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May 2007:3
J.nr.: 2610

Working paper, May 2007:3

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by

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Abstract

Using data from Copenhagen school registers and other sources, I test the hypothesis that Danes are more likely to opt out of their assigned public schools when these have larger concentrations of immigrant students. The results suggest that up to an immigrant concentration of around 25-35 percent in the assigned school, opting out decisions of Danes are not affected when a rich set of covariates at student, school and neighbourhood levels is controlled for. Yet, for concentrations exceeding 25-35 percent, the share of immigrants in the local school is strongly related to opting out. Additional results show that only a minor part of the immigrant population (the 20 percent speaking Danish at home) is responding to variations in the school composition and the response is much weaker than for Danes and primarily related to the percentage of low-SES students in the school. These results combined lend support to the native flight from immigrants hypothesis and suggest that ethnic segregation across schools is increased by Danes' and immigrants' differential behaviour.

1 Introduction

Segregation based on socioeconomic status or ethnicity is challenging school systems and policy makers in cities of high-income countries. Similar students are clustering in schools creating polarized school systems with some schools enrolling mainly advantaged, native students, and other schools enrolling large numbers of disadvantaged and/or immigrant students. In the debate over school choice, one of the main concerns about universal vouchers is that increased choice will isolate the most disadvantaged students in the worst schools and that parents may not be sufficiently informed to make choices in the best interests of their children. There is a growing literature that presents a mixed picture of the net impact of various forms of choice. Several recent US-studies examine whether the choice between private and public school is influenced by the racial composition of the

local population[1]. Interestingly, there is only one study in the literature examining the related hypothesis of *native* flight from *immigrant* schoolchildren (Betts & Fairlie 2003), inspite of the fact that the basics of the two phenomena are probably quite similar.

This study examines whether a high immigrant concentration is a factor behind the decision to opt out of the local public school in Copenhagen. In the past 15 years, Copenhagen has experienced a substantial increase in the share of students with an immigrant background (from 16% to almost 30%), and major changes in their countries of origin[2]. A recent study (Rangvid 2007a) examines the extent and patterns of ethnic segregation across schools in Copenhagen. This paper takes the previous analysis a step further asking which factors are behind families' choice of school. In particular, to the extent that "native flight" is a response to the presence of immigrant schoolchildren, it may pose an especially important and grave problem for the city's public schools. I ask whether the decision to opt out of the local public school is related to the concentration of ethnic students in that school, and if so, is there evidence of a threshold or "tipping" point in the response to the immigrant share (e.g. Clotfelter 1976) after which Danish families start to opt for alternatives to the local school [3].

This study contributes to the existing literature in several ways. First, this is the first study to address the joint opting out effect from the local public school to alternative schools (both public and private). This is possible, because unlike most other datasets used in the literature, the Copenhagen data allow me to identify the exact residential location (i.e. the school catchment area) and thus the assigned local school *and* the school actually attended for all students. Second, since I have the full sample of students with linked micro-level student background characteristics from administrative registers,

[1]For example, Conlon & Kimenyi, 1991; Fairlie & Resch, 2002; Figlio & Stone, 2001; Lankford & Wyckoff, 1997.

[2]For the overall immigrant population in Denmark, today 75% of immigrants (1st and 2nd generation) come from non-Western countries compared to only 40% 25 years ago. In Copenhagen, almost all (99%) immigrant school children come from non-Western countries. Western countries are here defined as Western Europe, North America, Australia, New Zealand and Japan.

[3]I measure the school minority concentration as the fraction of students in a local public school who are immigrants (1st or 2nd generation), i.e., children of parents who both are born in non-Western countries.

I can calculate precise measures of the school composition of each local school. These precise school level measures are usually not available in other existing studies. Third, I investigate school choice of immigrant students, too. The existing white flight literature typically estimates only the school choice decisions of white/native families. However, only if native families opt out of local schools with high concentrations of immigrants *at higher rates* than immigrant families, school choice options are increasing ethnic segregation in schools. Last, to my knowledge, this is the first study to consider native flight in a European context.

The remainder of the paper is organized as follows. Section 2 briefly reviews the background and previous literature on the impact of the ethnic student composition on school choice. Section 3 provides an overview of the patterns of school choice and the school assignment system in Copenhagen. Section 4 introduces the data and section 5 presents results. Section 6 analyses characteristics of the schools which those opting out choose, and a final section concludes.

2 Background and previous research

Despite of a growing literature on the influence of schools' minority concentrations on white flight, there seems to be no consensus in the literature on whether "white flight" exists. Buddin, Cordes & Kirby (1998) find that the immigrant share of public schools has no effect on the propensity to attend private school, and Figlio & Stone (2001) find that the probability of attending private school is not influenced by the minority share of the population. In addition, Lankford & Wyckoff (1992) find that white children are even *more* likely to attend public high school when these schools have more black students. In contrast, Conlon & Kimenyi (1991), Lankford, Lee & Wyckoff (1995), Lankford & Wyckoff (1997), and Fairlie & Resch (2002) provide evidence of "white flight" from minorities or blacks. Yet, there is only little knowledge about *why* white families flee such schools. The authors of these studies offer some considerations, e.g. white families dislike their children

to attend the same schools as blacks or minorities, parents use the ethnic composition of the school as a proxy of academic quality, and white families may be concerned about potential peer group effects of disadvantaged immigrant students. A recent survey among Danish parents living in school districts with high concentration schools gives an insight in the reasons and motivations behind their choice of school (Megafon 2005)[4]. Top concerns for Danish parents who have opted out of their local school[5] are clearly related to the peer composition and the ensuing social environment: 56% identified the high share of immigrant students in their local public school as their main reason for choosing an alternative school, 22% listed the high number of students from low-SES homes, and 18% stated concerns regarding violence, bullying, threats, bad language as reasons[6]. Only 8% listed concerns of a low academic level explicitly, even though concerns regarding this are probably embedded in the previous answers.

Most of the white flight literature is concerned with choice between public and private alternatives (e.g. Campbell, West & Peterson, 2005; Fairlie & Resch, 2002; Brunner, Imazeki & Ross, 2006; Betts & Fairlie, 2003; Lankford, Lee & Wyckoff, 1995), which is probably due to the fact that public school choice is restricted in the US. However, in school systems with more choice, the decision of native children to opt out from local public schools with high immigrant percentages into public schools with lower immigrant shares poses a potentially serious threat to school integration. Thus, the segregational impact does not only come from private school choice, but at least as much from public school choice. To my knowledge, there are no studies on the joint impact of high immigrant concentrations in the local school on opting out to private and other public schools.

Since the existing literature focusses on the US experience, the main issue there is

[4]This study, carried out on behalf of the school authorities in Copenhagen (Megafon 2005), although limited in size, provides a useful insight into why Danish and immigrant parents opt out of their local public school. About 200 Danish and 150 immigrant families living in school catchment areas with high concentration schools in Copenhagen (with an immigrant percentage varying between 48% and 84%) were surveyed.

[5]In the remaining of this paper, I use the terms local (public) school and assigned school interchangeably.

[6]Multiple answers were allowed.

white flight from minorities (one exception is Betts & Fairlie 2003). However, for most European countries, the related issue of native flight from immigrant schoolchildren is probably more relevant. To my knowledge, there is no European study on native flight from schools with high immigrant concentrations. While many considerations are similar to the white flight perspective, additional considerations related to native flight include the effects that immigrant schoolchildren have on school resources and teaching methods due to their limited language proficiency. As Betts & Fairlie suggest, a substantial increase of children with limited proficiency in the language of the destination country to a school can take away teaching resources from native students, due to e.g. the need of teachers teaching special classes for students with limited Danish proficiency, or alternatively, if immigrant children are in regular classes, teachers may decide to spend additional time helping immigrant students at the expense of other students in the classroom. A recent study for Copenhagen suggests that high immigrant concentrations in schools are related to lower test scores for native Danes and immigrant students alike (Rangvid, 2006).

There are at least two reasons why we should be interested in the level of school segregation. Firstly, suppose that there are educational peer effects where immigrant students gain from being in mixed schools rather than in schools with high immigrant percentages. In this case, ethnic segregation across schools hinders learning for these students. Second, social/ethnic cohesion might be hampered by ethnic segregation (e.g. in schools). Burgess & Wilson (2005) provide evidence that areas with high segregation levels for Asian students coincided with the locations plagued by severe disorders in the summer of 2001 in England (in Bradford, Oldham and Burnley).

The Copenhagen school system has a number of features that make it an interesting case for analysis. First, even though, in principle, a formal mechanism assigns students to specific public schools based on residence in the school catchment area, parents can apply for admission to other public schools and can freely choose among about eighty private schools (contingent upon oversubscription). In practice, 55% of all students do not attend their local public school: 30% attend an alternative public school, while the remaining

25% attend private schools. Thus, while a great deal of attention in the literature is typically focused on private school choice, open enrollment (i.e. choice between public schools) is actually the most prevalent form of choice in Copenhagen. Second, unlike many previous analyses of school choice, which typically affect only a small percentage of students in the district, more than half of the students in Copenhagen are involved in some form of school choice. Third, because immigrant and disadvantaged students are disproportionately represented in Copenhagen, I am able to explore the impact of choice within an environment about which there is heightened concern.

Ideally, we would like to identify the causal effect of the minority concentration at school on the school choice decisions of households. Yet, unobserved preferences and characteristics make it difficult to identify causal effects in my cross-section data. Bias may originate from two sources. First, households' choice of schools and choice of residence are probably related in ways that are unobserved by the researcher, and in ways we would expect to introduce a negative bias, i.e. the existence of this sort of bias will give me a lower bound of the true estimate. Second, unobserved preferences of households and unobserved school characteristics that are related to the share of immigrants at a school and do probably induce a positive bias. I attempt to reduce this sort of bias by including a large set of controls at the individual, school and neighbourhood level.

3 School assignment and choice in Copenhagen

In Denmark, until recently there has been a well-established principle about neighbourhood schools. Public schools were supposed to be rooted in the local community and to mirror the local population composition. Therefore – traditionally – school choice within the public sector was limited and school attendance was assigned by residence in non-overlapping school districts. The primary alternative to the local school were private schools. Yet, the share of private school students in primary/lower secondary school increased from 6% during the 1970s to 12% since the 1990s indicating a slowly increasing

parental interest for school choice alternatives.

Choice between public schools However, during the 1990s consecutive governments have gradually opened up for more public school choice. Today, students are still granted enrolment in their assignment school, but they may also apply to alternative public schools within and even – under certain conditions[7] – across municipalities. Schools are in principle required to accept out-of-catchment students up to their capacity limits (i.e. filling up existing classes). In 2003, about one in four Danish and immigrant student in Copenhagen attended a public alternative to their local school (Table 1).

[Table 1 about here.]

Yet, students may attend alternative public schools for other reasons than deliberately opting out. For example, students who move from one school catchment to another are not required to switch school, but are allowed to stay on[8]. Immigrant students with special educational needs (most frequently language support) may be required to attend a particular public school that offers courses matching their needs, and newly arrived immigrant students who start in special introductory classes which are located at some schools only, are allowed to stay on at this school after being mainstreamed into normal classes.

Private school choice In addition to public school choice, attending private school is a frequently exercised option in Copenhagen. With universal vouchers of about 75-85% of public school expenditures[9] attending private school is within reach (financially) of most families. 28% of Danish and 24% of immigrant students at the primary and lower secondary level attend private schools (Table 1). There are several types of Danish

[7] Namely that the student's home municipality reimburses the school municipality for the costs of schooling.

[8] However, also the decision to stay on is an implicit opting out decision, but probably (also) for other reasons that are unrelated to the peer composition of the school.

[9] Strictly speaking, the voucher is not given to individual families. Rather, it is a direct subsidy to the school. Though the physical mechanism of payment is different, the two policies are similar in directly linking the school budget to enrolment.

private schools differentiated along educational, pedagogical approaches or (Christian) religious lines, but the fundamental difference is between traditional (Danish) private schools and immigrant/Muslim schools which have become increasingly popular among the immigrant community since the beginning of the 1990s. While the propensity to attend private school is similar for Danish and immigrant students, they do not attend the same types of private schools. While (almost) all Danes attend traditional private schools[10], two out of three immigrant students attend Muslim schools. These schools are financed on the same premises as traditional Danish private schools and are recognized in the Danish school system as providers of formally acknowledged education.

In section 2, I discussed why Danish students might opt out of their local school. But do immigrant families opt for alternatives to their local school for similar reasons as Danes? Results from the Megafon survey provides some insight. Among the 150 immigrant families surveyed, 55% answered that they (very) strongly had preferred to choose an alternative to the local school when the child first enrolled in school, but only 24 students (16%) had actually opted out of their local school (half of these attend a private school). Yet, since 44% of all immigrant families surveyed stated that they actually applied for enrolment in another public school, but less than one in five were admitted[11], this low percentage does not seem primarily to be due to immigrant families' different preferences, but to limitations in their actual school choice options. For my year of data (2003), there were no formal, objective rules for admitting students from other catchments, but schools were allowed to set their own rules. Only from 2005 on, schools were required

[10] Some few individuals in the category of native Danes attend immigrant private schools. Almost all of them have one Danish and one immigrant parent or are third generation immigrants, both of which according to the definition of immigrants in this paper are "native Danes".

[11] Only 8% of all immigrant students in the survey have successfully chosen an alternative public school, while 25% of immigrants in the register attend another public school. This difference might come from different sources. First, the survey is selective, because only students in high concentration districts have been targeted for the survey. The application-to-admission rates of immigrant students to other schools may be particularly low in high concentration catchments, since public schools that are neighbours to high concentration districts may face much higher numbers of applications than public schools on average.

Second, only 61% of the target population actually answered the survey. If parents, who applied to another school, but were not admitted, had a higher propensity to answer the survey, this would introduce downward bias in the estimate of the application-to-admission rates of immigrant students to other schools.

to admit out-of-catchment students in the following order: siblings to already enrolled students, students from the same municipality before students from other municipalities, the remaining applicants by lottery. This suggests that the school attendance pattern does not necessarily reflect immigrant parents' preferences, but is also a result of the (informal) school choice restrictions faced by immigrant families[12]. Of the 24 families opting out, many answered that the main reason for doing so was related to the low percentages of Danish peers in their local school[13], but concerns regarding the academic level at the school were also frequent[14]. When immigrant parents whose child attends the local school were asked what they think is bad about the school, 36% list the high percentage of immigrant students and 6% the high percentage of socially disadvantaged students[15].

4 Data

This study uses several sources of data. First, student-level information on the school catchment and the school actually attended from the student administrative system for all students living in Copenhagen City[16] (in 2003) are used in the main dataset[17]. Individual student data are necessary, since I need to link the individual student to his/her assigned school and to the school (s)he is actually enrolled in. Furthermore, in the regressions, micro-level data allow me to control directly for individual-level characteristics such as

[12] In the survey, there is no information on how many Danish students are not admitted to other public schools, but anecdotal evidence suggests that also Danish families are restricted in their school choice options, since each year some parents are revealed of claiming false addresses in school districts with desirable schools.

[13] Students do not learn enough Danish language and culture (29%), the percentage of immigrant students is too high (21%), their children had few chances to socialize and make friends with Danish children(13%); multiple answers allowed.

[14] Students do not learn enough (21%), students do not do enough homework (13%).

[15] Differences between parents who chose their local school and those opting out were substantial for the following answers about the school actually attended: there are too many immigrant students (36% vs. 4%); too much violence, threats and bullying (12% vs. 4%); pupils do not learn enough (12% vs. 4%); bad language (11% vs. 4%); can think of nothing bad about school (19% vs. 58%).

[16] The term "Copenhagen City" in this paper includes the area of the Municipality of Copenhagen.

[17] All students with an address in Copenhagen are included in the sample, no matter whether they attend school in Copenhagen or in another municipality. Yet, students having their adress in another municipality and attending a Copenhagen school are not included in the dataset.

parental education and income. Second, information on school characteristics from a school-principal survey collected as part of the PISA-Copenhagen study, is linked to the micro-dataset[18]. Third, student-level data from the PISA-Copenhagen study are used to run separate regressions on the PISA-subsample of 9^{th} graders with additional student background controls which are available from the PISA student questionnaire. This is a useful check of the robustness of the main analysis, because for PISA-students additional family background information is available to capture effects to the academic orientation of the parents, thus reducing the amount of unobserved characteristics which might bias the estimates.

One attractive feature of this dataset is that I can precisely match each student in the sample to a unique (assigned) public school and the school actually attended, and thus, in contrast to studies that can only identify *average* characteristics of all public schools in the area/larger school district, I can link detailed local public school characteristics to each student in the sample. The main estimation sample consists of about 38,000 Copenhagen students in grades 0 to 9 (the last year of compulsory schooling)[19]. Students attending special education schools and immigrant students in special introductory classes are excluded from the analyses since these students might not be free to choose their local school. Since four out of 63 schools only offer grades 0 to 7, and since two recently opened schools only enrol students in grade levels 0 to 3 and 4 (at the time of data), respectively (while older students from these district have to attend schools in other district), opting out rates for these catchments appear greater than they are when including students in these higher grades. I therefore exclude all students living in such catchments and attending grade levels which are not offered by the local public schools. These reduce the dataset by 718 students, or 2%. Missing values are handled by missing value flags. The

[18] This is a replicate study of the international PISA assessment, see Rangvid (2007b) for a more detailed description of the PISA-Copenhagen study design.

[19] In fact, both grades 0 and 10 are optional. I keep students in grade 0 in my dataset, because almost all students choose to attend grade 0, and thus, the sample of 0th graders is hardly selective. Yet, I chose to exclude 10th graders, since only 66% of a cohort chooses to attend 10th grade, and on average, these students do less well in school and come from less favourable social backgrounds.

dataset available for the empirical analysis includes detailed information on the student and his/her family, and on school and community characteristics. Table A1 shows summary statistics for all variables included in the regressions on the subsamples of Danish and immigrant students. 71% are of Danish origin (i.e. students with one or two Danish parents, using the definition of Statistics Denmark), 28% have immigrant origins in non-Western countries[20] (6% are first generation immigrants, 22% are second generation[21]). As expected, Danish students have higher educated parents, earning higher wages and being much more active/integrated in the labour market, the difference being particularly noticeable for mothers. Danish families also live on average in communities with a more advantaged population, but the differences are not substantial, which might be due to the absence of extended ghetto-like areas in Copenhagen, and also probably to some extent due to the averaging across larger units. Danish families also live in catchments with schools with fewer immigrants and low-SES students, and students who achieve higher grades at the national school leaving exams[22].

Moreover, I include community characteristics of the 15 residential districts[23] to accommodate the possibility that residential choice across districts is related to unobserved characteristics which are correlated with school preferences, too. These controls include average income, education, and the percentage of non-Western immigrants in the residential population.

The analysis proceeds in three parts. I begin with plotting the share of Danish and immigrant students of a school catchment who opt out against the percentage of immi-

[20] A very small minority of only 1% are immigrants from Western countries (Western Europe, North America, Australia, New Zealand and Japan). They are not included in this analysis.

[21] Third, fourth etc. generation immigrants are in accordance with the practices of Statistics Denmark coded as Danes.

[22] These data are posted at the website: http://www.karakter.dk. I use the 5-year-average (2001-2005) of all test subjects (oral & written) that are evaluated by an external examiner. These subjects may include: Danish, English, German, French, Physics/Chemistry, Math, home economics, manual training. The school mean grades are calculated with weights corresponding to the number of pupils in each subject sitting the exam.

[23] Copenhagen City is divided into 15 residential districts, which I name "communities" in this paper. On average, they have a population of 30,000 inhabitants. Preferably, I would like to include these characteristics for the smaller school catchments, but this is not readily available.

grants in the local school. Then, I present a simple bivariate comparison, examining how the group of students attending their local public school compares to the group of those opting out. Last, I present the main results, where a linear probability model is used to separate the effect of the school composition on the opting out decision from confounding factors.

5 Results

Before discussing the results from the regressions, it is useful to examine the relationship between the immigrant concentration and opting out rates across school catchments.

5.1 Opting out rates at the school catchment level

In Figure 1, I plot the relationship between these variables for Danish and immigrant students, respectively. The figure indicates that (i) there exists substantial variation in opting out rates across school catchments in Copenhagen, and (ii) only for Danes is the immigrant concentration in the local school related to rising opting out rates[24]. This differential behaviour for Danes and immigrants results in an ethnic composition of public schools that is illustrated in Figure 2, where I plot the share of immigrant (student) residents in the school catchment against the immigrant concentration in the local public school. For low immigrant shares in the school catchment (up to around 35-40%), the share of immigrant students in the local school is generally similar to that in the catchment, while the share in schools increases (sharply) for immigrant concentrations in the catchment area between 40-60%, suggesting that substantially more Danes than immigrants opt out of the local school with rising immigrant concentrations in the school. For catchment areas with very high immigrant resident concentrations, native flight seems to be less severe, but this might be due to composition effects of the Danish resident population. Observable differences will be controlled for in the regression analyses in

[24] At least for immigrant shares above 30%.

section 5.3.

[Figure 1 about here.]

[Figure 2 about here.]

5.2 Comparing students who do and do not opt out

Table 2 presents a bivariate comparison of students who do and do not opt out of their local public school for Danish and immigrant students, respectively. The comparison of means shows that immigrant students who opt out have more well-educated parents (11.0 versus 11.3 years of education), while the gap for Danes is smaller (but significant at the 5% level)[25]. Both Danish and immigrant students opting out attend higher grade levels than those attending their local school (whether this is an age effect or a cohort effect cannot be distinguished due to the cross-sectional nature of the dataset)[26], and both face schools with higher immigrant concentrations, lower SES and lower achievement levels, but these differences are much higher for Danes. Danish students who live with both natural parents are less likely to opt out than others (60% and 69%)[27], while immigrant students opting out live in families that have a similar structure like those attending their local school. For neither group is there a gap in parental income or unemployment rates between those opting out and not opting out, and there is no statistical difference for gender, or – among immigrants – between the share of first and second generation immigrants opting out.

[Table 2 about here.]

[25] As will be the case throughout the discussion, any references to statistical significance are based on a two-tailed test of different means across the two subsamples. If nothing else is mentioned, the usual cut-off value of 5% is employed.

[26] The share of students who opt out increases progressively from 43% to 65% from 0^{th} to 9^{th} grade (in 2003).

[27] However, this correlation disappears once other controls are included. Additional analyses showed that students in nuclear families on average live in catchments with lower immigrant shares, which might explain the raw correlation of living with both parents and lower opting out rates.

These bivariate results show who chose to opt out of their local public school. Yet, a multivariate analysis – which is presented in the following section – is required to see the impact of each factor net of all the others.

5.3 Estimates of the impact of immigrant concentration in schools on opting out probabilities

More formally, I now estimate equations for the probability of opting out of the local school. To test the "native flight" hypothesis, I estimate a reduced-form equation for opting out probabilities.

The main objective of this study is to investigate the role of the immigrant concentration in school on the opting out propensity of students. However, this raises the question of whether it is ethnicity per se that is driving families away, since it is a well-established result that ethnicity is correlated with a number of other school composition characteristics that may also factor into the decisions of native households, most notably student socioeconomic background. Therefore, in addition to the percentage of immigrant students in the school I also include the percentage of students with unskilled parents in the local school as another school composition characteristic in the regressions[28]. These measures are correlated (with a correlation coefficient of 0.94), and as it turns out, in some regressions, the estimates of the low-SES concentration variable are significant, and sometimes – in the Danish subsample – with the "wrong" sign. Yet, generally, whether the low-SES variable is included or not does not seem to matter much for the estimates of interest in the Danish subsample, while this variable turns out to be important for immigrants in certain subsamples. I therefore decide to keep both measures of the school composition in all regressions.

I examine the relationship between the immigrant concentration at school and the opting out propensity using a linear probability model, where p_{ijk} is an indicator for

[28] In the following, I name this variable share of *low-SES* students.

whether student i in district k has opted out of his local public school j. I model

$$p_{ijk} = \alpha SC_{jk} + \beta Q_{jk} + \delta D_k + \gamma X_{ijk} + \varepsilon_{ijk}$$

where ε_{ijk} is normally distributed. SC_{jk} is the percentage of immigrants and the percentage of students with low-educated parents in the local public school j, Q_{jk} are other characteristics of the local public school, D_k are community characteristics and X_{ijk} denotes student and family characteristics.

Based on the discussion above, we would expect the propensity of individuals to opt out of their local school to be positively related to the percentage of immigrants. Regressions are estimated separately for native and immigrant children to allow for differential effects in the decision-making process. Parameter estimates for the samples of native Danes and immigrants are presented in Table 3 with standard errors below. To conserve space, I do not report results for the control variables.

I start off with a basic model (I) including only the immigrant percentage and the percentage of students with low-SES parents in the local public school, but without any controls. I then successively add school, community and student controls (models II-IV)[29]. The results from regressions I to IV in Table 3 show that for Danes, in the simplest model (model I), the propensity to opt out increases by 7.3 percent for a 10 percentage point increase in the immigrant share in school. The point estimate does not change significantly when the different sets of controls are added (models II-IV), while the R-squared increases from 0.06 in the simplest model to 0.15 in the full model. Thus, controls add to explaining the opting out decision, while not significantly altering the estimate of interest. The point estimate of the percentage of low-SES parents variable varies across models I-IV, but is insignificant in the full model. Since the estimates of the single sets of controls are (jointly)

[29] The right-hand-side variables are at three different levels of aggregation: the student, the school catchment and the community. In models excluding community characteristics, the school catchment is the unit with the highest level of aggregation, and standard errors are therefore adjusted for clustering at the school catchment level in these estimations. The main specification includes community characteristics and since this is a higher level of aggregation than the school catchments, standard errors in this specification are adjusted for clustering at the community level.

significant, I choose the full model (IV) as my preferred specification.

The point estimate of the full model implies a nontrivial effect: the predicted increase in the Danish opting out probability resulting from a 10 percentage point increase in the immigrant share is 0.077 (a one standard deviation increase in the immigrant share (26%) increases the Danish opting out rate by 0.20[30]).

[Table 3 about here.]

In stark contrast to the results for Danes, the coefficient estimates for immigrant families are generally much smaller and are – except in model II – never significantly different from zero at conventional levels. Thus, in the full model (IV) the opting out decision of immigrant households seems to be unresponsive to the share of immigrant and low-SES students their children are exposed to. Yet, as discussed above, this is probably at least partly due to restrictions immigrant families face when applying for enrolment to alternative schools.

Coefficients of the control variables (not shown) are briefly discussed in the following. Very few estimates of the school resource coefficients are statistically significant. Yet, when tested whether they are *jointly* insignificant (F-statistics are shown in Table 3), this is clearly rejected. The estimates of individual student controls have generally the expected signs. The probability of opting out decreases with increasing school size suggesting that parents prefer medium-sized schools to small ones[31] (which might offer a higher percentage of teachers teaching in their subject of specialization, more choice of optional subjects and better facilities than small schools), but this might also be an indicator of unobserved characteristics of small schools that experience failing enrolments

[30] In these OLS subsample regressions, marginal effects are evaluated at the mean of the subsample, which are not the same in the Danish and immigrant subsamples. I therefore reestimated model IV in a probit specification and calculated the marginal effects for the (pooled) sample average student. The results (reported in Table 3) are virtually identical.

[31] There are no truly large schools in Copenhagen the largest school enrolling just above 800 students in 10 grades.

due to high opting out rates which are unaccounted for by other controls included in the regression. For both Danish and immigrant students, the probability of opting out increases with the grade-level, probably suggesting that the (transport) costs of attending schools that are potentially farther away than the local school are lower for older children. For native students, a range of family controls is significantly related to the propensity of opting out (parental years of education, number of children in the family, income, labour-market status[32]), while for immigrant students, only parental education and the language spoken at home (Danish or other) are significantly related to opting out probabilities. The language spoken at home is strongly connected to school choice[33]: it is by far the most significant predictor of school choice (with a t-statistic of 15.9) and the size of the estimate is substantial – speaking another language than Danish at home decreases the probability of opting for another school by 0.41(!).

There is a potential problem with the specification of my model that deserves special attention[34]. For one point in the support of my model, the relation between the percentage of immigrants in the local school and the probability to opt out becomes tautological. For example, when the immigrant share in the local public school is 100%, *all* native students in the school catchment *must* have opted out of their local public school. Vice versa, for immigrant students, when the immigrant share in the neighbourhood school is zero, all immigrant students living in the catchment area must have opted out. Thus, for Danes, the support for the opting out decision when the immigrant percentage in the local school is (a hypothetical) 100% is fixed at 1 (=opting out), and similar for immigrant students when there are no immigrants in the local school. The existence of such a fix-point in a parametric specification[35] of the model might lead to an upward bias of the slope

[32]The indicator for being self-employed covers both the effect of being self-employed per se and the income-effect associated with being self-employed. This is due to the fact that we have no reliable information on income from self-employment, and therefore income from self-employment is set to zero and the effect is captured by the indicator variable for self-employment.

[33]This variable comes from the Copenhagen School Register. When students are enrolled in school at the age of 6, parents are asked which language they predominantly speak with the child at home.

[34]I owe thanks to Michael Rosholm for pointing this out.

[35]E.g. where the regressor of interest is specified as a linear function – and not as e.g. a set of indicator variables. The problem is only global in model specifications where the percentage of immigrants is

for natives and a downward bias of the slope for immigrants. However, this fixation only exists *exactly* in these points. To see this, consider the case where the immigrant percentage in the local school is 95%. In this case, due to the fact that students from other catchments can opt into the local school, it is not given beforehand how many native students from their own district have chosen the school[36]. A similar reasoning applies to immigrant students around the point of 0% immigrants in school. However, since there are no observations in my dataset located at the critical points (0 and 100% immigrants in the local school – the minimum and maximum in the data are 3% and 87% – see Table A1), this (theoretical) problem is no (practical) concern in my data. However, to be safe, I ran additional regressions excluding schools with almost no and almost only immigrant students[37]. When I exclude schools below the 2^{nd} and above the 98^{th} percentile of the immigrant-share distribution, the Danish and immigrant subsamples are reduced by 3% and 11%, but the point estimates are very similar. Thus, the conclusion from this robustness check suggests that the tautological relationship in some points of support of the main variables probably does not affect my main results.

Yet, another – very different – concern is that the group of students who choose immigrant private schools are not responsive to the share of immigrants in the local school, since these students cannot be said to flee high immigrant concentrations per se. Therefore, I ran regressions separately for the alternative choices "local school versus immigrant private schools" and "local school versus alternative public schools and Danish private schools". As expected, the results from these regressions suggest that including only immigrant students who opt for public schools or traditional private schools are more

entered as a parametric function. When instead a set of dummies is included to describe the immigrant share, only the dummy coefficient for the dummy including the fixed point is potentially affected.

[36] With an immigrant percentage of 95% (let's say the school has 1,000 students in all), we can have each of the following choice patterns (and many others):

- 50 local natives chose the school as did 950 immigrants; no "out-of-catchment" students attend the local school.
- 25 local natives chose the school, as did 950 local immigrants and 25 natives from other catchments.
- 40 local natives chose the school, as did 950 local immigrants and 10 natives from other catchments; and so on.

[37] Thanks go to Helena Skyt Nielsen for suggesting this check.

responsive to the immigrant share (the estimate is 0.0025, yet, with a p-value of 0.14), compared to a regression which includes only students in either the local public school or an immigrant private school (with a point estimate of -0.0002 and a p-value of 0.85). Yet, given the size of the standard errors, the two estimates are unlikely to be statistically different from each other. Thus, leaving out immigrant students who openly demonstrate that their preferences are not against high immigrant concentrations at schools (because they choose an immigrant private school) does not alter the insignificance of the immigrant concentration coefficient for the remaining immigrant sample, which lends more credibility to my full sample results for immigrants.

Several preliminary conclusions emerge from these results. First, only Danes, but not immigrants, seem to react to higher shares of immigrant schoolchildren by opting out of their neighbourhood school. Thus, since only Danes flee, the opting out pattern is consistent with the notion of "native flight" – rather than the concept of "universal flight" of schoolchildren of both Danish and immigrant backgrounds from schools with large concentrations of immigrant schoolchildren.

In the following section, I conduct a range of further sensitivity checks of the results. First, I look into whether the results hold across different subsamples. Second, I investigate, whether the assumption that the opting out probability is a linear function of the school composition is warranted. Third, I analyse whether Danes flee from specific immigrant characteristics. Last, using additional background information from the PISA-questionnaire on a subset of my full sample, I check whether the non-availability of additional background variables in the full sample (all grades) is biasing the results.

5.4 Sensitivity analyses

Subsample regressions As we saw above, parental education is an important predictor of school choice for Danes and immigrants alike, and the language spoken in the home is a particularly important predictor for immigrants. For these key controls, I have

investigated whether they interact with the percentage of immigrants in the opting out regressions, since it may be that higher educated parents or immigrants who speak Danish at home are more (or less) sensitive to variations in the school composition. I present the results from these regressions in Table 4 below.

[Table 4 about here.]

When a set of dummies indicating whether parents have at most upper secondary or tertiary education (with lower secondary education as the reference category) is interacted with the immigrant share in the local school, the results imply that while the probability that Danish students with low-educated parents opt out increases by 0.055 for a 10 percentage point increase in the immigrant percentage in the local school, the corresponding numbers for a student with medium and high educated parents are much higher (0.080 (=0.055+0.025) and 0.087 (=0.055+0.032)). For immigrants, there is no significant increase in the probability to opt out for low- and medium educated families when immigrant percentages rise, while the probability that high educated families opt out increases by 0.025 (0.022+0.003) compared to the reference category for a 10 percentage point increase in the immigrant percentage in the local school. Thus, Danes, no matter whether they come from low, medium or high educated homes are reponsive to the percentage of immigrants in the local schools, but medium and high educated respond stronger than low educated families. Among immigrants, only the high educated show a similar behaviour, but the strength of their response is much weaker than for Danes.

[Table 5 about here.]

For immigrants only, I interact the percentage of immigrants in the local school with a dummy for whether students speak Danish or another language than Danish in their home. Henceforth, I call these students *monolingual* and *bilingual* immigrants for brevity. The results are shown in Table 5. The results suggest that bilingual immigrants do not

react to higher levels of the immigrant share at schools by increased opting out[38], while the estimate for monolingual immigrants (0.0038) is marginally significant with a p-value of 0.07. To pursue this line of investigation further, I run separate regressions for each subsample of monolingual and bilingual immigrants (Table 5). As expected, bilingual immigrants are not affected by the local school composition in their opting out decision. For monolingual immigrants, interestingly, the results suggest that they are influenced by the school composition, yet not by the *immigrant* share, but by the share of students with *low-SES* parents[39]: an increase of of 10 percentage points of the share of students with low-SES parents is associated with an increase in the opting out probability by 11.4% – or an effect size of 12.3% for a one SD increase of the share of students from low-SES parents. This is substantially lower than the effect size of 20.2% for Danes of a one SD increase in the immigrant share at school, which suggests that while both Danes and monolingual immigrants react to the school composition, Danes react much stronger.

To sum up, for Danish students of any educational family background, the opting out decisions are responsive to the share of immigrants in the local school, but higher educated families show a higher increase in the opting out probability as response to a given increase in the immigrant share in the local school. Immigrant students are in their opting out behaviour sharply divided into two groups: those who do speak Danish at home *do* opt out from schools with high shares of students from low-SES parents, while students who speak another language than Danish at home are *not* responsive to the school composition.

Nonlinearities in the school composition variables In the following, I investigate whether there is a threshold in the relationship, i.e. is there a tipping point above which Danish students start opting out as a response to increasing immigrant shares?

[38] The sum of the coefficients for percentage of immigrant students and the interaction hereof with the language dummy (0.0038 - 0.0032) are not significantly different from zero.

[39] When the share of students from unskilled homes is not included in the regression, the estimate of the share of immigrants is quite large and significant. Yet, including the share of students from unskilled homes shows that it is not ethnicity per se that is related to the opting out decision, but the (correlated) share of students from low-educated homes.

First, I investigate whether there is evidence of a threshold or "tipping" point in the response to the relevant school composition variables. Since only the immigrant share seems to matter for Danes, and only the share of low-SES families for (monolingual) immigrants, I concentrate on nonlinearities in these respective variables for Danes and immigrants. The specification of the immigrant concentration is a set of dummy variables (0-5%, 5-10%, etc.) with 0-5% immigrants being the reference category. The share of students from low-educated families does hardly exceed 40% in any school and therefore, I generate four dummy variables with 0-10% low-SES parents in the school being the reference category[40].

Figure 3 illustrates the dummy coefficient estimates from separate estimations for Danes and monolingual immigrants[41]. The pattern for Danes in the upper panel of Figure 3 suggests that there are several distinct zones: up to an immigrant percentage of around 25, there is no significant difference in opting out probabilities compared to the reference group of schools with no or only very few immigrants (0-5%). The results for a percentage between 25-35 are somewhat inconclusive, but it is in this interval where the tipping point is located (the results just do not allow to say *where* precisely in this interval). For immigrant concentrations above this interval, opting out probabilities are substantially higher. Yet, while at a higher level than before, opting out probabilities are rather stable and do not seem to increase over the 35-60% range. Only thereafter, opting out probabilities seem to rise slightly with increasing immigrant shares. The size of the effect is substantial: for immigrant shares between 35 and 60%, the students probability of opting out is increased by 0.25-0.30 compared to the reference category. For even higher immigrant concentrations, the increase is from 0.40 to 0.50. These results show that Danes respond to higher immigrant shares in schools when the immigrant concentration exceeds the 25-35%-level.

[40] I tried to estimate with dummies covering smaller intervals (0-5%, 5-10% etc.), but all dummy estimates were insignificant, probably indicating that the smaller sample size of the monolingual sample does not allow to estimate coefficients on smaller intervals precisely.

[41] There is no dummy estimate for the range of 90-100%, since there are no public schools with such high immigrant concentrations.

[Figure 3 about here.]

For immigrants (Figure 3, lower panel), opting out probabilities start to rise marginally from a share of low-educated parents of about 20-30% (p-value=0.065), but the increase is significant (at the 5% level) only for schools with very large shares of low-SES families (above 30%).

Which types of immigrants do Danes flee from? Until now, we have considered immigrants as a homogenous group (albeit controlling for the percentage of low-SES students). In this section, I try to shed light on whether Danes differentiate between different types of immigrants, when they make their school choice decision. Therefore, I have split immigrants into different groups, delineated for example by socioeconomic status, immigrant generation, and language spoken at home.

Fairlie & Resch (2002) and Conlon & Kimenyi (1991) find evidence of "white flight" from poor minority, but not from non-poor immigrant children. This finding suggests that white families may react differently to socially disadvantaged and non-disadvantaged minorities. To examine whether "native flight" is from all immigrants or only from immigrant groups from low educated homes, I estimated models specifying the percentage of immigrants from low-educated homes (only lower secondary schooling) and higher-SES homes (more than lower secondary schooling). Another piece of evidence may be provided by considering the language factor, which is peculiar to the immigrant dimension, but not to socioeconomic status. For US data, Betts & Fairlie (2003) find that natives respond mainly to immigrants who speak a language other than English at home. If the "flight from immigrants"-interpretation of my results is correct, then Danish parents should be more likely to opt out if immigrants in the local school are less acculturated into the host society. Even though there are very few monolingual immigrant students from non-Western countries in public schools, since most of them attend private schools[42],

[42] Only 20% of immigrant students speak Danish at home and of these, 77% attend private schools (half of these Muslim private schools).

I divide the immigrant share into mono- and bilingual immigrants and include these two measures in the regressions instead of the overall immigrant share. Another possibility is that Danes respond the level of integration into the host society in general. To check this, I replaced the immigrant share in the school with the share of 1^{st} and 2^{nd} generation immigrants.

When these pairs of variables were included into three separate regressions, the differences in the estimates between the mentioned immigrant group pairs, were never significant at conventional levels (results not shown), suggesting that Danes do not differentiate between different immigrant characteristics when making their opting out decisions, which lends additional credibility to the results of the main analysis.

Additional student background information: the PISA-subsample Despite of including a reasonable set of student background controls, we might still be worried that unobserved characteristics which are related to location and school choice might bias the estimates. For a subsample of the students (9^{th} graders who participated in the PISA-Copenhagen assessment) additional student background information is available. These variables are designed to capture parental involvement with the child and parental academic interest in general. Information on the language spoken at home, the number of books in the home, cultural and social communication, home educational resources and cultural possessions is available (see Table A1 for summary statistics). Since the PISA-subsample is a small and selective sample of the entire student population (covering only 9^{th} graders and excluding a non-negligible number of non-participating private schools), I compare results *within* the PISA-subsample – with and without additional controls. The results from such regressions (not shown) suggest that whether additional PISA controls are included or not does not appreciably alter the estimates.

6 Do "schools of choice" have a more desirable school composition than the assigned (local) school?

In this paper, I hypothesize that the share of immigrants and the share of students from low-SES parents in the local school are related to opting out probabilities of Danes and monolingual immigrants. Whether this relationship is purely statistical or can be given a causal interpretation has been briefly discussed above, but since I have no exogenous variation to identify causal effects, I cannot be sure that the relationship observed above is truly causal. Therefore, in this section, I seek to provide some suggestive evidence. A necessary (but not sufficient) condition for the existence of a causal effect of the immigrant concentration on native flight is that Danish and monolingual immigrant students who opt out actually choose schools with lower immigrant shares and/or lower shares of students from low-SES parents, respectively. For exploratory purposes, I also present results on the school's average performance at the national school leaving exams as a school quality measure[43]. A drawback of using this measure is that it is not available for schools that do not enrol 9^{th} graders and for schools that do not administer school leaving exams at the end of 9^{th} grade – particularly private schools using Rudolf Steiner's pedagogical approach.

[Table 6 about here.]

Table 6 shows the gap in the different school composition measures in the assigned school and the school actually attended for Danes and monolingual immigrants. The results show that both Danes and immigrants choose schools with lower percentages of students with low-SES parents – a decline of about 8 percentage points relative to the local public school for both Danes and immigrants (but immigrants still attend schools with substantially higher shares of students from low-SES families). Moreover, both Danes

[43] I refrain from using the school averages of PISA-testscores calculated from the student-level PISA-Copenhagen data, since they are available for even fewer schools, because only two out of three private schools participated in this assessment. Since private schools are a favoured alternative for those opting out, using PISA-scores would greatly reduce the sample for this analysis – and in a non-random manner.

and immigrants choose schools with higher average achievement at school leaving exams. Yet, while Danes choose schools with substantially fewer immigrant peers than in the local school, immigrants choose schools with on average higher immigrant shares. This suggests that while both Danes and immigrants seem to value higher SES- and higher achieving peers, immigrants do not shy away from being educated together with (even more) other immigrants. Yet, we would expect that this preference differs for students who choose to attend Muslim private schools compared to those who choose other alternatives. Interestingly, I find that immigrant students who opt out to other public or traditional private schools, choose schools with lower immigrant shares, but the "gain" is smaller than for Danes who opt out, while they reduce the share of low-SES students and increase exam grade means by more than Danes.

7 Concluding remarks

Using the full sample of students living in the municipality of Copenhagen in 2003, I investigated whether native and immigrant children are opting out of local public schools in response to the school's concentration of immigrant students. Estimates from the regressions imply that the tipping point, i.e. the immigrant concentration after which natives start opting out in response to rising immigrant shares is around 25-35%. The estimated effect of the immigrant share on the opting out decision of native Danish children is quite large: when schools have between 35-60% immigrants, the probability to opt out increases by 0.25 compared to schools with no or very few immigrants, and for even higher concentrations, opting out probabilities are increased by 0.40-0.50.

With respect to opting out behaviour, immigrants are divided into two groups. Immigrants who speak Danish at home have a higher propensity to opt out, when the concentration of students from low-SES homes at the local school is high, while the opting out choices of immigrants who do not speak Danish at home are not related to the ethnic or socioeconomic school composition of the local school. Yet, whether or not Danish is

spoken in the home is of course also a choice variable of the individual family. It is most certainly related to their degree of integration in the host society.

A comparison of the assigned school and the school of choice for students who opt out showed that both Danes and immigrants choose schools with lower percentages of low-SES students and with higher average achievement at school leaving exams. Yet, while Danes choose schools with substantially fewer immigrant peers than in the local school, immigrants choose schools with on average higher immigrant shares, suggesting that while both Danes and immigrants seem to value higher SES- and higher achieving peers, immigrants do not shy away from being educated together with (even higher percentages of) other immigrants (another possibility is that they are restricted in their choice of school). As discussed at length above, a strong caveat applies to the results of this study: even though I try to reduce concerns due to selection on unobservables into different schools, I cannot be certain that this has completely rid the results of endogeneity bias. Thus, the results must be interpreted with this caution in mind.

As mentioned above, Betts & Fairlie (2003) is the only other article in the literature investigating native flight from immigrants. Using data for two years (a decade apart) they examine the relationship between changes in immigration in 132 metropolitan areas and changes in the probability to attend private school of native-born American families. In contrast to other studies of "flight-from-immigrants" (including this one), they can improve the causal identification of the model, since with longitudinal data the effect can be identified from the correlation between changes over time in immigration and private school rates across metropolitan areas and thereby controlling for unobserved fixed traits of each metropolitan area that might confound the relationship between immigration and school choice. They find a significant and sizeable link between immigration and private school enrolment for secondary schools: for every four immigrants added to the public schools in a metropolitan areas, one additional native is predicted to switch to private school from public school. Moreover, natives seem to respond mainly to bilingual immigrant children (i.e. who speak a language other than English at home).

The results of this study suggest that immigrant concentrations of more than 25-35% are related to substantial opting out of native students from these schools. Thus, in Copenhagen City, for a substantial number of school catchments, given the actual residential segregation level, native flight cannot be avoided without the intervention of the municipal (school) authorities. Results for immigrants suggest that they generally do not respond to higher immigrant shares by opting out to other schools. Yet, this analysis cannot diffentiate whether this is due to preferences or to restricted choice options for immigrants. Data from a recent survey suggest that the latter is at least part of the story. Being aware of this, the Copenhagen school authorities have from the beginning of the school year 2006/2007 launched the so-called "Copenhagen model for integration". In the first year, selected schools with low immigrant percentages were required to accept a certain number of immigrant students from neighbouring high concentration catchments in an attempt to improve school choice options for immigrants and to decrease school segregation. It is planned that more schools join in the second year of this programme. While it is more than questionable whether the programme is encompassing enough to reduce segregation substantially, it is a step in the right direction.

As discussed at length above, a strong caveat applies to the results of this study: even though I try to reduce concerns due to selection on unobservables into different schools, I cannot be certain that this has completely rid the results of endogeneity bias. Thus, the results must be interpreted with this caution in mind.

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Appendix Since immigrant families who speak Danish at home and those who do not apparently have quite different school choice strategies, I provide some descriptive statistics on these groups. Table AA1 illustrates the choices of school. Only one in six immigrants who speaks Danish at home attends his/her local public school and of these, nine out of ten choose a private school – either a traditional Danish or a Muslim private school. Only 8% of monolingual immigrants attend an alternative public school. Compared to Danes, immigrants who speak Danish at home have much higher opting out rates (85% vs. 56%). Yet, they also live in catchments where the immigrant share and the percentage of students in low-SES homes in the local school are much higher. In contrast, 58% of bilingual immigrants attend their local school and further 29% attend another public school. Private school attendance rates are much lower accordingly: only about 6-7% attend Danish and immigrant private schools, respectively. Thus, contrary to what one would expect, the attendance of immigrant private schools is much more prevalent among "better integrated immigrants", i.e. immigrants who speak Danish at home. One worry about these numbers could be that choices of Danish speaking immigrants are different because there are more second generation immigrants among them who have been in the country for a longer time. Yet, when we separate choices of first and second generation immigrants (Tb. AA1), we see that the only important difference is for the choice between private school types of immigrants who speak Danish at home: contrary to what we might expect, the first generation is *less* likely to be enrolled in an immigrant private school compared to a Danish private school than the second generation is. Thus, immigrant private schools seem to be more popular among Danish speaking second generation immigrants, i.e. those who appear to be the most integrated group. Thus, generally, immigrant private schools do not only seem to attract newcomers to the country, but also to a high degree well-established immigrant groups who perhaps want to foster the language and culture of their parents' country of origin in their children.

[Tb. AA1]

Figure AA1 shows the percentage of students not speaking Danish at home by country of origin and immigrant generation. As could be expected, for most country of origins, the share of first generation children speaking another language at home is very high, at least around 80%. Yet, in the second generation, important differences emerge. While immigrants from some countries still speak another language at similar rates in the second generation (Morocco, Iran, Macedonia, Turkey, Pakistan, Libanon, Iraq, Former Yugoslavia, Somalia, Jordania and Bosnia all reduce the percentage by 10 percentage points at most), immigrants from other countries speak Danish at much higher rates (Poland, Philippines, Vietnam, Thailand). But still, also in the second generation, Danish does not seem to be the natural family-language for most immigrants (which could be, of course, because the parents of the second generation are first generation immigrants and this decides which language is spoken in the family).

[Fig. AA1]

Another issue is whether the backgrounds of the two groups of immigrants – those who speak Danish at home and those who do not – differ. Differences in the socio-economic background in the two groups (Tb. AA2) emerge, as could be expected in the level of education of the higher educated parent. The difference in the number of siblings is, albeit significant, not sizable. Parental income is not significantly different (if, at all, income is higher for the "wrong" group), but slightly more mothers in the Danish speaking families are in the workforce (39% vs 35%).

[Tb. AA2]

Table 1: School choice patterns - grades 0 to 9 (2003)

School choice	*Danes*	*Immigrants*	
Local public school	44%	50%	***
Alternative public school	27%	25%	**
Danish private school	27%	8%	***
Immigrant private school	1%	16%	***
All	*27,491*	*10,428*	

***=0,001; **=0,01

Table 2: Means of students opting out or staying in their local school

	Danes			*Immigrants*		
	Stay	**Opt out**	*Test of diff. means*	**Stay**	**Opt out**	*Test of diff. means*
Parental education						
Father: years of schooling	12,25	12,37	**	10,99	11,27	***
Mother: years of schooling	12,45	12,61	***	10,53	10,85	***
Family structure						
Lives with both parents	0,64	0,56	***	0,72	0,71	
No. siblings	0,99	0,91	***	1,91	1,9	
Income & unemployment						
Income, father	299	301		145	142	
Income, mother	228	227		122	122	
Unemployment, father	0,02	0,04	***	0,07	0,07	
Unemployment, mother	0,03	0,03		0,05	0,04	
Not active in labour market, father	0,06	0,07		0,31	0,33	**
Not active in labour market, mother	0,09	0,10	**	0,63	0,62	
Ethnicity						
1st generation	-/-	-/-		0,21	0,21	
2nd generation	-/-	-/-		0,79	0,79	
Female	0,5	0,5		0,49	0,48	
Grade	3,67	4,65	***	3,75	4,32	***
Local school characteristics						
% immigrant parents	20,02	31,32	***	50,2	54,93	***
% students with low-SES parents[a]	15,7	19,5	***	27,7	28,7	***
Mean exam grades	7,94	7,82	***	7,6	7,56	***
No. obs.	12584	14907		5315	5113	

*Note: * p < .05; ** p < .01; *** p < .001. [a] The definition low-SES covers parents with no more than lower secondary education.*

Tabel 3: Estimating the relation between the immigrants concentration in the local public school and the probability to opt out

	Danes				
	I	**II**	**III**	**IV**	**Probit**
Percentage of immigrants in local school	**0,0073**	**0,0087**	**0,0081**	**0,0077**	**0,076**
	0,0016	0,0014	0,0012	0,0012	0,001
Percentage of students with low-SES parents in local school[a]	-0,0055	**-0,0116**	**-0,0066**	-0,0045	-0,0025
	0,0039	0,0032	0,0030	0,0029	0,0025
School characteristics (F-stat of joint sign)		**60,23**	**97,28**	**401,50**	incl.
Community characteristics (F-stat of joint sign)			**10,62**	**7,59**	incl.
Student&family characteristics (registers) (F-stat of joint sign)				**133,17**	incl.
No obs.			27,491		27,491
R-sq adj. // Pseudo R-sq (for probit)	0,06	0,09	0,10	0,15	0,12

	Immigrants				
	I	**II**	**III**	**IV**	**Probit**
Percentage of immigrants in local school	0,0028	**0,0030**	0,0009	0,0012	0,0012
	0,0018	0,0012	0,0018	0,0018	0,0014
Percentage of students with low-SES parents in local school[a]	-0,0041	-0,0031	0,0007	0,0000	-0,0002
	0,0058	0,0028	0,0029	0,0031	0,0003
School characteristics (F-stat of joint sign)		**20,92**	**189,88**	**191,30**	incl.
Community characteristics (F-stat of joint sign)			**5,66**	**61,52**	incl.
Student&family characteristics (registers) (F-stat of joint sign)				**4,68**	incl.
No obs.			10,428		10,428
R-sq adj. // Pseudo R-sq (for probit)	0,01	0,18	0,18	0,20	0,16

Note: The probit regression estimates marginal effects at the sample averages of the controls. Standard errors are adjusted for clustering at the school catchment level for models I-II and at the community level for specifications III-IV. School, community and student&family characteristics include all variables in the respective categories in Tb. A1.
[a] The definition low-SES covers parents with no more than lower secondary education.

Table 4: Interactions of school composition with own parental education

	Danes	Immigrants	Immigrants
Percentage of immigrants in local school	**0,0055**	0,0003	0,0011
	0,0011	**0,0020**	0,0018
- Interaction with: parents' max. education is upper secondary educ.	**0,0025**	**0,0010**	
	0,0009	0,0006	
- Interaction with: parents' max. education is tertiary educ.	**0,0032**	**0,0022**	
	0,0009	0,0005	
Percentage of students with low-SES parents in local school[a]	-0,0054	0,0001	-0,0015
	0,0030	0,0031	0,0029
- Interaction with: parents' max. education is upper secondary educ.			**0,0019**
			0,0006
- Interaction with: parents' max. education is tertiary educ.			**0,0040**
			0,0008
Obs.	27,491	10,428	10,428
R-sq adj.	0,15	0,20	0,20

[a] The definition low-SES covers parents with no more than lower secondary education.

Table 5: Interactions & subsample regression of school composition with language spoken at home (immigrants only)

	All immigrants	Monolingual	Bilingual
Percentage of immigrants in local school	*0,0038*	0,0008	0,0012
	0,0020	0,0019	0,0020
- Interaction with language spoken at home	**-0,0032**		
	0,0006		
Percentage of students with low-SES parents in local school[a]	-0,0003	**0,0114**	-0,0035
	0,0030	0,0038	0,0033
Obs.	10,428	1,951	8,477
R-sq adj.	0,20	0,31	0,10

[a] The definition low-SES covers parents with no more than lower secondary education.

Table 6: What are the "gains" of choosing alternative schools?

	Danes	Monolingual immigrants		
		All	Attending alternative public or traditional private schools	Attending immigrant private schools
	Mean	Mean	Mean	Mean
Difference: Share of immigrants in schools	**-16,1**	**11,3**	**-7,2**	**31,5**
Share of immigrants in school of choice	15,3	63,3	36,9	92,5
Share of immigrants in local school	31,3	52,1	12,4	61,0
Difference: Share of students with low-SES parents in schools[a]	**-8,0**	**-7,9**	**-12,5**	**-2,9**
Share of students with low-SES parents in school of choice	11,4	19,7	12,4	27,7
Share of students with low-SES parents in local school	19,5	27,6	24,9	30,6
Difference: Combined exam grades in schools	**0,3**	**0,4**	**0,5**	**0,3**
Average combined exam grade in school of choice	8,1	8,0	8,2	7,8
Average combined exam grade in local school	7,8	7,6	7,7	7,5

Note: Only students who opt out are included in these means.
[a] The definition low-SES covers parents with no more than lower secondary education.

Table A1: Descriptive statistics

	Danes					Immigrants				
Variable	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**
Opting out	27,491	0,56	0,50	0	1	10,428	0,50	0,50	0	1
Student & family characteristics (registers)										
Grade level	27,491	4,22	2,88	0	9	10,428	4,04	2,82	0	9
Number of brothers and sisters	27,491	0,94	0,76	0	6	10,428	1,90	1,29	0	10
Student is female	27,491	0,50	0,50	0	1	10,428	0,49	0,50	0	1
Student lives with both natural parents	27,491	0,59	0,49	0	1	10,428	0,71	0,45	0	1
Mother: years of education	26,930	12,54	2,84	7	20	8,578	10,70	2,16	7	20
Father: years of education	25,772	12,32	3,02	7	20	8,189	11,13	2,48	7	20
Father: income	26,188	300	222	0	7552	9,435	143	107	0,00	2127
Father: self-employed	26,188	0,09	0,29	0	1	9,435	0,16	0,36	0	1
Father: unemployed	26,188	0,03	0,18	0	1	9,435	0,07	0,25	0	1
Father: enrolled in formal education	26,188	0,01	0,10	0	1	9,435	0,01	0,11	0	1
Father: receives permanent social transfer payments	26,188	0,02	0,14	0	1	9,435	0,07	0,26	0	1
Father: not active in labour market	26,188	0,07	0,25	0	1	9,435	0,32	0,47	0	1
Mother: income	27,197	227	117	0	3420	10,247	122	66	0,00	751
Mother: self-employed	27,197	0,04	0,19	0	1	10,247	0,03	0,17	0	1
Mother: unemployed	27,197	0,03	0,17	0	1	10,247	0,04	0,20	0	1
Mother: enrolled in formal education	27,197	0,04	0,20	0	1	10,247	0,02	0,13	0	1
Mother: receives permanent social transfer payments	27,197	0,01	0,11	0	1	10,247	0,01	0,11	0	1
Mother: not active in labour market	27,197	0,10	0,30	0	1	10,247	0,64	0,48	0	1
Community characteristics										
Average income	27,491	314	34	238	388	10,428	294	28	238	388
Percentage of residents with max. lower secondary education	27,491	17,39	3,76	11,20	23,20	10,428	17,91	3,88	11,20	23,20
Percentage of residents with upper secondary education	27,491	24,75	5,03	17,00	29,60	10,428	24,28	4,61	17,00	29,60
Percentage of residents with short tertiary education	27,491	4,18	0,50	3,50	5,30	10,428	4,00	0,40	3,50	5,30
Percentage of residents with medium tertiary education	27,491	11,40	2,24	7,00	14,40	10,428	10,77	2,14	7,00	14,40
Percentage of residents with bachelor-level tertiary education	27,491	3,25	1,36	1,20	5,30	10,428	3,33	1,32	1,20	5,30
Percentage of residents with long tertiary education	27,491	9,29	3,92	3,60	17,10	10,428	7,97	2,69	3,60	17,10
Percentage of immigrants from non-Western countries	27,491	12,41	5,55	3,70	24,50	10,428	16,11	5,06	3,70	24,50

Table A1, continued

	Danes					Immigrants				
Variable	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**
School controls (for local public school; available only for PISA schools)										
Teacher-student ratio	23,360	0,08	0,02	0,01	0,13	7,699	0,09	0,02	0,01	0,13
School enrolment	27,491	521	161	174	809	10,428	474	155	174	809
In your school, how much is the learning of 15-year-old students hindered by … (1-4; not at all - a lot)										
Physical infrastructure										
- poor condition of buildings?	22,929	2,33	0,85	1	4	7,678	2,16	0,89	1	4
- poor heating, cooling/lighting?	22,929	1,97	0,84	1	4	7,678	1,93	0,82	1	4
- lack of educational space?	22,929	2,41	1,06	1	4	7,678	2,10	1,03	1	4
Educational resources										
- lack of instructional material?	22,929	2,40	0,99	1	4	7,678	2,29	1,00	1	4
- not enough computers for instruction?	22,929	2,44	0,94	1	4	7,678	2,23	1,00	1	4
- lack of instructional material in the library?	22,929	2,12	0,83	1	4	7,678	2,06	0,99	1	4
- lack of multi-media resources for instruction?	22,929	2,11	0,89	1	4	7,678	2,06	0,92	1	4
- inadequate science laboratory equipment?	22,929	2,19	1,02	1	4	7,678	2,32	1,03	1	4
How often do you have access to a computer at your school? (1-5; almost every day - never)										
PC access at school	23,356	2,12	0,92	1	5	8,531	2,13	0,88	1	5
Teacher education										
Percentage of full-time Danish teachers with a major in Danish	22,288	0,80	0,18	0,37	1,00	7,453	0,80	0,19	0,37	1,00
Percentage of full-time math teachers with a major in math	22,025	0,66	0,25	0,03	1,00	6,703	0,61	0,25	0,03	1,00
Percentage of full-time science teachers with a major in science	22,929	0,90	0,18	0,33	1,00	7,678	0,88	0,21	0,33	1,00
Local public school characteristics										
% immigrant students	28317	26,74	22,73	2,55	86,94	10,419	53,08	25,11	2,55	86,94
% low-SES students	28317	17,80	9,89	2,41	40,39	10,419	28,20	9,27	2,41	40,39
Mean grades in national school leaving exam	26646	7,88	0,35	7,03	8,49	9,252	7,58	0,34	7,03	8,49

Table A1, continued

	Danes					Immigrants				
Variable	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**
PISA-student characteristics (only available for 9th graders)										
Number of books in the home [a]	1,145	238	214	0	600	436	74	134	0	600
Highest parental occupation	1,137	55	17	16	90		39	17	16	88
Other language than Danish spoken at home	1,152	0,03	0,16	0	1	405	0,81	0,39	0	1
Cultural communication: "In general, how often do your parents: (1-5; never or hardly ever - several times a week)"										
Discuss political or social issues with you?	1,158	3,13	1,39	1	5	431	2,77	1,39	1	5
Discuss books, films or television programmes with you?	1,167	3,62	1,26	1	5	431	3,07	1,41	1	5
Listen to classical music with you?	1,148	1,52	1,02	1	5	422	1,84	1,32	1	5
Social communication "In general, how often do your parents: (1-5; never or hardly ever - several times a week)"										
Discuss how well you are doing at school?	1,164	4,23	0,99	1	5	432	4,17	1,11	1	5
Eat <the main meal> with you around a table?	1,158	4,77	0,73	1	5	439	4,64	0,90	1	5
Spend time just talking to you?	1,162	4,62	0,82	1	5	438	4,41	0,99	1	5
Home educational resources: "In your home, do you have:"										
A dictionary (1=yes)	1,174	0,98	0,15	0	1	448	0,95	0,22	0	1
A quiet place to study (1=yes)	1,164	0,83	0,38	0	1	448	0,82	0,39	0	1
A desk for study (1=yes)	1,168	0,93	0,26	0	1	445	0,90	0,31	0	1
Text books (1=yes)	1,143	0,56	0,50	0	1	444	0,38	0,49	0	1
Cultural possessions: "In your home, do you have: (1=yes)"						429				
Classical literature	1,159	0,56	0,50	0	1	431	0,24	0,43	0	1
Books of poetry	1,145	0,54	0,50	0	1	434	0,31	0,46	0	1
Works of art	1,162	0,75	0,43	0	1	438	0,45	0,50	0	1
How many calculators do you have in your home? (1-4; none - three or more)	1,159	3,64	0,65	1	4	444	3,67	0,65	1	4

[a] The categorical variable for number of books has been recoded into a continuous variable, taking the values: "no books"=0, "1-10 books"=5, "11-50 books"=30, "51-100 books"=75, "101-250 books"=125, "251-500 books"=375, "More than 500 books"=600.

Table AA1: School choice by language spoken at home and immigrant generation

	Speak Danish at home			Speak another language at home			
	All immigrants	1st generation	2nd generation	All immigrants	1st generation	2nd generation	*Danes*
Assigned school	15%	16%	15%	58%	56%	58%	*44%*
Other public school	8%	9%	8%	29%	31%	29%	*27%*
Danish private school	37%	47%	34%	6%	7%	6%	*29%*
Immigrant private school	40%	28%	43%	7%	7%	7%	*0%*
All	100%	100%	100%	100%	100%	100%	*100%*

Table AA2: Selected descriptives on mono- and bilingual immigrant students

	Monolingual	Bilingual	P-val. Diff
Highest parental education	12,2	11,5	0,0
No. siblings	1,8	1,9	0,0
Father's income	139,6	143,6	0,16
Mother's income	119,4	122,4	0,07
Father not active in labour market	0,33	0,32	0,73
Mother not active in labour market	0,61	0,65	0,004
Number of individuals	1,951	8,477	
Percentage of immigrants	19%	81%	

Figure 1: Percentage of students opting out by immigrant concentration in local school

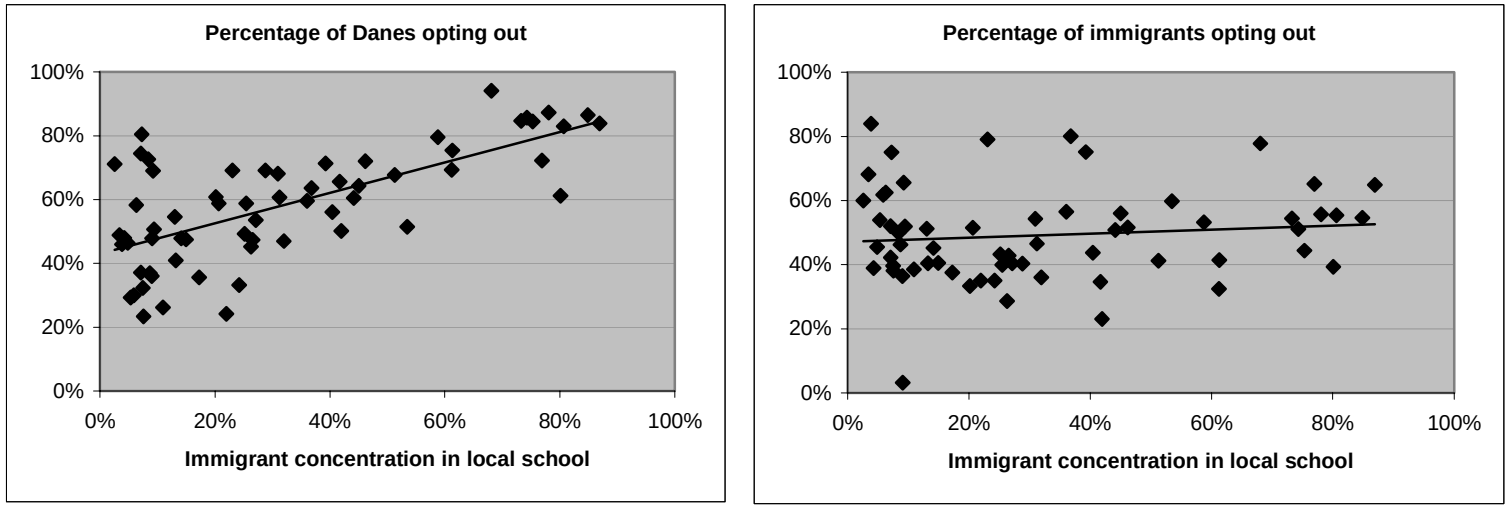

Figure 2: Percentage of students in local school by immigrant concentration in the catchment area

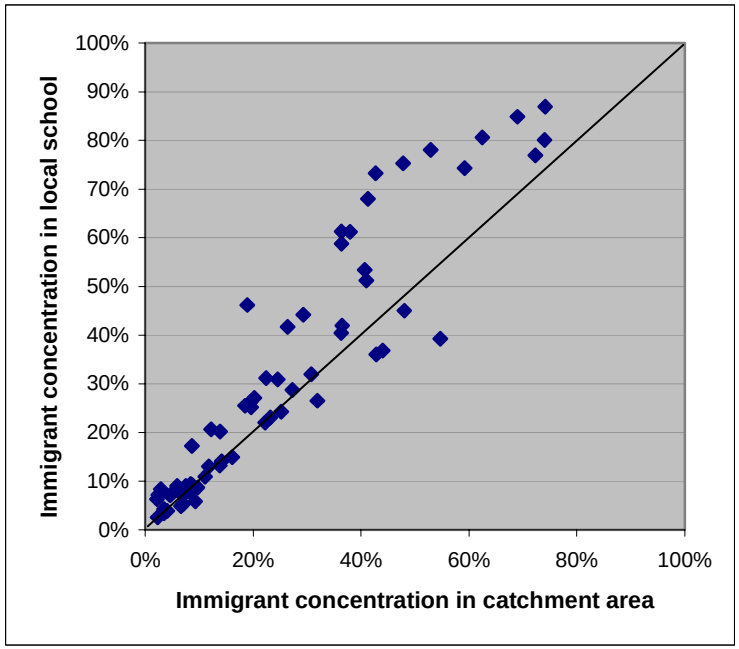

Figure 3: Nonlinear regression results

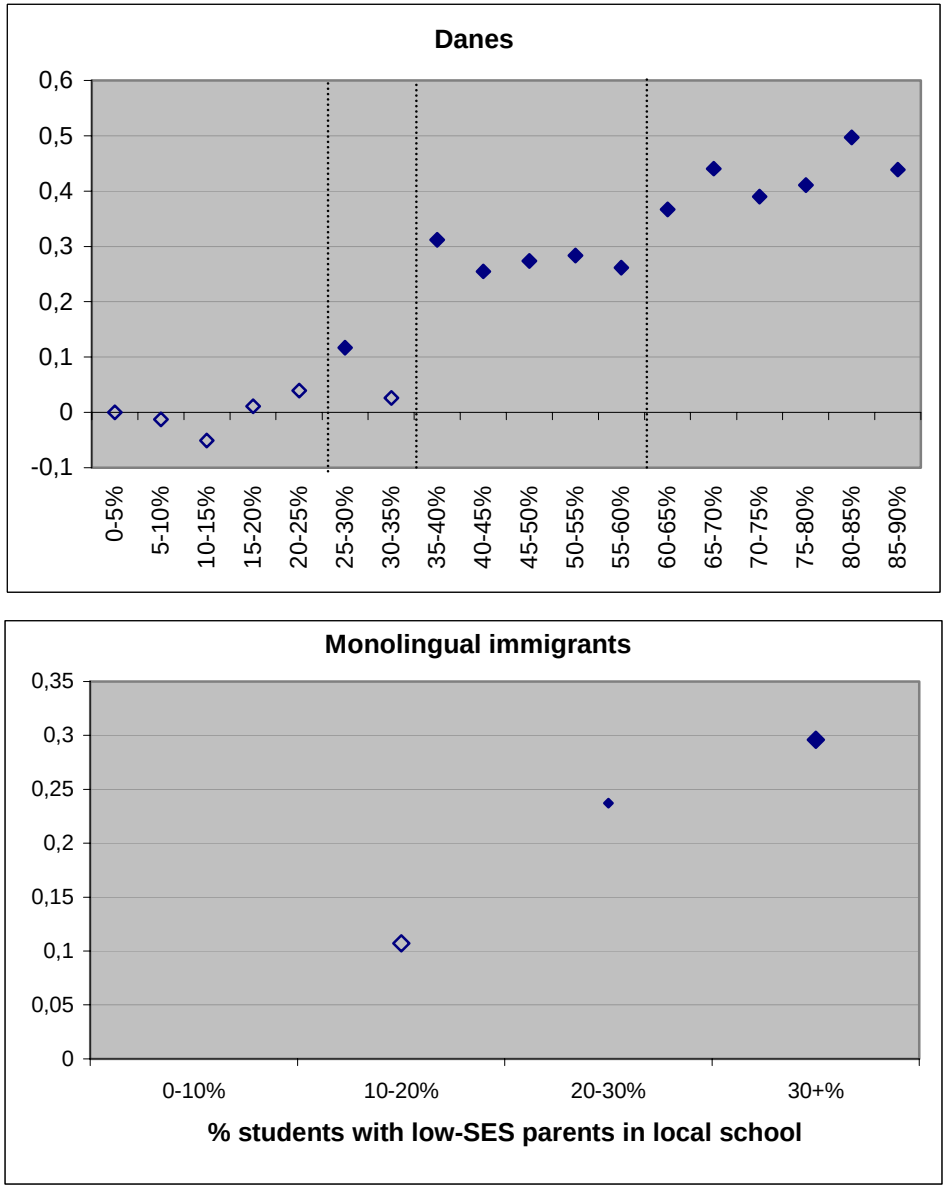

Figure AA1: Percentage of immigrants speaking another language than Danish at home