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by

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Contents

Abstract: *This study documents sizable test score gaps between immigrant students and native Danes among Copenhagen 9^{th} graders in reading, math and science literacy. Results show that while differences in family background account for up to 50 percent of the ethnic test score gap, school fixed effects account for another 15 percent, suggesting that differences in school quality and peer composition may be an additional source of the gap. The results on group differences in school inputs show that while immigrant students are favoured compared to native students with respect to traditional school resources (e.g. class size, language lessons per week, physical and educational infrastructure in schools) and* **general** *teacher support, commitment and engagement is similar at schools attended by immigrants and native Danes, factors related to* **academic** *expectations, encouragement and pressure to achieve are less favourable at schools attended by immigrant students. Also, immigrants attend schools with less favourable peer compositions, fewer specialized teachers, more problems with students lacking respect for teachers, while differences in attitudes and learning strategies are generally in favour of immigrant students.*

1 Introduction

The existence of racial/ethnic gaps in academic achievement is well documented across many countries[1]. Also for Denmark, the international PISA studies conducted in 2000 and 2003 document sizable gaps between native and immigrant students' test scores in reading, math and scientific literacy[2], but the international PISA studies do not have sufficiently sized immigrant samples to thoroughly explore this issue[3]. However, the recently released data from the so-called PISA-Copenhagen study have provided more suitable Danish data for assessing achievement gaps between immigrant and native students. As an offshoot of the enormous interest for the results of the international PISA studies in Denmark, in 2004, the City government of Copenhagen has had the PISA2000 test replicated for all 9^{th} graders in Copenhagen public schools, and for a range of private schools (those willing to participate). The size of the immigrant subsample is still far from impressive (665 individuals), but this is nevertheless a clear improvement over the sample size available from the international PISA studies.

The PISA2000 results show an ethnic gap of 0.8 standard deviations of the test score distribution in reading literacy. In the PISA-Copenhagen sample, this gap is even greater

[1] For an US-overview, see Jencks & Phillips (1998); for evidence from Germany, see Ammermüller (2005) and Baumert & Schümer (2001).

[2] Another Danish study (Colding 2005) documents the ethnic gap measured by grades from school leaving exams, which are administered at the end of 9^{th} grade, i.e. at about the same time in the school career as the PISA target group (15 year olds).

[3] The Danish samples include only about 270 immigrant students in each PISA wave.

(about one standard deviation). In Copenhagen, the typical immigrant student scores below 85% of native students in reading literacy. However, the sources of the ethnic test score gap in Denmark have not been examined thoroughly[4]. Considerable international research shows that family resources and parenting behaviour are strongly related to children's school achievement. Moreover, differences in family resources and parenting behaviours have been shown to account for a considerable portion of race/ethnicity differences in test scores (e.g. Phillips et al. 1998). However, as schools are the primary environment for direct cognitive skill teaching, much of what is measured by achievement tests must be learned in schools, suggesting that schooling may play a role in the production of achievement gaps by providing differential opportunities or incentives for students to learn. This does not necessarily mean that schooling produces, or widens, achievement gaps - in fact, a good school environment may moderate achievement gaps produced by family differences. However, socioeconomic status and school factors are not enough to explain ethnic achievement gaps. Ferguson (2001, 2002) examines other inputs into the education production process, like attitudes and behaviours of students, and he concludes that differences in learning techniques might be one of the factors most promising for future research. In the present paper, I investigate these suggested sources of achievement gaps in turn.

Understanding why immigrant students fare worse in school is a question of paramount importance from a social policy perspective since effectively targeting policy efforts and resources depends on knowing where such efforts are most likely to have an impact. While this papier is not able to identify truly causal effects, its specific goal is to provide a careful description of ethnic test score gaps and their potential sources using test score data from the recent PISA-Copenhagen assessment[5]. In particular, I address the following questions:

1. How large are the achievement gaps between natives and immigrants; and do they differ by immigrant generation? Also, do test score gap sizes differ at different points of the test score distributions for immigrants and native Danes?

2. To what extent can ethnic differences be accounted for by socioeconomic differences among the groups? That is, how much of the test score gap remains when we compare students with similar socioeconomic background?

[4] Skolverket (2003) includes a brief analysis of immigrants' school achievement for Denmark using PISA 2000 data.

[5] The data have a standard set of limitations. First, all data (exept for the test score data) are self-reported by students or school principals. Therefore, these measures may be less reliable than if the data had come from official records. Second, methodological requirements (for example, longitudinal data and exogenous sources of variation) necessary to distinguish causal relationships from mere correlation could not be met. Therefore, to be cautious, the text will usually say that the explanatory variables are correlated with the ethnic test score gap, as opposed to cause it.

3. To what extent can ethnic differences in achievement be attributed to differences among schools? Specifically, how do achievement patterns differ when we compare students within the same school? Are school resources and other school characteristics distributed equally among native and immigrant students?

4. Are there differences in attitudes and learning strategies among the ethnic groups?

5. Do these differences in school characteristics, attitudes and learning styles account for part of the gap? Which school characteristics are correlated with the size of the ethnic gap and with the overall level of test scores?

The paper proceeds as follows. The next section details the data and the model of academic achievement used for this analysis, followed by a brief examination of the test score distributions. Section 4 details the results, and the last section concludes.

2 The data and a model of academic achievement gaps

The PISA-Copenhagen data which are used for this study is a cross-sectional dataset of all 9^{th} grade students in Copenhagen schools[6]. The cognitive test itself is a replicate of the international PISA2000 assessment with special focus on reading skills, and only half the total sample size for math and science (see OECD, 2001 for details). The test scores for each test domain have been standardized to an international mean of 500 and a standard deviation of 100. Apart from test scores, data from student and school questionnaires were collected[7]. These include information on the student background, the availability and use of resources and the institutional setting at schools. All 59 public schools and 24 out of 39 private schools (17 Danish private schools and 7 immigrant/Muslim private schools) participated in the assessment[8]. Thus, the Copenhagen sample is representative only for the public school sector. Special education schools did not participate. The common OECD rules for excluding single students have been used, i.e. mentally retarded students, functionally disabled students and non-native language speakers who had received less than one year of language instruction[9]. Originally, 2,740 students were selected for participation. However, the response rate was only 86%, i.e. 2,352 students actually participated

[6] This is slightly different from the international PISA target population which is 15-year-old students no matter which grade they currently attend.

[7] The student questionnaire used in PISA2000 was slightly extended for the Copenhagen survey to accommodate information of special interest to the local policy makers.

[8] In all, there are 66 public schools in Copenhagen. Seven of those do not include 9^{th} grade and have therefore not participated in the PISA assessment. Also, there are eleven additional private schools in Copenhagen, but they do not have 9^{th} grades and were therefore not eligible to participate.

[9] Moreover, it is required that the overall exclusion rate within a country be kept below 5 percent. For details see Adams & Wu (2002).

in the test. The dataset available for analyses reduces further to 2,303 observations, as information on the key variable "immigrant status (place of birth)" is missing in a number of cases. School questionnaire data are missing for six public schools and one private school. However, as missing values for explanatory variables are handled using dummy variables, this does not further reduce the dataset for the analysis.

The academic performance of students is commonly modelled in an education production function framework[10]. In this study, four broad sets of factors are postulated as determinants of academic achievement: native/immigrant status, socioeconomic status, school factors, and student attitudes and learning strategies. That is, a student's academic achievement, e.g. reading literacy skills, may be modelled as:

$$READ = f(\text{native/immigrant status, student's socioeconomic status, school factors, student attitudes \& learning strategies}) \quad (1)$$

The **student's status as native or immigrant** is the variable of main interest in this study. It is entered as a set of dummy variables with native being the omitted category and 1^{st} and 2^{nd} generation immigrant status being the immigrant categories. Thus, the coefficient of the immigrant dummies gives the estimated performance gaps between the named immigrant category and native Danes.

Various definitions of immigrant status have been employed in the literature. Some studies treat students born to one immigrant and one native parent as immigrants (e.g. Ammermüller 2005), other studies label only students with two immigrant parents as immigrants (e.g. OECD, 2001); some studies treat 1^{st} and 2^{nd} generation immigrants as two separate groups (e.g. OECD, 2001), others do not make this distinction (e.g. Ammermüller, 2005), and again others do not label the second generation as immigrants at all, but as natives (Ellen et al., 2002). To provide an idea about the appropriate definition for this study, Table 1 displays the mean test scores for different migration groups from the PISA-Copenhagen sample. The results suggest the following. First, mean test scores for students with two native parents and students with one native and one immigrant parent are quite similar (eg. 510 and 505 for reading), while mean scores for students with two immigrant parents are much lower (413). This suggests that grouping students with one immigrant and one native parent together with students with two native parents is most appropriate. Second, immigrant students born in Denmark (2^{nd} generation) perform on average better than immigrants born abroad (1^{st} generation) - 420 and 402, respectively. This suggests that it might be relevant to treat 1^{st} and 2^{nd}

[10] See, for example, Hanushek (2003) for a collection of relevant articles from the economic literature of schooling.

generation immigrants as separate groups[11]. Ideally, I would prefer to exclude immigrant students from so-called Western countries[12] from the immigrant group, as they typically do not suffer the same disadvantages as students from non-Western countries. Unfortunately, there is no information on country of origin in the data. However, as students were asked which language they mainly speak at home, the idea to use the language variable as proxy for country of origin might seem compelling. However, language spoken at home is no good proxy, as it does not provide country of origin information on immigrant students who speak Danish at home[13].

[Table 1 about here].

Still, the language at home variable is relevant in its own right, since it might be an indicator of Danish language skills and acculturation. Considering immigrants only, those speaking Danish at home perform on average 0.2 standard deviations better than those speaking another language, but even students from Danish speaking immigrant homes perform significantly below the native average. Table 1 also suggests that there is some heterogeneity for the different languages spoken, but all foreign-language groups perform substantially below the Danish mean. However, the foreign-language samples are too small to provide reliable results when analysed separately.

When formulating the empirical model, the question arises whether to include a variable for "language spoken at home" as an additional control. For the main analysis, I have decided not to, so that the influence of speaking another language at home be captured by the immigrant coefficients and thus reflected in the test score gap to natives. The reason for doing so is that only 13% of the 1^{st} generation and 23% of the 2^{nd} generation students speak Danish at home[14]. Including the language variable as control in the regressions would mean measuring the ethnic test score gap between natives and (the few) immigrants who speak Danish at home. By excluding the language indicator, the estimated gap gives a weighted test score gap of all immigrants - the few who speak Danish at home and the many who do not. However, in addition to the main analysis, I offer results from a model including the language indicator for comparison in section 4.1.

[11] Note, that while this definition is the same as in the PISA-reports, I have labeled the groups differently: the group I label "1^{st} generation immigrants" refers to "non-natives" in the OECD category, while my "2^{nd} generation" is labeled "1^{st} generation" in the OECD reports.

[12] Western Europe, North America, Australia, New Zealand and Japan.

[13] 13% and 23% of 1^{st} and 2^{nd} generation students speak mostly Danish at home.

[14] These seem like rather low percentages, but this is partly due to the restrictive definition of immigrants employed here. However, even using Ammermüller's (2005) broader definition of immigrants on the Copenhagen data (where also students with one native parent are defined as immigrants), 40% of immigrants in Denmark speak the language of assessment (Danish) at home, which is still far below the 60% in Germany who speak the language of assessment (German) at home.

Students' socioeconomic status has several dimensions. Parents' average years of schooling and household composition variables aim to capture systematic differences among households in the supports that they are able to provide for achievement. For example, parents' years of schooling may indicate income differences that affect resources in the home, as well as parents academic orientations and aptitudes passed on from parent to child[15]. Table 2 displays large differences in parental education between native and immigrant students. Fathers have at least some tertiary education in roughly 50% of native households, compared with about 32% and 23% of 1^{st} and 2^{nd} generation households, respectively. The disparity for mothers' education is even more marked[16]. Among low-educated parents, immigrants' parents are strongly overrepresented: almost 50% of immigrants' fathers have no more than lower secondary schooling. The same is true for only 16% of natives' fathers. Disparities in labour market attachment are substantial, too: 83% of natives' fathers are working full-time, while only between 44% and 52% of immigrants' fathers are (of 1^{st} and 2^{nd} generation students). 84% of natives' mothers are working full-time or part-time (most of them, 73%, full time), but only between 36% and 46% of immigrants' mothers are. Native students also have higher mean values for the number of books in their homes, cultural communication[17] and -possessions, social communication and educational resources in their homes[18]. Household composition may reflect differences in financial resources per child and parental attention and supervision. Household composition is measured by indicator variables for two parents, one parent and one step-parent, one parent, or neither. Interestingly, there are almost no differences in household composition for 1^{st} generation immigrants and native Danes; of the 2^{nd} generation, a higher share of students lives with both parents[19]. However, immigrant students

[15] There is no direct measure of parental income in the PISA questionnaires. Information on parents' "socio-economic index of occupational status", which is available in the international PISA-datasets, is not available in the PISA-Copenhagen dataset. Examination of the correlation between parental years of schooling and socio-economic index of occupational status in the PISA 2000 data reveals a correlation coefficient of 0.39 for mothers and 0.45 for fathers.

[16] Note that the 1^{st} generation has better educated parents than 2^{nd} generation immigrants.

[17] There is one exception: immigrant students report that their parents more often listen to classical music together with them.

[18] Aspects of parental interest are described by two sets of variables: cultural communication and social communication. The set of variables on cultural communication includes student reports on the frequency with which their parents enganged with them in the following activities: discussing political or social issues; discussing books, films or television programmes; and listening to classical music. The set of variables on social communication includes student reports on the frequency with which their parents enganged with them in the following activities: discussing how well they are doing at school; eating <the main meal> with them around a table; and spending time simply talking with them. Information on possessions related to "classical" culture in the family home includes student reports on the availability of the following items in their home: classical literature, books of poetry and works of art. Information on home educational resources in the family home include student reports on the availability and number of the following items in their home: a dictionary, a quiet place to study, a desk for study, textbooks and calculators.

[19] The percentage living with two parents is 65 percent for Danes, 66 percent for 1^{st} generation immigrants and 77 percent for the 2^{nd} generation.

have on average more siblings than natives: immigrant students have on average about 2.5 siblings, natives average about 1.8 siblings[20]. Means and standard deviations for all socioeconomic status variables are available in Table 2.

[Table 2 about here].

School characteristics may play a role in the production of achievement gaps by providing differential opportunities or incentives for students to learn. I use a wide range of school characteristics to describe the learning environment of students, such as class size, the number of lessons per week, the teacher-student ratio at the school, teacher education, computer access at school, physical conditions at school, and shortages of learning materials, but also indicators of the teacher-student relationship, teacher support and engagement, teacher expectations and the student composition at school. A detailed examination of these variables is given in section 4.2.2, and means and standard deviations for these variables are displayed in Table 6 (section 4.2.2).

Finally, aspects of **student attitudes and learning strategies** have been suggested to have important influence on students' learning (Ferguson 2001, 2002). However, at least to some extent, they might be influenced by the academic achievement level of students and parental background, as are (many of) the school factors above. Rather than treating the results as causal relationships, we might settle for interpreting the results as correlations, since it might be instructive to have a closer look at this range of factors, too. Issues like absenteeism, the feeling of belonging to the school environment, homework, leisure-time activities, paid work, and learning strategies are included in this part of the analysis, reported in details in section 4.2.3. Means and standard deviations for this set of variables appear in Table 7, section 4.2.3.

Ordinary Least Squares regressions are used to estimate the model of reading, math and science literacy developed above. With the dependent variables being measured at the individual level, and some explanatory variables measured at the school level, standard errors are corrected for clustering at the school level.

3 A brief examination of the test score distributions

The international PISA studies revealed substantial ethnic test score gaps in many countries. Figure 1 shows the reading test score gap for 1^{st} and 2^{nd} generation immigrants compared to natives for the OECD countries that have participated in the PISA2000

[20] The number of siblings seems high for Danish families, but might partly be due to that also half- and step-brothers and sisters are included in these numbers.

assessment. Compared to the other countries, the test score gap for 1^{st} generation immigrants in Denmark is only slightly greater than the mean, while Denmark has the second highest test score gap for 2^{nd} generation immigrants after Belgium. Also, Figure 1 indicates that Denmark is one of the few countries, where the test score gap is greater for 2^{nd} generation than for 1^{st} generation immigrants. However, this difference is not statistically significant at conventional levels.

[Figure 1 about here.]

However, as opposed to the PISA2000 study, results from PISA-Copenhagen reveal a statistically significant advantage for the 2^{nd} over the 1^{st} generation of immigrants (Table 3). As the results show, this is not due to 2^{nd} generation immigrants performing much better compared to native Danes in the PISA-Copenhagen sample, but it is due to severe underperformance of 1^{st} generation immigrants in Copenhagen: while the mean gap to Danes in the PISA2000 sample is 0.7 standard deviations, it is 1.1 standard deviations in the Copenhagen sample. However, this may (partly) be due to a more polarized population composition in Copenhagen than in the country as a whole: a comparison of differences in parental education shows that native Danes in the PISA-Copenhagen sample have more well-educated parents than for the country as a whole (PISA2000 sample), while the reverse is true for 1^{st} generation immigrants (results not shown)[21, 22]. Another possible source of the differences is the much smaller size of the immigrant subsample in PISA2003.

[Table 3 about here.]

There are enormous differences in the test score distribution of Danes and immigrants. Especially, there are much fewer very low performing students among natives: e.g. for reading test scores, only 12% of native students perform lower than one standard deviation below the international mean, while this is the case for almost 51% and 43% of 1^{st} and 2^{nd} generation immigrants. However, while the differences in means are substantial, it is important to note, that there is a lot of variation around these means. Thus, the statistics also imply that a lot of immigrant students score above the typical native student. As

[21] The results for 2^{nd} generation immigrants are more mixed, as Copenhagen-mothers are less well-educated, but Copenhagen-fathers are more well-educated than in the PISA 2000 assessment.

[22] Another source of the differences in gap-patterns might be the fact that private schools are not representatively sampled in the PISA-Copenhagen studies. Thus, if self-selection patterns of native Danes and immigrants into the private schools that have chosen to participate differ from selection patterns into non-participating private schools, this might be able to explain differences in the results between the two studies. However, also other differences between the two assessments, particularly the differences in the target populations (see data-section) may play a role.

an example, 16% and 20% of (1^{st} and 2^{nd} generation) immigrant students do better than the average native student in reading literacy. Additionally, I examined whether the test score distributions differ by reading domain (the combined reading score employed here is composed of three subdomains: retrieving information, interpreting texts, and reflection and evaluation). However, the differences are negligible (results not shown).

Is the test score gap constant over the whole distribution? Figure 2 compares the test score gaps at different points of the test score distributions. E.g. the gap at the 10^{th} percentile is the difference in test score means between the 10% lowest performing natives and the 10% lowest performing 1^{st} and 2^{nd} generation immigrants, respectively. As we see, the reading gap increases slightly in the lower end of the test score distribution and then declines monotonically. Thus, for the best performing students in each ethnic category, the gap to natives is smaller than for the lower performing students, but remains substantial[23]. The results for math and science are somewhat less reliable due to small sample sizes and fluctuate more. This being said, they do not display the same monotone decline in gap size over the distribution.

[Figure 2 about here].

4 Results

4.1 Do socioeconomic status differences explain achievement gaps?

Table 4 presents results on the raw ethnic test score gap and on socioeconomic status-adjusted gaps. Model 1 for each test subject presents the difference in means not including any controls. These results simply reflect the raw test score gaps reported in Table 2. Model 2 presents results including socioeconomic status controls. The background characteristics included in Model 2 are: gender, family structure, siblings, mother's and father's highest completed education, mother's and father's status in the labour market (full-time, part-time, unemployed, not active in labour market), and information on cultural and social capital in the student's homes: the number of books, and sets of variables indicating the level of cultural and social communication, cultural possessions and educational resources in the homes. Model 2 accounts for about 36% of the test score variation for reading literacy, 33% for math and 31% for science. However, some caution is war-

[23] When the same immigrant definition as in Ammermüller (2005) is employed for the Danish sample (i.e. only students with two Danish parents are defined as Danes, all others are immigrants), the reading gap shrinks to between 85 and 45 points. This is, however, still 10 to 20 points above the corresponding immigrant gaps in Germany.

ranted, because, as explained above, some background controls might be correlated with achievement and/or students' socioeconomic status.

[Table 4 about here].

Across all three subject areas, the ethnic test score gap is approximately constant and is statistically greater for 1^{st} generation than for 2^{nd} generation immigrants. As discussed in the preceeding section, the raw test score gap is sizable, around 1.00 - 1.10 and 0.88 standard deviations, for the 1^{st} and 2^{nd} generation, respectively. However, controlling for socioeconomic status characteristics decreases the gap substantially to between 0.60 to 0.70 standard deviations for 1^{st} generation immigrants, and between 0.39 to 0.48 standard deviations for the second generation. Thus, for the 1^{st} generation, between 30% to 45% of the test score gap to natives is due to differences in students' socioeconomic status, while differences in socioeconomic status account for about 45% to 55% for the 2^{nd} generation.

While the focus of this paper is the estimated test score gap, it is nevertheless interesting briefly to examine the pattern of the control variable coefficients. The controls generally enter with the expected sign. As we saw before, girls perform better in reading literacy, while the gender pattern is reversed for math and science. The size of the parental education coefficients is impressive: e.g. for reading scores, having two parents with a university level tertiary education is associated with a one third of a standard deviation increase in students reading scores compared to having two parents with high-school exams. More siblings predict lower test scores, but the estimate is only significant for reading and science. Surprisingly, very few single coefficients on parents' labour market status are significant, but the entire set of indicators is *jointly* highly significant. The number of books is also strongly positively associated with high reading scores, but at a decreasing rate[24]. For the coefficients for the sets of indicators describing cultural and social communication, cultural possessions and home educational resources, only joint significance statistics are reported[25]. Indicators of cultural communication are jointly highly significant for all three test areas. The test statistic is clearly highest for reading scores. However, examining the coefficients from the underlying variables of the composite shows that this is mainly due to less precision of the estimation for math and science due to the smaller sample size, while there is no clear evidence of systematically greater point estimates for reading.

[24] The marginal benefit associated with one additional book decreases as more books are added. Beyond roughly 300 books, the marginal impact decreases.

[25] I do not create composites from each set of variables as provided in the international PISA datasets. Rather, I include these variables separatly. However, due to collinearity, the individual coefficients are unreliable and I therefore report only joint significance levels.

Due to the arguments presented in the data section, information on whether the student mainly speaks Danish or another language at home is not included in the main regressions. However, whether Danish is spoken in the students' home or not might be both an indicator of the students' Danish language proficiency and an indicator of acculturation, and it is therefore relevant to examine the relative performance of immigrants who do or do not speak Danish at home. Results from regressions including the language-at-home variable (not shown here) show that immigrant students speaking Danish at home achieve 0.11 standard deviations higher reading scores and around 0.18 standard deviations higher math and science scores than immigrant students speaking a different language at home. Counterintuitively, speaking Danish at home seems to matter more for mathematics and science than for reading scores.

To conclude this section, even after controlling for socioeconomic status, the test score gap remains sizable, the test score gap for the 2^{nd} generation being approximately 2/3 of that for the 1^{st} generation. This poses the question what can predict the remaining gap? There are a number of plausible explanations for the remaining ethnic test score gap. In the next section, two groups of explanations are investigated further: (i) immigrant children attend lower quality schools on average, and (ii) group differences in students' attitudes and learning styles.

4.2 Do immigrant students underperform because they attend worse schools or have different attitudes and learning strategies?

As already documented in Rangvid (2005), there is substantial ethnic segregation in Copenhagen schools. In the PISA-Copenhagen sample, the average immigrant student attends a school that is 55% ethnic. In contrast, the typical native student attends a school that is only 18% ethnic. Given that immigrant and native students are clustered in different schools, differences in school quality are potential explanations for the ethnic achievement gap. School characteristics that might influence academic achievement are examined in this section and include school resources, teacher education, peer composition, but also other characteristics as teacher expectations and encouragement.

4.2.1 School fixed-effects Since the dataset has many individuals from each school included in the sampling frame, school-fixed effects can be included in the estimation. With school-fixed effects, the estimated test score gap is identified for the relative performance of natives and immigrants within the same school, as opposed to across schools. If differential average school quality across ethnic groups is the complete explanation for the test score gap (after controlling for socioeconomic status differences), one would predict that the gap is eliminated when comparing immigrants and natives attending the same

school. There are, of course, thorny issues of sample selection that potentially complicate the interpretation of these results: native students who choose to attend schools with many immigrant students may have differential unobserved abilities affecting their test scores than other native students. Nonetheless, looking within schools provides a first attempt at testing the school quality hypothesis.

The comparison of ethnic test score gaps including and excluding school-fixed effects is presented in Table 5. All of the specifications in the table include the full set of controls for socioeconomic status characteristics from Table 4, although only the coefficients on the ethnic gaps are shown in the table. Columns 1 to 3 of the table repeat the baseline results from Table 4. When school-fixed effects are included in the regressions (columns 4 to 6), the estimates of the reading gaps shrink by between 26% and 37% for 1^{st} and 2^{nd} generation immigrants in reading, math and science, compared to the estimation without fixed effects, indicating that systematic differences in school quality account for an important additional part of the test score gap. The gap reduction is smaller for science and, particularly, math literacy. However, even with school-fixed effects included, the test score gap remains sizable (about 0.5 standard deviations) and statistically highly significant[26].

[Table 5 about here]

4.2.2 Differences in school quality If immigrants attend worse schools than natives on average, one might expect that this would be reflected in observable characteristics of the schools. In this section, different aspects of school quality are examined. Results are reported in Table 6. Each row of the table corresponds to a different measure of school quality. Column 1 presents means and standard deviations of each variable describing four broad aspects of school quality: school resources (class size, number of lessons, teacher/student ratio, physical infrastructure, educational resources, teacher education[27]), peers (percentage immigrant students, mean parental education), school policies and practices (staff professional development, school climate: teacher related, teachers morale & commitment, teacher shortage), and classroom practices (teacher support, disciplinary climate, school climate: student related; pressure to achieve, teacher-student relationship).

[26] When I eliminate students attending the six all-native schools and the four all-immigrant schools from the sample, but estimate otherwise identical specifications, the results are not greatly affected. This set of students is relevant because only mixed-race schools provide useful variation to identify the racial test score gap when school-fixed effects are included. The existence of only four all-immigrant schools is partly due to the restrictive immigrant definition in this study: not even all Muslim private schools are "all-immigrant" schools here, because they are also attended by children where one parent is born in Denmark, and they are therefore labeled as native Danes.

[27] Having examined the data on part-time teaching staff, they seem rather unreliable, which is why I only use information on full-time staff to calculate the teacher education variables.

All measures are (subjective) responses by the school principals or the students. This may be unproblematic with information such as teacher education or teacher professional development, but is potentially a problem with questions such as how serious problems related to drugs and alcohol are at the school, or with information on teacher expectations and encouragement. However, since I do not just want to dismiss examining these variables, I opt for including them into the analysis, keeping in mind the potential limitations on the interpretation of the results. Columns 2 to 3 display the size of the raw difference in school characteristics between natives and the two immigrant categories[28]. These are the immigrant coefficients from a model with no controls except for the set of immigrant indicator variables and the school inputs as the dependent variables. Columns 4 and 5 report the ethnic coefficients from regressions that are parallel to those presented in Table 4 (Model 2), except that school inputs are the dependent variable rather than test scores. Thus, the entries in columns 4 and 5 reflect the extent to which 1^{st} and 2^{nd} generation immigrants attend higher or lower quality schools than natives with respect to each of the measures, controlling for the usual set of controls.

[Table 6 about here].

Raw input differences in columns 2 and 3 show that on measures of school resources such as class size[29], the number of language (Danish) lessons[30,31] and teacher-student ratios, immigrant students tend to experience higher levels school resources than natives. This reflects the compensatory allocation of ressources to schools with many bilingual students in the Danish school system. For example, 1^{st} and 2^{nd} generation immigrants attend Danish classes with on average 16 and 17 students, respectively, while the average

[28] Note that while the main part of the school information included in this analysis stems from the so-called school questionnaire (filled in by the principal), some information comes from student questionnaires (the source of information for each variable is indicated in the last column of Table 6). Thus, differences compared to Danes for student-supplied variables are between natives and immigrants, while differences for school-supplied variables are between *schools* attended by Danes and immigrants, respectively.

[29] Generally, the class size data are quite noisy: they are collected from the student questionnaire, and there is great variation in the class size information across students in the same school and grade level. Preliminary examination of the data did not suggest an obvious way how to go about improving the data quality. However, there is no reason to be particularly suspicious of systematic errors in the class size variable.

[30] Further analysis of the variable has shown that many of the students who fill in a (very) high number of Danish lessons, indicate elsewhere in the questionnaire that they have received remedial courses in Danish. One might be suspicious of (some of) these students adding the number of remedial Danish lessons to the number of "common" Danish lessons.

[31] Students were ask to give the number of Danish/math/science lessons received during the preceeding week. Additionally, the students were ask whether the indicated number is representative of a typical week of school. Only when the student has indicated that the number of lessons corresponds to the number received in a typical week of school, the information is included in the dataset. Other information is treated as missing values.

class size for natives is 18. However, controlling for differences in students' socioeconomic backgrounds, class size is lower and the number of language (Danish) lessons higher for 1^{st} generation immigrants only. Somewhat surprising, both immigrant generations report having more science lessons per week than native Danes, also when socioeconomic differences between groups are controlled for. Also, immigrant students attend on average smaller schools than native Danes. Native Danes attend schools with a mean enrolment of about 525 students, while mean enrolments are lower by approximately 100 students in schools attended by immigrants. Principals at schools attended by immigrants (especially 2^{nd} generation) report much less deficiencies concerning the schools' physical infrastructure and educational resources than principals in schools attended by natives[32]. Especially, problems related to instructional space seem to be much less severe. This may partly be due to the fact that many schools with a high concentration of immigrants have low enrolments compared to their capacity.

However, schools attended by immigrant students have on average fewer specialized teachers in language (Danish) and mathematics: a higher share of Danish and math teachers at the school is not educated in the named subject. The difference is important especially for math: for example, in schools attended by natives on average 73% of math teachers are educated in teaching this subject, while the number is 63% for 2^{nd} generation immigrants and only 57% for the 1^{st} generation. The numbers for Danish teachers are 87%, 84% and 82%, respectively. However, results from statistical estimates that control for socioeconomic status (columns 4 and 5) show that the difference remains significant for 1^{st} generation students only[33]. Interestingly, while the share of specialized teachers is lower at schools attended by immigrant students, there is no difference in the perceived shortage (by the school principal) or inadequacy of Danish, math or science teachers at schools attended by immigrants and natives.

Moreover, a slightly higher percentage of teaching staff in schools attended by immigrants has participated in a programme of professional development during the three months preceding the survey than at schools attended by natives[34]. At schools attended by natives, an average of 42% of the teaching staff has attended a programme of professional development, while the percentages at schools attended by 1^{st} and 2^{nd} immigrants are 48% and 51%, respectively. The difference for natives and immigrant students is sig-

[32] This may partly reflect the higher resource level at schools with more immigrants, but the information might also be biased by school leaders differential priority/experiences: principals at schools with few other problems (e.g. school with a high quality student intake), might be more inclined to deplore physical deficiencies than schools with perhaps more substantial problems.

[33] The result for math remains marginally significant for the 2^{nd} generation.

[34] However, this might partly reflect a greater *need* for professional development at schools with many immigrant students. In the formal teacher education, courses in special pedagogy for teaching immigrant/bilingual students are optional, and especially the older teacher generation might even completely lack formal education in this area.

nificant also after controlling for socioeconomic status differences. However, professional development was in the questionnaire restricted to be concerned with enhancing teaching skills or pedagogical practices only, not to further the teachers' academic specialization in a subject[35]. Thus, the greater activity in professional development in schools attended by immigrants will not help moderate the possible effects from lower share of academically specialized teachers.

Peers are regarded as another important input to schooling. As the results in Table 6 show, the peer composition at schools attended by immigrants might be less conducive to academic achievement. Socioeconomic background, here proxied by the school average of years of schooling of the highest educated parent, is used as a proxy for peer quality. Average parental years of education at the school attended averages 11.2 for all students. Immigrant students attend schools, where the average parental education of one's peers is two years lower than at schools attended by native students, a gap that is reduced to one year when controlling for differences in socioeconomic characteristics of the individual students.

However, parental education background is only one dimension of peer characteristics. In the literature, it is argued that immigrant background puts an additional layer on socioeconomic differences, as immigrant students also are disadvantaged regarding language proficiency and cultural differences. In the PISA-Copenhagen data, immigrant students attend schools with a substantially higher percentage of immigrant children than natives do. If immigrant and native children were distributed equally across schools, all schools would be attended by 29% immigrant children. However, in reality, native students attend school with on average 18% immigrant students, while the numbers for 2^{nd} and 1^{st} generation immigrant students is 53% and 58%, respectively (a gap to natives of 35 and 40 percentage points). Thus, the average immigrant student attends schools where the majority of students has an immigrant background. Controlling for differences in socioeconomic characteristics, this gap shrinks to 22 and 28 percentage points, but remains of substantial size. Thus, native and immigrant students with similar family characteristics attend schools with substantially different peer characteristics.

In the literature on test score gaps, teacher expectations and encouragement are often stressed as being of paramount importance for closing gaps. Looking through the results on teacher behaviour in Table 6, there are no systematic differences for natives and immigrant students with respect to the teacher related factors affecting school climate, teacher morale and commitment, teacher support and teacher-student relations. However, for one aspect there are systematic differences: immigrant students report lower achievement pressure

[35] In the questionnaire, it was specified that "professional development is a formal programme designed to enhance teaching skills or pedagogical practices. It may or may not lead to a recognised qualification. The total length of the programme must last for at least one day and have a focus on teaching and education."

than natives for three out of four single variables. Thus, immigrants feel that it happens less often in their (Danish) classes that the teacher wants the students to work hard, the teacher does not like it when students deliver careless work, and students have to learn a lot. A quick glance through the table for related results to achievement pressure, provides more examples confirming the lower level of academic achievement pressure for immigrant students. For example, school principals at schools attended by immigrants report to a higher degree that learning is hindered by low expectations of teachers (see under "School climate: teachers", Table 6), and by students not being encouraged to achieve their full potential. Moreover, they report to a lesser degree that teachers value academic achievement (see under "Teacher morale & commitment"). This is an important result from this analysis: while *general* teacher support, commitment and engagement are not reported to be different at schools attended by immigrants, factors related to *academic* expectations, encouragement and pressure to achieve seem to be less favourable at schools attended by immigrant students. As has been argued above, this kind of inputs might be correlated with student achievement, and this must be kept in mind when interpreting the results.

Further results show that while student reports do not show differences in disciplinary behaviour between natives and immigrants, school principals report more problems with alcohol or illegal drugs, disruption of classes and students lacking respect for teachers at schools attended by immigrants (see under "school climate: students").

The overall impression from this section on differences in school characteristics is that immigrant students (especially the 1^{st} generation) are favoured compared to native students with respect to traditional school resources as class size, teacher-student ratios, language lessons per week, and the level of physical and educational infrastructure in schools. However, immigrant students appear to be in a deficit with respect to other inputs which are not as easy to provide for by central planners: immigrant students experience lower teacher expectations and lower efforts of pushing students to achieve higher academic performance, and the peer composition at schools attended by immigrant students is potentially less conducive to academic achievement.

In a further attempt to explain more of the gap, I now turn to consider ethnic differences in attitudes towards learning and school, and differences in learning strategies.

4.2.3 Differences in attitudes and learning strategies In this section, I examine whether differences in students' attitudes like absenteeism, their feeling of belonging to the school and peers, and aspects of their homework activities, and learning strategies (control, memorization and elaboration strategies) might explain more of the remaining test score gap. Also, ethnic differences in time devoted to non-school activities like leisure-time

activities and paid work are considered, as they may reduce the amount of time available for schoolwork.

[Table 7 about here].

When socioeconomic status is controlled for, immigrants have generally a stronger, or at least as strong, feeling of belonging to their school than natives: 2^{nd} generation immigrants feel less often like an outsider, make friends more easily, and "feel that they belong" (see Table 7). Also, both 1^{st} and 2^{nd} generation immigrants report to a lesser extent than natives that they "do not want to go (to school)", and that they often feel bored. Both immigrant groups report a more positive approach to homework than natives: they say they more often complete on time, feel that their homework is interesting and spend more time doing homework than native students with a similar socioeconomic status[36]. There are no differences between immigrants and natives concerning missing school (neither with or without parents' permission) or being late for school. Also, immigrant students do not differ from natives regarding time spent on leisure-time activities and time spent on (paid) work.

All in all, concerning the examined issues of belonging, homework practices, time used on out-of-school activities, and absenteeism, immigrant students do not seem to be in a disadvantaged position compared to native Danes. Concerning some aspects, they even appear to have more positive attitudes toward education/school than natives.

Learning strategies are important because those with stronger approaches to learning achieve better results at school (OECD, 2003). PISA collects information on three different learning strategies: Control strategies (strategies involving planning, monitoring and regulation), memorizing (e.g. learning key terms or repeated learning of material), and elaboration (e.g. making connections to related areas or thinking about alternative solutions). Learning strategies are the plans students select to achieve their goals: the ability to do so distinguishes competent learners who can regulate their learning. Cognitive strategies that require information processing skills include memorization and elaboration, as well as others such as the ability to transfer information from one medium to another. Metacognitive strategies, implying conscious regulation of learning, are summed up in the concept of control strategies. Immigrant students report more frequent use of control strategies, (some) memorizing strategies and elaboration strategies[37] than natives.

[36] This result holds even for students with similar reading scores (i.e. when test scores are included as controls in the regression), and is thus not merely due to weaker students spending more time on doing the same amount of homework as high performers.

[37] All but "When I study, I figure out how the information might be useful in the real world".

Finally, PISA considered whether students like learning in competitive environments and whether they like learning in co-operative environments. Native students and 1^{st} generation immigrants on average score higher in this regard than 2^{nd} generation immigrants, indicating that they have had positive experiences with this form of learning and regard a team approach to (study) projects as beneficial. However, natives also favour competitive learning more than immigrant students. These results suggest that 2^{nd} generation immigrants may be more independent learners, since they value *both* a co-operative *and* a competitive learning environment less than natives. 1^{st} generation immigrants value a co-operative environment just as natives, but they are less in favour of competition. Preference for co-operative and competitive forms of learning should not necessarily be regarded as being opposite student characteristics. As the results show, co-operative and competitive learning appear to be complementary motives, in the sense that students who have positive views about one are also more likely to be positive about the other. However, the extent to which students voice a preference for co-operative learning gives some indication of the approach they will take to co-operative projects in working life.

4.3 Do differences in school factors, attitudes and learning styles add to explaining the ethnic test score gap?

The previous section analysed whether there exist differences in school characteristics, attitudes and learning styles between Danes and immigrants. However, these differences can help explain the gap only if variation in these factors actually affects the test score gap. I look into this issue by adding a selected set of the above examined factors to the socioeconomic status controls in regressions otherwise identical to those in section 4.1. It is important to recognise that for this question to be answered sensibly, only those factors meeting the following two conditions are included in the analysis: (i) only school inputs, attitudes or learning styles, where immigrant students experience inferior levels of resources compared to Danes can be potential explanatory factors of ethnic achievement gaps, and (ii) only factors where there a priori is a clear expectation (from theory) that an inferior level of the particular factor of the particular input will influence student skills in a negative direction. These conditions substantially reduce the set of factors to be considered here, as sections 4.2.2 and 4.2.3 showed that immigrants are disadvantaged only with respect to a subset of the factors considered, and moreover, for some of these (namely competitive and co-operative learning styles) there is no clear expectation whether these factors influence achievement positively or negatively (or not at all). Imposing these two conditions means disregarding all factors concerning attitudes and learning styles, either because immigrants do not experience inferior levels of these factors, or because there is no certain expectation for the direction of how this influences achievement. The remaining

factors to be considered are: the percentage of Danish/math teachers with a major in Danish/math; the percentage of ethnic students at school; average parental education of the school's students; the extent to which learning is hindered by low expectations of teachers or by students not being encouraged to achieve their full potential at school; the degree to which teachers at school value academic achievement; the shortage of Danish teachers at a school, the extent to which learning is hindered by the use of alcohol or illegal drugs, by disruption of classes by students, or by students lacking respect for teachers; the frequency to which it happens (in Danish lessons) that the teacher wants students to work hard, that the teacher does not like it when the students deliver careless work, or that students have to learn a lot; and last, whether most teachers at the school are interested in students' well being.

Table 8 displays, by test score domain, the ethnic coefficient estimates from seven different specifications. The first specification includes the ethnic indicator variables only and does not include any other controls. The second set of specifications (columns 2 and 3) considers socioeconomic background and the set of selected school inputs as defined above one at a time. Finally, the third specification (column 4) includes both sets simultaneously. Table 8 also presents the portion of the ethnic test score gap accounted for by the included sets of controls (=1-ethnic coefficient/raw test score gap). In the following, I discuss only the results from reading score estimations. Even though the math score gaps are less well accounted for by the model, exept from this, results for math and science are broadly similar to the results for reading test scores.

[Table 8 about here]

Looking first at column 1, the mean difference in reading test scores between Danes and immigrants is -107 for the 1^{st} generation, and -88 for the 2^{nd} generation. Estimations in columns 2 and 3 indicate that controlling for socioeconomic status or for the selected school characteristics significantly reduces the gap by slightly more than 40% for 1^{st} generation and more than 50% for 2^{nd} generation immigrants. The results in column 4 controls for both socioeconomic status and (selected) school inputs. The results indicate that school inputs and socioeconomic status are correlated to some extent, but not entirely so, as additional 15 and 20 percentage points are accounted for by including both sets of factors simultaneously as compared to including only one of the two.

Apparantly, the set of school characteristics seems to account for an important part of the test score gap. Apart from assessing their joint explanatory power, we would like to know about individual inputs' ability to account for the test score gap. However, endogeneity issues and multicollinearity between school inputs prevent a straightforward

analysis. Finding credible approaches to account for endogeneity of school inputs is extremely difficult and beyond the scope of this paper (see the literature on class size or peer effects[38]). However, to provide just a taste of the varying strength of correlations between single school inputs and the test score gap, I present results from reading score regressions which include one school input at a time. Table 9 presents the ethnic coefficient estimates from two different specifications. Results are reported for reading skills only, as this section has mainly expository character. In the first specification (columns 1 to 6), socioeconomic status characteristics are excluded (the only regressors being the ethnic indicator variables and the named school input). As the interest of this paper is to see which factors can account for the ethnic test score gap, the relevant question to examine is whether the gap estimates in the model including the school input are different from the gap estimated in the model with ethnic indicators only (repeated in the first row of Table 9). This is done by means of a series of Hausman tests[39]. In columns 4 and 10, the chi-square statistics from the Hausman tests are displayed[40]. Bold figures indicate that including the named school input in the estimation equation significantly (at the 5% level) changes the ethnic test score gap estimates compared to the model not including this school input, and that the named school input therefore accounts for a significant portion of the ethnic test score gap. However, as stressed above, a Hausman test statistic rejecting the nul of no change of the test score gap estimate does not have a causal interpretation due to unsolved endogeneity problems.

Additionally, I report the school input coefficients from the regressions (col. 5, 6 & 11, 12), mainly to convey a sense of the problems connected with this type of research rather than to provide conclusive results. The estimates of school input coefficients give the correlations between the school input and the general test score *level*, rather than the test score *gap*. For those school inputs which are represented with sets of variables, I report results on joint significance of the school input set from an estimation including the entire set of school inputs (e.g. the three variables representing the school's physical infrastructure) - columns 5 and 11. However, due to the strong collinearity between variables in these sets, reporting results on the single coefficients when all variables are included jointly is not very illuminating. Therefore, the single coefficient results in columns 6 and 12 come from separate regressions, each including one of the variables belonging to the set of school inputs.

[38] E.g. Hanushek et al. (2003) for peer effects estimation and Hanushek (1999) on class size effects.

[39] The Hausman test is typically used to test model consistency; e.g. how to choose between random and fixed effects panel data models. However, in this paper, the Hausman test is merely used to test whether the ethnic test score gap estimates are significantly different in models including and excluding an additional regressor.

[40] In a few cases, the variance for the estimate from the regression including a school input is smaller than for the estimate from the baseline regression. According to Greene (1993, p. 657), in this case, the difference between the variances is assumed to be zero, and, the chi-square statistic is therefore zero, too.

Looking first at the main results, i.e. the results from the Hausman test, only peer characteristics account for a significant portion of the gap in models both with and without controls for socioeconomic status (columns 4 & 10). The size of the gap reduction is substantial: while socioeconomic status (entered as only controls) explains 44% and 56% of the test score gap for 1^{st} and 2^{nd} generation immigrants, peer characteristics explain additional 13% and 15% of the gap. These results suggest that the correlation between peer characteristics and the ethnic test score gap is of a size and strength that this school factor might be an interesting candidate for future research.

Despite the school input estimates not being the results of primary interest, it is nonetheless instructive to consider these results. It is important to note that the results considered here do not relate to the ethnic test score *gap*, but to the *overall level* of (reading) test scores. A quick glance across column 12 of Table 9 reveals that only about one in two of the school inputs is significantly related to the overall level of test scores. Moreover, teacher shortage is significantly related to reading scores, but with the "wrong" sign. Teacher education is measured as the number of full time Danish teachers with a major in Danish divided by the total number of teachers teaching Danish at a school. The percentage of specialised Danish teachers is positively associated with reading scores, but at a decreasing rate. Beyond a share of roughly 70%, the marginal impact decreases. The coefficient size is reduced when socioeconomic status is included, but the estimate remains significant. The peer group at the school is positively related to reading scores, even if own socioeconomic status is controlled for: a higher percentage of ethnic students correlates with lower reading scores, while a better average educational background of the peers' parents is related to higher scores, when the two peer characteristic variables are entered separatly into the regression. Due to high collinearity between the ethnic and the social peer group variable[41], the influence of ethnicity cannot be separated from the influence of social background. Teacher shortage is significantly related to reading scores only when socioeconomic status is controlled for, but in the "wrong" direction, implying greater (principal perceived) teacher shortage being related to higher reading scores - a result that is difficult to interpret. Moreover, pressure to achieve[42] in Danish lessons and teacher-student relations at the school seems to be positively related to reading scores. However, all in all, more school inputs seem to matter for the overall test score *level*, than for the ethnic test score *gap.*

To sum up, differences in those school characteristics of which immigrants experience lower levels account for a sizable portion of the ethnic test score gap. Peer characteristics are the only school input which can account for part of the ethnic test score gap. However,

[41] The correlation coefficient is above 0.80.

[42] However, one of them ("students have to learn a lot") enters with a counter-intuitive sign.

several other school characteristics are correlated with overall reading scores, such as teacher education, achievement pressure and teacher-student relations. However, as these inputs are potentially endogenous explanatory variables, additional research, accounting for endogeneity bias would be needed to identify causal effects.

5 Conclusion

This study documents a sizable test score gap between immigrant students and native Danes in Copenhagen of about one standard deviation of the test score distribution. The gap is greater for 1^{st} generation than for 2^{nd} generation immigrants - a result that is different from what is found in the national Danish subsample of the OECD PISA studies from 2000 and 2003, where the gap is not smaller for 2^{nd} generation immigrants. Furthermore, the test score gap closes slightly as one goes up the relative performance distribution, i.e. the gap between the best-performing immigrants and the best-performing native Danes is smaller than at the lower end of the performance distribution, but the gap remains sizable at all points of the distribution.

Results from this study confirm what we know from previous research: that immigrant students on average are disadvantaged with respect to their home background. Differences in socioeconomic status account for about 50% of the ethnic test score gap, i.e. even after controlling for socioeconomic status differences, a substantial gap remains. School fixed effects control for the fact that immigrant students are clustered in schools of potentially different school quality than schools attended by native Danes. These results provide within-school estimates of the test score gap. School fixed effects account for a substantial additional portion of the ethnic gap (about 30% for reading scores, and somewhat less for math and science), suggesting that differences in school quality in schools attended by immigrants and native Danes may be part of the explanation of the ethnic test score gap. As one might expect these differences to be reflected in observable characteristics of schools, results on differences between native Danes and immigrants are provided for a broad range of school characteristics. The results show that immigrant students (especially the 1^{st} generation) are favoured compared to native students with respect to traditional school resources such as class size, teacher-student ratios, language lessons per week, and the level of physical and educational infrastructure in schools. However, immigrant students appear to be in a deficit with respect to other inputs which are not as easily provided by central planners. First, while *general* teacher support, commitment and engagement are not reported to be different at schools attended by immigrants, factors related to *academic* expectations, encouragement and pressure to achieve are less favourable at schools attended by immigrant students. Also, the peer composition at schools attended by immigrant students is potentially less conducive to academic achievement, and schools

attended by 1^{st} generation immigrants have lower percentages of specialized Danish and, particularly, math teachers, even compared to natives with similar socioeconomic status. While *student* reports do not show differences in disciplinary behaviour between natives and immigrants, school *principals* report more problems with alcohol or illegal drugs, disruption of classes and students lacking respect for teachers at schools attended by immigrants. Adding school characteristics as explanatory variables in the test score estimations accounts for additional 15 and 20 percentage points of the ethnic test score gap for 1^{st} generation and 2^{nd} generation immigrants, respectively.

However, 40% and 25% of the test score gap are still unaccounted for. In a continued search for additional explanations, differences in attitudes and learning strategies are examined as potential sources of the ethnic test score gap. The results reveal group differences in these variables, but they are generally in favour of immigrant students (and are therefore no obvious candidates for explaining ethnic underperformance): they have a stronger feeling of belonging towards the school and their peers, they say that they more often complete their homework on time and they use learning strategies more often than native students, all of which should promote academic achievement. Immigrant students favour both co-operative and competitive learning environments less than native Danes, but here for these variables there is no clear expectation of the direction of their influence on test scores given by theory, and therefore these results are somewhat difficult to handle. They are therefore not included in the remaining of the analysis. A selected set of school characteristics (those for which immigrants experience inferior levels) seems to be a more promising category of inputs into the learning process to examine further. However, while it is relatively straightforward to examine differences in *levels* of individual inputs, assessing which of these inputs actually *affect* the size of the gap is notoriously difficult due to correlation between inputs and due to the endogeneity of inputs. Anyway, to provide a sense of the influence of individual school inputs on (reading) test scores, results on correlations are reported. Briefly, only peer characteristics are correlated with the size of the test score gap, when own socioeconomic status is controlled for. Thus, most of the differences in school characteristics between immigrant and native students cannot be shown to account for the ethnic test score gap. Various different school characteristics are related to the overall test score level, however. But as the results show as well, severe endogeneity problems seem to contaminate the results, which underlines the exploratory character of this analysis. For real causal effects to be estimated, some kind of exogenous variation in the school input variables, true experiments, or longitudinal data would be needed. However, this is beyond the scope of the present paper and must be left for future research.

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Table 1. Mean test scores by migration status and language spoken at home

		Read score /Std.dev	**Students** number %	**Math score** /Std.dev	**Students** number %	**Science score** /Std.dev	**Students** number %
Sample		***479***	***2351***	***480***	***1323***	***461***	***1291***
			100%		*100%*		*100%*
Migration status	Danes (two native parents)	510	1325	511	743	492	735
			56%		*56%*		*57%*
	One parent immigrant	505	313	498	172	481	180
			13%		*13%*		*14%*
	Both parents immigrants	413	665	416	385	393	350
			28%		*29%*		*27%*
	All	481	2303	481	1300	463	1265
			100%		*100%*		*100%*
	[Migration status data missing]	*372*	*48*	*371*	*23*	*376*	*26*
	"Native Danes"[1]	509	1638	509	915	490	915
			71%		*70%*		*72%*
	"1st generation"[2]	402	259	408	153	380	141
			11%		*12%*		*11%*
	"2nd generation"[3]	420	406	422	232	402	209
			18%		*18%*		*16%*
Language	Danish	506	1668	507	931	487	932
			71%		*70%*		*72%*
	Other Western*	490	60	473	34	483	35
			3%		*3%*		*3%*
	Non-Western	411	473	414	276	384	247
			20%		*21%*		*19%*
	All	485	2201	485	1241	466	1214
			100%		*100%*		*100%*
	[Language data missing]	*389*	*150*	*395*	*82*	*387*	*77*
Immigrants only:	*Speak Danish with parents*	*435*	*111*	*444*	*59*	*406*	*65*
	Speak other language	*416*	*481*	*416*	*282*	*391*	*250*
	Turkish	*401*	*48*	*404*	*30*	*386*	*21*
			2%		*2%*		*2%*
	Albanian	*386*	*38*	*395*	*17*	*383*	*24*
			2%		*1%*		*2%*
	Punjabi	*429*	*36*	*437*	*18*	*398*	*18*
			2%		*1%*		*1%*
	Urdu	*427*	*46*	*400*	*24*	*405*	*25*
			2%		*2%*		*2%*
	Arabic	*395*	*138*	*400*	*77*	*366*	*75*
			6%		*6%*		*6%*
	Kurdish	*377*	*33*	*399*	*20*	*374*	*18*
			1%		*2%*		*1%*
	Other Non-Western lang.	*436*	*134*	*436*	*90*	*394*	*66*
			6%		*7%*		*5%*

[1] One or both parents born in Denmark.
[2] Both parents immigrated, student born abroad.
[3] Both parents immigrated, student born in Denmark.
** In this sample, the category of "other Western languages" includes students speaking English, Spanish, Swedish, German, Norwegian, French, Greek, Italian and Portuguese.*

Table 2. Family background: Descriptive statistics (by ethnic group)

	N with valid information	Full sample				Danes		1st generation immigrants		2nd generation immigrants	
Variable		Mean	*Std Dev*	*Min*	*Max*	Mean	*Std Dev*	Mean	*Std Dev*	Mean	*Std Dev*
Read scores	2303	481	*103*	*30*	*887*	509	*91*	402	*104*	420	*96*
Math scores	1300	481	*100*	*202*	*744*	509	*90*	408	*85*	422	*94*
Science scores	1265	463	*107*	*169*	*787*	490	*98*	380	*108*	402	*93*
Student speaks Danish at home	2185	0,76	*0,43*	*0*	*1*	0,97	*0,17*	0,13	*0,34*	0,23	*0,42*
Gender (male=0, female=1)	2303	0,50	*0,50*	*0*	*1*	0,50	*0,50*	0,49	*0,50*	0,53	*0,50*
Family structure											
Student lives with both parents	2292	0,67	*0,47*	*0*	*1*	0,65	*0,48*	0,66	*0,48*	0,77	*0,42*
Student lives with single parent	2292	0,24	*0,43*	*0*	*1*	0,25	*0,43*	0,25	*0,44*	0,18	*0,39*
Student lives with parent & step-parent	2292	0,07	*0,25*	*0*	*1*	0,08	*0,27*	0,06	*0,23*	0,02	*0,14*
Student lives without parent	2292	0,02	*0,13*	*0*	*1*	0,02	*0,13*	0,02	*0,14*	0,02	*0,15*
Number of siblings	2279	2,02	*1,39*	*0*	*8*	1,79	*1,28*	2,51	*1,66*	2,56	*1,44*
Mother's highest education											
No school	2202	0,04	*0,20*	*0*	*1*	0,00	*0,03*	0,12	*0,33*	0,15	*0,35*
Lower secondary education	2202	0,24	*0,43*	*0*	*1*	0,15	*0,36*	0,37	*0,48*	0,44	*0,50*
Vocational education	2202	0,08	*0,27*	*0*	*1*	0,09	*0,28*	0,05	*0,21*	0,05	*0,21*
High-school exam	2202	0,10	*0,30*	*0*	*1*	0,09	*0,29*	0,08	*0,27*	0,10	*0,30*
Non-universitary tertiary education (up to 2 years)	2202	0,06	*0,23*	*0*	*1*	0,06	*0,24*	0,05	*0,23*	0,04	*0,20*
Non-universitary tertiary education (2 - 3 years)	2202	0,08	*0,28*	*0*	*1*	0,10	*0,30*	0,04	*0,19*	0,02	*0,15*
Non-universitary tertiary education (3 - 4 years)	2202	0,29	*0,46*	*0*	*1*	0,35	*0,48*	0,11	*0,32*	0,10	*0,30*
University level tertiary education (min. 5 years)	2202	0,11	*0,31*	*0*	*1*	0,13	*0,33*	0,08	*0,27*	0,02	*0,16*
Note: 6% of the observations have missing values for mother's education.											
Father's highest education											
No school	2127	0,03	*0,17*	*0*	*1*	0,00	*0,05*	0,12	*0,32*	0,08	*0,27*
Lower secondary education	2127	0,22	*0,42*	*0*	*1*	0,16	*0,37*	0,21	*0,41*	0,38	*0,49*
Vocational education	2127	0,16	*0,36*	*0*	*1*	0,16	*0,37*	0,10	*0,30*	0,11	*0,31*
High-school exam	2127	0,11	*0,31*	*0*	*1*	0,10	*0,30*	0,12	*0,32*	0,10	*0,30*
Non-universitary tertiary education (up to 2 years)	2127	0,07	*0,25*	*0*	*1*	0,07	*0,25*	0,07	*0,25*	0,05	*0,23*
Non-universitary tertiary education (2 - 3 years)	2127	0,07	*0,26*	*0*	*1*	0,08	*0,27*	0,04	*0,20*	0,04	*0,20*
Non-universitary tertiary education (3 - 4 years)	2127	0,14	*0,34*	*0*	*1*	0,15	*0,36*	0,09	*0,29*	0,05	*0,22*
University level tertiary education (min. 5 years)	2127	0,20	*0,40*	*0*	*1*	0,22	*0,41*	0,12	*0,33*	0,09	*0,28*
Note: 9% of the observations have missing values for father's education.											
Mother's labour market status											
Working full-time	2244	0,63	*0,48*	*0*	*1*	0,73	*0,44*	0,29	*0,46*	0,34	*0,47*
Working part-time	2244	0,11	*0,31*	*0*	*1*	0,11	*0,31*	0,07	*0,25*	0,12	*0,32*
Unemployed	2244	0,07	*0,26*	*0*	*1*	0,05	*0,22*	0,13	*0,34*	0,10	*0,30*
Other (e.g. home duties, retired)	2244	0,19	*0,39*	*0*	*1*	0,09	*0,29*	0,44	*0,50*	0,41	*0,49*
Note: 4% of the observations have missing values for mother's labour market status.											
Father's labour market status											
Working full-time	2151	0,74	*0,44*	*0*	*1*	0,78	*0,42*	0,44	*0,50*	0,52	*0,50*
Working part-time	2151	0,06	*0,24*	*0*	*1*	0,05	*0,23*	0,05	*0,21*	0,08	*0,27*
Unemployed	2151	0,06	*0,23*	*0*	*1*	0,04	*0,19*	0,11	*0,32*	0,08	*0,27*
Other (e.g. home duties, retired)	2151	0,14	*0,35*	*0*	*1*	0,07	*0,26*	0,28	*0,45*	0,26	*0,44*
Note: 8% of the observations have missing values for father's labour market status.											
Number of books in the home [a]	2243	203,00	*212,11*	*0*	*600*	243,95	*218,28*	81,00	*132,96*	85,74	*149,32*
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?	2243	3,08	*1,39*	*1*	*5*	3,20	*1,37*	2,72	*1,39*	2,83	*1,36*
Discuss books, films or television programmes with you?	2255	3,51	*1,32*	*1*	*5*	3,65	*1,25*	3,26	*1,42*	3,06	*1,38*
Listen to classical music with you?	2217	1,67	*1,16*	*1*	*5*	1,55	*1,09*	1,83	*1,38*	1,68	*1,36*
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?	2246	4,23	*1,02*	*1*	*5*	4,24	*0,98*	4,20	*1,17*	4,17	*1,07*
Eat <the main meal> with you around a table?	2245	4,75	*0,77*	*1*	*5*	4,79	*0,68*	4,54	*1,02*	4,68	*0,87*
Spend time just talking to you?	2256	4,57	*0,87*	*1*	*5*	4,64	*0,80*	4,37	*1,06*	4,43	*0,97*
Cultural possessions: "In your home, do you have: (1=yes)"											
Classical literature	2233	0,49	*0,50*	*0*	*1*	0,57	*0,50*	0,25	*0,43*	0,24	*0,43*
Books of poetry	2236	0,50	*0,50*	*0*	*1*	0,54	*0,50*	0,39	*0,49*	0,31	*0,46*
Works of art	2263	0,68	*0,47*	*0*	*1*	0,75	*0,43*	0,47	*0,50*	0,45	*0,50*
Home educational resources: "In your home, do you have:"											
A dictionary (1=yes)	2286	0,97	*0,16*	*0*	*1*	0,98	*0,15*	0,95	*0,23*	0,94	*0,24*
A quiet place to study (1=yes)	2269	0,83	*0,37*	*0*	*1*	0,84	*0,37*	0,77	*0,43*	0,85	*0,38*
A desk for study (1=yes)	2277	0,92	*0,27*	*0*	*1*	0,93	*0,27*	0,90	*0,32*	0,89	*0,33*
Text books (1=yes)	2222	0,53	*0,50*	*0*	*1*	0,59	*0,50*	0,42	*0,49*	0,39	*0,48*
How many calculators do you have in your home? (1-4; none - three or more)	2268	3,67	*0,63*	*1*	*4*	3,66	*0,75*	3,64	*0,81*	3,72	*0,78*
No obs			*2351*			*1638*		*259*		*406*	

[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 3: Comparison of reading score results from PISA 2000 and PISA-Copenhagen

			(1) PISA 2000	(2) PISA-Copenhagen	Difference (2)-(1)
	(i)	Native Danes	504	509	5
	(ii)	1st gen	433	402	-31
	(iii)	2nd gen	409	420	11
Gap	(ii)-(i)	1st gen	-71	-107	
	(iii)-(i)	2nd gen	-95	-89	

Table 4: Regressions results: Raw gap and family background adjusted gaps

	1		2		3		4		5		6	
	Reading scores				**Math scores**				**Science scores**			
	Model 1		***Model 2***		***Model 1***		***Model 2***		***Model 1***		***Model 2***	
Variable	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Intercept	**508,86**	2,30	**444,14**	27,99	**508,97**	2,99	**411,88**	37,15	**489,52**	3,25	**378,64**	41,22
Ethnic groups - Reference category=Danes												
1st generation immig	**-107,17**	6,24	**-60,46**	6,44	**-101,25**	7,89	**-69,77**	8,73	**-109,48**	8,90	**-63,80**	9,51
2nd generation immig	**-88,49**	5,17	**-39,29**	5,66	**-87,29**	6,64	**-48,48**	7,59	**-87,28**	7,54	**-41,27**	8,46
Gender - Reference category=male												
Female			**11,76**	3,54			**-20,71**	4,77			**-23,23**	5,28
Family structure - Reference category="Lives with both parents"												
Lives with single parent			*7,74*	4,52			-3,35	6,21			5,98	6,60
Lives with parent & step-parent			**17,48**	7,24			-3,20	9,55			*18,61*	10,33
Lives without parent			-13,02	13,58			**-61,52**	19,77			1,35	20,21
Number of siblings			**-3,62**	1,35			-1,89	1,80			**-4,05**	1,97
Mother's highest education - Reference category="No school / unskilled"												
Vocational education			10,15	7,78			-2,50	10,35			4,13	11,49
High-school exam			10,28	7,25			2,73	9,52			-6,42	10,98
Non-universitary tertiary education (up to 2 years)			7,52	8,50			5,44	11,15			5,61	12,37
Non-universitary tertiary education (2 - 3 years)			*14,51*	7,82			*19,14*	10,48			6,79	11,39
Non-universitary tertiary education (3 - 4 years)			**20,08**	6,02			**16,85**	8,19			5,18	8,86
University level tertiary education (min. 5 years)			**34,21**	7,94			**45,10**	10,74			14,40	11,54
Father's highest education - Reference category="No school / unskilled"												
Vocational education			-0,34	6,22			0,61	8,47			6,69	9,03
High-school exam			**17,73**	7,09			**22,34**	9,39			**30,61**	10,50
Non-universitary tertiary education (up to 2 years)			9,87	8,08			2,03	10,84			3,57	11,94
Non-universitary tertiary education (2 - 3 years)			*15,14*	8,06			-0,18	10,58			*22,35*	12,13
Non-universitary tertiary education (3 - 4 years)			**29,83**	6,94			**29,99**	9,13			**26,23**	10,35
University level tertiary education (min. 5 years)			**26,73**	6,72			**17,30**	9,08			**37,85**	9,94
Mother's labour market status - Reference category="Working full-time"												
Working part-time			6,46	5,89			-1,56	7,90			10,33	8,59
Unemployed			-7,68	7,21			-14,51	9,80			-6,14	10,57
Other (e.g. home duties, retired)			3,35	5,27			-4,08	6,98			11,53	7,74
Father's labour market status - Reference category="Working full-time"												
Working part-time			-13,94	7,63			1,40	10,35			*-20,05*	11,08
Unemployed			-8,05	8,00			-7,19	9,96			-0,83	12,10
Other (e.g. home duties, retired)			6,54	5,75			3,07	7,99			**-16,73**	8,49
Number of books in the home/100			**22,53**	3,83			6,73	5,14			**21,40**	5,74
Number of books in the home/100 squared			**-2,91**	0,58			-0,28	0,78			**-2,44**	0,86
			F-statistic	Pr > F			F-statistic	Pr > F			F-statistic	Pr > F
Cultural communication			**24,62**	<0,00			**5,86**	<0,00			**9,04**	<0,00
Social communication			**3,46**	0,02			0,98	0,40			*2,52*	0,06
Cultural possessions			1,41	0,24			0,71	0,54			0,26	0,85
Home educational resources			1,41	0,22			**3,94**	<0,00			0,38	0,86
Missing-dummies			Included					Included			Included	
No obs		2303		2303		1300		1300		1265		1265
Adj. R-sq.		0,179		0,363		0,181		0,326		0,162		0,314
	F-statistic	Pr > F	F-statistic	Pr > F	F-statistic	Pr > F	F-statistic	Pr > F	F-statistic	Pr > F	F-statistic	Pr > F
Test for gap-difference*	**6,34**	0,01	**10,47**	<0,00	2,20	0,14	**6,14**	0,01	**4,29**	0,04	**5,28**	0,02

** Test for different gap to Danes for 1st and 2nd generation immigrants.*

Table 5: Selected regression results for school fixed effects estimation

	(1)			*(2)*			*(3)*			*(4)*			*(5)*			*(6)*		
	Reading scores		% gap	Math scores		% gap	Science scores		% gap	Reading scores		% gap	Math scores		% gap	Science scores		% gap
	Coeff.	SE	expl.	Coeff.	SE	expl.	Coeff.	SE	expl.	Coeff.	SE	expl.	Coeff.	SE	expl.	Coeff.	SE	expl.
1st gen	**-60,46**	*6,44*	44%	**-69,77**	8,73	31%	**-63,8**	9,51	42%	**-44,98**	8,04	58%	**-57,46**	9,06	43%	**-47,29**	9,96	57%
2nd gen	**-39,29**	*5,66*	56%	**-48,48**	7,59	44%	**-41,27**	8,46	53%	**-24,61**	6,15	72%	**-39,35**	7,89	55%	**-30,17**	9,00	65%
Adj. R-sq	0,36			0,33			0,31			0,42			0,36			0,36		
Family background controls included	Yes			Yes			Yes			Yes			Yes			Yes		
School fixed effects included	No			No			No			Yes			Yes			Yes		

Note: Bold figures indicate significance at the 5% level.

Table 6: Differences in school input levels between ethnic groups

					(1)			(2)		(3)		(4)		(5)		
					Mean of school input			Mean difference to Danes in school input level				Mean difference to Danes corrected for SES-differences				Source of information*
		N with	Sample		Danes	1st gen	2nd gen	1st generation		2nd generation		1st generation		2nd generation		
	School input/ characteristic	*valid inform.*	*Mean*	*s.d.*	*Mean*	*Mean*	*Mean*	*Coeff.*	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*	
School resources																
School size	Enrollment	2303	496	173	524	417	431	**-108**	**11**	**-94**	**9**	**-88**	**13**	**-76**	**11**	SCH[a]
Class size	Class size: Danish lessons	2074	17,80	4,47	18,30	15,90	17,00	**-2,32**	**0,32**	**-1,29**	**0,26**	**-1,48**	**0,37**	-0,41	0,32	STUD
	Class size: Mathematics	2074	17,28	4,64	17,80	15,40	16,30	**-2,35**	**0,34**	**-1,40**	**0,27**	**-1,51**	**0,39**	-0,60	0,33	STUD
	Class size: Science	2044	15,77	4,91	16,20	14,30	15,00	**-1,87**	**0,37**	**-1,11**	**0,30**	**-1,11**	**0,42**	-0,46	0,36	STUD
Number of lessons	Language lessons/week	1757**	7,03	2,00	6,90	7,60	7,20	**0,74**	**0,16**	**0,34**	**0,13**	**0,53**	**0,19**	0,08	0,16	STUD
	Math lessons/week	1672**	4,65	1,26	4,63	4,77	4,68	0,13	0,10	0,05	0,08	-0,07	0,12	0,00	0,10	STUD
	Science lessons/week	1413**	2,94	1,91	2,74	3,83	3,46	**1,07**	**0,18**	**0,71**	**0,15**	**1,22**	**0,21**	**0,84**	**0,18**	STUD
	Teacher/student ratio	2085	0,08	0,02	0,08	0,09	0,09	**0,01**	**0,00**	**0,01**	**0,00**	**0,01**	**0,00**	**0,01**	**0,00**	SCH
	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?	2056	2,04	0,89	2,07	2,01	1,94	-0,06	0,06	**-0,13**	**0,05**	-0,10	0,07	**-0,21**	**0,06**	SCH
	- poor heating, cooling/lighting?	2056	1,81	0,80	1,83	1,79	1,78	-0,03	0,06	-0,05	0,05	-0,07	0,07	**-0,12**	**0,06**	SCH
	- lack of educational space?	2056	2,31	1,00	2,44	1,97	1,99	**-0,47**	**0,07**	**-0,44**	**0,06**	**-0,35**	**0,08**	**-0,33**	**0,07**	SCH
Educational resources	- lack of instructional material?	2056	2,09	0,98	2,12	2,07	1,99	-0,04	0,07	**-0,13**	**0,06**	-0,04	0,08	**-0,15**	**0,07**	SCH
	- not enough computers for instruction?	2056	2,31	0,92	2,40	2,11	2,12	**-0,28**	**0,07**	**-0,27**	**0,05**	**-0,20**	**0,08**	**-0,19**	**0,07**	SCH
	- lack of instructional material in the library?	2040	1,98	0,88	1,97	1,94	2,03	-0,03	0,06	0,06	0,05	-0,07	0,07	*0,01*	*0,07*	SCH
	- lack of multi-media resources for instruction?	2041	2,08	0,91	2,10	2,03	2,00	-0,07	0,07	**-0,10**	**0,05**	0,01	0,08	-0,02	0,07	SCH
	- inadequate science laboratory equipment?	2056	1,97	1,04	1,91	2,16	2,10	**0,25**	**0,07**	**0,20**	**0,06**	*0,15*	*0,09*	0,07	0,08	SCH
PC access at school	*How often do you have access to a computer at your school? (1-5; almost every day - never)*															
		2197	2,07	1,03	2,00	2,39	2,13	**0,39**	**0,07**	**0,13**	**0,06**	**0,33**	**0,08**	0,07	0,07	STUD
Teacher education	Percentage of full-time Danish teachers with a major in Danish	2019	0,86	0,23	0,87	0,82	0,84	**-0,05**	**0,02**	**-0,03**	**0,01**	**-0,05**	**0,02**	-0,03	0,02	SCH
	Percentage of full-time math teachers with a major in math	1986	0,69	0,28	0,73	0,57	0,63	**-0,15**	**0,02**	**-0,09**	**0,02**	**-0,10**	**0,02**	*-0,04*	*0,02*	SCH
	Percentage of full-time science teachers with a major in science	2023	0,89	0,34	0,89	0,88	0,91	0,02	0,02	0,00	0,02	0,01	0,03	-0,02	0,02	SCH
Peers																
	Percentage ethnic students at school	2303	0,29	0,28	0,18	0,58	0,53	**0,40**	**0,01**	**0,35**	**0,02**	**0,28**	**0,02**	**0,22**	**0,01**	Authors own
	Average parental education of school's students	2303	11,20	2,09	13,75	11,86	11,80	**-1,96**	**0,13**	**-2,05**	**0,10**	**-1,05**	**0,13**	**-1,04**	**0,12**	calculations
School policies and practices																
Staff prof. development	*During the last three months, what percentage of teaching staff in your school have attended a programme of professional development?*															
		2054	43,78	28,20	41,54	48,13	51,02	**6,63**	**2,02**	**9,51**	**1,68**	**4,77**	**2,36**	**6,46**	**2,07**	SCH
School climate: teachers	*In your school, is the learning of 15-year-old students hindered by … (1-4; not at all - a lot)*															
	- low expectations of teachers?	2077	1,21	0,46	1,13	1,48	1,42	**0,35**	**0,03**	**0,30**	**0,03**	**0,24**	**0,04**	**0,19**	**0,03**	SCH
	- poor student-teacher relations?	2063	1,32	0,48	1,32	1,30	1,32	-0,02	0,03	0,00	0,03	-0,03	0,04	-0,03	0,33	SCH
	- teachers not meeting individual students' needs?	2077	1,49	0,51	1,52	1,36	1,47	**-0,15**	**0,04**	-0,04	0,03	**-0,13**	**0,04**	-0,03	0,04	SCH
	- teacher absenteeism	2043	1,64	0,63	1,67	1,55	1,58	**-0,12**	**0,05**	**-0,09**	**0,04**	**-0,13**	**0,05**	**-0,10**	**0,05**	SCH
	- staff resisting change?	2094	1,35	0,50	1,36	1,38	1,30	0,02	0,04	*-0,06*	*0,03*	0,01	0,04	*-0,07*	*0,04*	SCH
	- teachers being too strict with students?	2077	1,22	0,41	1,22	1,22	1,22	0,00	0,03	0,00	0,02	0,02	0,03	0,01	0,03	SCH
	- students not being encouraged to achieve their full potential?	2060	1,17	0,40	1,13	1,25	1,28	**0,11**	**0,03**	**0,14**	**0,02**	**0,07**	**0,03**	**0,09**	**0,03**	SCH
Teacher morale&commitment	*Think about the teachers in your school. How much do you agree or disagree with the following statements? (1-4; strongly disagree - strongly agree)*															
	The morale of teachers in this school is high	2078	3,44	0,56	3,44	3,46	3,40	0,01	0,04	-0,04	0,03	0,06	0,05	0,05	0,04	SCH
	Teachers work with enthusiasm	2077	3,39	0,51	3,40	3,37	3,37	-0,03	0,04	-0,03	0,03	-0,03	0,04	0,00	0,04	SCH
	Teachers take pride in this school	2094	3,38	0,53	3,39	3,38	3,32	-0,01	0,04	**-0,07**	**0,03**	0,02	0,04	-0,01	0,04	SCH
	Teachers value academic achievement	2093	3,36	0,53	3,40	3,26	3,28	**-0,14**	**0,04**	**-0,12**	**0,03**	**-0,09**	**0,04**	*-0,07*	*0,04*	SCH

Continued …

Table 6, continued: Differences in school input levels between ethnic groups

					(1)			(2)		(3)		(4)		(5)		
			Mean of school input		Mean of school input			Mean difference to Danes in school input level				Mean difference to Danes corrected for SES-differences				Source of information*
		N with	Sample		Danes	1st gen	2nd gen	1st generation		2nd generation		1st generation		2nd generation		
	School input/ characteristic	*valid inform.*	*Mean*	*s.d*	*Mean*	*Mean*	*Mean*	*Coeff.*	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*	
Teacher shortage	*In your school, is the learning of <15-year-old students> hindered by … (1-4; not at all - a lot)*															
	- general	1687	1,09	0,43	1,12	1,04	1,04	**-0,08**	**0,03**	**-0,08**	**0,03**	-0,06	0,04	**-0,08**	**0,04**	SCH
	- Danish	2052	1,07	0,38	1,09	1,03	1,03	**-0,06**	**0,03**	**-0,06**	**0,02**	*-0,06*	*0,03*	**-0,06**	**0,03**	SCH
	- Math	1855	1,05	0,30	1,04	1,06	1,06	0,02	0,02	0,01	0,02	-0,01	0,03	-0,02	0,02	SCH
	- Science	1852	1,04	0,28	1,04	1,04	1,03	0,00	0,02	-0,02	0,02	<-0,001	0,02	-0,02	0,02	SCH
Teacher turnover	*In your school, is the learning of 15-year-old students hindered by teacher turnover (1-4; not at all - a lot)?*															
		2093	1,31	0,49	1,29	1,28	1,38	-0,02	0,04	**0,09**	**0,03**	-0,07	0,04	0,01	0,04	SCH
Classroom practices																
Teacher support	*How often do these things happen in your Danish lessons? (1-4; never - every lessons)*															
	The teacher shows an interest in every student's learning	2271	2,79	0,96	2,81	2,72	2,76	-0,09	0,07	-0,04	0,05	0,04	0,07	0,03	0,07	STUD
	The teacher gives students an opportunity to express opinions	2285	3,11	0,90	3,13	2,99	3,12	**-0,14**	**0,06**	-0,01	0,05	<0,001	0,07	0,09	0,06	STUD
	The teacher helps students with their work	2284	2,96	0,86	2,96	2,90	3,04	-0,05	0,06	*0,09*	*0,05*	-0,04	0,07	0,05	0,06	STUD
	The teacher continues teaching until the students understand	2282	2,88	0,90	2,85	2,94	3,00	0,09	0,06	**0,15**	**0,05**	*0,12*	*0,07*	**0,15**	**0,06**	STUD
	The teacher does a lot to help students	2287	2,89	0,88	2,86	2,88	3,00	0,02	0,06	**0,15**	**0,05**	0,07	0,07	**0,16**	**0,06**	STUD
	The teacher helps students with their learning	2266	2,96	0,85	2,99	2,85	2,93	**-0,14**	**0,06**	-0,06	0,05	-0,02	0,07	0,03	0,06	STUD
Disciplinary climate	*How often do these things happen in your Danish lessons? (1-4; never - every lessons)*															
	The teacher has to wait a long time for the students to quiten down	2302	2,22	0,76	2,21	2,22	2,24	0,00	0,05	0,02	0,04	-0,03	0,06	0,02	0,05	STUD
	Students cannot work well	2267	2,10	0,61	2,10	2,16	2,04	0,06	0,04	*-0,06*	*0,03*	0,04	0,05	-0,07	0,04	STUD
	Students don't listen to what the teacher says	2274	2,15	0,65	2,15	2,20	2,10	0,05	0,04	-0,05	0,04	0,03	0,05	-0,05	0,05	STUD
	Students don't start working for a long time after the lesson begins	2265	2,08	0,76	2,07	2,16	2,07	*0,09*	*0,05*	0,00	0,04	0,08	0,06	-0,01	0,05	STUD
	There is noise and disorder	2265	2,32	0,82	2,34	2,25	2,28	-0,08	0,06	-0,06	0,05	-0,07	0,06	-0,03	0,06	STUD
	At the start of class, more than five minutes are spent doing nothing.	2283	2,67	0,94	2,75	2,56	2,51	**-0,19**	**0,06**	**-0,23**	**0,05**	**-0,27**	**0,07**	**-0,29**	**0,06**	STUD
School climate: Students	*In your school, is the learning of 15-year-old students hindered by … (1-4; not at all - a lot)*															
	The use of alcohol or illegal drugs?	2076	1,08	0,27	1,07	1,13	1,09	**0,07**	**0,02**	0,02	0,02	**0,07**	**0,02**	0,03	0,02	SCH
	Students intimidating or bullying other students?	2076	1,37	0,53	1,33	1,43	1,47	**0,10**	**0,04**	**0,14**	**0,03**	0,02	0,04	0,04	0,04	SCH
	Student absenteeism	2059	2,11	0,15	2,07	2,23	2,22	**0,15**	**0,05**	**0,15**	**0,04**	0,05	0,06	0,02	0,05	SCH
	Disruption of classes by students?	2094	2,10	0,74	2,01	2,25	2,34	**0,24**	**0,05**	**0,33**	**0,04**	0,07	0,06	**0,13**	**0,05**	SCH
	Students skipping classes?	2094	2,02	0,71	1,98	2,09	2,13	**0,11**	**0,05**	**0,14**	**0,04**	0,03	0,06	0,06	0,06	SCH
	Students lacking respect for teachers?	2094	1,68	0,69	1,61	1,85	1,87	**0,24**	**0,05**	**0,26**	**0,04**	**0,13**	**0,06**	**0,13**	**0,05**	SCH
Pressure to achieve	*How often do these things happen in your Danish lessons? (1-4; never - every lessons)*															
	The teacher wants students to work hard	2283	3,26	0,83	3,32	3,06	3,14	**-0,27**	**0,06**	**-0,18**	**0,05**	**-0,17**	**0,06**	**-0,13**	**0,06**	STUD
	The teacher tells students that they can do better.	2287	2,23	0,82	2,15	2,52	2,34	**0,36**	**0,05**	**0,17**	**0,05**	**0,25**	**0,06**	0,08	0,06	STUD
	The teacher does not like it when students deliver careless work.	2257	2,94	0,98	3,04	2,67	2,65	**-0,37**	**0,07**	**-0,40**	**0,05**	**-0,20**	**0,08**	**-0,21**	**0,07**	STUD
	Students have to learn a lot	2258	3,09	0,81	3,11	2,99	3,09	**-0,12**	**0,03**	-0,02	0,05	**-0,13**	**0,06**	-0,05	0,06	STUD
Teacher-stud. Relations	*How much do you disagree or agree with each of the following statements about teachers at your school? (1-4; strongly disagree - strongly agree)*															
	Students get along well with most teachers	2256	2,73	0,73	2,76	2,61	2,67	**-0,15**	**0,05**	**-0,09**	**0,04**	-0,08	0,06	-0,05	0,05	STUD
	Most teachers are interested in students' well-being	2247	2,84	0,70	2,89	2,74	2,73	**-0,14**	**0,05**	**-0,15**	**0,04**	-0,04	0,05	**-0,10**	**0,05**	STUD
	Most of my teachers really listen to what I have to say	2253	2,78	0,77	2,76	2,88	2,83	**0,13**	**0,05**	0,08	0,04	**0,19**	**0,06**	*0,10*	*0,05*	STUD
	I need extra help, I will receive it from my teachers	2253	2,87	0,72	2,85	2,92	2,94	0,07	0,05	**0,09**	**0,04**	0,09	0,06	*0,09*	*0,05*	STUD
	Most of my teachers treat me fairly	2252	3,07	0,70	3,08	3,04	3,06	-0,04	0,05	-0,02	0,04	0,03	0,05	0,00	0,05	STUD

Note: Columns 2 to 3 display the size of the raw difference in school characteristics between natives and the two immigrant categories. These are the immigrant coefficients from a model with no controls except for the set of immigrant indicator variables and the school inputs as the dependent variables. Columns 4 and 5 report the ethnic coefficients from regressions that are parallel to those presented in Table 4 (Model 2), except that school inputs are the dependent variable rather than test scores. Thus, the entries in columns 4 and 5 reflect the extent to which 1st and 2nd generation immigrants attend higher or lower quality schools than natives with respect to each of the measures, controlling for the usual set of controls.

Note: I use the student supplied information on computer use at school instead of the computer per student ratio at school from the school questionnaire since preliminary examination of this data suggests these data to be unreliable. Bold figures indicate results significant at the 5% level.

* STUD=student questionnaire, SCH=school questionnaire

** In the questionnaire, students have been asked whether the number of lessons indicated is representative of a typical week of instruction. Observations where this was not true are treated as missings.

[a] Plus additional information on school size from school's web.sites for missing data observations.

Table 7: Differences in attitudes and learning strategies between ethnic groups

			(1)					(2)		(3)		(4)		(5)	
			Mean of school input					Mean difference to Danes in school input level				Mean difference to Danes corrected for SES-differences			
		Sample			*Danes*	*1st gen*	*2nd gen*	1st generation		2nd generation		1st generation		2nd generation	
		N	Mean	Std.dev.	*Mean*	*Mean*	*Mean*	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Absenteism	*How many times in the previous two school weeks did you … (1-4; never - 5 times or more)*														
	Miss school	2269	1,44	0,70	1,43	1,47	1,46	0,05	0,05	0,03	0,04	-0,08	0,06	-0,08	0,05
	Skip classes	2253	1,16	0,52	1,14	1,17	1,21	0,02	0,04	**0,06**	**0,03**	-0,03	0,04	0,02	0,04
	Arrive late for school	2269	1,02	0,96	1,91	1,96	1,93	0,06	0,07	0,02	0,05	<-0,01	0,08	0,01	0,07
Belonging	*My school is a place where … (1-4; strongly disagree - strongly agree)*														
	I make friends easily	2267	3,09	0,75	3,10	2,99	3,14	**-0,10**	**0,05**	0,05	0,04	0,04	0,06	**0,15**	**0,05**
	I feel like I belong	2242	3,11	0,78	3,11	3,07	3,18	-0,03	0,05	0,07	0,04	0,05	0,06	**0,13**	**0,05**
	Other students seem to like me	2260	2,92	0,85	2,94	2,84	2,93	-0,09	0,06	<0,01	0,05	-0,04	0,07	0,05	0,06
	I feel like an outsider*	2278	1,42	0,65	1,42	1,52	1,35	**0,10**	**0,04**	**-0,07**	**0,04**	0,05	0,05	**-0,09**	**0,04**
	I feel awkward and out of place*	2254	1,58	0,74	1,57	1,71	1,54	**0,14**	**0,05**	-0,03	0,04	0,07	0,06	-0,06	0,05
	I feel lonely*	2274	1,53	0,69	1,54	1,57	1,47	0,03	0,05	-0,07	0,04	0,00	0,05	-0,07	0,05
	I do not want to go*	2250	1,81	0,89	1,85	1,80	1,66	-0,05	0,06	**-0,19**	**0,05**	**-0,14**	**0,07**	**-0,25**	**0,06**
	I often feel bored*	2245	2,36	0,93	2,47	2,22	2,03	**-0,25**	**0,06**	**-0,44**	**0,05**	**-0,24**	**0,07**	**-0,38**	**0,06**
Homework	*Please indicate how often each of these applies to you (1-4; never - always).*														
	I complete my homework on time	2283	3,00	0,76	2,98	3,02	3,08	0,04	0,05	**0,10**	**0,04**	**0,21**	**0,06**	**0,25**	**0,05**
	I am given interesting homework	2276	1,78	0,68	1,72	1,96	1,91	**0,24**	**0,05**	**0,20**	**0,04**	**0,25**	**0,05**	**0,18**	**0,04**
	On average, how much time do you spend <u>each week</u> on homework and study in these subject areas? (1-4; no time - 3 hours or more a week)														
	Hours Danish	2264	2,99	0,73	2,94	3,10	3,15	**0,16**	**0,05**	**0,21**	**0,04**	**0,19**	**0,06**	**0,23**	**0,05**
	Hours Math	2264	2,81	0,80	2,73	3,04	3,01	**0,31**	**0,05**	**0,28**	**0,04**	**0,34**	**0,06**	**0,31**	**0,05**
	Hours Science	2260	2,11	0,84	2,03	2,37	2,31	**0,34**	**0,06**	**0,28**	**0,05**	**0,37**	**0,06**	**0,30**	**0,06**
Leisure time	*On average, how much time do you spend <u>each week</u> on organized leisure activities (sportsclub, music lessons etc.)?*														
	(1-5; less than 4 hours - 8 hours or more a week)	1626	1,77	1,04	1,78	1,65	1,78	-0,13	0,08	-0,01	0,07	-0,06	0,10	0,07	0,09
Paid work	*On average, how much time do you spend <u>each week</u> on paid work? (1-5; less than 4 hours - 8 hours or more a week)*														
		1601	1,58	0,98	1,58	1,56	1,57	-0,02	0,08	-0,01	0,07	0,11	0,09	0,04	0,08
Control strategies	*How often do these things apply to you? (1-4; almost never - almost always)*														
	When I study, I start by figuring out exactly what I need to learn	2259	2,65	0,84	2,59	2,82	2,77	**0,23**	**0,06**	**0,18**	**0,05**	**0,22**	**0,07**	**0,20**	**0,06**
	When I study, I force myself to check to see if I remember what I have learned	2257	2,52	0,86	2,43	2,73	2,77	**0,30**	**0,06**	**0,34**	**0,05**	**0,34**	**0,07**	**0,37**	**0,06**
	When I study, I make sure that I remember the most important things	2222	2,99	0,77	2,96	3,10	3,02	0,06	0,05	**0,14**	**0,04**	**0,13**	**0,06**	**0,22**	**0,05**
	When I study, and I don't understand something look for additional information to clarify this	2230	2,50	0,86	2,44	2,67	2,63	**0,23**	**0,06**	**0,19**	**0,05**	**0,29**	**0,07**	**0,27**	**0,06**
Memorising	*How often do these things apply to you? (1-4; almost never - almost always)*														
	When I study, I try to memorise everything that might be covered	2267	3,00	0,82	3,00	2,94	3,03	-0,06	0,06	0,03	0,05	0,04	0,06	**0,12**	**0,06**
	When I study, I memorise as much as possible	2241	2,70	0,84	2,71	2,70	2,62	-0,09	0,06	-0,01	0,05	-0,06	0,07	0,02	0,06
	When I study, I memorise all new material so that I can recite it.	2233	2,14	0,80	2,07	2,30	2,27	**0,21**	**0,05**	**0,19**	**0,04**	**0,23**	**0,06**	**0,21**	**0,06**
	When I study, I practise by saying the material to myself over and over	2253	2,44	0,87	2,36	2,63	2,66	**0,26**	**0,06**	**0,29**	**0,05**	**0,22**	**0,07**	**0,24**	**0,06**
Elaboration	*How often do these things apply to you? (1-4; almost never - almost always)*														
	When I study, I try to relate new material to things I have learned in other subjects	2236	2,55	0,83	2,54	2,55	2,58	0,01	0,06	0,05	0,05	**0,15**	**0,06**	**0,19**	**0,06**
	When I study, I figure out how the information might be useful in the real world	2231	2,38	0,89	2,33	2,46	2,49	**0,12**	**0,06**	**0,15**	**0,05**	0,05	0,07	0,09	0,06
	When I study, I try to understand the material better by relating it to things I already know	2217	2,70	0,83	2,68	2,75	2,71	0,06	0,06	0,02	0,05	**0,19**	**0,06**	**0,15**	**0,06**
	When I study, I figure out how the material fits in with what I have already learned	2223	2,63	0,79	2,60	2,75	2,71	**0,15**	**0,05**	**0,11**	**0,04**	**0,19**	**0,06**	**0,15**	**0,05**
Co-operative learning	*How much do you disagree or agree with each of the following? (1-4; disagree - agree)*														
	I learn most when I work with other students	2184	2,13	0,86	2,18	2,09	1,96	-0,09	0,06	**-0,22**	**0,05**	-0,04	0,07	**-0,14**	**0,06**
	I do my best work when I work with other students.	2177	2,18	0,88	2,24	2,05	2,03	**-0,18**	**0,06**	**-0,21**	**0,05**	-0,12	0,07	-0,09	0,06
	I like to help other people do well in a group	2193	1,81	0,80	1,83	1,82	1,73	-0,01	0,06	**-0,10**	**0,05**	-0,10	0,06	**-0,16**	**0,06**
	It is helpful to put together everyone's ideas when working on a project	2182	1,54	0,73	1,53	1,63	1,52	**0,10**	**0,05**	**-0,02**	**0,04**	-0,02	0,06	**-0,14**	**0,05**
Competitive learning	*How much do you disagree or agree with each of the following? (1-4; disagree - agree)*														
	I like to try to be better than other students	2202	2,07	0,92	2,11	1,95	1,98	**-0,16**	**0,06**	**-0,13**	**0,05**	**-0,22**	**0,07**	**-0,17**	**0,06**
	Trying to be better than others makes me work well	2180	2,18	0,92	2,22	2,08	2,02	**-0,14**	**0,07**	**-0,21**	**0,05**	**-0,19**	**0,08**	**-0,22**	**0,06**
	I would like to be the best at something	2186	1,80	0,92	1,82	1,68	1,78	**-0,15**	**0,07**	-0,05	0,05	**-0,23**	**0,07**	-0,12	0,06
	I learn faster if I'm trying to do better than the others	2182	2,24	0,92	2,31	2,02	2,06	**-0,30**	**0,06**	**-0,26**	**0,05**	**-0,30**	**0,07**	**-0,23**	**0,06**

* Somewhat counterintuitively, negative coefficient values on these variables indicate a more favourable level of this variable for immigrants compared to Danes.

Note: Columns 2 to 3 display the size of the raw difference in school characteristics between natives and the two immigrant categories. These are the immigrant coefficients from a model with no controls except for the set of immigrant indicator variables and the school inputs as the dependent variables. Columns 4 and 5 report the ethnic coefficients from regressions that are parallel to those presented in Table 4 (Model 2), except that school inputs are the dependent variable rather than test scores. Thus, the entries in columns 4 and 5 reflect the extent to which 1st and 2nd generation immigrants attend higher or lower quality schools than natives with respect to each of the measures, controlling for the usual set of controls.

Table 8: Results on ethnic gaps using different sets of controls

		1		2		3		4	
		Reading scores							
		Coeff.	% gap	Coeff.	% gap	Coeff.	% gap	Coeff.	% gap
		s.d.	*expl.*	*s.d.*	*expl.*	*s.d.*	*expl.*	*s.d.*	*expl.*
Coefficient on:	1st generation immigr.	-107,17	0%	-60,46	44%	-61,78	42%	-44,08	59%
		6,24		*6,44*		*8,01*		*7,57*	
	2nd generation immigr.	-88,49	0%	-39,29	56%	-41,83	53%	-22,42	75%
		5,17		*5,66*		*6,99*		*6,06*	
Control set included:	Socio-economic status			X				X	
	Selected school inputs					X		X	
	Adj. R-squared	0,179		0,367		0,325		0,421	
	No. observations	2303		2303		2303		2303	
		Math scores							
Coefficient on:	1st generation immigr.	-101,25	0%	-69,77	31%	-67,63	33%	-59,21	42%
		7,89		8,73		8,89		8,74	
	2nd generation immigr.	-87,29	0%	-48,48	44%	-55,51	36%	-39,58	55%
		6,64		7,59		8,89		7,47	
Control set included:	Socio-economic status			X				X	
	Selected school inputs					X		X	
	Adj. R-squared	0,181		0,325		0,247		0,339	
	No. observations	1300		1300		1300		1300	
		Science scores							
Coefficient on:	1st generation immigr.	-109,48	0%	-63,80	42%	-69,31	37%	-47,77	56%
		8,90		9,51		9,87		9,06	
	2nd generation immigr.	-87,28	0%	-41,27	53%	-49,06	44%	-27,23	69%
		7,54		8,46		8,86		8,22	
Control set included:	Socio-economic status			X				X	
	Selected school inputs					X		X	
	Adj. R-squared	0,162		0,312		0,252		0,378	
	No. observations	1265		1265		1265		1265	

Note: Standard errors are corrected for clustering at the school level in regressions including school input variables as cor

Table 9: Correlations between individual school inputs and student reading test scores: the impact on the ethnic reading test score gaps

		1	2	3	4	5	6	7	8	9	10	11	12
		Estimated test score gap relative to Danes (no additional controls)				Joint sign.	Estimated coef. on school input	Estimated test score gap relative to Danes (family background controls added)				Joint sign.	Estimated coef. on school input
		1st generation	*Hausman*	*2nd generation*	*Hausman*	F-stat.		*1st generation*	*Hausman*	*2nd generation*	*Hausman*	F-stat.	
	School input	*Coeff.* *SE*	*test*	*Coeff.* *SE*	*test*		*Coeff.* *SE*	*Coeff.* *SE*	*test*	*Coeff.* *SE*	*test*		*Coeff.* *SE*
	No school inputs added: baseline estimation	**-107,20** **6,24**		**-88,49** **5,17**				**-60,46** **6,44**		**-39,29** **5,66**			
School resources													
Teacher education	Percentage of full-time Danish teachers with a major in Danish	**-99,56** **9,21**	1,27	**-83,68** **6,87**	1,13		*** (se note below)**	**-56,88** **7,55**	0,83	**-37,34** **6,11**	0,72		**** (se note below)**
Peers													
	Percentage ethnic students at school	**-67,88** **8,38**	**49,42**	**-47,59** **7,11**	**70,22**	**80,53**	**-108,48** **15,76**	**-45,79** **7,81**	**11,02**	**-25,54** **6,07**	**39,31**	**41,19**	**-64,79** **11,42**
	Average parental education of school's students						**21,44** **1,71**						**13,22** **1,52**
School policies and practices													
School climate: teachers	*In your school, is the learning of 15-year-old students hindered by … (1-4; not at all - a lot)*												
		-100,46 **10,79**	0,59	**-82,39** **9,04**	0,68	*2,53*		**-58,95** **8,24**	0,09	**-37,76** **6,85**	0,16	0,49	
	- low expectations of teachers?						**-19,46** **8,59**						-6,00 5,99
	- students not being encouraged to achieve their full potential?						-5,05 15,03						-3,55 8,48
Teacher morale&commitment	*Think about the teachers in your school. How much do you agree or disagree with the following statements? (1-4; strongly disagree - strongly agree)*												
	Teachers value academic achievement	**-104,62** **10,72**	0,09	**-86,53** **7,79**	0,11		*15,80* *9,33*	**-59,73** **8,08**	0,02	**-38,81** **6,28**	0,03		8,06 5,98
Teacher shortage	*In your school, is the learning of <15-year-old students> hindered by … (1-4; not at all - a lot)*												
	- Danish	**-106,67** **10,28**	0,00	**-87,92** **7,67**	0,01		-2,15 4,68	**-59,96** **7,94**	0,01	**-38,69** **6,30**	0,05		**-7,66** **3,17**
Classroom practices													
School climate: Students	*In your school, is the learning of 15-year-old students hindered by … (1-4; not at all - a lot)*												
		-102,37 **10,09**	0,37	**-83,06** **8,17**	0,74	2,33		**-59,20** **7,73**	0,09	**-37,96** **6,20**	0,28	1,43	
	The use of alcohol or illegal drugs?						-4,81 11,84						-0,22 7,63
	Disruption of classes by students?						-10,98 10,03						-2,13 6,61
	Students lacking respect for teachers?						-7,10 9,32						-7,40 5,88
Pressure to achieve	*How often do these things happen in your Danish lessons? (1-4; never - every lessons)*												
		-98,97 **9,91**	1,14	**-79,87** **7,80**	2,18	**27,34**		**-58,42** **7,72**	0,23	**-36,32** **6,21**	1,35	**16,28**	
	The teacher wants students to work hard						**11,87** **2,62**						**7,93** **2,26**
	The teacher does not like it when students deliver careless work.						**12,61** **2,44**						**7,53** **2,17**
	Students have to learn a lot						**-10,07** **2,64**						**-9,63** **2,65**
Teacher-stud. Relations	*How much do you disagree or agree with each of the following statements about teachers at your school? (1-4; strongly disagree - strongly agree)*												
	Most teachers are interested in students' well-being	**-102,70** **9,63**	0,38	**-83,68** **7,42**	0,82		**26,81** **3,15**	**-59,59** **7,94**	0,04	**-37,64** **6,23**	0,40		**16,93** **2,77**

** Entered as quadratic function: Percentage:**191,26** (63,92); Percentage-squared: **-127,85** (43,92)*

*** Entered as quadratic function: Percentage:**117,89** (38,12); Percentage-squared:**-84,06** (27,34)*

Figure 1: Immigrants' reading test score gap to natives (PISA 2000)

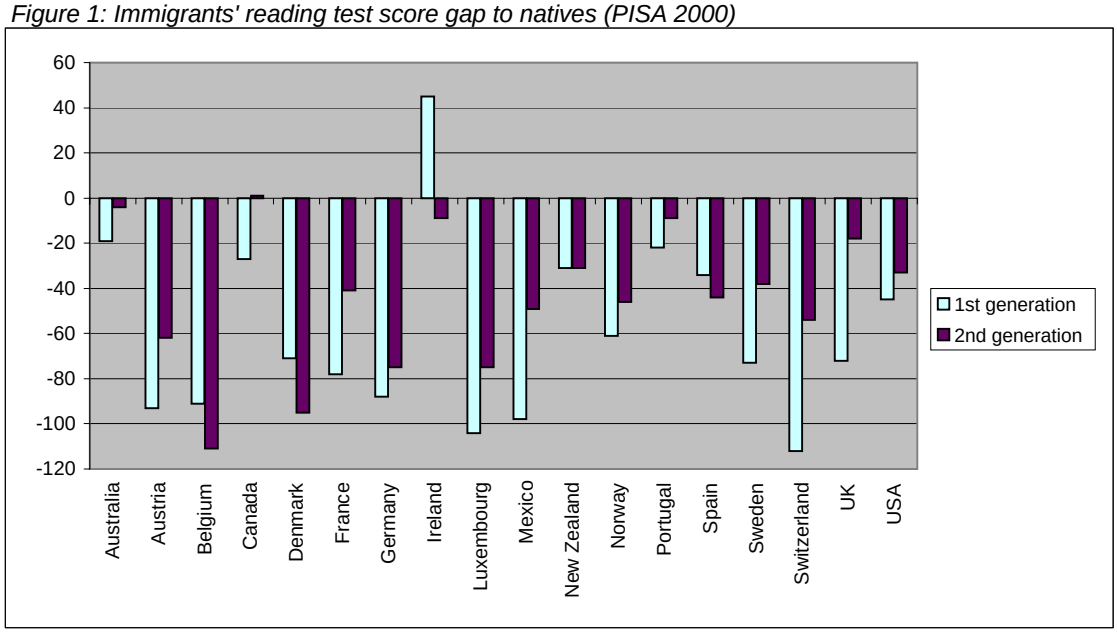

Figure 2: Distribution of ethnic test score gaps