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Christian Dustmann, Tommaso Frattini and Gianandrea Lanzara

Centre for Research and Analysis of Migration
Department of Economics, University College London
Drayton House, 30 Gordon Street, London WC1H 0AX

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Christian Dustmann*, Tommaso Frattini† and Gianandrea Lanzara*

* University College London and CReAM
† Università degli Studi di Milano, CReAM, IZA and LdA

Non-Technical Abstract

This paper investigates the educational achievements of second generation immigrants in several OECD countries in a comparative perspective.

We first show that the educational achievement (measured as test scores in PISA achievement tests) of children of immigrants is quite heterogeneous across countries, and strongly related to achievements of the parent generation. The disadvantage considerably reduces, and even disappears for some countries, once we condition on parental background characteristics.

Second, we provide novel analysis of cross-country comparisons of test scores of children from the same country of origin, and compare (conditional) achievement scores in home and host countries. The focus is on Turkish immigrants, whom we observe in several destination countries. We investigate both mathematics and reading test scores, and show that the results vary according to the type of skills tested. For mathematics, in most countries and even if the test scores achievement of the children of Turkish immigrants is lower than that of their native peers, it is still higher than that of children of their cohort in the home country - conditional and unconditional on parental background characteristics. The analysis suggests that higher school quality relative to that in the home country is important to explain immigrant children's educational advantage.

Centre for Research and Analysis of Migration
Department of Economics, Drayton House, 30 Gordon Street, London WC1H 0AX
Telephone Number: +44 (0)20 7679 5888
Facsimile Number: +44 (0)20 7679 1068

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°University College London and CReAM

§Università degli Studi di Milano, CReAM, IZA and LdA

Abstract

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We first show that the educational achievement (measured as test scores in PISA achievement tests) of children of immigrants is quite heterogeneous across countries, and strongly related to achievements of the parent generation. The disadvantage considerably reduces, and even disappears for some countries, once we condition on parental background characteristics.

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1. INTRODUCTION

The emphasis of the debate on immigration has shifted in recent years, from issues surrounding new immigration to issues surrounding the integration of the existing populations of immigrants, and their children. For instance, integration dominates the public debate in Germany, albeit Germany having witnessed a substantial decrease in immigration over the last decade, and even net out-migration in 2008**.** Concerns about the integration of foreign immigrants have also been one of the main motivations for the Dutch "Law on the integration of immigrants": The law, which became effective in the Netherlands in 2007, introduces an obligation to integrate into Dutch society for people entering the Netherlands. Likewise, Italy has recently amended its immigration law, and now requires all immigrants who have been in the country for at least five years and apply for a permanent residence permit to pass an Italian language test. Similar debates about integration-enhancing measures have opened up in other European countries. Thus, the focus of the political debate seems to have shifted from policies that regulate immigration to policies that regulate the integration of existing populations of immigrants.

The integration of immigrants and in particular of their children is a key challenge for policy makers. Many European countries are not well prepared for this task, in comparison to countries like the US, Australia, and Canada. This has at least two reasons. First, immigration – and in particular immigration of culturally and ethnically diverse populations – is a relatively new phenomenon for most European countries, posing many new challenges. For instance, Bisin et al. (2011) show that first generation immigrants in European countries, regardless of their origin, have a stronger ethnic identity than natives. Secondly, many European countries did not accept – until recently – that they are in effect immigration countries, and lack long-term integration programmes (see e.g. Bauer, Lofstrom and Zimmermann (2000) and references therein).

But how different are Europe's second generation immigrants from native born individuals of the same age, in terms of their educational attainment? How do they compare to their parent generation? Are there large differences across European countries, and is Europe different from the classical immigration countries US, Canada and Australia? How do immigrant children perform in the school systems of their parents' destination countries, compared to their peers back in their parents' home countries? Not much comparative work exists on these issues, and –despite being a key part of the debate about immigration – little conclusive evidence on the educational attainment of Europe's second generation immigrants, and how this compares to that of their parents, is available.

In this paper, we provide a comparative analysis across different European countries of second generation immigrants. We analyse how they perform in terms of education, in comparison to their native peers, and their peers back in their parents' home country, and we contrast this European experience with the classic immigration countries US, Australia, and Canada. We also analyse the relationship between second- and fist generation immigrants, and contrast this to comparable native groups. We categorise countries in four groups: The Anglo-Saxon Countries US, Canada, Australia, and the UK; Central European countries Austria, Germany, France, the Netherlands, Belgium and Switzerland; Southern European countries Italy, Spain, Greece, and Portugal; and the Nordic countries: Sweden, Denmark, Norway, and Finland.

Immigrant children's educational attainment has been studied by anthropologists and sociologists (see Chiswick and DebBurman (2004) for an overview of the sociological and anthropological literature). Economists have typically investigated second generation immigrants' educational achievement in the context of analyses on intergenerational mobility, and the labour market and social integration of the descendants of immigrants (see e.g. Chiswick (1977), Carliner (1980), Borjas (1993), Card, DiNardo and Estes (2000), Borjas (2006), Dustmann (2008), and Casey and Dustmann (2008, 2010)). Studies that look at the educational attainment of immigrants children[1] in comparison to natives include Gang and Zimmermann (2000) and , Riphahn (2003) for Germany, Van Ours and Veenman (2003) for the Netherlands, Chiswick and DebBurman's (2004) for the US, and Dustmann and Theodoropoulos (2010) for the UK. Algan, Dustmann, Glitz and Manning (2010) perform a comparative study of immigrants' integration in France, Germany, and the UK, and find that there is considerable cross-country heterogeneity in immigrants' educational achievements. Dustmann, Machin and Schoenberg (2010) investigate the school curricula of ethnic minority children in the UK and find that – while starting off at lower achievement outcomes at school entry – nearly all minority groups are outperforming British white children by the age of 16.

Most of these studies (except for Algan et al. 2010) focus on one country. Schnepf (2007) is one of the few papers that analyses – in a cross-country comparative perspective – standardised performance tests of immigrant children[2], using PISA 2003, TIMSS 1995 and 1999, and PIRLS 2001 data for ten high-immigration countries (Australia, Canada, France, Germany, the Netherlands, New Zealand, Sweden, Switzerland, the UK and the US).

[1] A related stream of literature has instead investigated the effect of immigrant students on the educational achievement of natives (see for instance Betts (1998), Hoxby (1998), Borjas (2004), Gould, Lavy and Paserman (2009), Brunello and Rocco (2011)).

[2] See also Entorf and Miniou (2005).

Our paper makes a number of contributions. First, we provide evidence on the relationship of educational attainment between immigrants (whom we define as individuals who are born in another country), and their children for countries with significant immigrant populations. Second, we use standardised performance tests across many countries, drawn from the PISA survey, to extend Schnepf's (2007) work in a number of dimensions. We consider a larger number of countries, clustered in culturally homogeneous groups, and use more recent data. Moreover, we look at both reading and mathematics test scores, and not only at maths scores. Finally, we adopt a slightly different reference group, defining as natives only individuals with both parents born in the country.[3] Third, we compare the test scores of the children of Turkish immigrants not only with those of native born individuals across destination countries, but also with test scores in the same tests of Turkish children in Turkey. Previous work by Luthra (2010) performs a similar analysis, but restricted to Germany, comparing the test scores of different groups of immigrant children to the test scores of children in their countries of origin. Dronkers and de Heus (2010) analyse, in a slightly different setting, the difference in PISA science test scores results between children of immigrants pooled across eleven European countries and those of non-immigrants in origin countries. We add to this literature by providing cross country analysis of children from the same origin country, and we investigate both mathematics and reading test scores.

Our results show that the educational achievement (measured as test scores in PISA achievement tests) of children of immigrants is heterogeneous across countries, and strongly related to achievements of the parent generation. In countries where the foreign born parents are well educated (as e.g. in Australia), the children of immigrants tend to do well, and sometimes even better, than their peers who are born to native born parents. On the other hand, in countries where children of native born parents outperform the children of immigrants, this is primarily due to the more disadvantaged family background of immigrant children. The disadvantage considerably reduces, and even disappears for some countries, once we condition on parental background characteristics.

Comparing children of Turkish origin in different host countries to children in Turkey, we find that for mathematics, even in host countries where the test scores achievement by the children of Turkish immigrants are lower than those of their native peers, they are still higher than those of children of their cohort in the home country. This is both conditional and unconditional on parental background

[3] Schnepf (2007) defines as children of natives those who have at least one parent born in the country.

characteristics. Our analysis also suggests that higher school and peer quality in the host countries relative to the home country is a main determinant of immigrant children's educational advantage.

The paper is structured as follows: in the next section we describe the data used for the analysis. Section 3 provides background information on immigrants' educational achievement in different countries and on the intergenerational correlation of immigrants' education and of immigrant-native gaps. Section 4 turns to the analysis of PISA data: we first investigate test score gaps between immigrants and natives; then we focus on Turkish immigrants and describe their achievement gaps relative to natives in different countries, and the differences in their test scores results with Turkish children in Turkey. Section 5 concludes and discusses the policy implications of our findings.

2. BACKGROUND AND DATA

2.1 Integration and Intergenerational Mobility

Before we investigate the relationship between educational (or other) outcomes of the children of immigrants and natives, it seems important to address a number of conceptual issues. A key factor in the determination of the educational attainment of second generation immigrants is the educational attainment of their parents. If children's outcomes are correlated with the outcomes of their parents, in the sense that parental background has some impact on child's outcomes, and if two parent populations (like natives and immigrants) have different mean outcomes, then the outcomes of the populations of their children will most likely also differ. To what extent parental outcomes are passed on to the offspring depends partly on the intergenerational correlation between parent and child generation. If this correlation is less than 1 (but larger than zero), the mean outcomes of children will be less different than the mean outcomes of parents. If two parent populations (like immigrants and natives) have different mean outcomes, but similar intergenerational correlations, then the same will be true for their children, although to a lesser degree. This is important, as it suggests that integration policies cannot be considered unsuccessful if they do not achieve the same mean outcomes for immigrant and non-immigrant children, as long as the parent generations differ.[4] We will demonstrate this in the sections below.

[Box 1]

[4] There is a large literature in economics as well as other social sciences that investigates the relationship between parental outcomes and the outcomes of their children (see Solon (2002) for a survey).

2.2 Data

Our analysis is based on three international datasets: the OECD Programme for International Student Assessment (PISA) database, the European Union Labour Force Survey, and the European Social Survey. This section describes briefly each dataset.

Throughout the paper, and regardless of the dataset used, we define "first generation" immigrants as individuals born abroad, and as "second generation" immigrants the children of foreign-born parents born in the destination country. We exclude mixed-background children (i.e. children with one foreign-born and one native-born parent) from our analyses, unless explicitly specified.

2.2.1 Programme for International Student Assessment (PISA)

PISA is an internationally standardised achievement assessment. It is administered to 15-year-olds in schools in all OECD countries as well as in a number of partner countries (like e.g. Brazil, Russia, Croatia, Chile). PISA assesses students' reading, mathematics and scientific skills by means of internationally standardised test scores. Questions are designed to reflect the capacity of students to extrapolate from what they have learned and apply their knowledge in novel settings.

PISA assessments started in 2000, and have since been conducted every three years. Our work is based on the 2006 assessment of reading and mathematics proficiency.

Tests are typically administered to between 4,500 and 10,000 students in each country. In 2006, 57 countries participated in the assessment. Beside test scores in reading, mathematics, and science, the PISA dataset has also information on parents' and children's country of birth, as well as on a number of household and school characteristics. However, countries of origin of children and parents are not coded consistently in all participating countries. For this reason, we are not always able to distinguish between different origin countries (except for Turkey in some destination countries, see section 4.2).

PISA test scores are internationally standardised, to have mean 500 and standard deviation 100 across OECD countries, therefore gaps in PISA scores can be straightforwardly interpreted in terms of percentage points of an international standard deviation.

Each student in PISA is tested on a randomly drawn subset of the total set of questions. For this reason, test results are not presented as point estimates. Rather, a probability distribution of test scores is estimated for each pupil based on their answers. Then, for each pupil five random draws are taken from the estimated distribution and reported in the dataset. These draws are referred to

as “plausible values”, and are a selection of likely proficiencies for students that attained each score (see OECD (2009a) for details). Throughout the analysis, we account for the use of imputed regressors in computing the standard errors of our estimates by using the “unbiased shortcut” procedure described in OECD (2009b). Moreover, we take into account the complex sampling design of PISA (described in OECD, 2009a) using the replications weights provided in the dataset.

2.2.2 European Union Labour Force Survey (EULFS)

The EULFS microdata are available for the 27 Member States of the European Union, except Malta, and in addition Iceland and Norway. The EULFS is a large quarterly household sample survey of people aged 15 and over as well as of persons outside the labour force. In all of the countries providing quarterly data, the quarterly sample is spread uniformly over all weeks of the quarter. The national statistical institutes are responsible for selecting the sample, preparing the questionnaires, conducting the direct interviews among households, and forwarding the results to Eurostat in accordance with the common coding scheme. Although the sampling schemes vary slightly, all countries apply a rotating panel design whereby the same individuals are interviewed for a fixed number of quarters, and then leave the sample.

The data collection covers the years 1983 to 2009, though not all countries are included in each year. For our analysis we pool the years 2006-2008 to deal with relatively small samples of immigrants. On average we have 450,000 individuals (of which 34,000 immigrants) for each country.

The EULFS collects information on respondents’ personal circumstances and labour market status and occupation; however, there is no wage information. It also contains information on country of birth (grouped in macro-areas) and, where applicable, years since migration, but it has no information on ethnicity or parents’ country of birth. Moreover, disaggregated information on macro-area of origin is consistently available only since 2004.

2.2.3 European Social Survey (ESS)

The ESS is a repeated cross-sectional survey, intended to map the attitudes and beliefs of citizens in Europe (see e.g. Card, Dustmann and Preston (2005) for a description of the dataset)**.** The survey has been conducted every two years since 2002, so that four waves are currently available. The number of participating countries has changed over time from 22 in the first wave (2002) to 31 in the fourth wave (2008). Of the 13 European countries in our sample, 11 have taken part in all waves, while Italy

participated in two waves only (2002 and 2004), and Greece in three waves (2002, 2004, and 2008). On average, about 1800 individuals are interviewed in each country in every wave.

The ESS collects information on values, attitudes, political engagement and identity, but also some core demographic information. In particular, the ESS contains information about country of birth of individual respondents and of their parents, and about the number of years of full time education received. In our analysis we pool all available waves to obtain large enough samples for the foreign born populations and their children.

3. DIFFERENCES IN EDUCATIONAL OUTCOMES AND INTERGENERATIONAL CORRELATION

As we discuss in the previous section, the educational attainment of immigrant children, and in comparison to the children of natives, cannot be seen in isolation from their parent generation. In this section we provide some evidence on the differences in educational outcomes of immigrants in the different countries we consider, and how this relates to the outcomes of their children.

3.1 The first generation: Heterogeneity in educational background

Immigrants represent a sizable, and increasing, fraction of the total population in most OECD countries. However, the size and composition of the immigrant population varies considerably across countries, as we show in the first column of Table 3.1.

[Table 3.1]

The share of immigrants in the total working age population tends to be lower in Nordic and Southern European countries (with the notable exceptions of Sweden and Spain), and higher in Central European and Anglo-Saxon countries, which have a longer history of immigration. The share of immigrants in the total working age population ranges between 3.3% in Finland and almost 24% in Australia and Canada.

Countries also differ greatly in the relative educational distribution of immigrants and natives. In Table 3.1 we use the International Standard Classification of Education (ISCED) and define as “low education” ISCED levels 0 to 2 (up to lower-secondary education), and as “high education” ISCED levels 5 and 6 (tertiary education). In columns 2 and 3 of table 3.1 we report the share of,

respectively, natives and immigrants with high education, while in columns 4 and 5 we report the share of immigrants and natives with low education. The share of immigrants with tertiary education ranges between 13.2% in Italy and 37.5% in Norway, while the share of immigrants with no more than lower secondary education is lowest in Canada (21%) and highest in Portugal (52.3%). In general, there is a positive correlation between immigrants' and natives' education, with Southern European countries having a large share of low educated immigrants as well as among the largest shares of low educated natives, and Nordic countries having high shares of tertiary educated immigrants and natives. Immigrants are on average more educated than natives in Italy, Portugal, Sweden and the UK, while they are less educated than natives in Belgium, Germany, Finland, France, Greece, and the Netherlands.

If there is some degree of intergenerational correlation in education, as we discuss in the previous section, then we would expect the native-immigrant education gap to persist also among the second generations. Therefore we would expect the relative educational achievement of second generation immigrants to differ across countries, in accordance with their parents' educational gaps.

3.2 Intergenerational mobility

How persistent across generations are the immigrant-native education gaps? Table 3.2 relates the educational achievements of first generation immigrants to that of their children's generation across Europe. The table uses information on the number of years of full time education obtained from the European Social Survey (ESS), where we pool together the four ESS rounds (years 2002, 2004, 2006 and 2008) to increase the number of observations in each country.

[Table 3.2]

We define a "parent generation" as immigrants (i.e. foreign born) aged 55 to 75 and a "second generation" by looking at the native-born children of foreign born parents, and who are 25 to 50 years of age. Individuals in the latter group are likely to be the daughters and sons of individuals in the former group. This is similar to the approach followed by Dustmann and Theodoropoulos (2010). The first column of the table reports, for each country, the mean number of years of education of the parent generation, while the second column displays the mean number of years of education of the children's generation. Since the number of sampled second-generation immigrants in the chosen age range is small in most countries (the cross-country mean number of observations is 59.8), in column 3 we adopt a less restrictive definition of second-generation immigrants, where we define as second-generation all individuals with at least one foreign-born parent. The educational attainment

of the children generation is higher in all countries, reflecting secular movements towards higher education, but there is a strong statistically significant positive correlation between parents' and children education across countries. This is displayed in Figure 3.1, where we only include countries with more than 15 observations for second generation immigrants.

[Figure 3.1]

In the figure we plot mean years of education of the parent immigrant generation against the mean years of education of the children generation. The lines crossing each dot denote the 95% confidence interval, and indicate the precision of the measurement. The regression line through the dots has a slope of 0.7 and is statistically significant at the 5% level.[5] It shows the degree of intergenerational transmission of education across immigrant generations, and it corresponds to the parameter ρ in our model presented in Box 1.

While the analysis so far was related to the educational achievements of adult immigrants and their children, we now turn to the schooling performance of the children of immigrants at age 15. Using the OECD PISA dataset, we can directly study the link between immigrant children's school performance (measured by test scores) and their parent's education. Figure 3.2 reports, for each of the countries we analyse, the average immigrant-native gap in maths test score at age 15 and the immigrant-native gap in average parental education, measured by the difference in the share of students with at least one parent having tertiary education.

[Figure 3.2]

The figure shows a strong and statistically well determined correlation between the two measures: a regression of the average maths test scores gap on the gap in the share of children with at least one highly educated parent gives a coefficient of 1.24 with a standard error of 0.527. This is much in line with what we established above, and suggests again that parental attainment and the attainment of children is correlated.

The share of pupils with at least a tertiary educated parent is higher among immigrants than among natives in Southern European countries and Anglo-Saxon countries (with the exception of the US), while it is generally lower in Nordic and Central European countries (with the exception of Sweden).

[5] Note that we have excluded the countries with less than fifteen observations for second generation immigrants (Denmark, Spain, Finland, Italy and Norway). If we include all countries the slope of the line is 0.57, and it is still significant at the 5% level.

On the other hand, the gap in maths test scores between immigrant and native children is lower (or even positive) in Anglo-Saxon countries, than in Southern European countries.

4. SCHOLASTIC ACHIEVEMENT OF IMMIGRANT CHILDREN

4.1 How do children of immigrants perform, relative to the children of natives?

How do the children of immigrants perform at school, relative to the children of natives? And how do the achievement differentials differ across countries? We focus here on second generation immigrants only, that is on the native-born children of two immigrant parents. In the Tables Appendix we report results when we consider children of immigrant parents who are born in the host or home country. Results are similar to those we report here.

Table 4.1 reports some summary characteristics of immigrant and native children's family background and school characteristics in different countries.

[Table 4.1 here]

In column 1 we show the mean of the highest parental occupational status, measured by the Socio-Economic Index of Occupational Status (ISEI). The ISEI is an index which captures the attributes of occupations that convert education into income[6]. Higher values of the index correspond to occupations which reward education more, while lower values of the index denote occupations that have lower returns to education. For instance, the mean value of the ISEI index for Professionals (ISCO code 2) in the PISA dataset is 69.6, while the mean value of ISEI for elementary occupations (ISCO code 9) is 38.3. We denote with HISEI the highest ISEI in a family. Column 1 shows that the children of immigrants come from families who have on average a lower occupational status than natives. The mean HISEI of immigrant children is in fact lower than for native children in all countries, except for Finland, Portugal and Spain. The differences are largest in Nordic and Central European countries, while the mean HISEI of immigrants and natives is quite similar in Anglo-Saxon countries. In column 2 we report the share of immigrant and native pupils with at least one parent having tertiary education. There are striking differences across areas. In Anglo-Saxon countries immigrant children are slightly more likely than natives to come from families with tertiary educated

[6] See Ganzeboom, De Graaf and Treiman (1992) for a description of the index and its construction.

parents, except for the US. Conversely, in Nordic and Central European countries, except for Sweden, native children have a substantially higher probability than immigrants to have at least one tertiary educated parent. Finally, in Southern European countries immigrant children come from more highly educated families than natives. Columns 3 and 4 compare the average reading and mathematics test scores of schools attended by native and immigrant children Again, there is substantial heterogeneity across areas. For instance, in Central Europe the children of natives are enrolled in schools with higher average test scores than the children of immigrants. The difference is largest in Germany, and small and only marginally significant in France. No major differences between schools of immigrant and native children are instead evident in Nordic countries, except for Finland where the average school test scores are slightly higher for immigrant children. Children of immigrants in Anglo-Saxon countries are on average enrolled in schools with higher test scores, although the differences are quite small. The US are an exception, as the average school test scores of immigrants and natives are similar in reading and only slightly smaller in maths. Results are more nuanced in Southern Europe. In Portugal and in Spain, the average peer quality in schools attended by natives is higher than in schools attended by immigrants. However, in Greece it is immigrants who tend to be enrolled in better schools, while the average peer quality in Italy is similar for both immigrants and natives. The last column of Table 4.1 reports the percentage of pupils who speak a foreign language at home. This percentage is obviously close to zero for natives in all countries, while significant differences exist for immigrants across countries. In Anglo-Saxon countries the share of immigrant pupils who do not speak the country language at home is quite low, except for the US where it is 56%. In Nordic countries, conversely, the percentage of those who do not speak the country's language at home is significantly higher, between 41% in Denmark and 54% in Norway. Similarly high are the shares in Central Europe, except for France (28%) and the Netherlands (37%). In Austria 78% of immigrant children speak a foreign language at home, the highest share among all countries. Countries in Southern Europe are more polarised: at one extreme, Greece and Portugal have just 7% and 9%, respectively, of immigrant pupils speaking a foreign language at home, while at the other extreme, 27% of immigrant children in Spain do not usually speak Spanish with their families.

We now turn to regression results on reading and maths scores. In Tables 4.2 and 4.3 we report the differences in reading and mathematics test scores between second generation immigrant and

native children at age 15 in each of the countries we analyse, as recorded by the 2006 PISA tests[7]. In the different columns we condition on different sets of explanatory variables. The estimated coefficients we report can be interpreted as percentage of an international standard deviation (see section 2.2.1).

[Table 4.2 here]

[Table 4.3 here]

Children of immigrants have lower reading and mathematics test scores than the children of native-born parents in most countries, with the notable exception of the Anglo-Saxon and Southern European countries. As regards reading proficiency, the achievement gaps for Central and Northern European countries range between 80 PISA points in Austria and 22 PISA points in France, which amounts to respectively 80% and 22% of a standard deviation. No significant differences exist in Finland (where the sample size is small) and in Southern European countries. Conversely, in Australia and Canada, the children of immigrants perform better than the children of native-born parents in reading tests, while there are no significant differences in the other Anglo-Saxon countries. When we condition the gaps on the parental education and occupation (see column 2), the relative situation of the children of immigrants improves everywhere, except for Finland and Portugal. For instance the gap vanishes (or becomes statistically not significant) in Denmark and France, while it shrinks by 25-30% in the other Nordic countries, and by 30-45 % in the Central European countries. Moreover, once we control for parental background, the achievement advantage of the children of immigrants in Canada increases.

Differences in family background between immigrants and natives reduce their achievement gaps, but, in most countries, do not account for the entire achievement disadvantage. We therefore investigate, in columns 3 and 4, to what extent the remaining gap is due to differences in school and peer quality between the schools attended by immigrant and native children. In column 3 we control for several school characteristics[8]. We include as additional variables a dummy for whether the school is public or private, an index of educational resources, the average school class size, the proportion of teachers with a college degree, and several variables capturing school selectivity,

[7] There is no reading proficiency assessment for the US in PISA 2006. We therefore use, for the US only, 2003 test scores instead.

[8] We have no school-characteristics variable for France. Also, we have no information on whether the school is private or public for Australia, and on the proportion of qualified teachers for Spain. For the US, since we are using 2003 PISA data, there are no comparable school variables.

ability grouping, school autonomy, and school accountability. We provide details on these variables in the Appendix. Interestingly, the inclusion of these variables does not have a sizeable effect on the estimated gaps, except for Australia where immigrants' advantage disappears, and Belgium, where the gap is substantially reduced. In all other countries the size of the gap is essentially unaffected. This points at school characteristics not being too important in explaining the gaps, but might also be due to the measurement error in these variables.

In column 4 we add peer quality, measured as the average test scores in the subject of the test for the other children in the school as an additional control. Besides peer quality, it also reflects the average school quality. Controlling for peer quality has different effects across countries. In Canada, the immigrant-native gap becomes small and statistically not significant. As we know from table 4.1, the children of immigrants in this country attend schools with a higher average peer quality. In Nordic countries, instead, controlling for peer quality leads to a slight decrease in the gap in Norway, while in Sweden the gap shrinks by 6 points, to about 50% of its original size, and in Finland it is slightly widened. In most Central European countries peer quality explains a substantial part of the immigrant-native reading score gap, driving the gaps further down to between 35 and 60% of the size of the unconditional gap, except for France (80%) and for the Netherlands (21%). The negative gap in Portugal is also completely accounted for by peer quality.

In column 5 we control for the share of immigrants in the school. The inclusion of this additional control tends to slightly magnify the immigrant-native gap in all countries. The exceptions are Sweden, where the gap becomes statistically non-significant, and Canada, where the difference becomes negative. In column 6 we additionally control for the language spoken at home. The inclusion of this variable turns out to have a substantial effect on the immigrant-native gap, which disappears in Anglo-Saxon and Nordic countries, except for Finland. It is substantially reduced in Central European countries: to about one fourth of the original size in Germany and Belgium, and to about 50% in Switzerland. The only exceptions are France and Austria, where adding the language dummy tends to slightly increase the size of the gap. This is much in line with work by Dustmann, Machin and Schoenberg (2010), which shows that language spoken at home is the largest single factor that explains early achievement gaps for ethnic minority children in the UK.

In column 7 we report the gaps conditional on family background and language only. These two variables alone account for the entire immigrant-native gap in Nordic and Southern European countries (except for Finland), while they magnify the achievement advantage of immigrants in

Australia and Canada. In Central Europe, they account for the entire gap in Germany and France, for over 60% of the gap in Austria, Belgium, and Switzerland, and for 40% in the Netherlands[9].

Table 4.3 reports gaps in Maths test scores. Maths test scores display similar patterns to reading scores. In most European countries the children of immigrants have substantial achievement gaps, ranging from 86% of a standard deviation in Austria to 21% of a standard deviation in Spain. In Anglo-Saxon countries, instead, children of immigrants have lower test scores than natives only in the US, while in Australia they outperform native children. In the remaining Southern European countries, there are no significant differences in test scores between immigrant and native children. In column 2, we control for family background. Similar to the reading case, conditioning out family background decreases the immigrant-native gap by a substantial fraction in most countries, especially in Central Europe (between 60% and 30%) and in most Nordic countries (between 15% and 50%). Conversely, it increases the gap in Finland, Portugal and Spain. As regards Anglo-Saxon countries, family background controls eliminate achievement differences between immigrants and natives in the US, but have no effects on immigrants' advantage in Australia.

The inclusion of school characteristics (column 3) does not affect the gaps in any country, except for Australia and Belgium. Controlling in addition for peer quality, measured by average school maths test scores, (column 4) leads to a sharp reduction of the size of the gap in almost all countries.

We control, additionally, for the share of immigrants in the school in column 5. In the Anglo-Saxon countries, the inclusion of this additional control variable does not change the results. Conversely, in most other countries the gap tends to increase slightly, except for Norway. If we include a dummy variable for language spoken at home (column 6) the gap disappears or is substantially reduced in most countries. In Northern Europe there remains a significant gap between immigrants and natives only in Finland and in Sweden. In Central European countries, significant gaps persist everywhere but their size, which ranges between 55 and 19 Pisa points is, especially in Germany, only a small fraction of the unconditional gap. A notable exception is France, where the inclusion of all controls does not significantly affects the size of the gap.

[9] As we do not include detailed information on origin, the language variables may capture some of the variation according to where immigrants come from. Also immigrant households where the host country language is spoken may differ in other aspects from immigrant households where it is not. We capture some of this by conditioning on other background characteristics, but we would like to emphasise that our estimates can not be given a causal interpretation.

As for reading, we report in column 7 the gap in mathematics test scores conditional on family background and language only. These two variables alone account for a substantial fraction of the gap in many countries. They are even enough to drive the gap to zero in the US, Denmark, Norway and France.

In the Tables Appendix, we also report results for the gaps in reading (table A1) and mathematics (table A2) test scores when we do not distinguish between children of immigrants born abroad and in the host country. The size of the gap is higher in most countries, but the contribution of the control variables to explain the gap is similar to those we report in tables 4.2 and 4.3.

How can we explain these results in terms of the model presented in Box 1? Tables 4.2 and 4.3 suggest that about 1/3 of the differences between immigrant children and native children in Germany is due to parental background, with similar percentages for other European countries. Our model shows that, if immigrant and native parents have different levels of education, and there is intergenerational correlation, then this would also lead to differences in educational achievements between children of immigrants and non-immigrants. However, even after conditioning on parental background variables, differences between immigrant and native children remain for most countries Within our model, this could be reflected by differences in the α's, reflecting mean differences in unobserved influences on immigrant and native children's attainments. These differences could be due to differences in the way the ethnic group or network holds back immigrant children, or differences in the way the education system discriminates between children

So far, we have treated immigrant children as an homogenous group, and we have ignored cross-country differences in the composition of the immigrant population. However, differences in countries of origin of immigrants might be one reason behind cross-country differences in immigrants-natives test score gaps. Unfortunately, PISA data do not contain detailed information about parental country of birth: the variable "country of birth" is aggregated differently in different countries, so there is limited scope for cross-country comparison of the same immigrant group across different destination countries (we provide such analysis for Turkish immigrants in section 4.2). Moreover, in most countries the sample of children of immigrants is too small for meaningful analyses that differentiate between different origin countries.

4.2 How do children of immigrants perform, relative to children of those who have not emigrated?

In the previous section we compare immigrant children to the children of native born parents. This is the comparison usually undertaken in the public debate about immigrant integration. It answers the question "How do the children of immigrants do in terms of educational achievements, compared to the children of non-immigrants?" We have addressed this question, conditional and unconditional on background characteristics. However, another reference group are the children of individuals from the same origin country who decided not to emigrate and whose children attend educational institutions in that country. The question to be answered here is "How do the children of immigrants perform in the host country, compared to the children of non-immigrants who are educated in the home country?" This is likewise an important reference category, as it tells us something about the opportunities or disadvantages (in terms of educational achievements) migration implies for the children of immigrants.

In this section we investigate this question, by comparing a group of immigrants that we observe in different immigration countries, as well as in their home country: immigrants from Turkey[10]. We compare the test scores of the children of Turkish immigrants to those of natives and to those of Turkish children of the same age in Turkey.

We have selected for this analysis all PISA countries where Turkish immigrants are separately identifiable: Austria, Belgium, Switzerland, Germany and Denmark. Table 4.4 shows that, in each of these countries, the children of Turkish immigrants have significantly different characteristics from the children of native-born parents.

[Table 4.4]

Column 1 shows the mean value of the highest parents' occupational status as measured by the Socio-Economic Index of Occupational Status, which we denote with HISEI (see section 4.1 for

[10] This is the only group of immigrants that we can consistently identify across several countries, and for which we also have tests in their country of origin. Former Yugoslavians are in principle identifiable in several countries as well. However, only Germany and Austria provide detailed information on the country of origin for Former Yugoslavian, while most other countries simply refer to "Former Yugoslavian Republic". As there are no test scores for Bosnia and Macedonia, though, we cannot really compare these immigrants to their native counterparts. Also, it is not clear how we should treat sons of cross-marriages (e.g. Serbian father and Croatian mother) as these children seem to perform consistently worse in FYRs even after controlling for socio-economic background.

information on this index). The mean HISEI among the children of Turkish immigrants is lower than the mean HISEI for the children of native-born parents in all countries. The gap is largest in Austria, which is the country where Turkish immigrants have the lowest HISEI, and smallest in Switzerland, which is the country where the average HISEI of Turkish children is highest. The mean HISEI for Turkish children in Turkey is higher than for Turkish children in all other countries, except for Switzerland. This indicates that on average Turkish immigrants in Austria, Belgium, Germany and Denmark have a lower occupational status than their compatriots in Turkey.

Column 2 shows instead that the share of Turkish emigrant families with at least one parent with tertiary education is in all countries higher than the share of families in Turkey with tertiary education, indicating that Turkish immigrants are positively selected on education, although they are on average employed in lower-ranked occupations. Conversely, the share of families where at least one parent has tertiary education is higher among natives than among Turkish immigrants in all host-countries. The gap is particularly large in Denmark and Belgium, where over 60% of native families have at least one parent with tertiary education versus 21% of Turkish families, and relatively small in Germany with only 46% of native families having some tertiary education versus 28% of Turkish families. Column 3, which reports the share of families with both parents having at most lower secondary education, depicts a similar picture.

Column 4 reports the share of children in each country who speak a foreign language at home. In Austria, 89% of Turkish families speak Turkish at home, while this share is substantially lower for instance in Germany (66%) and in Denmark, where only 34% of Turkish families do not speak Danish at home.

Panel B of Table 4.4 reports summary characteristics of the schools where children of Turkish parents and of native-born parents are enrolled, again for each country. Column 1 displays the average reading test scores in schools attended by children of natives and children of Turks, while column 2 reports the average mathematics test scores. In all countries, the children of Turkish parents are enrolled in schools with lower average test scores than the children of natives. The gap is highest in Belgium, where the average reading (mathematics) test scores in schools attended by the children of natives are about 56 (60) Pisa points, or 56% (60%) of a standard deviation, higher than in schools attended by Turkish children. In Denmark, conversely, the average test scores of schools attended by Turkish and native children are very similar. The most striking differences, however, are between Turkish children in Turkey and abroad, particularly for mathematics test scores. While in

Turkish schools the average mathematics test score is 428, in schools attended by the children of Turkish immigrants abroad the average score ranges between 433 in Austria and 513 in Denmark.

Columns 3 and 4 of Panel B report the mean values of two PISA indices of school inputs: the index of quality of educational resources, which assigns higher values to schools with higher quality resources (column 3), and the index of teacher shortages, which assigns higher values to schools with more severe shortages (column 4).[11] Both indices are normalised to have mean 0 and standard deviation 1 across OECD countries, so that their values can be interpreted as fractions of standard deviations from the OECD mean. There is a lot of cross-country heterogeneity in the mean values of the indices; however in all countries Turkish children go to schools with lower-quality educational resources and higher teacher shortages than the children of natives. Most interestingly, however, the indices also show that the average quality of schools attended by Turkish children in Turkey is far lower than the average quality of schools attended by Turkish children abroad. The average value of the index of quality of educational resources in Turkey is -0.84 (or 84% of a standard deviation lower than the OECD mean), while for the children of Turkish immigrants abroad it ranges between -0.35 in Denmark and 0.6 in Switzerland. Likewise, while the average value of the index of teacher shortages in Turkey is 1.4 (140% higher than the OECD means), this ranges between -0.03 in Austria and 0.89 in Belgium for Turkish children abroad.

We now turn to an analysis of the test scores of the children of Turkish immigrants (Table 4.5), where we choose as the reference category the children of natives in host countries (Panel A), and alternatively the children of non-emigrants in Turkey (Panel B). The left panel of Table 4.5 reports results for Reading proficiency, while the right panel reports results of Maths test scores. When we interpret these results we should keep in mind that immigrants may be selected compared to non-migrants in Turkey. In fact, the numbers in Table 4.4 indicate that Turkish immigrants are positively selected on education. Although we condition on these background characteristics, there may still be selection on non-observable characteristics.

[Table 4.5]

Columns 1 of the left and right panel show that the children of Turkish immigrants perform significantly worse than the children of natives in all foreign countries in both Reading and Maths –

[11] The index of school's educational resources and the index of teacher shortage are derived on the basis of the school principals' perceptions of potential factors hindering education at school. The former includes inadequacy of laboratory equipment, library materials, computer resources, etc, while the latter includes lack of qualified teachers. See OECD (2009a) for more details.

which much reflects the overall unconditional results that we report in Table 4.3. When we compare them to Turkish children in Turkey, children of Turkish immigrants in Austria, Belgium, and Germany have worse reading scores than their native counterparts, while Turkish children in Denmark and Switzerland do not have a significant disadvantage. The disadvantage in reading is not surprising as reading tests are administered in the host country language, while they are in Turkish for the Turkish reference group.

Turning to Math scores, the children of Turkish parents in Belgium, Switzerland and Denmark have higher mathematics proficiency scores than Turkish children in Turkey. There is no statistically significant difference for Turks in Germany, and Turkish children in Austria have lower scores. In column 2, we control in addition for parental education and occupation. Adding these controls reduces substantially (by about 40%) the achievement gap of the children of Turkish immigrants relative to natives in all countries, and eliminates the gap in Denmark. However, controlling for parental education and occupation has little effects on reading and mathematics proficiency gap relative to Turkish pupils in Turkey, as we show in Panel B.

These results are in line with the interpretation that selection on observables does not account for the stronger educational achievements of Turkish children abroad, relative to those who stayed in the home country. However, there may be other factors that we cannot account for, and that lead to these differences in achievement. For instance, immigrant parents may place a stronger emphasis on the education of their children, as they may lack existing structures and networks to advance their children's careers in other ways, conditional on their educational background.

One reason why Turkish children abroad perform better relative to those who stayed in Turkey is the exposure to higher quality peers, and better educational resources or teacher quality, as was suggested by the numbers in Table 4.4[12]. We explore this in column 3 of Table 4.5, where we report the gap in reading and mathematics scores when we control for the average test scores of pupils in the school and for the two measures of school inputs reported in Table 4.4, a teacher shortage index and an index of quality of educational resources. Adding these controls reduces the reading and mathematics gap of Turkish children relative to natives in all countries, with the exception of Denmark, suggesting that Turks in these immigration countries attend schools that are of lower

[12] It is not clear whether we should condition on these characteristics. We believe that when comparing test score results of Turkish children in immigration countries and at home all variables other than parental characteristics are a feature of the new environment where children are educated. Thus, in our view, the interesting results are those in column 2.

quality than those attended by natives. However, controlling for school quality has the opposite effect on the relative achievement gap of Turkish children in the immigration countries, relative to Turkish children in Turkey: The reading gap becomes negative, significant, and large in all countries, ranging between -27 in Belgium and -49 in Denmark, while the Maths score gap also turns negative and significant in each of the immigration countries. This suggests that a reason for Turkish children in three of the five immigration countries performing better in Maths than Turkish children in Turkey is the higher school- and peer quality in the immigration countries.

We have shown in Table 4.4 that a substantial fraction of Turkish immigrants speak a foreign language at home, and results from Tables 4.2 and 4.3 suggest that this might be a significant determinant of test score gaps. In columns 4 we augment our control variables with a dummy for language spoken at home. The addition of this variable leads to zero the reading gap relative to natives in Austria, Belgium and Switzerland, and it considerably reduces the gap in Germany and Denmark. The effects on mathematics gaps are similar, although slightly less pronounced, and the maths score gap still persists in Switzerland. Controlling for language spoken at home in addition to family background and peer and school quality affects reading gaps relative to Turkish children in Turkey as well, reducing the size of the gap especially for Turkish children in Austria and Belgium, while having little effects in Denmark. Maths score gaps are instead only marginally affected. In columns 5 we report the test score gaps conditional on family background and language only. The reading score differences relative to Turkish children in Turkey are in this case not significantly different from zero in any country, except for Austria. Conversely the conditional difference in maths score with Turkish children in Turkey is positive, and larger than the unconditional difference, in Belgium, Switzerland and Denmark, ranging between 38 and 46 Pisa points. The maths score difference is instead not statistically significant in Austria and Germany.

Overall, our results indicate that the children of Turkish immigrants have substantially higher mathematics test scores than those of Turkish children in Turkey with a similar family background. This advantage is even higher among those children who have more familiarity with the host country language because they speak it at home. A key determinant of this educational advantage is the higher quality of peers and schools in host countries.

5. DISCUSSION AND CONCLUSIONS

Integration of immigrant communities is among the foremost policy concerns in many European countries. An important focus is on the intergenerational dimension of this process. Here the differences in educational outcomes between the children of immigrants and the children of natives have attracted particular attention. Nevertheless there is little work that compares the achievements of immigrants' children across different countries, and puts them in relationship to the educational outcomes of the parent generation. This is what we do in the first part of the paper.

Before addressing this issue using data from various cross-country surveys, we show that the way immigrant children compare to native children is importantly determined by the differences in the same outcomes between the parent generations. This implies that, if there is a similar intergenerational mobility in both groups, immigrant children will – on average – perform more poorly than native children if their parents are lower educated than natives.

The first part of our analysis confirms just that. We show that immigrant children's educational attainment across countries is strongly correlated with the level of education of their parents. In those countries where immigrants are highly educated (in particular the Anglo-Saxon countries Australia, the UK and Canada), their children's educational attainments are similar to those of natives, or – in the case of Australia – even better. On the other hand, in countries where immigrants have a far lower level of education than natives, their children tend to do substantially worse than those of natives.

These results are confirmed when analysing test score results for 15 year old children across 18 countries. The test score gaps between children born to immigrants and natives tend to be larger the larger the differences in education between immigrant and native parents. When we condition on parental characteristics the educational achievement gap between children of immigrants and natives is substantially reduced in most countries. Another important factor in reducing the test score gap between children of immigrants and natives is school and peer quality. However, the most important single factor in explaining differences between immigrant and native children seems to be the language spoken at home.

On average, in Anglo-Saxon countries no achievement gaps between immigrants and natives persist, after controlling for family background. In the Nordic countries, instead, differences in family backgrounds explain about 20% of the gap, with a further 10% explained by differences in school characteristics and peer quality and composition. Language spoken at home accounts for an

additional 15% of the gap. Family background accounts for almost 45% of the total gap in Central European countries, with only a further 1% accounted for by school-level characteristics and peer quality, but another 20% explained by language spoken at home[13].

While children born to native born parents are the typically chosen reference group for immigrant children, another possible reference group are children born to non-immigrants in the country of origin. We make use of the standardised test scores in the PISA data to compare Turkish children to immigrants in a number of countries with Turkish children born in Turkey. Our results show that children of Turkish immigrants perform on average better in identical tests than children born and raised in Turkey. Although households who decide to emigrate may be selected, these findings remain unchanged when we condition on observed parental characteristics. Our analysis also hints at better school- and peer- quality in the immigration countries as being a main reason for the higher test scores achieved by children of immigrants in the host countries, when compared to children born and raised in Turkey.

There are a number of conclusions that emerge from our work. First, there is substantial heterogeneity in the way the children of immigrants perform in the destination countries. Traditional immigration countries, like the US, Australia, and Canada, seem to do well in absorbing immigrant children, with test score gaps disappearing after conditioning on parental characteristics, and hardly any test score gaps being explained by school- or peer quality (conditional on parental background). One reason may be that these countries have a long experience in absorbing new immigrants, and providing their children with education. For instance, the stock of the foreign born in total population in the US was 13.6% in 1900 and it is 12.5% today[14], while many countries in Europe had only small, and culturally very similar, immigrant populations before the 1950s or – in the case of Southern Europe – until the 1980's. Thus, while traditional immigration countries may have developed educational institutions that are well explained and understood and provide easy and equal access to immigrant and native children alike, educational institutions in many European countries may be less transparent, more complex, and have more access restrictions. Thus, more transparency, and provision of better information to immigrants about educational paths and possibilities for their children could be an important first step in improving the educational outcomes of their children. Secondly, an important factor in explaining the test gaps between

[13] These results are based on regressions where we pool together all countries within each macro-area, but control for country dummies.
[14] Source: U.S. Bureau of the Census for 1900, American Community Survey for 2009.

children is parental education[15]. This hints at selective immigration policies being important in affecting the educational success of immigrant children. Thirdly, language spoken at home is very important in explaining test score gaps between children of immigrants and natives. Although care has to be taken when giving our estimates a causal interpretation, our results provide support for policies that improve the language proficiency of immigrants, and emphasise that this such policies may have long term consequences for the dynastic integration of immigrant populations[16]. And finally, our analysis suggests that children of Turkish emigrants enjoy better quality schools and peers in all destination countries and perform significantly better than children born and raised in Turkey. This is despite them attending, on average, slightly worse schools than the children of natives in the respective host countries. This adds an important detail to the debate about the disadvantage immigrant children experience in the receiving countries, by suggesting that – when compared to children in the home country, rather than to children in the destination country – these children may actually do better.

[15] Some recent papers have also investigated the role of school institutions for the disadvantage of children born to foreign born parents, see e.g. Luedemann and Schwerdt (2010), Schneeweis (2011) and Woessmann (2005).

[16] These results are in line with work by Casey and Dustmann (2008) who find a strong intergenerational link between language proficiency of immigrant parents and their children.

BOX 1. A FORMAL DISCUSSION OF INTERGENERATIONAL MOBILITY

In this box, we state in a slightly more formal way the considerations of Section 2.1.

It is common in the literature on intergenerational transmission to write the relationship between outcomes of parents and outcomes of children as

$$y_{it}^{j} = \alpha^{j} + \rho^{j} y_{it-1}^{j} + \varepsilon_{it}^{j} \qquad (1)$$

where y_{it}^{j} and y_{it-1}^{j} are some permanent measures for outcomes such as education, wealth or earnings of a child and parent belonging to group j (which could be immigrants and their children, or natives and their children). According to Equation (1), the education of family i's child is determined by family i's parental education and other influences ε. The parameter α^{j} can be thought of as the average effect of these other influences. Assuming that the variances of y_{it}^{j} and y_{it-1}^{j} are the same, ρ^{j} is the population correlation coefficient between y_{it}^{j} and y_{it-1}^{j}. Assume that the ε_{it}^{j} are iid distributed with mean zero and $Var(\ y_{it}^{j}\ ) = Var(\ y_{it-1}^{j}\ ) = \sigma_{y}^{2,j}$, so that estimation of Equation (1) gives a consistent estimate of ρ^{j}, $\hat{\rho}^{j}$.[17] The coefficient ρ^{j} represents the fraction of economic advantage (in terms of earnings, education, or wealth) that is on average transmitted across the generations. It is called the intergenerational correlation coefficient or transmission parameter. A coefficient close to zero suggests high intergenerational mobility, while a coefficient close to one indicates low mobility.

How does that relate to the "integration" or "assimilation" of immigrant and native populations over time? To see this, consider Equation (1), and index outcomes of immigrants and natives by I and N respectively. Further, allow the intergenerational transmission parameter to differ between the two groups, so that $\rho^{N} = \rho^{I} + \zeta$. Then the outcome differential between the two populations in generation t is given by

[17] If the variance of education differs across the two generations, the OLS estimator $\hat{\rho}$ measures $\rho\sigma_{yt}/\sigma_{yt-1}$.

$$E(y_t^N) - E(y_t^I) = \alpha^N - \alpha^I + \rho^N (E(y_{t-1}^N) - E(y_{t-1}^I)) + \zeta E(y_{t-1}^I) \quad (2)$$

Consider first the case where $\zeta = 0$ (intergenerational transmission ρ is the same in the two populations) and assume for simplicity that $\alpha^N = \alpha^I$. In this case, the native-immigrant gap in outcomes disappears from one generation to the next only if $\rho = \rho^N = \rho^I = 0$. On the other hand, if $\rho = 1$, the initial outcome differential will be fully transmitted to the next generation. The magnitude of ρ determines the speed of convergence. For example, for $\rho = 0.5$, a 2 years difference in average education between immigrants and natives in the parent generation translates into a 1 year difference in their children's generation.

But ρ is not the only parameter that governs integration between different populations. Assume that the mean of "other influences" determining outcomes as captured by the parameter α differs across the two groups. If $\alpha^N - \alpha^I > 0$, the difference in outcomes in the next generation may still be larger than in the parent generation, even if $\rho < 1$. One reason for differences in the α could be discrimination, or differences in unobservable determinants of e.g. educational success, like incentives created through an ethnic network. For instance, if we consider educational attainment of immigrant children, differences in the way national education systems serve immigrant children versus native children would be reflected in differences in the α; they would remain, even when we compare immigrant and native parents who are identical in terms of educational achievements.

If $\zeta \neq 0$: the intergenerational transmission parameter differs between the two groups. It follows from Equation (2) that if $\zeta > 0$ (i.e. intergenerational mobility in the advantaged groups – e.g. natives – is smaller than in the disadvantaged group), outcome differentials in the next generation may still be larger across groups than those in the previous generation even if there is regression to the mean within both groups. Thus, the degree of "integration", measured as the similarity of second generation immigrants' educational outcomes, depends on the relative magnitudes of ζ, ρ^N, and $\alpha^N - \alpha^I$. See Dustmann and Glitz (2011) for more details, and extensive evidence.

Tables

Table 3.1: Immigrant stock and educational composition

		% Immigrants in working age population	*% with high education*		*% with low education*	
			Natives	All immigrants	Natives	All immigrants
Anglo-Saxon	Australia	23.8	11.1	16.0	65.8	46.2
	Canada	23.7	19.5	32.4	24.6	21.0
	UK	12.9	29.8	32.6	29.7	24.0
	USA	12.5*	27.5	26.9	12.3	32.2
Central Europe	Austria	17.8	17.1	18.0	16.9	34.0
	Belgium	13.2	32.3	27.5	30.4	43.7
	France	12	26.9	23.6	29.2	46.9
	Germany	14.9	26.2	19.2	11.2	37.2
	Netherlands	12.7	30.3	24.1	28.0	35.3
	Switzerland	27.2	36.8	36.1	6.9	28.1
Southern Europe	Greece	8.2	22.3	16.3	40.3	44.0
	Italy	8.2	13.1	13.2	49.4	46.0
	Portugal	7.9	12.6	22.1	75.6	52.3
	Spain	14.8	29.6	24.9	51.4	39.3
Nordic	Denmark	5.7	33.4	35.2	21.8	26.5
	Finland	3.3	35.8	30.5	20.6	25.5
	Norway	8.6	33.1	37.5	20.6	28.1
	Sweden	14.9	30.1	30.9	14.6	22.5

Note: Working age is defined as 15 to 64 years old (Switzerland, 15 years or older). The educational distribution is calculated for working age individuals not in full-time education older than 25 (for European countries except Switzerland), and on individuals older than 25 in other countries.

High education: ISCED levels 5 and 6, as reported in EU-LFS for European countries except Switzerland. University certificate or degree at or above bachelor level in Canada. Bachelor's or higher degree in the US. Bachelor or higher degree in Australia.

Low education: ISCED levels 1 and 2, , as reported in EU-LFS for European countries except Switzerland. Less than high school in Canada. Less than high school graduate in the US. Certificate I and II or lower in Australia.

* Data refer to the whole population, not working age only.

Sources: European countries except Switzerland: EU-LFS, years 2006-2008 pooled.

Canada: our elaboration, based on Statistics Canada - 2006 Census. Catalogue Number 97-564-XCB2006008.

USA: our elaboration, based on Tables B06009 and C05002 obtained from U.S. Census Bureau, 2006-2008 American Community Survey.

Australia: 2006 Census of Population and Housing, via CDATA online.

Switzerland: Swiss LFS, year 2008, via Swiss Federal Statistical Office.

Table 3.2: Comparison of educational achievement of immigrants and their children

	Years of full time education completed		
	First Generation	Second Generation -A	Second Generation -B
UK	13.9	15.5	15.0
Austria	11.8	13.9	13.3
Germany	11.9	14.3	14.6
France	10.1	13.4	13.7
Netherlands	12.2	13.6	14.2
Belgium	11.3	12.0	12.5
Switzerland	11.5	12.6	12.5
Greece	9.6	11.3	11.7
Italy	11.1		13.9
Portugal	9.2	11.3	9.8
Spain	12.2	12.7	14.7
Denmark	12.0	15.9	15.2
Finland	12.6		15.6
Norway	15.1	11.8	14.3
Sweden	12.3	14.1	14.0

Note: columns 1-3 show the average years of full time education completed by immigrants across European countries. First-Generation immigrants are individuals aged 55-75 born in a foreign country. Second-Generation - A are individuals aged 25-50 born in the country of residence from foreign-born parents. Second-Generation - B are individuals aged 25-50 born in the country of residence from at least one foreign-born parent. The values are computed using the design weights provided by ESS.
Values for Italy and Finland are excluded from column 2 as there are not enough observations.
Source: ESS, rounds 1-4.

Table 4.1: Descriptive statistics for native and 2nd generation immigrant children

	Highest parental occupation index (ISEI)		*% of students with at least one parent having tertiary education*		*average reading score of other students at school*		*average maths score of other students at school*		*% of students who speak another language at home*	
	Nat.	Imm.	Nat.	Imm.	Nat.	Imm.	Nat.	Imm.	Nat.	Imm.
Australia	52.7	52.1	51.4	55.5	514.2	527.4	520.2	533.5	0.3	26.4
Canada	53.8	51.9	69.3	69.3	535.1	545.4	533.9	536.4	0.2	30.6
UK	51.4	50.4	51.2	52.1	509.4	521.2	507.8	507.8	0.1	19.9
USA	54.2	46.8	62.7	43.2	506.0	505.3	489.1	473.6	0.4	56.2
Denmark	49.1	41.9	63.1	40.0	499.4	501.6	518.3	514.8	0.1	41.5
Finland	49.0	54.4	77.2	75.8	550.4	564.1	552.0	560.5	0.0	42.3
Norway	53.5	47.9	66.8	48.4	492.5	489.3	496.2	481.7	0.4	53.8
Sweden	51.0	48.0	68.3	74.3	514.1	504.1	507.6	503.2	0.2	51.8
Austria	50.2	38.0	52.7	39.0	513.5	464.5	524.1	479.8	0.3	77.8
Belgium	51.1	41.9	61.4	37.0	528.6	479.3	546.3	492.9	0.2	42.9
France	49.3	43.4	40.1	26.4	499.1	497.3	506.9	502.6	0.3	27.8
Germany	50.7	39.4	45.0	39.1	520.4	478.1	527.1	481.4	0.5	55.9
Netherlands	52.8	44.1	55.4	32.1	522.9	491.7	547.1	512.1	0.0	37.0
Switzerland	50.7	44.5	51.0	40.8	512.1	502.2	543.6	527.3	0.1	43.9
Greece	49.4	47.6	43.1	56.6	469.2	485.4	467.8	484.2	0.9	7.1
Italy	46.9	42.7	25.1	38.7	481.0	473.3	476.9	480.8	0.1	22.2
Portugal	41.6	48.0	21.0	44.8	479.0	474.2	473.5	462.2	0.2	9.0
Spain	45.0	47.6	33.7	44.7	471.0	457.9	489.8	474.7	0.3	27.0

Note: The table reports means of some variables for native and second generation immigrant children in different countries. Column 1 reports the mean of the highest value of the parental International Socio-Economic Index of Occupational Status (ISEI). Column 2 reports the percentage of native and immigrant students with at least one parent having tertiary education. Column 3 reports the average reading scores of other pupils in the schools attended by native and immigrant children. Column 4 reports the average maths scores of other pupils in the schools attended by native and immigrant children. Column 5 reports the percentage of students who do not speak the country language at home.

Source: PISA 2006. In column 3, for the United States, the source is PISA 2003.

Table 4.2: Second generation immigrants-natives reading test score gaps

	1		2		3		4		5		6		7	
Australia	10.39	**	10.69	***	5.32		0.47		0.05		2.50		11.88	***
	(4.43)		(4.07)		(3.91)		(2.82)		(3.61)		(3.73)		(3.59)	
Canada	9.69	**	13.13	***	11.39	**	4.72		-7.88	*	-2.44		18.09	***
	(4.77)		(4.55)		(4.75)		(3.24)		(4.08)		(5.18)		(5.13)	
UK	10.09		13.21		5.21		3.06		-1.67		0.92		17.32	
	(11.03)		(9.97)		(8.31)		(7.44)		(8.34)		(9.18)		(11.36)	
USA	-1.97		9.42				5.80		4.77		0.47		7.70	
	(9.35)		(8.89)				(7.65)		(9.29)		(9.89)		(9.39)	
Denmark	-37.48	***	-18.38		-14.52		-21.50		-26.16	*	-7.30		-1.69	
	(13.96)		(15.35)		(15.26)		(13.89)		(14.28)		(14.53)		(16.77)	
Finland	-75.79		-80.50	*	-81.36	*	-89.26	**	-93.27	**	-87.64	**	-86.02	*
	(52.19)		(46.37)		(45.92)		(45.61)		(43.85)		(42.61)		(49.09)	
Norway	-37.25	**	-25.38	*	-27.48	*	-26.47	**	-32.41	**	-12.41		-3.60	
	(15.48)		(14.69)		(14.42)		(12.94)		(14.48)		(14.48)		(15.34)	
Sweden	-23.95	***	-18.08	***	-18.83	***	-12.17	*	-13.75		-13.92		-10.23	
	(8.48)		(6.95)		(6.79)		(6.74)		(9.66)		(12.29)		(11.08)	
Austria	-79.75	***	-51.27	***	-56.01	***	-33.54	***	-36.07	***	-43.37	***	-32.48	**
	(24.08)		(19.06)		(10.07)		(5.96)		(7.23)		(13.62)		(14.56)	
Belgium	-78.61	***	-56.95	***	-42.37	***	-28.37	***	-37.75	***	-20.17	***	-31.46	***
	(8.97)		(8.07)		(7.98)		(6.18)		(7.28)		(7.15)		(8.86)	
France	-22.15	**	-4.53				-17.99	***	-21.92	***	-25.96	***	-5.92	
	(10.29)		(9.00)				(4.85)		(5.57)		(6.75)		(10.32)	
Germany	-77.24	***	-48.19	***	-44.65	***	-30.83	***	-35.24	***	-21.01	***	-13.95	
	(12.26)		(11.78)		(9.97)		(6.86)		(7.55)		(7.73)		(11.38)	
Netherlands	-41.66	***	-22.76	**	-24.47	***	-8.86	*	-12.52	*	-13.39		-25.81	**
	(10.80)		(10.15)		(7.63)		(5.32)		(6.85)		(10.22)		(11.34)	
Switzerland	-39.23	***	-24.03	***	-27.52	***	-23.21	***	-28.71	***	-19.93	***	-13.77	**
	(5.90)		(5.97)		(5.35)		(4.62)		(5.27)		(6.16)		(6.58)	
Greece	13.22		17.52		10.79		2.13		5.62		8.48		25.18	
	(21.13)		(23.78)		(18.58)		(14.54)		(15.18)		(15.16)		(22.13)	
Italy	-26.20		-20.38		-24.75		-17.44		-23.81		-3.87		0.07	
	(25.49)		(23.58)		(23.31)		(16.73)		(17.79)		(15.81)		(24.57)	
Portugal	-11.09		-28.13	**	-21.73	*	-14.78		-17.22		-14.68		-22.20	*
	(18.20)		(14.38)		(12.86)		(10.42)		(11.01)		(10.89)		(13.30)	
Spain	5.46		-1.30		-2.15		11.30		9.00		20.02		9.35	
	(16.45)		(15.36)		(12.44)		(14.30)		(14.51)		(13.43)		(13.98)	
Family Background	No		Yes		Yes		Yes		Yes		Yes		Yes	
Peer quality	No		No		Yes		Yes		Yes		Yes		No	
School characteristics	No		No		No		Yes		Yes		Yes		No	
% immigrants at school	No		No		No		No		Yes		Yes		No	
Language	No		No		No		No		No		Yes		Yes	

Note: this table reports the reading test score gaps of second generation immigrant relative to native pupils in several countries. Second generation immigrants are defined as native-born children of foreign-born parents. The values are the estimated coefficients of a regression of PISA scores on a dummy for immigrants. Model (1) reports unconditional regressions; model (2) adds dummies for the educational level of parents and the Higher Socio-Economic Index of Occupational Status (HISEI) of parents; model (3) controls additionally for several school characteristics: whether the school is public or private, school educational resources, class size, teacher qualifications, selectivity, ability grouping, school autonomy, school accountability; model (4) controls additionally for the average school reading test scores; model (5) adds the share of immigrants in the school; model (6) adds a dummy for the language spoken at home to model (5); model (7) adds a dummy for the language spoken at home to model (2). Regressions are run separately for each country. All coefficients and standard errors are estimated according to the "Unbiased Shortcut" procedure (PISA Technical Report, 2006), using the replicate weights provided by PISA.

* denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Source: PISA, 2006; for the US reading proficiency the source is PISA, 2003.

Table 4.3: Second generation immigrants-natives maths test score gaps

	1		2		3		4		5		6		7	
Australia	15.05	***	15.24	***	10.58	**	4.88	*	5.83	*	3.93		11.29	***
	(5.39)		(5.08)		(4.56)		(2.72)		(3.49)		(3.74)		(4.26)	
Canada	2.66		5.49		6.14		3.67		-0.25		-2.36		2.30	
	(5.49)		(5.69)		(5.78)		(4.07)		(5.10)		(5.35)		(6.19)	
UK	-6.37		-3.48		-11.68		-5.44		-6.45		-3.76		0.66	
	(9.90)		(8.65)		(7.19)		(5.99)		(7.07)		(7.40)		(9.48)	
USA	-19.44	***	1.74		0.20		6.65		8.97		14.58	*	9.33	
	(7.14)		(5.90)		(5.74)		(4.91)		(6.91)		(7.71)		(8.64)	
Denmark	-43.64	***	-23.24	**	-21.50	*	-23.18	**	-26.41	**	-14.40		-13.31	
	(10.67)		(11.86)		(11.99)		(11.48)		(11.83)		(14.05)		(13.79)	
Finland	-107.20	**	-113.05	**	-108.81	**	-116.29	***	-117.33	***	-75.14	***	-75.33	***
	(52.64)		(45.12)		(46.90)		(41.26)		(40.10)		(19.39)		(26.63)	
Norway	-45.19	***	-33.37	**	-34.82	**	-28.02	**	-26.78	*	-19.16		-23.44	
	(14.53)		(14.47)		(13.99)		(13.16)		(15.30)		(15.88)		(16.00)	
Sweden	-32.75	***	-27.97	***	-30.04	***	-26.84	***	-35.26	***	-29.14	**	-20.44	*
	(9.13)		(7.65)		(8.15)		(7.58)		(9.30)		(11.56)		(10.54)	
Austria	-86.24	***	-60.19	***	-67.26	***	-44.50	***	-55.69	***	-54.90	***	-38.57	***
	(18.91)		(15.11)		(11.47)		(7.48)		(7.50)		(11.38)		(12.90)	
Belgium	-75.78	***	-53.18	***	-36.83	***	-21.12	***	-30.56	***	-27.69	***	-45.49	***
	(8.28)		(7.35)		(7.58)		(4.39)		(5.52)		(6.13)		(8.15)	
France	-33.16	***	-14.00				-24.24	***	-31.43	***	-32.12	***	-12.26	
	(10.76)		(9.62)				(5.15)		(5.14)		(5.67)		(10.46)	
Germany	-74.66	***	-46.80	***	-43.41	***	-26.81	***	-30.49	***	-19.39	**	-18.37	*
	(11.16)		(10.17)		(9.05)		(5.83)		(6.27)		(8.14)		(9.68)	
Netherlands	-53.35	***	-35.73	***	-36.61	***	-17.67	***	-21.72	***	-23.33	***	-40.10	***
	(9.21)		(8.72)		(6.89)		(4.58)		(5.53)		(6.64)		(8.94)	
Switzerland	-54.27	***	-39.51	***	-42.05	***	-33.36	***	-37.99	***	-37.22	***	-39.90	***
	(5.61)		(5.43)		(5.52)		(4.41)		(5.07)		(6.62)		(7.02)	
Greece	13.06		14.78		8.60		1.45		5.38		5.35		17.04	
	(17.86)		(17.14)		(17.38)		(16.54)		(16.61)		(16.50)		(17.07)	
Italy	-21.94		-16.48		-20.99		-23.37		-27.24		-21.19		-13.01	
	(25.93)		(24.92)		(25.47)		(18.13)		(17.96)		(21.80)		(30.13)	
Portugal	-30.15		-45.25	***	-39.24	***	-28.61	**	-27.91	**	-27.12	**	-41.49	***
	(20.85)		(16.49)		(14.56)		(11.65)		(12.37)		(12.67)		(15.99)	
Spain	-21.54	*	-28.90	***	-31.46	***	-15.77		-17.52		-13.44		-24.58	***
	(11.85)		(9.78)		(8.36)		(11.03)		(12.32)		(11.41)		(9.31)	
Family Background	No		Yes		Yes		Yes		Yes		Yes		Yes	
Peer quality	No		No		Yes		Yes		Yes		Yes		No	
School characteristics	No		No		No		Yes		Yes		Yes		No	
% immigrants at school	No		No		No		No		Yes		Yes		No	
Language	No		No		No		No		No		Yes		Yes	

Note: this table reports the mathematics proficiency gaps of second generation immigrant relative to native pupils in several countries. Second generation immigrants are defined as native-born children of foreign-born parents. The values are the estimated coefficients of a regression of PISA scores on a dummy for immigrants. Model (1) reports unconditional regressions; model (2) adds dummies for the educational level of parents and the Higher Socio-Economic Index of Occupational Status (HISEI) of parents; model (3) controls additionally for several school characteristics: whether the school is public or private, school educational resources, class size, teacher qualifications, selectivity, ability grouping, school autonomy, school accountability; model (4) controls additionally for the average school maths test scores; model (5) adds the share of immigrants in the school; model (6) adds a dummy for the language spoken at home to model (5); model (7) adds a dummy for the language spoken at home to model (2). All coefficients and standard errors are estimated according to the "Unbiased Shortcut" procedure (PISA Technical Report, 2006), using the replicate weights provided by PISA.

* denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Source: PISA, 2006; for the US reading proficiency the source is PISA, 2003.

Table 4.4: Summary statistics, Turkish immigrants, non-immigrants, and natives

Panel A: Family Background

	Highest parental occupation index (ISEI)		*% of pupils with at least one parent having tertiary education*		*% of pupils with both parents having lower-secondary education*		*% of pupils who speak another language at home*	
	Natives	Turkish Imm.	Natives	Turkish Imm.	Natives	Turkish Imm.	Natives	Turkish Imm.
Austria	49.10	32.79	50.96	22.17	2.00	44.17	0.25	89.02
Belgium	51.36	35.46	61.47	21.12	3.83	34.22	0.22	74.24
Switzerland	50.36	41.11	50.31	24.5	14.88	60.07	0.14	72.68
Germany	50.87	37.78	46.16	27.85	11.65	48.35	0.42	66.49
Denmark	49.47	36.77	63.50	21.25	4.93	61.98	0.15	33.84
Turkey	39.47		16.51		57.68		2.53	

Panel B: School Quality

	average reading score of other students at school		*average maths score of other students at school*		*Quality of Educational Resources*		*Teacher Shortage*	
	Natives	Turkish Imm.	Natives	Turkish Imm.	Natives	Turkish Imm.	Natives	Turkish Imm.
Austria	500.3	413.5	514.0	433.5	0.38	-0.22	-0.37	-0.03
Belgium	528.1	453.1	547.6	470.2	-0.05	-0.26	0.35	0.89
Switzerland	510.7	476.6	542.8	501.4	0.70	0.60	-0.10	0.07
Germany	519.9	457.2	525.4	464.4	0.13	-0.29	0.26	0.84
Denmark	501.6	502.1	519.9	513.5	-0.07	-0.35	0.10	0.20
Turkey	450.6		427.8		-0.84		1.4	

Note: The table reports summary characteristics of the families of children of natives and children of Turkish immigrants (Panel A), and of the schools they attend (Panel B) in several countries. Column 1 of Panel A reports the mean of the highest value of the parental International Socio-Economic Index of Occupational Status (ISEI). Column 2 reports the percentage of pupils with at least one parent having tertiary education. Column 3 reports the percentage of pupils with both parents having at most lower secondary education. Column 4 reports the percentage of pupils who speak a foreign language at home. In Panel B, column 1 reports the average reading test scores of the other pupils in the school. Column 2 reports the average maths test scores of the other pupils in the school. Column 3 reports the mean value of the index of quality of educational resources (higher values correspond to better educational resources). Column 4 reports the mean value of the index of teacher shortage (higher values correspond to higher shortages).

Source: PISA 2006

Table 4.5: Test Score Gaps gap for Turkish immigrants

	Reading					Mathematics				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	Panel A: gap relative to natives									
Austria	-120.5***	-68.6***	-24.2***	6.9	-12.8	-122.9***	-75.0***	-35.1***	-18.8	-36.3*
	(23.8)	(24.2)	(7.6)	(13.0)	(26.3)	(16.2)	(16.3)	(8.2)	(11.8)	(20.4)
Belgium	-106.6***	-62.3***	-25.3**	2.3	-12.0	-98.7***	-55.3***	-15.2**	-0.1	-19.1
	(10.8)	(12.4)	(10.4)	(12.6)	(17.7)	(11.0)	(9.6)	(6.8)	(10.7)	(14.9)
Switzerl.	-77.2***	-34.7***	-31.0***	-5.4	11.2	-92.9***	-56.2***	-44.2***	-30.8**	-24.3
	(9.6)	(10.9)	(7.4)	(10.8)	(15.6)	(10.7)	(12.0)	(8.6)	(12.5)	(15.5)
Germany	-108.6***	-65.3***	-36.8***	-13.7*	-23.8	-97.8***	-58.5***	-30.6***	-18.6**	-29.7**
	(12.4)	(13.3)	(7.2)	(7.6)	(15.9)	(9.5)	(10.4)	(5.1)	(7.9)	(13.2)
Denmark	-55.8***	-0.3	-38.5**	-26.7*	20.5	-66.4***	-17.6	-46.8***	-40.6***	-3.1
	(15.8)	(17.4)	(15.7)	(16.1)	(20.0)	(15.5)	(16.0)	(15.9)	(15.7)	(17.5)
	Panel B: gap relative to Turkish natives in Turkey									
Austria	-69.6***	-64.7***	-30.4***	-20.5**	-40.5*	-33.4**	-30.4*	-35.7***	-33.1***	-9.9
	(24.1)	(24.0)	(7.6)	(9.3)	(23.8)	(17.0)	(16.2)	(9.1)	(10.6)	(18.7)
Belgium	-26.5**	-27.3**	-27.2***	-19.0*	-7.1	23.8**	20.7**	-15.7***	-13.5**	37.8***
	(10.6)	(11.4)	(9.6)	(9.8)	(13.0)	(10.9)	(9.6)	(6.1)	(6.8)	(11.4)
Switzerl.	-7.9	-10.6	-32.7***	-24.6***	9.0	32.5***	29.1**	-37.0***	-34.8***	45.7***
	(10.6)	(10.7)	(6.7)	(7.2)	(12.1)	(12.0)	(12.4)	(8.3)	(8.8)	(12.6)
Germany	-36.5***	-37.9***	-41.7***	-34.4***	-20.0	2.7	-0.9	-31.2***	-29.3***	14.3
	(13.7)	(13.7)	(7.1)	(7.2)	(14.3)	(10.9)	(11.1)	(4.8)	(6.4)	(12.3)
Denmark	-2.2	1.7	-49.4***	-45.6***	10.4	28.5*	32.0**	-50.2***	-49.2***	39.4**
	(16.3)	(16.5)	(15.4)	(15.1)	(16.2)	(17.0)	(16.3)	(15.4)	(15.9)	(16.7)
Family Backgr.	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Peer quality	No	No	Yes	Yes	No	No	No	Yes	Yes	No
School Inputs	No	No	Yes	Yes	No	No	No	Yes	Yes	No
Language	No	No	No	Yes	Yes	No	No	No	Yes	Yes

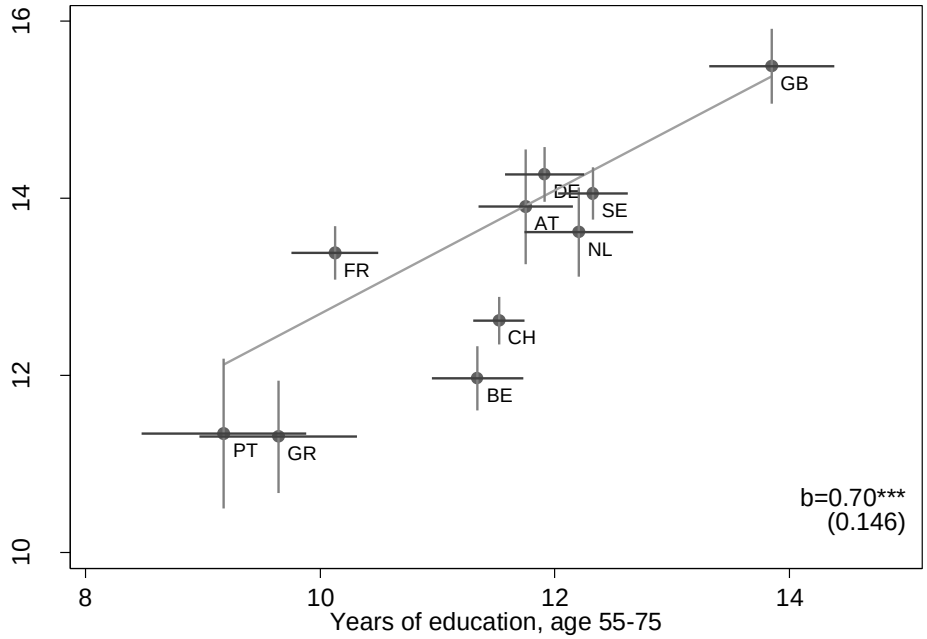
Note: Panel A reports the reading and mathematics test score gaps of Turkish immigrant pupils with respect to native pupils in several destination countries. Panel B reports the proficiency gaps of Turkish immigrant students relative to Turkish native students in Turkey. Turkish immigrants are those who have both parents born in Turkey, and took the test in a destination country. Native students (Turkish and non-Turkish) are those who were born in the country of assessment from native-born parents. Columns 2 add the highest parental occupation (measured by the ISEI index) and dummies for the highest educational level of parents; columns 3 add the average test score of other pupils in the school and for school-specific indices of quality of education resources and of teacher quality; columns 4 adds a dummy variable for whether children speak the host country language at home; column 5 controls exclusively for parental education and occupation and for language spoken at home.

* denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Source: PISA, 2006.

Figures

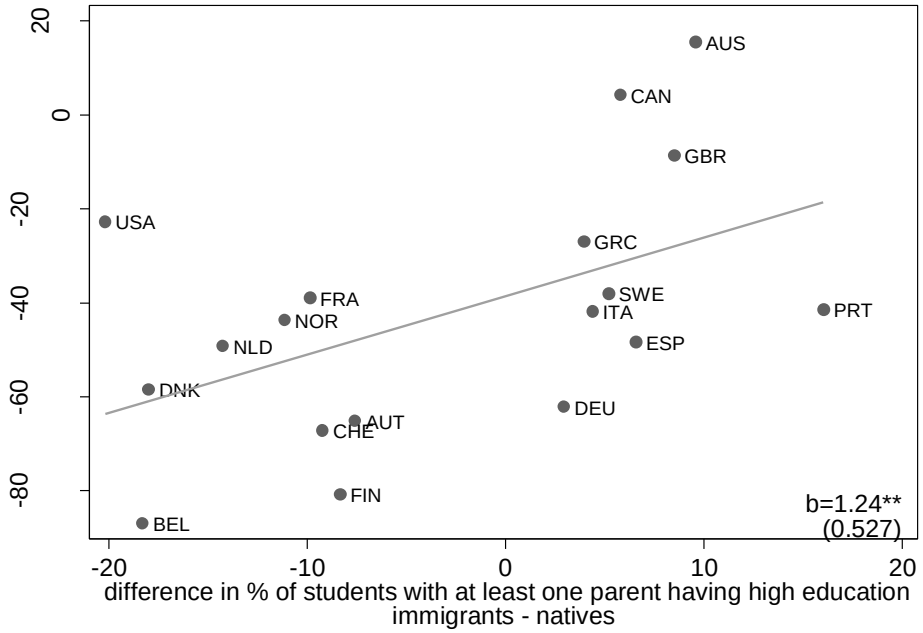
Figure 3.1 – Intergenerational correlation of immigrants' educational achievement



Source: ESS, rounds 1-4.

Note: The figure plots the mean years of education of second generation immigrants aged 25-50 versus the mean years of education of first generation immigrants aged 55-75 in different destination countries. The grey lines through each entry represent the 95% confidence interval.
Source: European Social Survey, rounds 1-4

Figure 3.2 – Immigrant-native gaps in parental education and Maths test scores



Source: PISA, 2006.

Note: The figure plots the average gap in mathematics test scores between immigrants and natives versus the difference in the share of immigrant and native students with at least one parent who has tertiary education.
Source: PISA 2006

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APPENDIX: School quality variables

We provide here details for each of the school characteristics variable that we use in Section 4. See OECD (2009a) for a thorough description.

Variable	Description
Private	Dummy variable for whether the school is private
Index of quality of educational resources	Based on school principals' perceptions of potential factors hindering instruction at school
Index of teacher shortage	Based on school principals' perceptions of potential factors hindering instruction at school
Class size	Average number of pupils per class
Teacher qualifications	Proportion of teachers in the school with a college degree
School selectivity	Dummy variable for whether students' records or recommendation from feeder schools is a high priority or prerequisite for admittance.
Ability grouping	Dummy variable for whether students are grouped according to their ability at least for some classes.
Index of curricular autonomy	Derived from the number of decisions that relate to curriculum that are a school's responsibility
Index of resource autonomy	Derived from the number of decisions related to school resources that are a school's responsibility
Public achievement	Dummy variable for whether achievement data are posted publicly
Principal's evaluation	Dummy variable for whether achievement data are used in evaluation of principal's performance
Teacher's evaluation	Dummy variable for whether achievement data are used in evaluation of teachers' performance
Resource allocation	Dummy variable for whether achievement data are used in decisions about resource allocation
Achievement tracking	Dummy variable for whether achievement data are tracked over time by an authority
Achievement disclosed to students	Dummy variable for whether students' performance is disclosed relative to other students in the school
Achievement benchmarked I	Dummy variable for whether students' performance is disclosed relative to national benchmarks
Achievement benchmarked II	Dummy variable for whether students' performance is disclosed relative to students in the same grade in other schools

Tables Appendix

Table A.1: Immigrants-natives reading test score gaps

	1		2		3		4		5		6		7	
Australia	8.76	**	6.25		1.33		-3.66		-5.58	*	-0.66		9.96	***
	(4.38)		(4.00)		(3.64)		(2.58)		(3.20)		(3.23)		(3.48)	
Canada	3.43		3.38		2.55		-5.95	**	-14.67	***	-4.24		13.09	***
	(4.48)		(4.48)		(4.57)		(2.75)		(3.29)		(4.19)		(4.94)	
UK	-4.49		-4.43		-12.40		-7.46		-12.40	*	-6.77		8.18	
	(11.67)		(10.42)		(9.55)		(6.55)		(7.40)		(7.84)		(10.65)	
USA	-14.68	*	-2.67				-3.08		-5.37		-4.81		3.10	
	8.40		8.53				6.21		8.10		8.24		8.57	
Denmark	-55.00	***	-39.30	***	-36.81	***	-39.43	***	-45.55	***	-16.76		-11.61	
	(11.18)		(11.52)		(11.23)		(10.48)		(11.24)		(12.63)		(14.36)	
Finland	-58.39	***	-50.83	***	-51.16	***	-55.13	***	-57.75	***	-51.44	**	-41.85	
	(15.55)		(14.44)		(14.34)		(11.77)		(10.83)		(21.47)		(26.16)	
Norway	-39.85	***	-28.34	***	-30.16	***	-30.47	***	-34.51	***	-14.40		-4.38	
	(9.33)		(9.77)		(9.11)		(8.69)		(9.70)		(15.69)		(15.31)	
Sweden	-31.47	***	-24.43	***	-25.69	***	-20.48	***	-21.36	***	-11.98		-9.25	
	(7.32)		(5.98)		(6.03)		(5.79)		(8.25)		(10.31)		(9.44)	
Austria	-46.77	***	-25.81	*	-27.89	***	-10.22	**	-8.15		-9.50		-9.69	
	(17.78)		(13.84)		(7.72)		(4.14)		(5.40)		(9.94)		(9.37)	
Belgium	-82.13	***	-64.07	***	-45.40	***	-28.47	***	-39.65	***	-22.87	***	-43.49	***
	(6.86)		(6.44)		(6.12)		(5.11)		(5.81)		(5.45)		(6.11)	
France	-25.43	***	-9.45				-13.39	***	-16.90	***	-23.40	***	-9.88	
	(9.30)		(8.49)				(3.69)		(4.49)		(6.22)		(9.55)	
Germany	-62.46	***	-40.64	***	-35.64	***	-23.99	***	-27.13	***	-14.48	**	-14.75	
	(9.46)		(8.92)		(7.68)		(5.08)		(5.86)		(7.14)		(9.73)	
Netherlands	-42.56	***	-27.71	***	-26.85	***	-13.97	***	-16.89	***	-10.65		-22.02	**
	(9.60)		(8.87)		(6.39)		(4.23)		(5.39)		(8.85)		(10.17)	
Switzerland	-55.48	***	-38.17	***	-41.06	***	-35.77	***	-41.29	***	-25.70	***	-18.15	***
	(5.39)		(5.31)		(4.86)		(3.54)		(3.93)		(5.11)		(6.19)	
Greece	-19.44	*	-3.99		3.96		11.14		14.00		19.85		22.28	
	(10.36)		(9.68)		(9.05)		(10.1)		(12.50)		(12.52)		(14.45)	
Italy	-66.78	***	-55.27	***	-56.23	***	-44.54	***	-50.45	***	-32.58	**	-25.35	
	(12.93)		(11.58)		(10.96)		(8.07)		(9.23)		(15.58)		(17.75)	
Portugal	-40.76	***	-44.65	***	-39.54	***	-27.41	***	-29.66	***	-24.63	***	-36.13	***
	(13.49)		(11.53)		(10.23)		(8.07)		(8.32)		(8.98)		(12.28)	
Spain	-42.21	***	-41.06	***	-37.06	***	-29.35	***	-31.56	***	-26.38	***	-34.88	***
	(7.52)		(6.54)		(5.86)		(5.46)		(6.48)		(5.94)		(6.38)	
Family Backgr.	No		Yes		Yes		Yes		Yes		Yes		Yes	
Peer quality	No		No		Yes		Yes		Yes		Yes		No	
School Chars.	No		No		No		Yes		Yes		Yes		No	
% imm.at school	No		No		No		No		Yes		Yes		No	
Language	No		No		No		No		No		Yes		Yes	

Note: this table reports the reading proficiency gaps of immigrant relative to native students in several countries. Immigrants are defined as students whose both parents were born abroad. The values are the estimated coefficients of a regression of PISA scores on a dummy for immigrants. Model (1) reports unconditional regressions; model (2) adds dummies for the educational level of parents and the Higher Socio-Economic Index of Occupational Status (HISEI) of parents; model (3) controls additionally for several school characteristics: whether the school is public or private, school educational resources, class size, teacher qualifications, selectivity, ability grouping, school autonomy, school accountability; model (4) controls additionally for the average school reading test scores; model (5) adds the share of immigrants in the school; model (6) adds a dummy for the language spoken at home to model (5); model (7) adds a dummy for the language spoken at home to model (2). Regressions are run separately for each country. All coefficients and standard errors are estimated according to the "Unbiased Shortcut" procedure (PISA Technical Report, 2006), using the replicate weights provided by PISA.

* denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Source: PISA, 2006; for the US PISA, 2003.

Table A.2: Immigrants-natives mathematics test score gaps

	1		2		3		4		5		6		7	
Australia	15.51	***	13.02	***	8.83	**	2.28		1.57		0.89		10.02	**
	(5.27)		(4.87)		(4.13)		(2.26)		(2.78)		(3.15)		(4.13)	
Canada	4.24		4.00		5.36		0.56		-1.94		-3.25		0.10	
	(4.52)		(4.55)		(4.47)		(2.64)		(3.83)		(4.61)		(5.61)	
UK	-8.71		-8.79		-16.67	**	-5.59		-7.09		-5.80		-1.84	
	(10.04)		(8.68)		(7.58)		(5.84)		(7.07)		(6.87)		(8.74)	
USA	-22.73	***	-2.83		-4.36		2.49		3.08		7.38		4.31	
	(7.01)		(5.74)		(5.34)		(4.32)		(6.01)		(6.26)		(6.67)	
Denmark	-58.50	***	-42.02	***	-41.14	***	-40.60	***	-44.60	***	-17.98		-19.23	*
	(8.69)		(9.00)		(8.79)		(8.44)		(8.93)		(11.64)		(11.38)	
Finland	-80.83	***	-72.20	***	-71.53	***	-68.92	***	-68.43	***	-37.24	*	-37.02	*
	(14.54)		(13.61)		(13.50)		(11.88)		(11.49)		(19.57)		(22.38)	
Norway	-43.67	***	-32.91	***	-34.14	***	-29.62	***	-28.21	***	-19.18		-22.11	
	(9.48)		(9.56)		(9.29)		(8.76)		(9.81)		(13.39)		(13.65)	
Sweden	-38.03	***	-31.00	***	-32.77	***	-30.22	***	-36.23	***	-25.77	***	-20.71	**
	(7.00)		(6.31)		(6.64)		(5.86)		(7.19)		(9.53)		(8.63)	
Austria	-65.15	***	-45.81	***	-50.26	***	-31.49	***	-36.87	***	-37.91	***	-33.77	***
	(13.13)		(10.29)		(7.59)		(4.41)		(4.77)		(9.05)		(9.12)	
Belgium	-86.93	***	-68.25	***	-48.56	***	-30.56	***	-40.86	***	-36.96	***	-62.38	***
	(6.92)		(6.39)		(6.03)		(4.54)		(5.34)		(5.63)		(6.80)	
France	-38.92	***	-21.73	**			-24.48	***	-30.61	***	-33.24	***	-19.49	**
	(9.68)		(8.60)				(4.16)		(4.27)		(5.02)		(9.54)	
Germany	-62.13	***	-40.79	***	-37.28	***	-24.63	***	-27.09	***	-16.61	**	-20.49	**
	(8.00)		(7.20)		(6.17)		(4.02)		(4.63)		(6.79)		(8.91)	
Netherlands	-49.16	***	-35.63	***	-34.36	***	-19.61	***	-23.93	***	-21.56	***	-34.63	***
	(7.69)		(7.14)		(5.34)		(3.39)		(4.09)		(5.60)		(8.07)	
Switzerland	-67.19	***	-50.54	***	-52.19	***	-43.47	***	-48.71	***	-41.61	***	-42.14	***
	(5.07)		(4.94)		(5.00)		(3.55)		(3.94)		(6.32)		(6.90)	
Greece	-28.97	**	-16.68		-10.57		3.11		8.54		9.22		-0.24	
	(10.81)		(10.57)		(10.46)		(9.70)		(11.41)		(11.32)		(13.37)	
Italy	-41.80	***	-31.00	***	-31.33	***	-26.30	***	-32.43	***	-28.83	**	-20.21	
	(11.49)		(10.25)		(9.50)		(6.59)		(7.26)		(13.71)		(15.91)	
Portugal	-41.48	***	-45.20	***	-39.76	***	-25.32	***	-24.69	***	-29.53	***	-47.99	***
	(13.24)		(11.12)		(9.82)		(7.80)		(9.19)		(10.34)		(12.71)	
Spain	-48.39	***	-47.29	***	-44.50	***	-35.91	***	-38.13	***	-40.26	***	-48.32	***
	(7.12)		(6.23)		(5.46)		(5.57)		(7.21)		(7.44)		(6.40)	
Family Background	No		Yes		Yes		Yes		Yes		Yes		Yes	
Peer quality	No		No		Yes		Yes		Yes		Yes		No	
School Characteristics	No		No		No		Yes		Yes		Yes		No	
% imm. at school	No		No		No		No		Yes		Yes		No	
Language	No		No		No		No		No		Yes		Yes	

Note: this table reports the mathematics proficiency gaps of immigrant relative to native students in several countries. Immigrants are defined as students whose both parents were born abroad. The values are the estimated coefficients of a regression of PISA scores on a dummy for immigrants. Model (1) reports unconditional regressions; model (2) adds dummies for the educational level of parents and the Higher Socio-Economic Index of Occupational Status (HISEI) of parents; model (3) controls additionally for several school characteristics: whether the school is public or private, school educational resources, class size, teacher qualifications, selectivity, ability grouping, school autonomy, school accountability; model (4) controls additionally for the average school mathematics test scores; model (5) adds the share of immigrants in the school; model (6) adds a dummy for the language spoken at home to model (5); model (7) adds a dummy for the language spoken at home to model (2). Regressions are run separately for each country. All coefficients and standard errors are estimated according to the "Unbiased Shortcut" procedure (PISA Technical Report, 2006), using the replicate weights provided by PISA.

* denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Source: PISA, 2006.