The effects of immigrant student concentration on educational outcomes of native and immigrant students

Carla Haelermans (TIER, Top Institute for Evidence Based Education Research, Maastricht University) & Marieke Heers (FORS, Swiss Expertise Centre for the Social Sciences, University of Lausanne)

Abstract:
This study evaluates the impact of immigrant student concentration in Dutch primary and secondary schools on educational outcomes of immigrant and native students in secondary education. We use Dutch administrative data that follow students as they are placed into secondary school tracks and records whether students drop out from secondary school. Endogeneity is tackled by using neighborhood immigrant concentration and distance from home to school as instruments for immigrant student concentration in schools. Primary school immigrant concentration is an additional instrument for secondary school immigrant concentration. Novelties are that we follow students longitudinally and differentiate effects for native and immigrant students.

We find that students with a higher immigrant concentration in primary school more often attend lower tracks and have higher dropout probabilities in secondary school. Higher immigrant concentration in secondary school also increases the likelihood of dropping out. Previous studies seem to have underestimated this effect.

JEL-codes: I21; I24; J15;
Key words:
Ethnic diversity, school immigrant concentration, educational outcomes, drop out, primary and secondary education, school composition
Introduction

The issue of how to deal with immigrants and how to successfully integrate them has become a very hot topic again lately, with the large flows of refugees coming to Europe from war-areas. In the US it has always an issue to discuss how to deal with immigration, but with the conventions coming up to elect the candidates for presidency in 2016, it seems to be more on the agenda than ever. All across the world, societies are challenged by the influx of foreign cultures and belief systems through assimilating migrants in their economic and cultural system. And everyone has an opinion on immigration: whether people believe borders should be closed or whether immigrants and refugees should be welcomed with open arms, everyone seems to know best whether it is good or bad to have increased immigration. However, the main problem here is that in general it is not entirely clear (or not clear at all) what the effect of immigration on various spheres of life is. This also holds particularly for educational systems.

How to ideally integrate immigrant students in schools and classes is a highly complex issue that challenges educationalists, policymakers and researchers internationally. The ideal share of immigrant students in classrooms has not yet been identified and it is unclear if a clear answer can be given to this question. Many considerations are brought up in discussions on the topic. On the one hand, a high share of immigrant students may lead to hampered class room learning and reduced teacher attention, while on the other hand the concomitant cultural diversity can benefit students (Schneeweiss, 2015). The grouping of students with different immigrant backgrounds is another important issue to consider. It can be argued that teachers are better able to recognize the needs of immigrant students if the share is relatively high; however, the immigrant students who find themselves in a class with many other immigrant children have less opportunities to interact with native students, which in turn would be beneficial for the language skills and social inclusion (Schneeweiss, 2015) and, as a consequence, also for their educational development. Shedding more light on these issues is critical. This is because in many countries, student populations are becoming more heterogeneous and teacher trainings need to be adjusted to the changing and growing demands towards them.

Knowing more about the relationship between immigrant share and the educational performance of immigrant and native students is not only important with respect to students’ educational, social-emotional and behavioral development but also from a societal point of view. For a society it is important to know how to design educational policies in a way that allows both immigrant and native students to perform at the highest possible level so that economic prosperity can be ensured in the long run. Furthermore, considering the specific educational outcome student dropout – as it will be analyzed in this paper – it is clear that its costs are high. At the same time, higher immigrant concentrations are often associated with dropout, it is important to shed light on whether there is not only a correlation but a causal effect as well.
So far, research on immigrants changing the student composition in schools has focused more on how immigrants affect labor markets than educational systems (Brunello & Rocco, 2013; Gould et al., 2009). Apart from that most studies focused on the effects for either immigrants or natives, instead of on both.

Studying the effect of student composition on educational outcomes is very complex as not only the educational context, that children and adolescents experience in schools and in classrooms affect the rate at which children learn (Willms, 2010), but also neighborhood and family characteristics, such as the language spoken at home. What makes it even more complex is that the experiences from early education are likely to have an effect on educational outcomes throughout students’ educational careers. Therefore, when considering the effect of share of immigrants at an educational level, not only the current or most recent experience is likely to play a role but also previous experiences; hence empirical analyses have to account for the full picture.

Therefore, this study analyses the effect of shares of immigrants in primary and secondary education, taking a longitudinal perspective and assessing its impact throughout their educational careers. An important component of this study is that it is able to follow students over time, from primary to secondary education and that it is able to assess the impact of immigrant share on the educational outcomes of immigrant as well as native students. In order to do so, we use rich administrative municipality data from a Dutch new town. The data provide information on primary and secondary education and make it possible to follow students longitudinally from 2002 to 2010. The data include the full population of a Dutch municipality of 195,000 inhabitants, although we only include students that we observe in 6th grade (end of primary school) that continue into secondary school, which is a total of 815 unique students that we can follow over time.

We analyze the effect of immigrant concentration on educational outcomes in four steps, and follow students throughout their educational careers with distinct analyses for primary, lower secondary and upper secondary education.

First we consider primary education. In a first analysis we estimate the effect of ethnic composition in primary education on the track attendance in secondary education. In order to do so, we use ethnic composition of the neighborhood as an instrument for school ethnic composition. Next, we consider secondary education, where we follow the same students. In a second analysis we link the ethnic composition experienced in secondary education to dropout from secondary school, using distance to the secondary school as an instrument. Then, we consider secondary school ethnic composition, but explicitly control for primary school immigrant concentration, and estimate its effect on dropout probabilities. Here we also use distance to the secondary school as an instrument. Lastly, we analyze the effect of primary school immigrant composition on dropout, by using neighborhood immigrant concentration during primary school as an instrument, as well as distance to secondary school. In all analyses, we include a wide range of background characteristics, relating to the students,
school, family and neighborhood level. For all four steps, separate analyses are carried out for immigrant and native students, thereby allowing us to study differential effects as well.

With the above-described approach, we make several contributions to the existing literature. The main novelty of this study is that it makes two major contributions. First, the data allow to follow students over time, making it possible to not only include the immigrant composition of a students’ current school, but also of previous schools. Most, if not all, studies in the literature focus on either primary or secondary education, but not both, and not with panel data in which students can be followed. This also allows us to show what happens to the effect of secondary school immigrant composition once you can include the primary school information as well, thereby incorporating a possible longer lasting effect. Second, this study allows for differential effects among immigrant and native students separately, whereas previous study mainly focused on either one of them. Knowing about the effects on different groups of students is critical for policy makers in order to implement targeted educational policies.

Apart from the major contributions, this study considers immigrant concentration in relation to educational tracking. Both these topics have not yet jointly been considered, so that there is a gap in the literature with respect to the sorting of students into different educational tracks depending on immigrant concentration in previous education. Finally, most of the literature on ethnic composition in schools and neighborhoods stems from the US, while European evidence on the topic is only starting to emerge. Therefore, this study will contribute to learning more about the effect of ethnic school composition in a European context, with an immigration history and context that differs in several regards from the US one, but is similar at the same time, with respect to its large shares of immigrant students. Methodological challenges in this area of research arise from the fact that immigrants and natives select into schools, classes and neighborhoods. We tackle this by using an instrumental variable approach.

In the remainder of this paper we provide an overview of the existing literature, describe the research context and the Dutch educational system, describe the data and the identification strategy, and presents the results; finally we conclude and discuss the findings.

**Literature overview**

The literature argues that experiencing diversity in schools is important for students’ educational and social-emotional development in the short and in the long run (Gary & Chungmei, 2005). However, for several reasons immigrant students are often concentrated at the bottom of the academic achievement distribution; these include difficulties with the language of instruction, lower parental education and problems related to integration (Brunello & Rocco, 2013). Moreover, often cheaper housing options force immigrants in less affluent neighborhoods (Brunello & Rocco, 2013). Schools in these neighborhoods are not only attended by immigrant students with limited language proficiency
but also by natives who have a relatively poor parental background characteristics (Jargowsky, 2009). A consequence of such sorting is a negative correlation between academic achievement of natives and the share of immigrants in a school (Brunello & Rocco, 2013). Overall, the results from empirical studies on the relationship between immigrant concentration and educational outcomes are mixed.

Most of the literature on ethnic segregation and diversity in education is based on US-samples and focuses on Black, and more recently, on Hispanic immigrant students (Schneeweiss, 2015). Since the middle of the 1950s, several initiatives were taken to decrease black-white educational segregation and to increase Black students’ educational opportunities in the US (Schneeweiss, 2015). The success of such initiatives has been evaluated for several places and at several times and revealed mixed findings: Reducing segregation in school districts in the 1970s and 1980s has led to decreased high school drop-out rates of 2-3 percentage points (Guyran, 2004). For the Boston school desegregation program¹ some negative effects for other minority students were found while no negative effects were found for white students (Angrist & Lang, 2004).

Another stream of the literature considers ethnic composition in schools and how it affects educational outcomes. In order to be able to estimate the causal impact of school composition on learning outcomes, analyses need to account for the fact that the selection of families into neighborhoods and schools is endogenous (Schneeweiss, 2015). Two of the first studies in this area (Betts, 1998 and Hoxby, 1998) find a negative impact of immigration on the school performance of natives. Betts¹ (1998) findings suggest that immigration reduces the probability of completing high school for American-native minorities (Blacks and Hispanics). It seems that this is because a higher share of students with limited knowledge in the language of instruction absorbs teaching resources at the expense of low-performing native students (Brunello & Rocco, 2013). Betts (1998) does not find a negative effect for non-minority groups. Hoxby (2000) considers a sample from Texas and uses population variation, namely, variation in composition between cohorts in the same school and thereby considers time trends. The findings suggest that the share of black students in a class negatively affects test scores, particularly those of other black students for whom it is four times stronger compared to white students. She concludes that peer effects are stronger within than across races. Hanushek, Kain and Rivkin (2009) also use data from Texas and find results similar to Hoxby’s (2000): White students are hardly affected by the presence of Black students while other Black students are negatively affected. Card and Rothstein (2007) use data that is aggregated at the city-level in order to eliminate sorting within cities and differences by race to eliminate unobservables at the city level that are experienced by all students. They estimate the effect of segregation in schools and neighborhoods on the black-white achievement gap. Overall, their findings suggest that more segregation at the school level as well as at the neighborhood level relate to an increased gap between Black and White

¹ Called Metco.
achievements. The results also suggest that neighborhood segregation is more important than school segregation and that the effects are mainly driven by income of neighbors.

Research for non-US contexts is only starting to emerge. In the Netherlands, students in ethnically diverse schools have been found to have a higher chance of dropping out than those in less diverse schools (Dronkers & Van der Velden, 2013). Gould, Lavy and Paserman (2009) and Ballatore, Fort and Ichino (2013) use elementary school samples from Israel and Italy respectively, their results suggest that immigrant concentration has a negative effect on academic achievement of natives. Gould and colleagues (2009) investigate the impact of immigrant concentration in primary education on long-term academic outcomes of native students in high schools and find that the overall presence of immigrants in fifth grade had an adverse effect on the chances of passing the final high school exam. In particular, they study the mass migration of Jews from the former Soviet Union to Israel in the early 1990s. As an identification strategy they assume that conditional on the total number of immigrant students admitted in a school, the variation in the proportion of immigrants across grades of the same school can be considered as only due to exogenous demographic factors. For both England (Burgess et al., 2005) and Denmark (Schindler-Rangvid, 2006) a higher degree of segregation in schools is found than in neighborhoods. Moreover, for Denmark it is observed that native students are more likely to leave public schools and attend a private school the higher the share of immigrants in their school gets (Schindler-Rangvid, 2010; Gerdes, 2013). This behavior is referred to as the ‘native flight phenomenon’ (Schindler-Rangvid, 2010; Gerdes, 2013). The ‘native flight phenomenon’ has also been observed for secondary but not for primary schools in the US (Betts & Fairlie, 2003). Brunello and Rocco (2013) argue that the ‘native flight phenomenon’ has two potential reasons: first, native households may dislike schools that attract a large share of immigrants; second, a high share of immigrants signals low school quality.

Several recent studies use PISA\textsuperscript{2} data. Brunello and Rocco (2013) consider 19 countries from Europe, the Americas, Oceania, Asia and the Middle East. As the authors consider several countries they are able to address sorting of immigrants within countries by aggregating key information on test scores and immigrant shares at the country level. Moreover, they control for between country migration flows by conditioning on country fixed effects, country specific trends, per captia GDP, education expenditure and the stock immigrants in a country at a time. They find small negative spillover effects from immigrants to natives. More precisely their findings suggest that doubling the share of immigrants which ranges from 4.2 to 8.4 percent would reduce natives’ average performance by 1-3.4 percent, depending on the group of natives. The effect is strongest for native females. Another study that also uses PISA data (from the 2012 wave) finds that across the participating countries the concentration of immigrant students in a school is not associated with poor performance (OECD, 2014). These different results, that are based on the same data source show that analyzing the

---

\textsuperscript{2} Programme for International Student Assessment.
relationship between immigrant status and learning outcomes is complex and depends on the type of analysis and the variables that are included. Given the nature of the data the authors of these studies are not able to use panel and to follow students over time. Moreover, they observe the outcome only at one point in time, when most students are 15 years old. Often, only sample, cannot account for all students in a class.

Several studies do not find any or no negative effect of the presence of immigrants on natives. Geay, McNally and Telhaj (2013) focus on English schools and do not find spillover effects of immigrants on natives. Similarly, Neymontin (2009) does not find clear evidence that immigration reduces natives’ test scores or their propensity to apply for top schools in Texas and California. A positive picture is drawn by Hunt (2012). She has used data from 1940 to 2010 and found that immigration has led to increased educational attainment in the general population and amongst black in particular, which was caused by growing pressure on the market of low skilled jobs.

From the existing literature it is apparent that the effect of immigrant concentration is more widely studied on educational outcomes of natives than that of immigrants (Gould et al., 2009; Brunello & Rocco, 2013; Geay et al., 2013; Ballatore et al., 2013) and only few studies were able to focus on both the effects of immigrant on native as well immigrant students (Ohinata & Van Ours, 2013; Jensen & Rasmussen, 2011; Schneeweiss, 2015). The explanation seems to be the availability of accurate data on the educational outcomes of immigrant students. Ohinta and Van Ours (2013) use Dutch primary school data from PIRLS\(^3\) and TIMSS\(^4\) and exploit variation across classes. They find a negative effect on reading test scores of immigrants. Natives are not affected. Jensen and Rasmussen (2011) use secondary school data from the Danish PISA. They use country wide immigrant concentration as an instrument for school level immigrant concentration and find negative effects of a higher immigrant concentration for both native and immigrant students. In the most recently available study, Schneeweiss (2015) measures the effect of immigrant concentration in primary education on educational outcomes of native and migrant students in Austria. She finds that migrant students have worse school-grades when there is a higher share of migrant students, native students are on average not affected. She further finds that spill-over effects are particularly strong across students with the same ethnic origin. Van Ewijk and Sleegers (2010a) carry out a meta-analysis on the effects of ethnic minority share in school on achievement test scores of native and minority students. Compositional effects appear small in general. A high share of students from an ethnic minority group seems to affect the achievement of students belonging to the same ethnic group more than the achievement of students belonging to the ethnic majority or to other ethnic minority groups. Effects of the share of immigrants on test scores of ethnic majority students seem close to zero. Van Ewijk and Sleegers (2010a, 2010b) conclude in their meta-analyses that both socioeconomic and ethnic peer effects matter in explaining

\(^3\) Progress in International Reading Literacy Study.

\(^4\) Trends in International Reading and Literacy Study.
educational achievement. The ethnic compositional effect differs depending on one’s ethnic or migrant background. Therefore, the below analyses will take into account peer effects.

Peer effects have already been inexplicitly mentioned above. Immigrant students – just as native students – have a peer effect on their native class and school mates, as well as on other immigrant students. Brunello and Rocco (2013) characterize immigrants as peers with a different culture, a different way to interact with others and often with limited language proficiency. Still, these characteristics differ strongly across students. The academic literature on peer effects is large. For example, Lavy et al. (2009) reveal that peer effects are strongest when peers are students that are at the top or at the bottom of the ability distribution. Hence, with respect to immigrant peers Brunello and Rocco (2013) argue that the effect of immigrants on native students should be stronger than the effect generated by native peers.

Finally, some studies have considered the diversity of different countries of origin and how these relate to educational outcomes. For instance, Veerman et al. (2013) focus on primary education in the Netherlands and distinguish the proportion of migrant children and the diversity of different ethnic groups within classes. The level of diversity given a particular share of migrant children is negatively related to reading comprehension in Grade 6, the final year of primary education in the Netherlands.

The research context

The setting

The empirical application considers one municipality in the eastern region of Amsterdam, the Netherlands. With a population of 195,000 inhabitants the municipality is the seventh largest Dutch municipality. The municipality makes an interesting case study as it has, due to historical reasons, a high share of immigrants.

The municipality is a so-called new town, which are towns constructed to stop the suburbanization in the Netherlands after the Second World War. New towns are located at a short distance of large cities. The existence of these towns should stop housing and resources shortages and provide commuting possibilities to its residents (Hall & Tewder-Johnes, 2010). New towns are heavily subsidized by the government and the low and medium priced houses attracted the people that were targeted, namely the people with a vulnerable position in the housing market due to income, social or cultural skills (MinVROM, 2000). It are mainly low and middle income families that live in these new towns.

The municipality is a special new town as it is constructed in the artificial polders around the city of Amsterdam. Previous research has shown that new towns, similar to this one, have a population that does not constitute the average town population in the Netherlands. There is a larger share of immigrants, single parents, and lower educated parents (De Witte, Van Klaveren, & Smets, 2011;
Ledoux, 2011). This has consequences for the educational performance in these cities. Educational attainments are lower and dropout rates are higher than the Dutch average (Education Inspectorate, 2010). Although the population does not constitute the average population in the country, within ‘new towns’ the population is homogeneous with only minor differences in population characteristics, which makes it attractive for our analysis.

The Dutch educational system
Tracking students in secondary education
The Dutch educational system differs in some critical characteristics from the American one. The first particularity is the tracking system of students in secondary education. In this respect, the Netherlands resemble other European countries such as Germany and Switzerland. In the Netherlands, pupils attend primary education between ages 4 and 12 and secondary education until a higher secondary degree is obtained. Within the Dutch educational system, one can distinguish five different levels of education: practical training education (pro), prevocational secondary education (vmbo), vocational education (mbo), general upper secondary education (havo) and pre-university education (vwo). Pupils enter a level of education in the first year of secondary education based on a standardized national test and a recommendation given in elementary school (i.e., ability tracking). Depending on the level of education, secondary education takes 4 (pro; vmbo), 5 (havo) or 6 (vwo) years to complete. A combination of vmbo (4 years) and mbo (at least 2 years) also counts as a starting qualification with which you are considered to be educated at a minimum level. Mbo has 4 levels, level 1 being the highest, and for this starting qualification you need at least level 2. As placement in tracks is merely based on a standardized test in primary school and the advice of the primary school teacher in the last primary school grade, there is not much mobility between education tracks. Within tracks, students have to specialize in courses as well. In upper secondary school, they have to choose between a culture and a nature track in havo and vwo, and between a health, economics, agriculture and technical track in vmbo/mbo.

A second difference between the Dutch system and the American system is track repetition. Because of the tracking system, students have to be able to meet the level of the track for all courses they follow. If they perform badly at a couple of classes, they are not allowed to continue to the next year, leading to grade repetition or worse. As said before, there is not much mobility between tracks. However, grade repetition (often combined with stepping back one track) is very common. Almost half of the students repeats a grade in primary or secondary school (Van Vuuren & Van der Wiel, 2015), of which almost two thirds come from secondary education. Grade repetition often leads to unlawful absence, which in turn often leads to school dropout.

The third difference, and important characteristic of the Dutch educational system is the concept of “free school choice”. This element of the Dutch education system is comparable to US charter schools that can be attended by choice; this means that students do not have to live in a
particular catchment area in order to be eligible to attend a school in that area (Imberman, 2011). Thus, students receive secondary school level advice from their elementary school, but usually the same educational track is offered by several schools so together with their parents students can freely choose a particular secondary school.

School dropout in the Netherlands
In line with the European definition, a youngster below the age of 23 is considered as a school dropout if he or she is no longer in education and did not obtain a higher secondary degree (i.e., completes vwo or havo or at least finishes mbo-level2). In the Netherlands, 38,568 students dropped out of school during the school year 2010/2011. The municipality under study has one of the highest percentages of early school leavers (i.e., 4.1% of newly registered early school leavers in 2010/2011 in comparison with the national average of 2.9%). The high numbers of early school leaving made European policy makers decide to make school dropout as one of the main priorities in the Horizon2020 targets. In the Netherlands, various policy interventions aim to reduce early school leaving (for a discussion of the interventions, see Cabus & De Witte, 2011; De Witte & Cabus, 2012).

Immigrant concentration in Dutch education
The Netherlands, and this municipality in particular, is an interesting case in point to study the relationship between immigrant concentration and educational outcomes. According to Statistics Netherlands, the definition of an immigrant is that someone has at least one parent that is born abroad. Someone that is born abroad is a first generation immigrant, someone with at least one parent being born abroad is a second generation immigrant.

In the Netherlands, more than half of the immigrants are non-Western immigrants, and most of them are from Turkey, Morocco, Surinam and the Antilles. As discussed above, there is a relatively large share of immigrants in this municipality, as they are often middle and lower class people, who were the ones with a higher likelihood of moving into this ‘new town’. Often, even if the student officially has the Dutch nationality, at least one of the parents has another nationality, leading to an interesting and diverse mix of ethnicities and nationalities in this municipality. This makes it an excellent case to study from an international context as well, as there is much more variation in immigrant concentration in schools than in the rest of the Netherlands, making it much more comparable to the United States and other countries with a large share of immigrants.

Data
For this study, we start with a panel dataset with 65,015 unique students from this new town, in the years 2002-2010. Most of the student background variables we only have from 2004 onward. Furthermore, dropout information is only available from 2005 on, and therefore, for the dropout
analyses the dataset is limited to 2005-2010 here. As we are interested in the transition from primary to secondary education, and then what happens to these same students in secondary school, we only keep students in the data of whom we have the data from at least 6th and 7th grade (in other words, that make the transition from primary to secondary school). Therefore, we end up with 815 students that are in 6th grade between 2004 and 2009, and we follow these students throughout secondary school and, if applicable, vocational education in the years after. For the first part of the analysis (transition from primary to secondary school track), we only work with these 815 student, for the second part of the analyses (dropout analysis) we consider each student each year again. In total, we have an unbalanced panel dataset of 1751 students that appear in multiple years for the dropout analysis.

Apart from the below described variables, we know the ethnicity of each student, the residential area where the student lives and the school and exact school location of the student. Note that we actually consider school location in all of our analyses, as this is more detailed than the school (note that almost half of all administrative school unit usually has multiple buildings and therefore multiple locations).

**Descriptive statistics**

Table 1 shows the average gender, age, parental immigrant status, share of immigrants in the neighborhood and share of immigrants in primary school for all students in the last year of primary school. Note that there are around 100 students each year in the last year of primary education and aggregated over all years, we observe 815 students that transition from primary school to secondary school in our dataset. They are about 13 years old at the start of secondary school, 47 percent is female and almost half of them have at least one parent that is not Dutch. The latter again shows the large diversity in ethnicity and immigrant status in this municipality. The average share of immigrants in the neighborhood is 45 percent, whereas the average share in primary school is 41 percent.

Table 2 shows the share of students attending the different secondary school tracks. We see that most students attend a prevocational track.
Table 1 – Descriptive statistics of students in last year of primary education

<table>
<thead>
<tr>
<th>Obs</th>
<th>Mean</th>
<th>St.Dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>815</td>
<td>12.44</td>
<td>0.68</td>
<td>10</td>
</tr>
<tr>
<td>Female</td>
<td>815</td>
<td>0.47</td>
<td>0.50</td>
<td>0</td>
</tr>
<tr>
<td>One parent non-Dutch</td>
<td>815</td>
<td>0.50</td>
<td>0.50</td>
<td>0</td>
</tr>
<tr>
<td>Share of immigrants in neighborhood</td>
<td>815</td>
<td>0.45</td>
<td>0.11</td>
<td>0.05</td>
</tr>
<tr>
<td>Share of immigrants in primary school</td>
<td>815</td>
<td>0.41</td>
<td>0.08</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Table 2 – Student placement in different tracks in first year of secondary school (in %, n=812)

<table>
<thead>
<tr>
<th>Track</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical education</td>
<td>2.83</td>
</tr>
<tr>
<td>Prevocational education additional support</td>
<td>16.01</td>
</tr>
<tr>
<td>Prevocational education level 1</td>
<td>42.36</td>
</tr>
<tr>
<td>Prevocational education level 2</td>
<td>17.73</td>
</tr>
<tr>
<td>General secondary education</td>
<td>2.22</td>
</tr>
<tr>
<td>General higher or pre academic secondary education</td>
<td>18.84</td>
</tr>
</tbody>
</table>

Table 3 shows the average gender, age, parental immigrant status, distance to school, share of immigrants in secondary school and dropout rates for all students in secondary school that are included in the analysis. The students are about 14 years old on average, 49 percent of them is female and half of them have at least one parent that is not Dutch. The share of immigrants in secondary school is 42 percent, which is very comparable to the 41 percent we saw in Table 1. The average distance to school is a little over 4 kilometers, but note that the standard deviation is pretty high. Lastly, about 7 percent of students drop out (note that this number also contains repeating dropouts, and not only newly registered dropouts. Hence the difference in size of this number compared with the section where dropout in the Netherlands is further explained).

\footnote{Note that for the analysis the share of immigrants in the school and the neighborhood are multiplied by 100 to make the interpretation of the results easier.}
Table 3 – Descriptive statistics of secondary school students

<table>
<thead>
<tr>
<th></th>
<th>Obs</th>
<th>Mean</th>
<th>St.Dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1722</td>
<td>14.49</td>
<td>1.79</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>Female</td>
<td>1751</td>
<td>0.49</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>One parent non-Dutch</td>
<td>1751</td>
<td>0.50</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Share of immigrants in secondary school</td>
<td>1751</td>
<td>0.42</td>
<td>0.07</td>
<td>0.09</td>
<td>0.74</td>
</tr>
<tr>
<td>Distance to school</td>
<td>1751</td>
<td>4.37</td>
<td>5.46</td>
<td>0.10</td>
<td>37.73</td>
</tr>
<tr>
<td>Average dropout rate</td>
<td>1751</td>
<td>0.07</td>
<td>0.25</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Identification strategy and estimation method

Given the multiple factors playing a role in the relationship between immigrant concentration and educational outcomes, estimating the effect of the former on the latter is highly complex from a methodological point of view (Cebolla Boado, 2007; Brunello & Rocco, 2013). Blume et al. (2011) further suggest that ethnic composition is an endogenous variable that requires using econometric solutions such as instrumental variables, panel data, and regression discontinuity. Such methodologies allow taking into account that different levels are at play: In Van Ewijk and Sleegers (2010b) socio-economic composition measured at the cohort/school level is associated with smaller effects than composition measured at the class level. They further underline that estimating compositional effects without controlling for prior achievement or not taking into account the potential for omitted variables bias, carries the risk of overestimating the effect.

Previous studies have used different approaches; for example, fixed effects estimations (Brunello & Rocco, 2013), instrumental variables (Card & Rothstein, 2007; Cebolla Boado, 2007; Jensen & Rasmussen, 2011) and multilevel analyses (Hanselman & Fiel, 2015; Veerman et al., 2013).

The present study will use an approach similar to Dustman and Preston (2001) and Jensen and Rasmussen (2011), namely an instrumental variable approach. In their studies they have used an instrumental variable approach, in which they used concentration of immigrants in the area as an instrument.

Instrumental Variable Approach

In order to correct for the direct selection of native and/or immigrant students into primary and secondary analysis, we use a two-stage-least-squares (2SLS) instrumental variable approach to estimate the Local Average Treatment Effect (LATE) or, in other words, the treatment effect of the treated. For our analysis at the primary school level, we use the share of immigrants in the

---

6 Note that this number was also multiplied by 100 in the analysis.
neighborhood as an instrument for share of immigrants in primary school, as the former is considered to be relatively random, as pretty much all students attend the closest primary school in the same neighborhood, and it is uncommon for students in the Netherlands to sort themselves into a specific neighborhood simply because of the nearest school, and since there is free school choice parents can always decide to bring their child to another school. For our analysis at secondary school, we use the distance from the students’ home address to the secondary school (as the crow flies), as most secondary students attend a school within a small range of their house. We further elaborate on the instruments in the next section. Furthermore, we use the share of immigrants in the neighborhood while attending primary school as a second instrument to account for earlier immigrant share experience of the student. Our first instrument, the share of students in the neighborhood is highly correlated to the share of students in primary school correlated ($r=0.15$, $p=0.00$), and internally consistent, and the share of Dutch students in the neighborhood is small and not significantly correlated with the track students end up in ($r=-0.03$, $p=-0.28$) and with the error term. The second instrument, distance to school, is significantly correlated ($r=-0.08$, $p=0.00$), and internally consistent, and small and/or not significantly correlated with the outcome measure, student dropout ($r=0.01$, $p=0.57$). The last instrument is the share of immigrants in the neighborhood while attending primary school, and this is significantly correlated with secondary school immigrant concentration ($r=0.12$, $p=0.00$) and not significantly related to dropout ($r=0.02$, $p=0.06$) The first stage is then estimated as follows:

$$D_i = \beta_0 + \beta_1 d_i + \beta_2 X_i + \varepsilon_i,$$

(1)

where $D_i$ is the share of students in primary school or secondary school, and $d$ is the share of students in the primary school neighborhood or the distance to secondary school, respectively. Note that the first stage results can be found in the appendix. These results also indicate that we are using good instruments. In the second stage, we use the predicted share of immigrants in primary school in the regression as follows:

$$y_i = \gamma_0 + \gamma_1 \hat{D}_i + \gamma_2 X_i + \varepsilon_i,$$

(2)

Here $y$ is the outcome indicator, track placement or drop out (note that drop out is a negative outcome measure, the lower the number the better), $D$ is the predicted share of immigrants and $X$ consists of a rich set of control variables and fixed effects, as discussed above.
The Instruments

As argued above, for the research question of this paper, OLS would lead to biased results as it does not take into account the selection problem: a school may have a high share of immigrants because parents may have decided to send their immigrant child to a school with a high share of immigrants. We deal with this problem by making use of three instruments for immigrant concentration: (1) neighborhood composition as an instrument for primary school composition; (2) share of immigrants in the neighborhood at the time of primary schooling for secondary school composition; (3) distance to the school as an instrument for secondary school composition. Using IV will allow us to identify a causal effect.

(1) The first instrument we use is neighborhood composition as an instrument for primary school composition. Using immigrant concentration in a larger geographical area has also been done by other researchers (Jensen & Rasmussen, 2011). The underlying rationale is that this instrument does not directly affect educational outcomes and only affects them via school concentration. In the Netherlands schools are financed by the national and not by the local government. Furthermore, teachers in schools usually do not live in the neighborhood of the school where they teach. This implies that school resources are not directly linked to neighborhood resources. Consequently, this instrument allows us to estimate the effect of school immigration share on educational outcomes by correcting for selection. Moreover, we have a rich dataset so that omitted variable bias can be very much excluded. Despite the above-described Dutch characteristic of the “freedom of school choice”, in the Netherlands almost all children attend a primary school in their own neighborhood. This is also shown in exact distances: On average, in the Netherlands, children in primary education travel only 1.26 Km from their home to their school (Van der Houwen, Goossen & Veling, 2004). Dutch administrative data covering the years also in our dataset also shows that the average distance to the primary school of choice in the academic year 2008-2009 is indeed around 1.3 Km (i.e. 0.8 mile; BRON, school year 2008-2009), with 75% and 90% of all primary school students attending a school that is within 1.6 Km (1.0 mile) and 2.7 Km (1.7 miles) respectively (Cornelisz, 2014).

(2) Second, we use the share of immigrant students at the time of primary schooling as an instrument for secondary school composition. Students in from the same neighborhood and thereby primary school tend to group together when choosing a secondary school. Especially in densely populated areas such as the new town under study, there are many schools to choose from, and students do not only very often choose the closest school where their desired level of education is offered, (see next instrument), but also tend to stick together with (groups of) other students from their neighborhood and primary school.

7 However, note that in the Netherlands there are no catchment areas such as in the US (Imberman, 2011).
8 Basisregister Onderwijsnummer.
Finally, the third instrument is distance to the school as an instrument for secondary school composition. As explained above, most Dutch students live close to their schools. Although for secondary education it is in many cases not the closest school, due to level of education restrictions (as not all schools offer all levels of education, but rather specialize), it is in most cases a school at a reasonable and acceptable distance. Here, it should be mentioned that more than 75 percent of secondary students in the Netherlands travels to school by bike (Statistics Netherlands, 2012), independently, making the acceptable maximum distance for most students somewhere between 15 minutes and half an hour travel time, corresponding to somewhere between 4 and 8 kilometers. Many other studies have shown that the one of the main reasons for students to choose a certain school (in the case of freedom of choice) is the distance to school (Elacqua et al., 2006; Müller et al., 2008; Chumacero et al., 2011; Burgess et al., 2014; Ruijs and Oosterbeek, 2012; Koning and Van der Wiel, 2013). Apart from that, the instrument distance to school has also been previously successfully used in the literature (see e.g. Cornelisz, 2014).

Results

General results

All models are estimated using a linear probability model, and include individual control variables, which are gender, age, ethnicity of parents, student ethnicity fixed effects, and student residential area fixed effects, with robust standard errors clustered at the year*school level and the individual student level.

The first results that are presented in this paper (analysis 1) are those of the analysis of the effect of the share of immigrant students in primary school on secondary school track. Table 4 presents the results of the second stage analysis. The analysis includes 39 clusters of schools*residential areas and 815 students that have attended the last grade of primary school (6th grade) and continued to secondary school the year after. The results from Table 4 show that there is a negative and significant effect of having a higher share of immigrant students in primary school on the track the student attends. The coefficient is -0.13. For each additional percentage point of immigrant students in primary school (with an average of 43 percent), students end up in .13 track lower. As tracks are measured in full points, 7 percentage points more immigrant students in primary school leads to attending a lower track. This effect is significant at the 5 percent level.
Next, we study the effect of share of immigrant students in secondary school on secondary school dropout (analysis 2). As argued above, in previous studies, authors usually do not include primary school immigrant concentration information. The first column of Table 5 shows the results of the effect of secondary school immigrant concentration on dropout, where immigrant concentration is instrumented by distance to school. Here 228 school*year*residential area clusters are included, and 1722 students, although these are again the same unique 778 students as before (note that some students are not included in this analysis because they are not registered in the data anymore after the transition to secondary school). Here, we find an effect of 0.010 of a one percentage point higher immigrant share in secondary school on dropout, significant at the 5% level. Given the average dropout rate of 0.057 percent and an average share of immigrant students of 40 percent in secondary school, an increase in share of immigrant students by 12 percentage points could double students’ chances of dropping out.

In the previous analysis, we have applied the type of analysis that others have used before, namely instrumenting secondary school immigrant concentration with distance to school, and estimating the effect on an education outcome such as dropout. However, as emphasized before, we have information on primary school immigrant concentration, and on neighborhood immigrant concentration for the time when students attended at primary school. Therefore, the next step in our analysis is to investigate what happens if we add that information to the analysis.
First, we add the share of immigrant students that a student experienced in primary school, as a control variable to the analysis (analysis 3). By doing so, we account for the fact that the share of immigrant students in school (whether primary or secondary), might have a longer lasting effect. We also account for the fact that maybe what so far has been attributed to the share of immigrant students in secondary school, could partly be due to the situation in primary school the student was in. In the second column of Table 5 we see these results. Apart from adding the control variable, the specification is exactly the same as in the first column of Table 5. The findings are very similar to what we presented before, there is a significant effect of -.010 on dropout. However, in the next step, we do not just include the share of immigrant students in primary school to the regression, but we use this information as an instrument for the share of immigrant students in secondary school (analysis 4). Because the share of immigrant students in primary school is not exogenous to the share of immigrant students in secondary school, we again instrument by the share of immigrants in the neighborhood when the student was in primary school, and we complement this by the distance to school, as this is still an important indicator for secondary school choice. The third column of Table 5 shows that the coefficient has increased to 0.011. The effect we find now is 10 percent higher than you would find if you do not take into account primary school immigrant concentration (see Table 5). This finding shows that an increase of the share of immigrant students of 10 percent almost doubles the chances of dropout (instead of the 12 percent we found before when not including primary school immigrant concentration information). This finding implies that most previous studies that have estimated the effect of immigrant concentration on educational outcomes such as dropout have been underestimating the effect in itself, because the longer lasting effect of immigrant share in previous schools is not taken into account.
Table 5 – The effect of secondary school immigrant concentration on dropout

<table>
<thead>
<tr>
<th>Outcome=Dropout</th>
<th>Coef</th>
<th>Std. Err</th>
<th>p-value</th>
<th>Outcome=Dropout</th>
<th>Coef</th>
<th>Std. Err</th>
<th>p-value</th>
<th>Outcome=Dropout</th>
<th>Coef</th>
<th>Std. Err</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>(partialled out)</td>
<td></td>
<td></td>
<td>Intercept</td>
<td>(partialled out)</td>
<td></td>
<td></td>
<td>Intercept</td>
<td>(partialled out)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of immigrant students in secondary school</td>
<td>0.010</td>
<td>0.005</td>
<td>0.022</td>
<td>Share of immigrant students in secondary school</td>
<td>0.010</td>
<td>0.004</td>
<td>0.023</td>
<td>Share of immigrant students in secondary school</td>
<td>0.011</td>
<td>0.005</td>
<td>0.017</td>
</tr>
<tr>
<td>Female</td>
<td>-0.023</td>
<td>0.017</td>
<td>0.190</td>
<td>Female</td>
<td>-0.021</td>
<td>0.017</td>
<td>0.221</td>
<td>Female</td>
<td>-0.023</td>
<td>0.017</td>
<td>0.190</td>
</tr>
<tr>
<td>Age</td>
<td>0.017</td>
<td>0.007</td>
<td>0.010</td>
<td>Age</td>
<td>0.019</td>
<td>0.006</td>
<td>0.001</td>
<td>Age</td>
<td>0.016</td>
<td>0.006</td>
<td>0.012</td>
</tr>
<tr>
<td>One parent non-Dutch</td>
<td>0.018</td>
<td>0.021</td>
<td>0.384</td>
<td>One parent non-Dutch</td>
<td>0.018</td>
<td>0.021</td>
<td>0.392</td>
<td>One parent non-Dutch</td>
<td>0.018</td>
<td>0.021</td>
<td>0.391</td>
</tr>
<tr>
<td>Share of Dutch students in primary school</td>
<td>-0.001</td>
<td>0.001</td>
<td>0.349</td>
<td>Student ethnicity Fixed Effects</td>
<td>YES</td>
<td></td>
<td></td>
<td>Student ethnicity Fixed Effects</td>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student residential area Fixed Effects</td>
<td>YES</td>
<td></td>
<td></td>
<td>Student residential area Fixed Effects</td>
<td>YES</td>
<td></td>
<td></td>
<td>Student residential area Fixed Effects</td>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year Fixed effects</td>
<td>YES</td>
<td></td>
<td></td>
<td>Year Fixed effects</td>
<td>YES</td>
<td></td>
<td></td>
<td>Year Fixed effects</td>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>1722</td>
<td></td>
<td></td>
<td>N</td>
<td>1722</td>
<td></td>
<td></td>
<td>N</td>
<td>1722</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nr of clusters school<em>year</em>residential area</td>
<td>228</td>
<td></td>
<td></td>
<td>Nr of clusters school<em>year</em>residential area</td>
<td>228</td>
<td></td>
<td></td>
<td>Nr of clusters school<em>year</em>residential area</td>
<td>228</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nr of clusters student level</td>
<td>778</td>
<td></td>
<td></td>
<td>Nr of clusters student level</td>
<td>778</td>
<td></td>
<td></td>
<td>Nr of clusters student level</td>
<td>778</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard errors clustered at primary school*residential area*year and the individual student level
Separate results for immigrant and native students

If we again estimate the same four models as before, but now separately for immigrant and native students, we find the results presented in Table 6. For brevity reasons, we only present the coefficients of interest here, namely the share of immigrant students in primary school (analysis 1) or secondary school (analyses 2-4)\(^9\). Table 6 shows that in all cases the coefficient is higher for immigrant students than for native students. Furthermore, we find significant effects for immigrant students but not for native students, which indicates that the previously found effect is solely driven by the effect on immigrant students. It seems that immigrant students are much more (negatively) influenced by increasingly more other immigrant students in the same school than native students. Note that the insignificant effect for native students could be due to a power problem. However, that does not change the fact that the coefficient of native students is about one third of the coefficient of immigrant students, also indicating that immigrant students are much more influenced. A larger sample would be needed to confirm that the effect is indeed insignificant for native students and that our insignificant coefficients are not due to a power problem.

<table>
<thead>
<tr>
<th>Analysis</th>
<th>N</th>
<th>Coef</th>
<th>Std. Err</th>
<th>p-value</th>
<th>N</th>
<th>Coef</th>
<th>Std. Err</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis 1</td>
<td>522</td>
<td>-0.197</td>
<td>0.106</td>
<td>0.063</td>
<td>290</td>
<td>-0.095</td>
<td>0.139</td>
<td>0.494</td>
</tr>
<tr>
<td>Analysis 2</td>
<td>1067</td>
<td>0.014</td>
<td>0.006</td>
<td>0.021</td>
<td>655</td>
<td>0.005</td>
<td>0.008</td>
<td>0.516</td>
</tr>
<tr>
<td>Analysis 3</td>
<td>1067</td>
<td>0.014</td>
<td>0.006</td>
<td>0.019</td>
<td>655</td>
<td>0.005</td>
<td>0.008</td>
<td>0.474</td>
</tr>
<tr>
<td>Analysis 4</td>
<td>1067</td>
<td>0.014</td>
<td>0.006</td>
<td>0.019</td>
<td>655</td>
<td>0.005</td>
<td>0.008</td>
<td>0.521</td>
</tr>
</tbody>
</table>

Table 6 – Separate analysis for immigrant and native students.

Conclusion and discussion

The question of how the share of immigrants affects educational outcomes throughout educational careers is ranked highly on political and scientific agendas. Therefore, in this paper we evaluate the impact of immigrant student concentration in Dutch schools on a variety of educational outcomes of immigrant and native students for both primary and secondary education. We use rich Dutch administrative municipality data of a new town with which we are able to follow students as they advance from primary to secondary school, are being placed into tracks and have a probability to drop out. Endogeneity issues are tackled by using neighborhood immigrant concentration at the student level and distance from home to school as instruments for immigrant student concentration in schools.

\(^9\) Full regression analysis are available upon request.
The novelty of this study is that we can follow students over time and we can separate out effects for native and immigrant students. The latter is important as the effects may be quite different for both groups. Following students longitudinally, is critical as many experiences at early educational stages are only likely to exhibit effects at later stages.

The results indicate that students with a higher immigrant concentration in primary school more often end up in a lower secondary school track, and have a higher probability of dropping out. A higher immigrant concentration in secondary school also increases the likelihood of dropping out, regardless of whether we control for primary school immigrant concentration. Differential analyses show that these effects mainly hold for immigrant students. This is an important finding, as it shows that taking decisions in this context is often a challenge as it may affect groups of students differently and sometimes even oppositely.

In comparison to the literature, this study was able to show that the previous estimates even become larger once primary school immigrant concentration is taken into account for estimating the effect of secondary school immigrant concentration. This is a critical contribution for educational policy making. These results confirm that a higher share of immigrants relates to lower achievement of native students in educational environments, therefore, keeping a good balance between both groups of students is critical. At the same time, it must be kept in mind that diversity in the classroom is also an important resource for learning and the social-emotional development of children. Given the free school-choice policy in the Netherlands, policy makers can only try to make it more attractive for children and parents to not simply choose for the closest school, but make the decision for school choice based on other school characteristics as well, in order to stimulate children to spread out more over the schools that are still within an acceptable distance range.

At a smaller scale it can also be argued that school principals need to take effects such as described into consideration when setting up their classes, since the effects are also likely to hold at the class level. Future research has to consider this more extensively.

Further research should also look into differentiated effects of children from different backgrounds. It is likely that depending on the country of origin, the above described effects differ. For example, because of languages and cultures that are more similar to each other than others. This study has not been able to include that for the lack of sufficient observations. Furthermore, future research where students can be followed over time from primary to secondary school should look into other outcomes as well, such as student performance.
References


Appendix – First stage tests and first stage results

Besides the arguments that can be given for the validity of the instruments, we can also perform statistical tests to check if the instruments are valid. Table A1 presents the first stage tests and first stage results for analyses 1-4. Table A1 shows, first of all, the strength of the instruments. The statistics presented in the first part of Table A1 are all high and significant. The under-identification test has a null-hypothesis that the specification is under-identified, which can be rejected in all four cases. The over-identification test, on the other hand, has a null-hypothesis that there is no over-identification, which is exactly identified in three cases and cannot be rejected in the fourth case. The weak identification test, also with the null-hypothesis that there is weak identification, can also be rejected in all four cases. This is the first statistical indicator that gives us confidence about our instruments.

As can be seen in the second part of table A1, the first stage results show that our instruments are indeed a strong predictor for primary and secondary school immigrant concentration. This is a second indicator also gives confidence that we have valid and strong instruments.
### Table A1 – First stage tests and first stage results

<table>
<thead>
<tr>
<th>First stage tests</th>
<th>Analysis 1 Value</th>
<th>p-value</th>
<th>Analysis 2 Value</th>
<th>p-value</th>
<th>Analysis 3 Value</th>
<th>p-value</th>
<th>Analysis 4 Value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Under-identification test</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kleibergen-Paap rk LM statistic</td>
<td>3.72</td>
<td>0.05</td>
<td>15.59</td>
<td>0.00</td>
<td>15.95</td>
<td>0.00</td>
<td>17.20</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Weak identification test</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cragg-Donald Wald F statistics</td>
<td>3.68</td>
<td></td>
<td>198.84</td>
<td></td>
<td>228.91</td>
<td></td>
<td>100.28</td>
<td></td>
</tr>
<tr>
<td>Kleibergen-Paap wald rk F statistic</td>
<td>6.47</td>
<td></td>
<td>34.98</td>
<td></td>
<td>34.93</td>
<td></td>
<td>17.95</td>
<td></td>
</tr>
<tr>
<td><strong>Overidentification test</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hansen J statistic</td>
<td>equation exactly identified</td>
<td></td>
<td>equation exactly identified</td>
<td></td>
<td>equation exactly identified</td>
<td></td>
<td>1.85</td>
<td>0.17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>First stage results</th>
<th>Analysis 1 Coef (partialed out)</th>
<th>Std. Err</th>
<th>p-value</th>
<th>Analysis 2 Coef (partialed out)</th>
<th>Std. Err</th>
<th>p-value</th>
<th>Analysis 3 Coef (partialed out)</th>
<th>Std. Err</th>
<th>p-value</th>
<th>Analysis 4 Coef (partialed out)</th>
<th>Std. Err</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of Dutch students in neighborhood</td>
<td>0.05</td>
<td>0.02</td>
<td>0.01</td>
<td>0.41</td>
<td>0.41</td>
<td>0.00</td>
<td>0.42</td>
<td>0.07</td>
<td>0.00</td>
<td>0.42</td>
<td>0.07</td>
<td>0.00</td>
</tr>
<tr>
<td>Distance to school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>share of Dutch students in primary school</td>
<td>0.19</td>
<td>0.03</td>
<td>0.00</td>
<td>-0.12</td>
<td>0.34</td>
<td>0.71</td>
<td>0.12</td>
<td>0.35</td>
<td>0.74</td>
<td>0.12</td>
<td>0.35</td>
<td>0.74</td>
</tr>
<tr>
<td>Female</td>
<td>-0.09</td>
<td>0.66</td>
<td>0.89</td>
<td>0.11</td>
<td>0.35</td>
<td>0.75</td>
<td>-0.12</td>
<td>0.34</td>
<td>0.71</td>
<td>0.12</td>
<td>0.35</td>
<td>0.74</td>
</tr>
<tr>
<td>Age</td>
<td>0.58</td>
<td>0.51</td>
<td>0.25</td>
<td>0.56</td>
<td>0.13</td>
<td>0.00</td>
<td>0.23</td>
<td>0.12</td>
<td>0.06</td>
<td>0.56</td>
<td>0.13</td>
<td>0.00</td>
</tr>
<tr>
<td>One parent non-Dutch</td>
<td>0.62</td>
<td>0.81</td>
<td>0.44</td>
<td>0.02</td>
<td>0.41</td>
<td>0.97</td>
<td>0.07</td>
<td>0.40</td>
<td>0.87</td>
<td>0.01</td>
<td>0.41</td>
<td>0.98</td>
</tr>
<tr>
<td>Student ethnicity Fixed Effects</td>
<td>YES</td>
<td></td>
<td></td>
<td>YES</td>
<td></td>
<td></td>
<td>YES</td>
<td></td>
<td></td>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student residential area Fixed Effects</td>
<td>YES</td>
<td></td>
<td></td>
<td>YES</td>
<td></td>
<td></td>
<td>YES</td>
<td></td>
<td></td>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year fixed effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>812</td>
<td>1722</td>
<td></td>
<td>1722</td>
<td>1722</td>
<td></td>
<td>1722</td>
<td>1722</td>
<td></td>
<td>1722</td>
<td>1722</td>
<td></td>
</tr>
<tr>
<td>Nr of clusters school<em>year</em>residential area</td>
<td>39</td>
<td>228</td>
<td></td>
<td>228</td>
<td>228</td>
<td></td>
<td>228</td>
<td>228</td>
<td></td>
<td>228</td>
<td>228</td>
<td></td>
</tr>
<tr>
<td>Nr of clusters student level</td>
<td>812</td>
<td>778</td>
<td></td>
<td>778</td>
<td>778</td>
<td></td>
<td>778</td>
<td>778</td>
<td></td>
<td>778</td>
<td>778</td>
<td></td>
</tr>
</tbody>
</table>