low that cream-skimming of the remaining high ability kids would not have a sizable effect on those left behind. Urquiola (2005) points out that the difference in the composition and distribution of students in the public schools results not only from school choice but also from the different number of school districts in any given metropolitan area. Increases in the number of districts in a metropolitan area result in a more homogenous school district population (Tiebout choice) and hence reduces private enrollment.

The aim of our study is to analyze the effects of parental choice. In the following, we will present theoretical approaches and research findings that help to understand parental choice preferences and the effects of choice on segregation.

Determinants of choice

Following theories of rational action in educational settings (Boudon, 1974; Manski, 1992), school choice can be understood as a decision based on a cost-benefit analysis of available alternatives. In general, individuals will choose the alternative which provides the greatest reward at the lowest costs. Examples of costs are school fees, (monetary and non-monetary) travelling costs, and social costs. Social costs of school choice arise if a student does not live in the same neighborhood as his/her classmates; hence, after-school activities with classmates are more difficult to coordinate. Expected benefits of school choice include improved socialization, learning conditions, and student composition at school. Parents might seek correspondence between their own norms and values and those conveyed by a school. Furthermore, parents might aim to optimize learning conditions for their offspring. A number of studies indicate that in fact average school achievement, measured by student test scores, is important for parental choice behavior: Parents who place more weight on achievement are willing to choose a school outside their local neighborhoods (Hastings, Kane, & Staiger, 2006). Black (1999) shows that parents are even willing to pay higher house prices when the academic achievement of the school district is high. Finally, parental choice behavior might be motivated by preferences for a favorable (in the opinion of the parents) ethnic or socioeconomic student composition, because school quality is, to a certain extent, determined by a school's student composition. For instance, schools with a high rate of students from advantaged backgrounds are more likely to have fewer disciplinary

problems and to attract and retain talented and motivated teachers (for a summary, see Opdenakker & van Damme, 2001; Thrupp & Lupton, 2006). As a result, parents might avoid schools with higher percentages of disadvantaged students in order to provide better learning conditions for their children.

Choice behavior of different social groups

Due to limited economic, cultural, and social resources (Bourdieu, 1983), school choice is less common in disadvantaged families. Accordingly, a number of studies have shown that choice is practiced primarily by socioeconomically advantaged, better-educated individuals. Low income families attach higher value to proximity when choosing schools, because they might have difficulties affording the transportation costs. They also put less weight on academic quality (Hastings, Kane, & Staiger, 2006), because they face higher information costs that they are not able or not willing to pay.

As explained above, school choice is also driven by preferences for school composition. Different groups of parents might rely on different arguments. Following “outgroup avoidance theories” (Bifulco, Ladd, & Ross, 2009), advantaged parents wish to maintain their social status by distancing themselves from groups with lower social standing. Accordingly, a number of studies find that white parents are more likely to opt out of their children’s assigned school if they live in an attendance zone with a high percentage of black students and white parents tend to avoid schools with substantial proportions of minority students (Lankfort & Wyckoff, 2001; Söderström & Uusitalo, 2005). This theory suggests that minority parents are not pressed to choose another school to maintain their social status. Another theoretical approach (“neutral ethnocentrism”, Bifulco, Ladd, & Ross, 2009) suggests that members of social groups desire to interact with those similar to themselves. Empirical studies demonstrate that both black and white parents are more likely to choose schools with a higher concentration of students with the same ethnic background than the assigned school (see also Bifulco & Ladd, 2007; Booker, Zimmer, & Buddin, 2005).

School quality and school composition are often closely related. Preferences of advantaged parents for high quality schools will be reinforced by a preference for schools with a high concentration of students from their own group. In contrast, parents with a disadvantaged background may face a trade-off between the desire for high quality schools and the desire for schools with students who share a similar background. For instance, the findings of Bifulco, Ladd and Ross (2009) show that black and socially disadvantaged parents have the tendency to choose a school with a higher concentration of students with a different social background relative to their assigned school than white and socially advantaged parents do.

Consequences of choice

In general, parental choice behavior could lead to integrating and segregating effects. Integrating (segregating) effects would result if the presence of choice led to socially and ethnically more (less) heterogeneous schools than in the absence of

choice. Taking the literature on parental choice preferences for student composition of schools into account, choice will lead to ethnic and social segregation. As the literature shows, white parents as well as black parents tend to choose schools with higher concentrations of students with the same ethnic background relative to their children's assigned school. The tendency for making segregating choices at the elementary level, however, is greater for white students than for black students. Bifulco, Ladd and Ross (2009) show that a considerable number of socially disadvantaged parents opt for schools with a higher concentration of students from more favorable backgrounds relative to their assigned school. However, these integrating effects of choice are outweighed by the segregating effects of choices made by students from socially advantaged backgrounds. Therefore, segregation by social class and ethnicity is higher than it would be if all students had attended their assigned schools. Echenique and Fryer (2007) and Echenique, Fryer and Kaufman (2006) also point to the fact that in addition to between-school segregation, within-school segregation also plays a significant role. Schools with more than 25 % black students experience complete segregation with respect to the social interactions between different ethnic groups.

In summary, the international literature has identified distance to school, the socio-economic background of the student, and the composition and quality of the school as relevant variables in explaining school choice. In addition, increased choice tends to contribute to social and ethnic segregation; little, however, is known about the potential benefits of school choice. In line with this research background, we present the following hypotheses about parental preferences regarding choice and how they affect segregation:

Research hypotheses

1. *Determining school choice:* Choice (i.e., opting out of the assigned school) is generally driven by school characteristics. The higher the costs associated with choosing the assigned school, the less favorable the student composition at the assigned school, and the better the quality of alternatives, the more likely it is that parents will opt out of the assigned school. Moreover, individual characteristics affect choice: Parents from economically disadvantaged and minority backgrounds are less likely to opt out of their assigned school. Since parents are expected to choose schools which meet their own norms and values, Catholic parents should be more likely to choose a Catholic school.
2. *Choice and the composition of schools:* As described above, academic achievement and student composition are important aspects in explaining school choice. In line with the findings of other studies, we expect the choice of non-immigrant parents to be driven by preferences for high-quality schools and favorable student composition. As a result, they are more likely to make segregating decisions, e.g. choosing schools with a larger fraction of students from their own ethnic/socioeconomic group. In contrast, ethnic minority parents face a trade-off between high-quality schools and schools with a high proportion of their own ethnic background. In the following, we will test the hypothesis that minori-

ty parents are more likely to make integrating decisions, e.g. choosing schools with a higher percentage of students from non-minority and advantaged backgrounds.

3. *Segregation*: Parental choice will increase ethnic segregation. Although some parents of all ethnic groups will make integrating decisions (see Hypothesis 2), the net effect of choice on segregation is positive, i.e. segregation increases.

3. School Choice in NRW and the Data

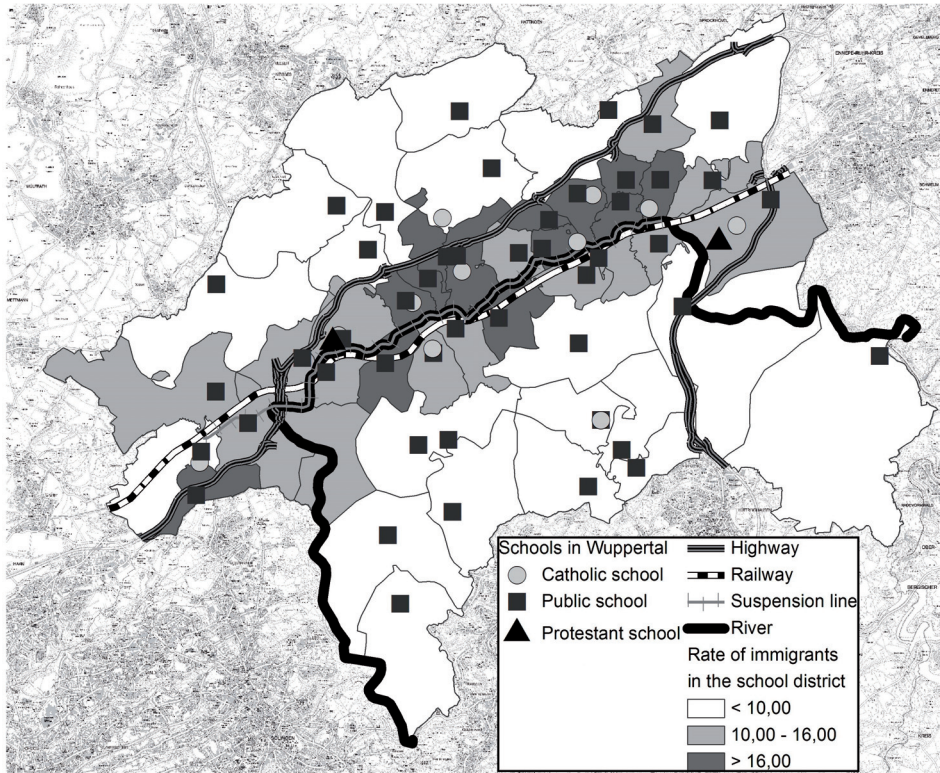
Choice appears to be rather limited in German primary schools. Students are assigned to a public school (Gemeinschaftsgrundschule) in a school district. However, choice is not as limited as it initially appears to be. First, parents can apply for permission to attend a different school (§39 SchulG-NRW (school law NRW)). They have to present a convincing argument, such as the presence of a child care provider in another school district. Neither school quality nor the social composition of the school are accepted arguments. The parents' application is discussed by the principals of the chosen school and the principal of the assigned school in the school district of residency. The final decision is made by the school authority. To our knowledge, there is no research that analyzes permission to attend a public primary school other than the one assigned.

Second, there are public denominational schools (öffentliche Bekenntnisschulen). Public schools and public denominational schools do not charge tuition, and are fully publicly funded. In the following, we simply label them public schools and denominational schools. In addition to the public and the denominational schools, there is a small number of private primary schools, which will, however, be disregarded in this study. Private schools might charge a school fee and are often Waldorf schools, Montessori schools or private denominational schools with a strong focus on religious education. Private denominational schools are partially funded by the church, which is not the case with public denominational schools in NRW. Children in NRW have the right to attend a denominational school in their community or a neighboring community if the child belongs to that denomination (§26 SchulG-NRW). They might also be admitted to a denominational school even if the children do not belong to the school's denomination, in cases where the parents wish their child to be educated according to that denomination. This is clearly a soft condition which is not verifiable and hence leaves room for interpretation. Moreover, children of a different denomination might be admitted to a denominational school if there is no school of the child's denomination within a reasonable distance from the child's home.

The present paper analyzes school choice in Wuppertal, one of the ten biggest cities in NRW. Wuppertal has 356000 inhabitants and 48 public primary schools, 11 public Catholic schools, and 2 public Protestant schools (cf. Figure 1).²

2 Wuppertal has two Waldorf schools, one Catholic private school, one Greek primary school, and one private primary school.

Figure 1: Primary Schools and the Distribution of Immigrants in the School Districts in Wuppertal (2007)



Wuppertal used to be a rich industrial city and is, like many such cities in NRW, now experiencing structural change and suffering severe economic problems. The unemployment rate in 2007 stood at 12.6 % and the welfare dependency rate was 16.5 %, which is higher than both the national and regional averages.

As Figure 1 illustrates, Wuppertal is a city with a lot of socioeconomic diversity. The immigrants are not equally distributed among the school districts, but are concentrated in the central (east-west) axis of the city around the famous Wuppertaler Schwebebahn (suspension railway), the city's best-known landmark and the important element of its public transportation. The proportion of immigrants drops considerably if one moves away from the suspension line in the valley to the outer, mountainous regions of Wuppertal. A similar pattern occurs when looking at the distribution of welfare dependency rates and unemployment rates. Furthermore, the parts of Wuppertal close to the axis are also more densely populated when compared to the outer city regions, which is also reflected by the distribution of primary schools. The density of schools is much higher in the valley than in the outer parts of the city.

Table 1: Sample Description

	(1) All	(2) Catholic Schools	(3) Protestant Schools	(4) Public schools
<i>Student data</i>				
Not assigned school	.33 (.47)			.15** (.36)
km to assigned school	.62 (.47)	.69** (.42)	1.02** (.58)	.59** (.47)
km to chosen school	.74 (.83)	.68** (.68)	1.19** (1.12)	.74 (.85)
km to assigned Catholic school	1.46 (1.39)	.64** (.47)	1.11** (.95)	1.66** (1.47)
km to school with 5 percentage points less immigrants	2.06 (2.49)	1.12** (1.27)	.96** (1.23)	2.31** (2.67)
km to school with 5 percentage points higher transfer rate	1.36 (1.26)	.78** (.58)	.79** (.81)	1.52** (1.34)
<i>City block data</i>				
% Immigrants city block	15.33 (12.50)	18.87** (12.82)	12.53** (11.33)	14.64** (12.33)
% Turkish inhabitants city block	4.54 (6.29)	5.27** (5.55)	2.72** (4.41)	4.45 (6.49)
% Non-German Catholics city block	3.11 (3.19)	3.55** (3.97)	3.60** (4.24)	2.99** (2.92)
% German Catholics city block	19.66 (7.35)	19.51 (6.95)	18.91+ (6.18)	19.72 (7.48)
<i>School district data</i>				
% Immigrants school district	13.92 (7.106)	17.08** (6.06)	13.57 (5.082)	13.23** (7.20)
% Turkish inhabitants school district	3.81 (3.00)	4.93** (2.78)	3.34** (2.396)	3.57** (3.01)
<i>School data</i>				
% Transfer rate academic track chosen school	33.88 (13.40)	33.57 (9.29)	41.49** (9.723)	33.66 (14.19)
% Immigrants in chosen school	22.35 (15.00)	25.27** (13.79)	9.74** (3.24)	22.17 (15.26)
Observations	11976	2124	358	9494

Note. Degree of significance of differences in means (compared to (1)) + $p < .10$, * $p < .05$, ** $p < .01$. Standard deviations in parentheses.

The data used in this analysis is from 2007, and was collected from different sources. Table 1 summarizes the data for the total sample in column (1). In columns (2)-(4), we distinguish between Catholic, Protestant, and public schools. Note that three schools did not provide data and one school was excluded because it is about to be closed. The total number of students in the sample is 11976.³ 9494 students attend a public school, 2124 students are enrolled in a Catholic school, and 358 students chose a Protestant school.

3 This accounts for 92 % of primary school students in Wuppertal in 2007/2008.

The first interesting result of the sample statistics is that despite the existence of school districts at the time, as much as 33 % of the students did not attend their assigned public school, either because they have chosen a denominational school or because they attend a different public school, which is the case for 15 % of the sample. The percentage of students who visit a public school other than the one assigned seems rather high, since parents have to apply to be admitted to another public school and have to present persuasive arguments.⁴

Moreover, we calculated the straight-line distance between the student's home and school. Note that for each student there is, in addition to a chosen school and an assigned public school, an assigned Catholic school and an assigned Protestant school as well. The average distance to the chosen school is 0.74 km for the overall sample (column (1)). In column (2), only students who attend a Catholic school are included. On average, the distance is 0.68 km, which is even a little bit shorter than the overall average. Thus, students who visit a Catholic school do not incur extra travelling time; hence, Catholic schools might be chosen because they are convenient to reach and are located around the city's densely populated middle axis. The distance is substantially longer for those who visit a Protestant school (1.19 km). This is not surprising, since there are only two Protestant schools in Wuppertal (cf. Figure 1).

The data also contains information on the availability of alternatives and their costs, as measured by the distance to an alternative school. Assuming that the composition of socially advantaged and disadvantaged students is an indicator of school quality, a variable measuring the distance to the next school with a more favorable composition can be constructed. Here, we use the straight-line distance to the next school where the proportion of students with immigrant backgrounds is at least five percentage points lower than that of the assigned school.⁵ The average distance to a school with a more favorable composition is 2 km for the total sample and about 1 km for children who attend a denominational school.

While the ethnic composition of a school might be one factor of school choice, the level of academic achievement might be equally important. School quality is clearly hard to assess, and no generally accepted measure of school quality exists. While student achievement, one possible indicator of school quality, is measured and published in other countries, Germany is lacking comparable information. Hence we follow a different strategy to gather information on academic achievement, namely using schools' transfer rates to the academic track. After primary school, German students get a (more or less binding) teacher recommendation for a secondary school. In NRW, the alternatives are a basic track school, an intermediate track school, an academic track school, and a comprehensive school, which

4 Compared to international evidence, the percentage of choosing parents in Wuppertal is not particularly high. Bifulco, Ladd and Ross (2009) report that 40 % of elementary school students opt out of the assigned school and Burgess, McConnell, Propper, and Wilson (2004) report that almost half of English secondary school students do not attend the nearest school.

5 If there was no school with a five percentage points lower rate of immigrants, the distance to the school with the lowest percentage of immigrants was chosen.

has an internal tracking system. The most prestigious of these tracks is the academic track school. After graduation (Abitur), academic track students are entitled to study at a university. The schools in Wuppertal vary widely with respect to the percentage of students transferring to the academic track. The average transfer rate between 2003 and 2006 is 34 %, with values for individual schools ranging from 10.6 % to 66.8 %. Comparing the types of schools, the Protestant schools have the highest average transfer rates, whereas Catholic schools in Wuppertal only exhibit average performance. To calculate a proxy variable for the availability of a higher quality school, we use the distance to the next school where the transfer rate to the academic track is five percentage points higher than at the assigned school.⁶ In our sample, the average distance to a higher quality school is 1.36 km.

In addition, we use data on the students' ethnicity/citizenship⁷ and religious denomination. The information on the denomination is known for 70 %. Within these sub-samples, 21 % of the students are non-Germans and 20 % are Muslims.⁸ Besides the information on the student level, we can enrich the data with official data on nationality for 2452 city blocks and the school districts in Wuppertal, and assign the information to each student. For instance, a student living in a city block with 15 % immigrants will be interpreted as having a 15 % probability of being non-German. Hence we use city block data to describe the students' neighborhood as an important predictor for the socioeconomic performance of children (Borjas, 1995). Interestingly, the proportion of immigrants in Catholic schools is 19 %, which is significantly higher than the overall average. One explanation is that immigrants from EU countries like Italy and Spain tend to keep their citizenship, even though the families have been living in Germany for generations. Since members of these families are predominantly Catholic, they might prefer to attend Catholic schools. Moreover, as Figure 1 shows, the Catholic schools are directly located in areas with a high percentage of immigrants; thus, they are also within convenient distance of these students.

In Hypothesis 1, we claim that Catholics tend to choose Catholic schools. Interestingly, there are eleven Catholic schools in Wuppertal, but only two Protestant schools, despite the fact that Catholics in Wuppertal are clearly outnumbered by Protestants. The average percentage of German Catholics in the city blocks is about 20 % (33 % Protestants), and there are 3 % non-German Catholics (0.3 % Protestants).

When it comes to issues of integration, citizenship has become an increasingly less reliable indicator. As has been recently argued in an integration report, Turkish people are the least integrated group among the major ethnic groups in Germany (Berlin Institut für Bevölkerung und Entwicklung, 2009). However, children in families of Turkish descent are mostly born in Germany. Hence they have

6 If there is no school with an academic track transfer rate (which is) five percentage points higher, the distance to the school with the highest transfer rate is chosen.

7 The available information is German versus non-German citizenship.

8 Information about denomination is available from 42 schools (34 public, 6 Catholic, 2 Protestant).

the German citizenship and are not counted as immigrants in the official statistics. For instance, the average percentage of Turkish students among children aged 6-10 in a city block is only 5 %, a figure which most likely underestimates the number of children of Turkish descent in Wuppertal. This conjecture is supported by looking at the school statistics. From the 2007 school statistics, we know that 19 % of the students in primary schools are Muslim, and 60 % of the Muslims in Wuppertal have a Turkish background. Hence, in the following we will use information about student denomination, particularly whether the student is Muslim or not, to identify whether that student belongs to a disadvantaged group in Germany.

Finally, the proportion of non-Germans in Wuppertal primary schools, as documented in the school statistics, is 22 %, which is much higher than the official data would suggest. The percentage of immigrants is highest in Catholic schools (25 %) and lowest in Protestant schools (10 %). At first glance, the difference between the percentage of immigrants according to the official data and the school statistics is stunning. However, at least part of this difference can be explained. The city blocks vary substantially in terms of inhabitants. The average city block size in the sample is 309 inhabitants, but the standard deviation of 270 is high, and immigrants tend to live in the more densely-populated city blocks. The correlation between inhabitants per city block and percentage of immigrants in the city block is positive and highly significant. Thus there will be more students from large city blocks with a high probability of being non-German. This is reflected in the school statistics, but not in the official data. Thus, the official data underestimates the percentage of immigrants in the schools. However, the reliability of the school data is also problematic, as procedures for collecting the data on ethnicity have not been sufficiently standardized across schools.

4. Analytical Strategy

Our analysis proceeds in three steps and draws on the analysis in Bifulco, Ladd, and Ross (2009).

Determinants of choice (see Hypothesis 1)

First, we model the decision to opt out of the assigned school. We model the likelihood that student i will not attend the assigned public school Z as a function of the distance between the student's residence and the assigned public school, D_{iz} , the student's neighborhood (city block) characteristics, S_{iz} , the school district characteristics, C_z , and the characteristics of the assigned school, S_z , such as the percentage of students that transfer to the academic track school after grade 4, the availability of alternatives, A_{iz} , and the random error term e .

$$Y_{iz} = f(S_{iz}, D_{iz}, C_z, S_z, A_{iz}, e) \quad (1)$$

Equation (1) is estimated as a probit regression. Students from economically disadvantaged neighborhoods should be less likely to attend a not assigned school than students from more advantaged backgrounds. Thus a high percentage of immigrants in the neighborhood is expected to reduce the probability that the student attends a school other than the assigned public school. The distance between the students' home and the assigned school, D_{iz} , should have a positive impact on the decision to opt out, as it is a good indicator for travel costs and also for the social costs a student has to incur if his or her classmates do not live in the student's neighborhood.

The school district variables, C_z , are not as much an indicator of the students' neighborhood as they are of the ethnic composition of the schools. A school district with a large proportion of immigrants suggests that the schools exhibit unfavorable compositions and should therefore lead families to send their children to schools with a more favorable composition.⁹

Moreover, we have information about the chosen school, S_z . One available indicator of school quality is the transfer rate to the academic track. The higher the transfer rate, the better the school, and therefore also the higher chances for the child to be in a high quality peer group. Alternatively, a high percentage of children of non-German descent might indicate an unfavorable composition regarding the student body. Finally, the variables that describe alternatives, A_{iz} , are the distance to the next school with a more favorable composition and/or a higher transfer rate to the academic track. It is expected that the availability of alternatives increases the probability of opting out.

Second, we consider the decision to choose a denominational school R . Even though there are less Catholics than Protestants in Wuppertal – 23 % of the population is Catholic, whereas 35 % is Protestant – Catholic schools clearly outnumber Protestant schools.¹⁰ Since the family's denomination, and in particular being Catholic, might be of importance when deciding to send the child to a public denominational school and in particular to a Catholic school, we include variables that indicate the percentage of German and non-German Catholics in the neighborhood, RN_{iz} . The effect of Catholic neighborhoods – German and non-German – is expected to be positively correlated with the likelihood of choosing a denominational school. Furthermore, the distance between the student's residence and the denominational school, RD_{iz} , is included. The equation to be estimated changes to

$$R_{iz} = f(S_{iz}, RN_{iz}, D_{iz}, RD_{iz}, A_{iz}, C_z, S_z, e) \quad (2)$$

9 Alternative variables to measure the composition of the school district include the welfare dependency rate and the unemployment rate. We conducted the analysis using these alternative variables as well. The results are very similar, because the variables are highly correlated.

10 See West and Wößmann (2008) for a study on this topic with historical data.

Choice and school composition (see Hypothesis 2)

Next, we look at the integrating/segregating effects of choice. Since we are mainly interested in the effect of choice on the distribution of disadvantaged groups, the focus is on the relative size of disadvantaged groups in the schools. In particular, the percentage of disadvantaged students at their chosen school is compared to the percentage of disadvantaged students at their assigned school, and to the percentage of disadvantaged students which would have resulted, had every student attended the assigned school, i.e. the counterfactual distribution.

Here, we use the variable ‘student is Muslim’ as one possible characteristic to distinguish between advantaged and disadvantaged students. Clearly, however, other characteristics such as citizenship and socioeconomic status could be used as well. Moreover, we differentiate between students who attend their assigned school and students who do not. For each of the four subgroups, we compute the composition of the chosen school, the assigned school, and the school based on the counterfactual distribution. For Muslims, choice is interpreted as integrating (segregating) if the chosen school has fewer (more) Muslims than the assigned public school. In contrast, for non-Muslim students, an integrating (segregating) choice is defined as the choice of a school that has more (fewer) Muslims than the student’s assigned public school.

Segregation (see Hypothesis 3)

A third measure considered in this paper is the extent of observed segregation. Again, we use the characteristic “Muslim” as proxy variable for “disadvantaged group”. Our measure of segregation between group a and b is the dissimilarity index, which is computed as

$$S = \frac{1}{2} \sum_{i=1}^N \left| \frac{a_i}{A} - \frac{b_i}{B} \right|. \quad (3)$$

In (3) a_i and b_i are the number of individuals in group a (i.e. Muslims) and b (i.e. non-Muslims) in school district i and A and B are the total number of individuals in group a and b . If choice is predominantly segregating, the level of segregation at the school level exceeds the level of residential segregation.

5. Results

Determinants of choice (see Hypothesis 1)

Our data contains information on the level of the school districts and individual student/neighborhood data. While the sample of the school districts can be treated as a random sample, the students in each school district are clearly not a random sample of the students in Wuppertal. Due to residential segregation, students in different school districts will differ with respect to the socioeconomic and

ethnic background. Thus, there is clustering of errors at the school district level. Errors will be correlated within clusters but not across clusters. While the point estimates of the regressions are not biased, the variance-covariance matrix of the probit model is incorrect and can be substantially biased downward. Therefore, we estimate an Eicker-White-type cluster-robust variance (Cameron & Trivedi, 2009; Wooldridge, 2002). The cluster-robust standard errors converge to the true standard error as the number of clusters gets larger. The number of clusters in this paper, i.e., the number of school districts is 47, which is sufficiently large for this procedure to be appropriate.

Tables 2–4 summarize the results of the regression analysis. All t-values reported are adjusted for clustering within school districts, and the reported coefficients in Tables 2–4 are marginal effects derived from a probit model. Note that the coefficients provided in this paper are correlations; they cannot be interpreted as causal effects.

In Table 2, the dependent variable is a binary variable indicating whether the student chooses a school other than the assigned public school. In model (1) we include the distance to the assigned school, the percentage of immigrants in the city block and in the school district, the percentage of students who transferred to the academic track school, and the distance to the next school with a transfer rate five percentage points higher than the assigned school.

As expected, and in line with the international literature, the correlation between the distance to the assigned school and the likelihood of choosing a school is positive and significant. Increasing this distance by 100 m increases the likelihood to opt out by 3 %. To make sure that the variables referring to immigrants at the city block level and on the school district level are not collinear, we include the city block variables in deviations from the school district level. Hence, the city block variable is positive if the percentage of immigrants in the city block exceeds the school district average. The city block variable is not significant, whereas the percentage of immigrants in the school district level is positive and significant. Increasing the rate of immigrants in the school district by 1 % is associated with a 2.3 % increase in the likelihood of choosing another school. This is a fairly strong effect. In comparison, Bifulco et al. (2009) estimate the effect of a ten point increase in the percent black in an assigned attendance zone to be just 5.7 %. The academic track transfer rate, our measure of academic quality, is positive and significant; better schools are chosen more often. The availability of a better alternative, as measured by the distance to the next school with a five percentage point higher transfer rate, raises the probability of opting out significantly. Increasing the distance to the next school with a higher transfer rate than the assigned public school by 100 m reduces the probability of opting out by 1.2 %.

Instead of only using the school district variable, we also use the information on the percentage of immigrants from the school statistics and the distance to a school with a percentage of immigrants five percentage point lower than the assigned public school. As model (2) shows, the results are fairly stable. A higher percentage of immigrants at the assigned school is positively related to the likelihood of choos-

Table 2: Decision to Opt Out

	(1) ^(b)	(2)	(3)	(4)
	All	All	All	Public schools
km to assigned school	.30** (5.55)	.23** (7.09)	.26** (5.57)	.13** (5.81)
% Immigrants city block (a)	-.0008 (-.61)	-.0007 (-.66)		
% Immigrants school district	.023** (4.33)			
% Turkish inhabitants city block (a)			-.006** (-3.23)	-.005** (-3.90)
% Turkish inhabitants school district			.03** (2.88)	.02** (3.76)
% Immigrants in assigned school		.01** (5.21)		
km to school with 5 percentage points less immigrants		-.01 (-.82)	-.03* (-1.67)	-.01* (-2.19)
% Transfer rate academic track chosen school	.012** (3.23)	.01** (3.26)	.009* (2.68)	.005** (2.92)
km to school with 5 percentage points higher transfer rate	-.12** (-3.52)	-.09** (-2.97)	-.10** (-3.00)	-.02* (-2.10)
Observations	11976	11976	11976	9494
Pseudo R ²	.17	.17	.15	.09

Note. The dependent variable = 1 if the student attends a school other than the assigned public school and 0 otherwise. Figures reported are marginal effects from a probit estimation. In parentheses, we report the *t*-values that are based on robust standard errors adjusted for clustering within school districts.

(a) Variables in deviations from school district level.

(b) In Models (1)-(3) all schools are included. Model (4) includes only public schools.

(c) For discrete change of dummy variable from 0 to 1

* $p < .10$, ** $p < .05$, *** $p < .01$.

ing a school other than the assigned one. However, the distance to a school with a more favorable composition has a negative, but insignificant effect. Parents tend to opt out of schools with a high percentage of immigrants, but the distance to an alternative school is not relevant for the decision.

As noted earlier, immigrants in Germany form a heterogeneous group. The largest group, and also the group that is least integrated among the major ethnic groups in Germany, are the Turkish people. In models (3) and (4), the immigrant variables are replaced by the percentages of Turkish people. In model (3) we consider the total sample, whereas in model (4) we restrict the sample to the public schools, because those of Turkish descent are predominantly Muslims and hence might not consider sending their children to a Christian school. The coefficients on the distance to the assigned school remain positive and significant in both samples. Unlike in the earlier regressions, where the percentage of immigrants in the neighborhood were not significantly related to choice, the coefficient representing

the percentage of Turkish people in the city block is now significant and negative, while the percentage of Turkish people on the school district level is now positive and significant. Since we interpret the city block variables as characterizing the students by their neighborhood and the school district variables as characterizing the school environment, the results are quite intuitive. Families with a higher probability of having a Turkish background are less likely to choose a school other than the assigned one. A school with a large proportion of Turkish students, however, signals an unfavorable composition, and parents thus choose to opt out more often.

In model (4) denominational schools are excluded. While the results remain qualitatively stable, the coefficients change in magnitude. For instance, the coefficient representing the distance to the assigned school is still significant, but decreases by more than half. This is due to the fact that – compared to denominational schools – the distances between public schools in Wuppertal are relatively short (cf. Figure 1). Therefore, distance is less important for school choice when only looking at the sample of public schools. The percentage of Turkish people in the school district is again positive and significant; increasing the percentage of Turkish people in the city block by one percentage point lowers the probability of opting out of the assigned school by 0.5 %. The distance to a school with a lower percentage of immigrant students is negative and now significant, whereas the coefficient of the transfer rate variable remains significant, but is reduced in magnitude.

The results in Table 2 show that the distance variables measuring the cost of travelling to school have the expected significant effects. The closer the assigned school, the more likely it is that the student will attend the assigned school. Choosing another school that is not as close imposes additional costs on the student. Variables describing the ethnic and socioeconomic background also yield the theoretically expected effects. Families that live in a school district with a disadvantaged population opt out of their assigned school more often. The neighborhood variables are a useful description of the characteristics of student background. Students from disadvantaged neighborhoods are more likely to attend their assigned school, whereas families from advantaged neighborhoods opt out more often. Parents also base their decision on the quality of the school. Schools with a larger proportion of students transferring to an academic track school at the end of primary education have more students that had not originally been assigned to those schools.

Hypothesis 1 suggests that denominational and public schools are chosen for different reasons. Therefore, we will now look at denominational schools in more detail. Since there are only two Protestant schools in the sample, we restrict the analysis to Catholic schools only. It is commonly thought that denominational schools in NRW are merely an option for children from advantaged backgrounds to opt out of their assigned public school, which might be of lower quality. The results of the analysis are summarized in Table 3. In models (1) to (3) the dependent variable is a binary indicator for whether the student attends a Catholic school or not.

Table 3: Decision to Choose a Catholic School

	(1)	(2)	(3)
km to assigned school	.1** (5.26)	.1** (5.25)	.06** (3.32)
km to Catholic school	-.15** (-10.40)	-.15** (-10.54)	-.10** (-5.92)
% Non-German Catholics city block		.002+ (1.84)	
Student is Catholic (d)			.10** (3.88)
% German Catholics city block		.002** (3.03)	
% Turkish inhabitants city block (a)	-.001 (-1.23)	-.0004 (-0.43)	-.00004 (-0.06)
% Turkish inhabitants school district	.007* (2.16)	.007* (2.26)	-.003 (-0.65)
% Transfer rate academic track chosen school	.003* (2.53)	.003* (2.56)	.0002 (0.19)
Observations	11976	11976	8339
Pseudo R ²	.23	.24	.25

The dependent variable is in models (1) to (3) = 1 if the student attends a Catholic primary school and 0 otherwise. Figures reported are marginal effects from a probit estimation. In parentheses, we report the *t*-values that are based on robust standard errors adjusted for clustering within school districts.

(a) Variables in deviations from school district level.

(b) For discrete change of dummy variable from 0 to 1

+ *p* < .10, * *p* < .05, ** *p* < .01.

In model (1) we use the distance variables, the ethnic composition of the school district and the neighborhood, and the transfer rate as explanatory variables.

The results are qualitatively similar to the results in Table 2. However, the immigration variables are smaller in magnitude and significance. Distance to the assigned school is still significant, but the coefficient is only about a third of the magnitude of the coefficient estimated in Table 2. Interestingly, distance to Catholic schools has a very strong effect. If the distance to a Catholic school rises by 100 m, the likelihood of a student choosing a Catholic school decreases by 1.5 %. Thus the location of Catholic schools is an important predictor of choice. To test whether it is also religious belief that leads parents to choose a denominational school, the percentage of German and non-German Catholics in the city block are included in column (2). Both variables yield a positive and significant coefficient, and the coefficients for the other variables are left unchanged. Hence, religious beliefs can explain the choice of Catholic schools. This is confirmed when including the students' denomination in model (3). Being Catholic increases the likelihood of attending a Catholic school. The percentage of Turks in the school district is not significantly related to the decision to attend a Catholic school, and the academic track transfer rate – our quality indicator – decreases in significance.

In summary, the regression analysis broadly supports Hypothesis 1: parents who live in disadvantaged school districts tend to choose a school other than the assigned one. If, however, families live in disadvantaged neighborhoods, they send

the children to their assigned school, which is also the closest school in 64 % of all cases. Parents do react to quality indicators like the transfer rate to academic track schools, but they also take into account the costs that arise from the longer distances resulting from (school) choice. Catholic schools are more often chosen by German and non-German Catholics.

Choice and the composition of schools (see Hypothesis 2)

In Hypothesis 2 we expect choice of immigrant and non-immigrant parents to be based on different preferences. As a consequence, this should affect school composition.

Unfortunately, the information on the nationality of the students, as noted earlier, is not very reliable, and distinguishes only between Germans and non-Germans. However, we have information about the religious denomination of the students and can distinguish between Muslims and non-Muslims. This distinction is valuable because it identifies a group of disadvantaged students in Germany. In Table 4, we use the student information on religious denomination and run separate regressions for non-Muslims (columns 1 and 3) and Muslims (columns 2 and 4).

Table 4: Decision to Opt Out – by Denomination

	(1)	(2)	(3)	(4)
	All schools		Public schools	
	Non-Muslims	Muslims	Non-Muslims	Muslims
km to assigned school	.27** (5.38)	.27** (3.44)	.14** (5.39)	.13** (2.82)
% Turkish inhabitants city block (a)	-.005 (-1.39)	-.003* (-1.71)	-.007** (-3.44)	-.002 (-1.28)
% Turkish inhabitants school district	.02 (1.57)	.007 (.34)	.02** (3.59)	.01 (1.01)
km to school with 5 percentage points less immigrants	-.04* (-2.05)	-.05 (-1.35)	-.02* (-2.02)	.006 (0.49)
% Transfer rate academic track chosen school	.006* (1.67)	.007 (1.12)	.005** (2.73)	.0003 (0.12)
km to school with 5 percentage points higher transfer rate	-.06* (-1.71)	.03 (.53)	-.01 (-0.67)	.03 (1.43)
Observations	6699	1640	5342	1394
Pseudo R ²	.14	.09	.12	.06

The dependent variable = 1 if the student attends a school other than the assigned public school and 0 otherwise. Figures reported are marginal effects from a probit estimation. In parentheses, we report the *t*-values that are based on robust standard errors adjusted for clustering within school districts.

(a) Variables in deviations from school district level.

(b) For 3637 students, there was no information about denomination available.

* $p < .10$, * $p < .05$, ** $p < .01$.

Note that, due to missing observations, the number of observations drops to 8339. The first thing to note is that Muslims actually choose less often. While 33 % of non-Muslim students exercise school choice, only 23 % of Muslim students do not attend their assigned school. When the sample is restricted to public schools only in columns (3) and (4), we find 16 % of non-Muslim parents have chosen a school other than the assigned one, as opposed to 10 % among Muslim parents.

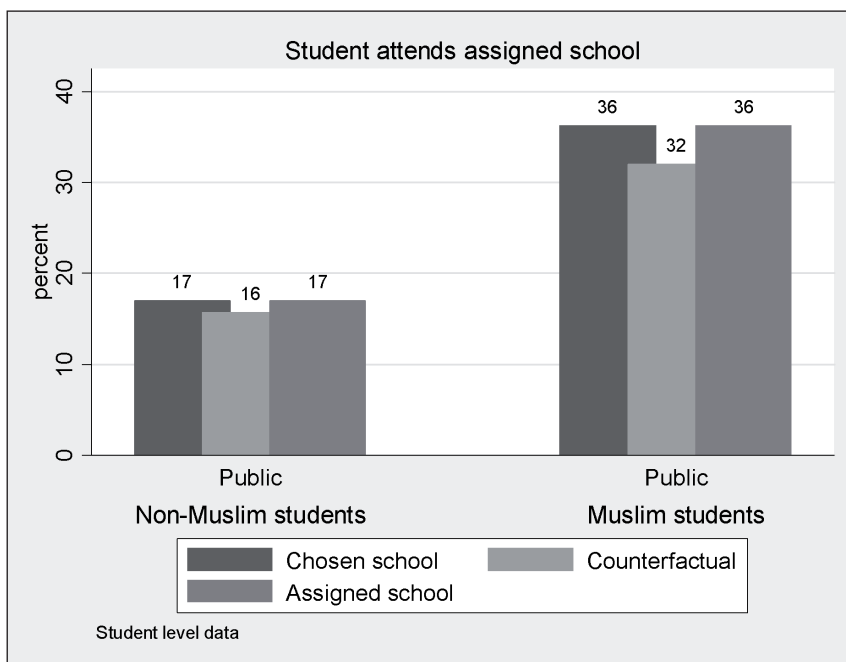
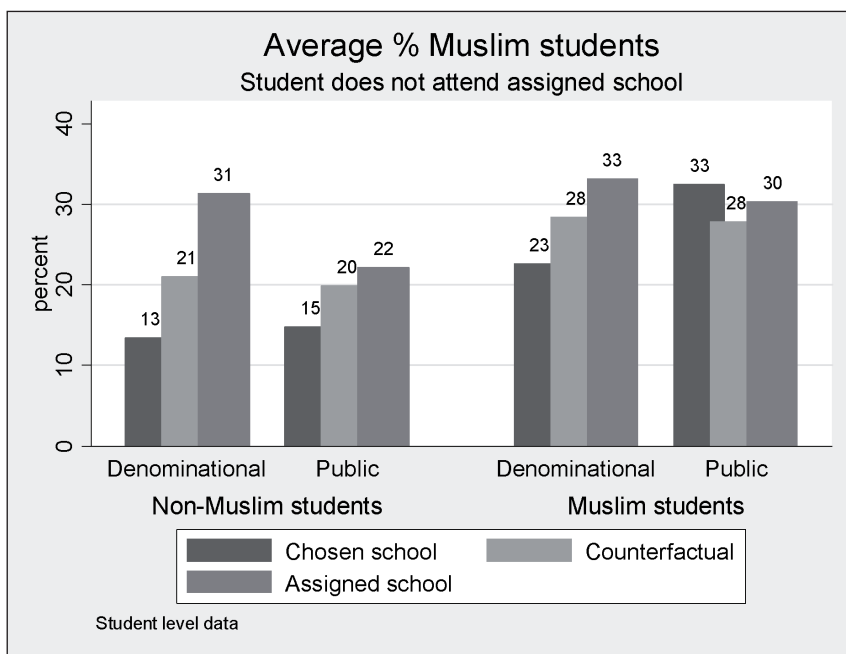
In models (1) and (2), students from all school types (public and denominational schools) are included. The coefficient for the distance to the assigned school is, as expected, positive and significant. Interestingly, the magnitude is almost identical for Muslims and non-Muslims. In the restricted sample, the transfer rate to academic track schools is no longer significantly related to the probability of choice, which is surprising given the results in Table 2. However, differences in the choice behavior become apparent when looking at the variables which represent the ethnic composition of the school district and the neighborhood. Confirming our hypotheses, school choice for non-Muslims is related to the composition of the school district; the more Turkish people live in the school district, the more likely it is that they choose another school. Moreover, if it is more convenient to reach a school with fewer immigrants, non-Muslims will opt out more often. In contrast, the composition of the school district does not explain the decision-making of Muslim parents. In addition, the effect of the distance to a school with fewer immigrants is not significant. This finding might reflect that Muslim parents more often face a trade-off between the preference for higher quality schools and the preference for schools with a higher percentage of students from their own cultural background.

Since we differentiate between Muslims and non-Muslims, choosing a Christian school might not be an option for Muslim parents. Hence, in models (3) and (4) only students who attend a public school are included, and students from denominational schools are excluded. Interestingly, the difference between the denominations is now even more apparent. School choice for non-Muslims is related to the ethnic composition of the school district as well as to neighborhood variables. Moreover, if a school with a more favorable composition is closer to the students' home, families choose this school. Non-Muslims also choose schools with a higher transfer rate. The choice of Muslims in column (4) is hard to predict, as the only variable that plays a significant role is that of distance to the assigned school. Hence, we can in fact observe differences between families of different denominations.

In the next step, we will look at the effect of choice on the composition of schools. In particular, we will look at the percentage of Muslim students in the schools and analyze how the distribution changes due to choice.¹¹ The preferences of non-Muslim parents for schools with a favorable student composition should result in segregating choices. Since Muslim parents do not seem to primarily base

11 A similar analysis has been done for the percentage of immigrants, using city block information. The results are available from the authors upon request.

Figure 2: Effects of Choice on School Composition



their choices on composition or school quality, the effects of their choices are hard to predict.

Figure 2 shows the average percentage of Muslim students under three different scenarios: 1. The percentage of Muslim students at their chosen school (labeled 'chosen school' in Figure 2), 2. The percentage of Muslims which would exist had every student chosen his or her assigned public school (labeled 'counterfactual'), and 3. The (observed) percentage of Muslim students in their assigned public schools (labeled 'assigned school'). In the upper panel of Figure 2, only students who choose a public school other than their assigned one are included, while the lower panel only includes/shows students who attend their assigned school. Within these groups of students, we further continue to distinguish between Muslim and non-Muslim students.

Comparing the three scenarios shows the effects of choice on the composition of students at their assigned public schools. If, for instance, a non-Muslim does not attend his or her assigned public school, the percentage of Muslims will *ceteris paribus* increase at the assigned public school. We call this externality of choice, i.e. the difference between the composition of the assigned school and the counterfactual situation, the composition effect. The composition effect is negative whenever, as a result of choice, the percentage of students from disadvantaged groups increases at the assigned school. Comparing the composition at the chosen school with the counterfactual situation yields information about the direction of choice (segregation effect). Choice is integrating if students from disadvantaged (advantaged) groups choose a school with a higher percentage of advantaged (disadvantaged) students, and segregating if they choose a school with a higher percentage of disadvantaged (advantaged) students.

Figure 2 shows that the average percentage of Muslims is substantially higher in schools attended by Muslim students. Moreover, choice of non-Muslim families results in a negative composition effect. The assigned public schools have a higher percentage of Muslim students than the counterfactual situation, i.e. the situation in the absence of choice. Non-Muslim students at denominational schools attend schools with 13 % Muslim students on average. Had every student attended the assigned school, the average percentage of Muslim students at the assigned public school would have been 21 %. But, due to choice, the actual percentage of Muslim students at the assigned school increases to 31 %. As stated in Hypothesis 2, the composition effect for non-Muslim families is negative. Hence choice of non-Muslim students is segregating. The results are qualitatively similar for the sample of public schools.

In contrast to our initial hypothesis, however, Muslims who choose a (not assigned) public school act in a segregating way, i.e. they choose schools with a higher percentage of Muslim students. However, the segregating effect is less pronounced than for non-Muslim students. The composition effect (assigned school – counterfactual situation) is two percentage points and the segregation effect (chosen school-counterfactual situation) is five percentage points. Looking at the Muslims who choose a denominational school, it turns out that choice again has an

adverse effect on the composition of the assigned schools. However, Muslims who choose a denominational school make integrating choices (i.e. they choose a school with a lower percentage of Muslims).

The second panel describes the situation for those students who attend the assigned school. The reported figures for the chosen school and the assigned school are, of course, identical. As in the upper panel, non-Muslim students attend schools with a lower percentage of Muslim students compared to Muslim students. The average percentage of Muslims in schools attended by non-Muslims is 17 %, compared to 36 % for schools attended by Muslim students. Due to choice, the composition of the assigned schools becomes less favorable. The percentage of Muslim students in the counterfactual situation, that is, the composition in the absence of choice, is lower than the actual percentage of Muslim students in the assigned schools.

Regarding the choice behavior of advantaged parents, Hypothesis 2 is confirmed: The choice of non-immigrant parents is driven by preferences for composition and quality. As a result, advantaged parents (non-Muslims) tend to make segregating choices. However, preferences of disadvantaged (Muslim) parents are less clear-cut and their choice is more ambiguous. Choice for Muslims is integrating when a denominational school is chosen. Possibly these parents are less attached to their religious and cultural background and expect better learning conditions from schools with a lesser percentage of Muslim students. When Muslim parents choose public schools, the average effect is segregating. These parents might favor a student composition similar to their own religious and cultural background instead of acting upon preferences for school quality. This confirms the results in Bifulco, Ladd, and Ross (2009), who found that black parents are more likely to make integrating moves than white parents. Moreover, choice has an effect on the social composition of schools: the socio-economic composition of the assigned schools becomes less balanced.

Segregation (see Hypothesis 3)

To conclude the analysis, we calculate the net effect of school choice to learn more about the level of segregation. In Table 5 we display the segregation indices of the actual (row 2-4) and the counterfactual (row 1) composition of students. We differentiate between German and non-German students (column 1) and Muslim and non-Muslim students (column 2).

The first row shows the segregation index which would exist had every student decided to attend his or her assigned public school, i.e. the index for the schools in Wuppertal in a situation without school choice and denominational schools that are based on residential segregation only. The value of 0.29 in column (1) indicates that 29 % of all students would have to move to a different school district to result in an equal distribution of Germans at each public school. Thus, even in the absence of school choice, the level of segregation would be substantial, because the socioeconomic mix of the school districts is heterogeneous, i.e. there is residential segregation.

Table 5: Segregation Index

	German	Muslim	Number of Schools
Assigned public school (counterfactual)	.29	.39	45
All schools	.38	.44	57
Public schools	.36	.41	45
Denominational schools	.39	.32	12

Comparing the counterfactual situation in row one with the actual segregation indices for the schools, we expect that parental choice will increase segregation above the level of residential segregation (Hypothesis 3). Indeed, we find that the dissimilarity index for German students versus non-German students increases by nine points, from 0.29 to 0.38. Differences between public and denominational schools appear to be minor, and much of the segregation in Wuppertal's denominational schools is driven by the two Protestant schools and the low enrolment of immigrant students in these schools.

The degree of segregation is even higher when looking at the Muslim versus non-Muslim characteristic in column 2. The dissimilarity index based on residential segregation is 0.39 for the Muslim/non-Muslim groups. It increases to 0.44 when looking at segregation at school. Denominational schools show the lowest levels of segregation when comparing Muslims and non-Muslims. This merely reflects that the distribution of Muslims across denominational schools is more equal than across public schools. The overall level of segregation in primary schools in Wuppertal increases from 0.41 to 0.44 when adding denominational schools to the sample of public schools. While Wuppertal faces substantial levels of segregation, compared to international evidence, segregation is still at a moderate level. For instance, Burgess, McConnell, Propper, and Wilson (2004) report dissimilarity indices for English secondary schools that range from 0.5 to 0.7.

6. Conclusions

This study is one of the first to analyze primary school choice in Germany. Even though school districts with assigned public schools exist, and even though choosing a different school is thought to be more of an exception than the rule, our data for Wuppertal – a major city in NRW close to the Ruhr-Area – shows that this is not the case. Choice exists because, in addition to the public schools, there are denominational schools the students can choose. Furthermore, there is the possibility to apply for admittance at a public school other than the assigned one. 32.5 % of primary school students in Wuppertal did not attend their assigned public school in 2007/8. 20 % attended a denominational school, and of the students who at-

tended a public school, 15 % attended a public school different than the one assigned.

The paper gives some initial insights into the determinants of primary school choice in Germany. Our hypotheses claim that (1) choice is determined by individual and school characteristics, (2) students from ethnically advantaged backgrounds would make segregating choices while students from ethnically disadvantaged backgrounds would make integrating choices, and (3) parental choice will increase segregation. By and large the hypotheses are confirmed in the empirical analysis.

We find that the distance to school and the perceived quality of the school influence school choice significantly. Other important factors are the socioeconomic background of the students and the composition of the school district. Families from disadvantaged neighborhoods tend to send their children to their assigned schools. A high percentage of immigrants and/or economically disadvantaged families in the school district lead parents to choose another school for their children. Advantaged families make segregating choices, whereas for disadvantaged families the effect of choice is ambiguous. Muslim parents choose denominational schools to avoid schools with a larger fraction of Muslim students, whereas they choose public schools with a higher proportion of Muslim students than their assigned schools. Since schools with a high percentage of students from minority backgrounds face more problems in attaining high levels of achievement, the gap between high and low quality schools is widened by choice. In all, the external effect of choice on the composition of the assigned schools is significant, and it affects the composition of these schools adversely. Overall, the level of segregation in Wuppertal primary schools is high and exceeds the level of residential segregation in the school districts.

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