Parents, Schools and Human Capital Differences across Countries*

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Abstract

Results from international standardized tests show large cross-country differences in students' performances. Where do these gaps come from? This paper argues that differences in cultural environments and parental inputs may be of great importance. We show that the school performance of second generation immigrants is closely related with the one of native students in their parents' countries of origin. This holds true even after accounting for different family background characteristics, schools attended and selection into immigration. We quantify the overall contribution of various parental inputs to the observed cross-country differences in the PISA test performance, and show that they account for about 40% of the gap between East Asia and other regions. This pattern questions whether PISA scores should be interpreted only as a quality measure for a country's educational system. They actually contain an important intergenerational and cultural component.

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1 Introduction

According to international standardized tests, there are large and persistent cross country differences in the performances of students of similar age. East Asian countries like Korea, Japan, China and Singapore consistently position themselves at the top of international rankings, while the relatively disappointing performance of several Southern European and Latin American countries has become a hot topic in the public debate. This is true, though to a slightly different extent, across all subjects commonly tested in these international studies and across all years for which these comparisons are available.

While these facts have been well known at least since the release of the first results of the PISA test, they have recently received renewed attention in light of an emerging literature that puts them at the center of the discussion on cross country differences in economic performance. Kimko and Hanushek (2000), Hanushek and Woessmann (2012a) and Schoellman (2012), among others, argue that average years of schooling, the standard proxy in the growth literature for the quantity of human capital, does a rather poor job of measuring differences across countries in terms of the knowledge embodied in their workers, while standardized tests allow to capture differences in terms of human capital quality which turn out to have much greater explanatory power for differences in GDP.

Given the increasing role these cross-country gaps in standardized tests play in the growth literature, it becomes important to understand where they come from. Most of the public and academic debate on this issue tend to rely on (and argue in favor of) an interpretation of PISA scores as measures of school quality. The popular press is rich of anecdotes on the severity and depth of school curricula in some Asian countries, which introduce students to challenges often quite demanding for their age. On the other hand, there is some evidence (once again, mostly anecdotal) of important differences in terms of parental inputs, a broad category which includes parenting styles and parents' attitudes and beliefs towards education. The international bestseller by Chua (2011) coined the expression "Tiger Mother" to describe the rather strict way in which some Asian parents raise up children, pushing on academic excellence and very long studying hours.

In this paper we aim at shedding some light on the importance of parental inputs in PISA test scores. Discriminating between the contribution of parental inputs and that of the schooling system has rather important implications, since it determines whether Western countries aiming at improving their students' performance should consider imitating some of the characteristics of the East Asian school system, or whether the explanation for achievement gaps lies in deeper cultural factors, perhaps harder to affect for policy makers. With this in mind, our objective is to investigate how much of the cross country variation in test scores can be attributed to differences in parental inputs, and what is the nature of these differences in parental inputs in the first place.

It is important to clarify that our focus in this paper is on the cross-country variation in average test scores only, as opposed to the variation across students within a given country. We are therefore after a country-specific parental component, which captures a set of practices, inputs, attitudes and beliefs that on average belong to parents of a given nationality. Of course parents differ on a wide array of dimensions even within countries, and it is likely that some of these differences will be important determinants of individual students' performances in standardized tests. However, for the study of cross country gaps in average scores, and cross country differences in GDP growth, what matters are gaps in terms of average parental inputs across countries.

Such analysis is obviously complicated by the fact that parental inputs are typically difficult to measure, and, even when proxies are available, it is unclear how to separately identify their effect from the quality of the school system. In this paper we wish to overcome these difficulties by studying test scores for second generation immigrants. We identify the importance of country-specific parental inputs by comparing the performance of students born and educated in a given country and in the same school, but with parents of different nationalities. Since factors such as the school curriculum, teaching style and school infrastructure (as well as other individual level characteristics) are being kept fixed in this comparison, we argue that we can reasonably attribute any residual difference to inputs received by their parents. In this respect, our paper shares the spirit and the approach of several studies that look at first and second generation immigrants to identify the importance of "portable" cultural and familiar components for various different outcomes (the so-called "epidemiological approach"; see among others Giuliano, 2007; Fernandez and Fogli, 2009; Alesina and Giuliano, 2010; Fernandez, 2011; Alesina et al., 2013). We then show that the results from this simple empirical exercise can be used to decompose the cross-country variation in test scores between different sources, shedding light on the nature of these gaps.

Our results point towards a substantial role for the parental component. We find the performance in the PISA test of second generation immigrant students, living in the same country and studying in the same school, is very closely related to the one of natives[1] from the country of origin of their parents. In particular, second generation immigrants from high PISA countries score better than their peers from low PISA countries, even when they are observed in the same school and even if their parents have the same level of education and other observable characteristics. This pattern is present also when we focus on a different schooling outcome from a different sample, such as the probability of grade repetition in the US Census; once again, the best performing second generation immigrants are those whose parents come from countries where natives are particularly successful in standardized tests. As we discuss at length, these results are unlikely to be driven by a pattern of differential selection of emigrating parents from different countries, which, if anything, seems to go against finding our results. Taking our estimates at face value, we find that at least 10% of the total cross-country variation in test scores can be accounted for by differences in parental inputs. Their contribution is substantially higher when we look at the gaps between specific countries: for example, at least 40% of the out-performance of East Asian and Souther European countries is persistent across second generation immigrants, suggesting that parental practices play a predominant part in explaining this gap.

We then move to explore more in detail the nature of these differences in terms of parental inputs, making use of both the PISA and US Census data as well as of several other sources. We first show that the relationship between the performance of a second generation immigrant and the average score in the parents' country of origin is weaker for parents that are more educated. This suggests that what drives our results is not something related to the quantity or quality of education received by parents in their home country. Moreover the relationship weakens if parents have spent more years in the host country, suggesting the importance for school performance of country-specific "cultural" traits, that are progressively lost by immigrants as they integrate in their new host country. We also look at detailed time use surveys on immigrants in the US, to investigate whether differences in parents and students' observable practices can

[1] Throughout the paper, we call natives those students born in the country where they are taking the test and whose parents are born in the same country as well. Students born in a country different from the one where they are taking the test are excluded from all the analyses that follow.

help to explain gaps in performance between children of different nationalities. Our results suggest that this is a promising avenue for further exploration, since parents from high PISA countries systematically spend more time on various forms of childcare, while their children spend more time studying and in related activities.

Beside contributing directly to the previously mentioned debate on cross country differences in human capital quality, our results speak to a wide literature across economics and sociology that studies the school performance of first and second generation immigrant children (see Levels et al., 2008; Dustmann et al., 2012, for broad reviews). Differently from these papers, the objective of our analysis is to understand gaps in performance between natives of different nationalities, and our focus on second generation immigrants is mostly instrumental in that it provides us with an empirical strategy to discriminate between possible sources of these gaps. As a consequence of this, our empirical approach is also different: we relate gaps between second generation immigrant groups to gaps between natives in the corresponding countries of origin, while most of this literature has focused on the comparison between immigrants and natives in the host country[2] (Schnepf, 2004; Marks, 2005; Song, 2011, among others). On top of this, by combining several waves of the PISA test we can conduct our analysis on a broad sample of host countries and countries of origin (while, for example, Dustmann et al. (2012) focus on Turkish immigrants, and Jerrim (2015) on East Asian immigrants), and we rely on several additional sources to provide suggestive evidence on the mechanism behind our results.

More broadly, our findings are also connected to a literature examining the intergenerational transmission of skills as a function of parental ethnicity or nationality.[3] In his seminal work, Borjas (1992) uses data from the General Social Survey (GSS) and the National Longitudinal Survey of Youth (NLSY) to argue that the average level of education in the ethnic environment of parents, what he calls "ethnic capital", plays a role in the human capital accumulation process of the following generations in the US. The emphasis on cross-country differences in parental inputs is shared by Doepke and Zilibotti (2012), who develop a model of preference

[2] As a partial exception, Levels et al. (2008), Dronkers and de Heus (2012) and Dronkers and de Heus (2016) do compare the performance of (a combination of) first and second generation immigrants across countries of origin. However, they do not relate those to the performances of natives in the countries of origin, nor explore the implications in terms of cross-country gaps in performance.

[3] Our focus on parental inputs is motivated by a growing literature highlighting the role in children's educational development of transmittable cultural values such as attitudes towards school, aspirations and non cognitive skills (Heckman and Rubinstein, 2001; Brunello and Schlotter, 2011; Behncke, 2012; Borghans et al., 2008; Carneiro et al., 2007).

transmission to explain the international variation in parenting styles as a function of local economic conditions. Schoellman (2016) infers from the US labor market outcomes of Indochinese refugees that country-specific environments can not account for a large cross-country variation in early-childhood human capital, and suggests that differences in parental inputs might play a bigger role.

The paper is structured as follows. Section 2 describes the data. Section 3 shows empirical evidence on the performance of second generation immigrants as a function of their parents' country of origin. Section 4 addresses the possibility that our findings are driven by different forms of selection. Section 5 makes use of these results to quantify the overall importance of the parental component for cross-country differences in test scores, while Section 6 explores more in detail the possible mechanisms behind our results. Finally, Section 7 concludes.

2 Data

Our main data come from the 2003, 2006, 2009 and 2012 waves of the PISA test. PISA is a triennial survey of the knowledge and skills of 15-year-old children, explicitly designed to allow comparisons across countries. Since 2003, 73 countries have administered at least one wave of the test, covering all OECD members as well as some partner countries. Typically, each country selects between 4,500 and 10,000 students through a two-stage stratified sampling technique, where a random sample of at least 150 schools enrolling 15-year-old students is drawn first, and then 35 students within each school are randomly selected to take part to the test. Throughout the analysis, we make use of the sample weights provided by the OECD.

The PISA test covers three subjects: reading comprehension, science and mathematics. Neither students nor teachers know the result of the test at the end, so these are rather low stake exams for students. Since each student is tested on a random subset of questions, for comparability reasons test results are not presented as point estimates but rather as "plausible values". The OECD estimates for each student a probability distribution of test scores based on their answers, and randomly draws from it five "plausible values" (see OECD (2011) for details).[4] PISA scores are standardized to have mean 500 and standard deviation 100 across

[4]Throughout the analysis on the PISA data, we compute our statistics of interest and their the standard errors by using the unbiased shortcut procedure described in OECD (2009) and followed by the literature (Dustmann et al., 2012), which takes into account both the use of plausible values for students' test scores and the two-stage stratified sampling design underlying the PISA test.

the (pooled, equally weighted) OECD countries participating in the wave where the subject-specific scale was set[5]. We further standardize them to have mean 0 and standard deviation 1 for each subject, on the same scale.

As well known, results for all subjects vary greatly across countries. In an attempt to summarize this variation, Table 1 shows the average score of native[6] students within a number of broadly defined geographical regions[7]. The superior performance of East Asian countries is particularly strong in mathematics, but the ranking across regions is quite stable across different subjects. The magnitude of the gaps is quite striking. According to OECD (2012a), a gap of 0.4 in this scale corresponds roughly to what is learned in an average year of schooling. It follows that East Asian students have a more advanced knowledge of mathematics which corresponds to approximately 1.5 additional years of schooling compared to Southern Europe, and to 4 additional years of schooling compared to Latin America and Other Asian countries. Region-wide averages mask a even larger heterogeneity across individual countries: in particular, China[8] reports an average mathematics score of 1.08 standard deviations larger than the average.[9]

The PISA data include a Student Questionnaire in every wave, which provides basic demographic information on students and parents, including their country of origin. The exact country of origin of the parents is, however, not available in all participating countries questionnaires and for the wave 2000.[10] On top of this, for some countries and waves further information is available from the School Questionnaire and the Parent Questionnaire. In particular, we use the School Questionnaire to construct some measures of school quality, and the Parent Ques-

[5]The subject-specific scale was established in the first wave where each subject was the major domain of the test, that is 2000 for reading, 2003 for mathematics and 2006 for science. The reported statistics for the science test refer only to the 2006, 2009 and 2012 waves, which are fully comparable between each other.

[6]Throughout the paper we use the term natives to refer to the group of children born and educated in a certain country, whose mother/parents were born in the same country. On average, across countries participating to the PISA test, 78% of the target population can be classified as native, according to this definition.

[7]See Appendix A for a list of countries belonging to each region. The grouping is not strictly geographical, since Singapore belongs to East Asia while Malaysia, Thailand and Vietnam do not. East Asia includes those countries in the region whose exceptional performance has become a natural benchmark for international comparisons.

[8]The PISA test in China is held in Shanghai only, and as such is not representative of the whole country. On the other hand, in our sample second generation immigrants from China might come from any part of the country, since we do not have information on the region of origin. This mismatch is likely to work against our main finding, since Shanghai is one the wealthiest are of China and Chinese second generation immigrants in our sample will be negatively selected. See section 4 for a discussion on this issue.

[9]Table 12 lists the mathematics score for all countries with at least 100 second generation immigrants in our sample.

[10]Individual countries moreover have some flexibility on how to classify parents' country of origin. While most have indicators for each country, some group small countries in broader categories. We construct a set of countries/regions consistently defined over time. See Appendix A for the details.

tionnaire to get additional information on parents' age and education.

The final sample includes 43,494 second generation immigrants on the mother side and 43,740 on the father side, from 49 and 48 different countries of origin and distributed across 39 host countries. Table 3 displays the number and main destination countries of second generation immigrants from each country of origin that can be included in our decomposition exercise, while Table 4 provides a similar breakdown across host countries. Sample sizes vary greatly, and for some countries of origin we have only a few parents to work with. To account for this, we weight countries of origin by the number of second generation immigrants in the sample when considering cross-country patterns, and we present country-specific estimates only for those countries of origin where the number of observations is sufficiently high. Descriptive statistics for second generation immigrants on the mother side are provided in Table 2.[11]

The second source of data is the Integrated Public Use Microdata Series (IPUMS) created by the US Census Bureau. The IPUMS consists of individual and household level data from the decennial census in the US and includes nearly all the details originally recorded by the census enumerations. We use the 1% samples from the 1970 and 5% sample from the 1980 censuses. Even if IPUMS has little information on children's outcomes, it does, however, contain information on each individual's exact grade attending at school.[12] We follow Oreopoulos and Page (2006) in combining this information with children's age to construct an indicator of whether or not each student has repeated any grade. As pointed out by Oreopoulos and Page (2006), grade repetition is a widespread phenomenon in the United States and is correlated with many commonly used measures of educational achievement and socioeconomic success. We classify a child as a repeater if his or her educational attainment is below the mode for the corresponding state, age, quarter of birth, and census year cell. Following Oreopoulos and Page (2006), we focus on children between the ages of 8 and 15, since children younger than 8 have not had many opportunities to repeat a grade, and children older than age 15 might have left home already or dropped out of school. To adjust for the fact that older sample members have had more opportunities to repeat a grade, and to adjust for possible gender differences in grade repetition, all regressions include controls for age dummies and gender. Moreover, we experimented with several alternative definitions of grade repetition and our results are robust

[11] Corresponding descriptive statistics on PISA data for the samples of second generation immigrants on the father side and natives can be found in Appendix B and C.

[12] This information is only available until 1980, which prevents us from using more recent years.

throughout. The final sample includes 53,081 second generation immigrants on the mother side and 46410 on the father side, from 61 different countries of origin. Descriptive statistics for second generation immigrants on the mother side are provided in Table 6.[13]

For Section 6.2, we use the ATUS-US Time Use Survey to analyze how immigrant parents and their children spend their time. We pool together all waves between 2002 and 2013. The ATUS survey was administered only to one person per household, chosen randomly among all individuals at least 15 years old. We use both data on parents and children, where children are those individuals between 15 and 18 years old. For parents, we construct a variable measuring the total time (in minutes) spent on child care on the previous day, and three subcategories that split total child care in educational, recreational and basic activities.[14] Descriptive statistics on parents' and students' time allocation are displayed in Tables 16 and 18.

Finally, we rely on several other sources to construct our controls at the level of parents' country of origin. We take GDP per capita in 2006 from the PWT, average years of schooling for different demographic groups from Barro and Lee (2013), measures of school quality from Bartik (2008), various answers from the World Value Survey to proxy for cultural differences and data on the religion composition in 1970 from Barro and McCleary (2003). For details on the construction of these variables see Appendix A.

3 Reduced Form Evidence

In this section we examine whether the school performance of second generation immigrants is related to the one of natives in their parents' country of origin. Throughout the section, we focus our analysis on second generation immigrants on the mother side only. This is done only to simplify the exposition, and alternative specifications in Appendices B and C show that our results hold without exception when we look at second generation immigrants on the father side or at the whole sample of second generation immigrants and natives.[15] We present results for the PISA and the US Census samples in turn.

[13]Corresponding descriptive statistics on US Census data for the samples of second generation immigrants on the father side and natives can be found in Appendix B and C.

[14]We follow Aguiar and Hurst (2007) for the construction of these variables. See Appendix A for the details.

[15]This more complete specification will be used for our decomposition in Section 5

3.1 PISA

Let T^m_{icst} denote the PISA math[16] score in year t of child i, studying (and born) in country c and in school s, whose mother was born in country m.[17] We start from the following specification:

$$T^m_{icst} = \theta_0 + \theta_1 T^m + \theta_2 X^m_{icst} + \theta_3 Z^m + \theta_{cs} + \theta_t + \varepsilon^m_{icst} \quad (1)$$

where T^m is the average score of native students in the mother's country of origin[18,19], X^m_{icst} is a vector of individual characteristics of student and parents, Z^m are controls at the mother country of birth level, θ_{sc} is a country or school (depending on the specification) fixed effect[20], θ_t is a PISA wave fixed effect and ε^m_{icst} is an error term. The main coefficient of interest is θ_1, which captures the relationship between a given second generation immigrant's performance and the average score of native students in country m.

Here, T^m is used as a proxy for the bundle of characteristics of parents born in country m which affect the school performance of their children. The average test score in a given country reflects a combination of school quality, economic, cultural and institutional factors. However, by analyzing children educated in the same country/school, who differ just because their parents come from different countries, we disentangle the part of their tests scores related to the institutional environment from the part related to parental inputs. The main worry is of course that omitted inputs for students' performance might be correlated with T^m, i.e. that, for example, second generation immigrants whose parents come from high PISA countries might receive higher investments in their educational development for reasons unrelated to their parents' nationality. The school fixed effect takes care of the possibility that they might attend schools of higher quality, given that we are comparing students within the same school. On top of this, we also control for parental characteristics which might be correlated with human

[16]The results are similar for the reading and science tests (see Appendix D). The Math test is often preferred for international comparisons for the relative easiness of defining and quantifying a common set of expected skills (Hanushek and Woessmann, 2012a).

[17]Throughout the paper, subscripts refer to the location and characteristics of students, while superscripts refer to the country of origin of parents.

[18]The average score is computed across all available waves, applying the provided sample weights.

[19]In this setting the dominant information is found in cross-country variation. A panel data approach would be of difficult implementation because the main regressor is indeed persistent over time (see Kimko and Hanushek (2000)), and short run shocks and variations in PISA scores are likely to be caused by cohort effects rather than significant changes in the cultural and educational environment. Moreover, PISA tests are available for few points in time and for recent years only.

[20]Since the PISA test in not administered in the same schools across different waves, the school fixed effects are effectively wave-specific.

capital investments on children and with PISA scores, such as parental education[21]. In this way, we are also able to understand how much of the gap comes from differences in parents' observable characteristics and how much from differences in an unobservable, country-specific, component. The possibility that our results are driven by differential selection on unobservables of second generation immigrants will be discussed in great detail in Section 4.

Table 5 shows our main results. The sample is limited to second generation immigrants on the mother side, and a dummy is included in all specifications to control for whether the father is also foreign born.[22] We proceed by progressively adding controls. Column 1 of Table 5 displays the raw correlation between PISA scores of second generation immigrant students whose mother comes from country m and the average PISA score of natives in country m. It is strong and highly significant: if we compare two second generation immigrant students, with the mother of the first coming from a country where students score a standard deviation higher than the mother of the second, we see the former doing better than the latter by 69% of a standard deviation.[23] The coefficient shrinks when we restrict the comparison to students that are observed in the same country (Column 2) and, especially, in the same school (Column 3), but is still positive and significant. The difference in the size of the coefficient between the first two specifications and Column 3 is quite illuminating, since it suggests that mothers from high PISA countries send their children to better schools. We will show further evidence of this and discuss some implications for our empirical exercise in Section 4.

The specification in Column 4 adds controls for parental education, with the coefficient of interest being hardly affected. This finding is useful for the interpretation of the mechanisms behind our results: it suggests that the estimate of θ_1 is unlikely to be driven by some parents' unobservable skills (like ability), since we would expect these unobservables to be correlated to parental education, and therefore the inclusion of this last variable to matter a lot for our coefficient of interest. What drives our result seems to be something not correlated with parents' education level[24]. Finally, the last two columns of Table 5 show that results are not driven by

[21] Additional results with socioeconomic status as controls are not show here, and are available upon request. Information on parental age is available only for country and waves for which the Parent Questionnaire was administered. Our results are robust to the inclusion of these controls in this sub-sample.

[22] This specification therefore ignores the variation in parental inputs associated with the country of origin of the father. As mentioned earlier, specifications that focus on fathers or that include the whole sample of second generation immigrants and natives give very similar results, and are shown Appendix B and C respectively.

[23] Here we refer at the standard deviation of the individual level scores, not of the country average scores.

[24] A possible concern, though, is that θ_1 is not much affected because parental education for immigrant parents is measured with error. Indeed, the estimated coefficients for these variables are quite small and, with

the particularly good performances of East Asian students, since the coefficient is robust to the inclusion of continent fixed effects and to the exclusion of East Asian mothers.

Figure 1 summarizes the results presented in this section. The left panel displays, for all countries with at least 100 second generation immigrants on the mother side in the sample, the strong and positive relationship between the average score of second generation immigrants and the average score of natives in the mother's country of origin country. The right panel shows that the correlation weakens but is still positive and significant when we clean the scores of second generation immigrants from the effect of observable characteristics, including school fixed effects.

3.2 US Census

We apply a similar specification as in equation (1) on the US Census data, using a dummy equal to one if a child has never repeated any grade as our dependent variable. We notice that this outcome, while still related to school performance, captures quite a different dimension compared to the PISA score, given that the variation in this case comes only from the bottom part of the distribution (more than 80% of the students in the sample has never repeated a grade, as shown in Table 6). On the other hand, while the PISA dataset contains only 15 year old children, the US data allows us to look at students between 8 and 15 years old. We therefore find quite noteworthy that our results generalize to this sample as well.

The US Census does not contain any information on the particular school children are attending, making it impossible to compare second generation immigrants in the same school, as we did for Table 5. In an attempt to capture some of the differences across educational systems within the US, we control for State and Commuting Zone[25] fixed effect. However, the US Census provides us with precious information on parents' immigration history, so that we can control for the number of years passed since the mother has first migrated to the US. On

the exception of the tertiary education dummy for fathers, not statistically significant. Moreover, the presence of some measurement error is quite realistic, given that PISA questionnaire are filled in by students, who may have difficulties reporting their parents' educational level, especially if parents were educated in a different country. To address this possibility, we exploit the fact that for countries and waves where the Parents Questionnaire was administered, parents were asked to report their education as well. We therefore instrument the mother's and father's educational levels, as reported by children, with those reported by the parents themselves. Since the sample that allows this exercise is considerably smaller, we focus on the specification that includes both natives and second generation immigrants on either parent's side.The results (available in Appendix E) show that, while there is some degree of measurement error, the coefficient of interest θ_1 does not vary much in magnitude between the OLS and the IV specifications.

[25]Commuting Zones are constructed following Autor and Dorn (2013).

top of this, we can also control for a richer (compared to the PISA sample) set of observable characteristics on family background, such as family size, child's and parents' age and family income.

Table 7 shows our main results. Once again the coefficient on T^m is positive and significant, and does not change much in magnitude when controls for parental education and years since migration are included. According to column 4, the most complete specification, an increase of a standard deviation in the PISA score of students in the mother's country of origin is associated with a higher probability of not having repeated any grade by 2.5 percentage points (3% over the average). This effect is not trivial, given that, as mentioned earlier, most students do not repeat any grade. As for the PISA specification, the result is robust to the inclusion of continent fixed effects and the exclusion of East Asian parents.

4 Selection

As our analysis relies on emigrant parents to make inference on all parents of a given nationality, an obvious concern is represented by the fact emigrants are not a random sample of the population, and might be selected on unobservable characteristics that also matter for children's school performance.

What type of selection should we worry about in this context? Figure 2 displays various possibilities. In these plots the solid line represents the actual relationship between the score of second generation immigrants and the one of natives from the parents' country of origin, i.e. the relationship that we would be able to observe in a world where emigrant parents were randomly selected from the population. The dashed line represents instead what we would observe in our data, assuming different pattern of selection into emigration. The first panel depicts the case where the type of selection into emigration (as measured by the gap between the two lines) is the same across countries of origin with different PISA scores: if this is the case, only the estimate of the intercept of our regression will be biased and out estimates of θ_1 will therefore not be affected. In the second panel we have the case where parents emigrated from countries with high PISA scores are more positively selected than parents emigrated from countries with low PISA scores, while in the third panel we have the opposite case. These patterns of differential selection would lead to a biased estimate of our coefficient of interest, and in particular the case depicted in the second panel could rationalize the findings of the previous sections.

While the main threat to our approach is represented by differential selection on unobservables, it is useful to verify whether emigrant parents are differentially selected on observable characteristics. The idea here is that unobservables that positively affect children's school performance (like parents' ability, motivation etc) are likely to be positively correlated with some observable characteristics, like parents' education and socioeconomic status. We can therefore somehow alleviate the concerns on differential selection by showing that the relative "quality" of emigrants compared to stayers is not higher for high PISA countries.

For each emigrant parent we construct a measure of selection given by the ratio between his or her years of schooling and the average years of schooling of non emigrant parents' from the same country.[26] Figure 3 plots the average of this measure of selection across mothers' countries of origin against the average score of native students in those countries. If anything, the relationship seems to be negative, suggesting that emigrants from high PISA countries are more adversely selected (at least in terms of observable characteristics) than emigrants from low PISA countries (panel 3 of Figure 2).

In addition, Table 8 shows results of a regression of our measure of selection of emigrant parents on the average PISA score in their country of origin, controlling for country (columns 1 and 3) and school (columns 2 and 4) fixed effects. The pattern is rather similar for mothers and fathers: we find some evidence of negative selection within host countries, and stronger evidence within schools.[27]

A distinct issue, though obviously related, is selection into host countries and schools, conditional on emigration. This is important for the interpretation of θ_1. As mentioned earlier, the introduction of host country and, in particular, school fixed effect lowers our correlation of interest in Table 5, suggesting that parents from high PISA countries might select educational environments more conducive to a good schooling performance. In order to provide direct evidence for this, we use the proxies for school quality we constructed from the information

[26] We construct a mapping between the ISCED classification of educational levels and equivalent years of schooling by using the country specific conversion table in OECD (2012b).

[27] This pattern of negative differential selection within schools is consistent with the view that there is assortative matching between the quality of parental inputs and the quality of the school attended by children. The logic is as follows: when we observe two students in the same school, with one of them having received higher quality parental inputs (which in our setting means having parents born in high PISA country), then it must be that the other student, or his parents, are "better" on some other (unobservable) characteristics, otherwise the two students would not be in the same school to start with.

available in the School Questionnaire. Table 9 shows that, after controlling for country fixed effects and the usual observable characteristics, a higher PISA score in the country of origin of the mother is associated with schools where natives score better in the PISA test, no matter whether we take the raw average (column 1) or we clean it from observable characteristics (column 2), where admissions are more likely to be based on academic records, the proportion of teachers with at least some tertiary education is higher and the proportion of students dropping out is lower.[28]

This result has important implications when decomposing the importance of differences in parental and school inputs across countries. On the one hand, school selection is a choice in which parents (either directly or indirectly, through the transmission of attitudes and values) play an important role, so that, when comparing second generation immigrants, the attendance of better schools could be viewed as one of the channels through which superior parental inputs manifest themselves. On the other hand, for the purpose of explaining differences in the average performance of natives across countries, the extent to which differences in the in average ability or willingness to select better schools can matter is limited by the available supply of school quality in each country. At one extreme, if all schooling resources that matter are utilized to full capacity, then endowing a country with a higher average parental effectiveness in school selection would not contribute at all in boosting the average score[29]. This scenario is probably too stark however, since in several countries students might be able to access better schools without necessarily displacing others, or parents' drive for school quality could stimulate its supply to start with.[30]

In our context, specifications with school fixed effects wash out differences in school quality from our correlation of interest, while specifications which only include host country fixed effects "attribute" all of the within-country variation in school quality documented above to parents. In light of the difficulty of establishing the relative merit of these two views, for both our reduced form evidence and decomposition exercise we show results from both specifications, with the

[28]Tables 7 in Appendix B and 17 in Appendix C show that the same results hold when we look at fathers or at the whole sample.

[29]This would not necessarily be true in a world where parental and schooling inputs are complementary in the human capital production function, since then the matching pattern between schools or families would matter for the average performance. In Appendix F we investigate this possibility, and conclude that it is unlikely to be quantitatively important in our setting.

[30]See McMillan (2000) and references therein for a discussion on the role of parental pressure in holding schools accountable and improving their effectiveness.

understanding that regressions with school fixed effects provide us with a lower bound on the importance of parental inputs, while the ones with country fixed effects are likely to overstate their importance.[31]

While the discussion so far has focused on the "absolute" quality of schools to which second generation immigrants are allocated, an additional concern is that immigrant parents from high PISA countries may be systematically selecting host countries (or schools) where, because of idiosyncratic factors, it is easier for them and their children to integrate and perform well. Of course the quality of the match between parents or children on one side and countries or schools on the other is unobservable, and it is difficult to rule out entirely this possibility. However, we can check whether immigrant from high PISA countries are located in countries which are, according to reasonable proxies, culturally closer to their country of origin. To explore this possibility, Table 10 explicitly looks at the linguistic dimension. In column 2 we add to the baseline regression of column 1 a dummy variable that takes value of 1 for all students that declare to speak a foreign language at home (which is available only for part of the sample). While the coefficient on this newly added control is, as expected, negative and significant, our main coefficient of interest is virtually unaffected. In column 3 we add controls for whether the mother tongues of mothers and fathers (inferred from their countries of origin) are the same of the mother tongue spoken in the host country, while in column 4 we add a measure of linguistic distance from Spolaore and Wacziarg (2015). In both cases the coefficient on T^m remains positive and significant, and does not change much in size.[32]

5 Decomposing schools and parents contributions

For our decomposition we introduce a slightly more general model, which allows parental inputs supplied by both mothers and fathers to differ across countries. Suppose that the test score in wave t of a second generation immigrant i, studying in school s and country c, whose mother and father were born in countries m and f, is given by

$$T_{isct}^{mf} = Parents_{isct}^{mf} + \alpha_{sc} + \alpha_t + \rho' X_{isct}^{mf} + \varepsilon_{isct}^{mf} \tag{2}$$

[31] The patterns of negative differential selection documented in Table 8 reinforce our interpretation of the school fixed effect specification as lower bound.

[32] See Appendix B for the corresponding results for second generation immigrants on the father side.

where $Parents_{isct}^{mf}$ is the combined effect of all parental inputs,

$$Parents_{isct}^{mf} = \gamma^m + \delta^f + \beta' ParentsEdu_{isct}^{mf} + \eta_{isct}^{mf} \tag{3}$$

with γ^m and δ^f being country-specific components capturing a set of average (unobservable) characteristics of mothers and fathers from countries m and f respectively. The parental component of student i includes also the effect of parents' education, which potentially might influence his or her performance in school. Combining (2) and (3) we obtain

$$T_{isct}^{mf} = \beta' ParentsEdu_{isct}^{mf} + \gamma^m + \delta^f + \alpha_{sc} + \alpha_t + \rho' X_{isct}^{mf} + u_{isct}^{mf}$$

This model can be estimated on the sample of students for which both parents are born in a different country from the one where the PISA test is taking place. However, in order to use all the available information in the data and to obtain more precise estimates for the other controls (including the host country and school fixed effects), we include all second generation immigrants and native students in the following specification

$$T_{isct}^{mf} = \beta' ParentsEdu_{isct}^{mf} + \gamma^m + \delta^f + \theta^m NatMoth_{isct}^{mf} + \zeta^f NatFath_{isct}^{mf} + \rho' X_{isct}^{mf} + \alpha_{sc} + \alpha_t + u_{isct}^{mf} \tag{4}$$

where $NatMoth_{ist}^{mf}$ and $NatFath_{ist}^{mf}$ are dummies identifying native parents (mothers and fathers, respectively). The coefficient θ^m (and similarly ζ^f), in the spirit of a difference in differences, captures the extent to which the relative performance of students whose mother is from country m, compared to second generation immigrant students from another country, is larger or smaller in country m (where the mother is native) as opposed to a different host country. Importantly, we allow the "native advantage" to be country-specific for both mothers and fathers: a failure to do so would imply that this kind of variation would be absorbed by the country of origin fixed effects, which, in that case, would not be identified only out of second generation immigrants (see footnote 34 for further discussion on this point).

The object whose variation we are ultimately interested in decomposing is the average score (across all available waves) of native students in country c, which is given by

$$T^c = \alpha + Parents^c + \theta^c + \zeta^c + \overline{\alpha}_c + \rho'\overline{X}_c \tag{5}$$

where $Parents^c = \gamma^c + \delta^c + \beta'\overline{ParentsEdu}^c$, $\overline{\alpha}_c$ is either a weighted average of the school fixed effects or the fixed effect for host country c (depending on the specification) and $\overline{X}_c$ and $\overline{ParentsEdu}^c$ are within country c averages.[33] Equation (5) makes our decomposition explicit: our objective is to evaluate the importance of $Parents^c$ to account for the variation of T^c_c across countries.[34]

In order to do that, we estimate our country c specific parental component from

$$\widehat{Parents}^c = \widehat{\gamma}^c + \widehat{\delta}^c + \widehat{\beta}'\overline{ParentsEdu}^c$$

where $\widehat{\gamma}^c, \widehat{\delta}^c$ and $\widehat{\beta}$ are our estimated parameters from equation (4). As discussed earlier, we focus on two different specifications, one that includes school fixed effects and another with only host country fixed effects. Moreover, we display results for countries for which we have at least 100 second generation immigrants in our sample and therefore a reasonably precise estimate of the corresponding fixed effect. Figure 4 plots the parental component obtained from both specifications against the average score of natives (with $Parents_{\text{CHINA}}$ being normalized to 1 in both cases)[35]. Not surprisingly, the estimated $Parents^c$ is larger (in absolute terms) for countries that perform better in the PISA test, which means that our parental component does account for some of the cross-country variation (as opposed to masking an even larger dispersion) of average test scores. Consistently with our discussion in Section 4, the dispersion in $Parents^c$ is larger under the country fixed effect specification, which allows the parental component to absorb the within country variation in school quality.

As a simple summary statistic[36], we compute the share of the total cross-country variance

[33] The constant α absorbs the average of the waves fixed effects.

[34] Notice that θ^c and ζ^c are not included in $Parents^c$. These components are identified out of the comparison between native and second generation immigrant students in country c, and we think that various factors different from parental inputs (such as the extent to which immigrants manage or are willing to integrate in their host country, or even characteristics of the school curriculum) could drive the international variation in the "native advantage". Instead, we view our focus on second generation immigrants of different nationalities as one of the main advantages of our empirical approach: as a way to allow us to clean our estimates from confounders that would be difficult to proxy for. Nevertheless, even if we include θ^c and ζ^c in the parental component, they are both positively correlated with T^c, so including them in our parental component would lead us to infer a (moderately) higher role for parental inputs.

[35] Table 12 displays $Parents^c$ for all countries.

[36] Our decomposition exercise is conceptually similar to the ones proposed in Card et al. (2013) and Finkelstein et al. (2014), who also use (in different contexts) fixed effects identified out of movers to separate the contribution

of T_c^c accounted by $Parents^c$, simply as

$$V_{Parents} = \frac{Var(\widehat{Parents^c})}{Var(T^c)}$$

Moreover, for every country (or group of countries) c we can calculate the share of the gap in average test score accounted by the parental component with respect to a given benchmark b as

$$S_{Parents}(c, b) = \frac{\widehat{Parents^b} - \widehat{Parents^c}}{T^b - T^c}$$

Finally, to gauge the relative contribution of parental education and country-specific intercepts, we also compute equivalent statistics for the country specific intercepts only,

$$V_{FE} = \frac{Var(\widehat{\gamma}^c + \widehat{\delta}^c)}{Var(T^c)}$$

$$S_{FE}(c, b) = \frac{(\widehat{\gamma}^b + \widehat{\delta}^b) - (\widehat{\gamma}^c + \widehat{\delta}^c)}{T^b - T^c}$$

Tables 11, 12 and 13 show the results of these calculations, both under the country fixed effect and the school fixed effect specifications. For the pairwise comparisons, we focus on the gap between China and the other countries for Table 12 and on the gap between East Asia and the other regions as defined in Section 2 for Table 13.

Table 11 show that $Parents^c$ accounts for at least 10% of the total variation across countries, and up to 30% when we do not clean it from the variation in school quality within countries. The results are similar when we restrict attention to the international variation in $\widehat{\gamma}^c + \widehat{\delta}^c$, suggesting that cross-country differences in parents' education do not play an important role. However, the parental component plays a substantially larger role when accounting for the gap between the top performers and other countries. Table 12 shows that, on average, between 19% and 56% of China's out-performance can be accounted by parental inputs. While some of the country-specific estimates are too imprecise to allow definite conclusions, the gaps in $Parents^c$ are particularly high for several countries in the middle-bottom part of the score distribution (Spain, Portugal, Italy, Croatia, Greece and Turkey in particular), but not so pronounced for the worst performers.

of individual characteristics and geographical or institutional factors. Unfortunately, the lack of a panel dimension on the student side prevents us from implementing an event-study type of analysis as they do.

A similar message emerges from the analysis of broad regional groups in Table 13. Particularly striking are the results for Southern Europe and Middle East/North Africa, which as shown in Table 1 display large gaps with respect to the best performing countries, more than a third (and, under the host country fixed effect specification, virtually all) of which is potentially explained by differences in terms of parental inputs. On the other hand, it is interesting to notice the relatively smaller role that parental inputs play for Latin American countries, whose poor performance in standardized test has been object of recent study (Hanushek and Woessmann, 2012b). Once again, the country of origin fixed effects and not the differences in the parents' educational level account for the bulk of the contribution of the parental component.[37]

6 Mechanism

In this section we attempt to open the black box of the parental inputs whose importance was quantified above. What makes parents from high PISA countries more "effective" in terms of the school performance of their children? While answering this question precisely is difficult, we attempt to shed some light on this by proceeding in three steps. First, we distinguish between two alternative interpretations on the source of differences in parental inputs, one based on an intergenerational effect of parental education and another based on a cultural transmission mechanism. Then we turn to the Time Use data to see whether immigrant parents from high PISA countries and their children differ in some observable practices that might help us to explain their better performance at school. Finally, we test whether measures relative to countries' of origin economic development, culture or religion can explain our correlation of interest.

6.1 Interactions

The results shown in the previous sections can be rationalized by two conceptually distinct interpretations. One possibility is that the outstanding performance of second generation immigrants from high PISA countries is a by-product of the fact that their parents received an education of higher quality in their country of origin. While conceptually this would still imply

[37]For several geographic regions, and notably for the US, $S_{FE}(c, EA)$ is considerably larger than $S_{Parents}(c, EA)$, since in those regions parents are on average more educated than their East Asian counterparts.

that these students have an advantage in terms of parental inputs, the source of this advantage would be the school system itself, creating a powerful intergenerational multiplier effect of educational quality. In other words, while our decomposition would still be valid in an accounting sense, the underlying fundamental force driving this result would be the school system itself and the policy implications would be different.

An alternative explanation is that there is some fixed cultural trait which parents transmit to their children, which is unrelated to the quality of parental education and might have its roots in factors deeply entrenched with a country's history and culture. This would mean that this component is likely to be quite persistent over time, and improving a country's educational system might not do much in raising the average test scores if this cultural aspect does not change as well.

A useful way to discriminate between these two views is to explore the heterogeneity of the importance of the country specific parental component with respect to parental education and years since migration. If the intergenerational transmission of educational quality is important, we would expect the correlation with the PISA score in the parents' country of origin to be particularly strong for immigrant parents with higher education in their home country[38], which have been more exposed to the educational system.[39] At the extreme, parents with no education could not transmit the quality of their home country's educational system at all. On the other hand, if the underlying mechanism is a fixed cultural trait we would expect that parents that have been abroad for a longer time might be culturally more integrated in their host country and would have at least in part converged to its cultural norms[40]. In that case, the correlation with the average test score in the country of origin would be weaker for parents that have emigrated many years ago. Moreover, there is some evidence that highly educated immigrants have an easier time integrating in their host country[41]: if this is the case, under the "cultural"

[38] It is actually unclear whether only years of schooling in the home country should matter, giver that there could be dynamic complementarities in the human capital accumulation process that make the impact of an additional year of schooling in the host country stronger for parents that have spent the initial part of their educational career in higher quality schools. Moreover, it is possible that parents emigrating from high PISA countries would go to better schools once in the host country. Since we actually find a negative interaction term, this issue is mostly inconsequential for our purposes.

[39] This line of reasoning is similar to the one in Schoellman (2012), even though here it is applied to returns to parental education for school outcomes of their children.

[40] See Giavazzi et al. (2014) for evidence on the speed of convergence of different cultural traits.

[41] For example, there is widespread evidence that more educated migrants have a higher propensity to intermarry with natives (see Schoen and Wooldredge (1989); Sandefur and McKinnell (1986); Lichter and Qian (2001); Meng and Gregory (2005); Chiswick and Houseworth (2011)), which is an important indicator of integration in the host country.

interpretation, parents' years of schooling (acquired either in the home or in the host country), would also alleviate the correlation between their children performance and the average score in their country of origin.

To summarize, we have some testable implications to discriminate between the two mechanisms. The intergenerational transmission of educational quality mechanism would imply a positive interaction term between parents' years of schooling acquired in the home country and the average score of natives in the same country. The fixed cultural trait mechanism would instead predict a negative interaction between the average test score and parents' years since migration, as well as with parents' years of schooling.

We now turn to the US Census data to put these predictions to empirical scrutiny. We once again restrict attention to the results relative to second generation immigrants on the mother side in the main text.[42] We construct a measure of mothers' years of schooling both in their home and in their host countries based on the information on year of immigration and age at the end of education (imputed from the educational level). Year of immigration is available only as a categorical variable, identifying intervals of approximately 5 years. We therefore impute the exact year of arrival in the US according to two alternative criteria: either we assign to everybody the middle year of their interval (Table 14), or we impute the last year in that interval in order to identify immigrants that most likely had their whole education in their home country (Table 15)[43].

Table 14 shows our main results. We start by adding to the baseline specification in column 1 an interaction term between T^m and mother's years of schooling, finding a negative and significant coefficient. When we break down years of schooling between those acquired in the US and those acquired in country m (columns 3 and 4), we find that the interaction term is negative in both cases, with coefficients of similar magnitudes. These results are inconsistent with the presence of a strong intergenerational effect of educational quality.

A similar message emerges from the study of heterogeneity with respect to years since migration. According to the results in column 5, the correlation between T^m and the children's

[42] The results for the rest of the sample are available in the Appendix.

[43] Regardless of the imputation strategy, for a few observations (approximately 2% of the sample) the mother appears to have arrived in the US after her child was born. Since all children in the sample are (according to the Census) born in the US, these might be cases where mothers have moved in and out the US and the recorded date refers to the last time of arrival, or simply instances of coding errors. The results are robust to the exclusion of these observations.

school performance is weaker for mothers that have emigrated many years ago.[44] This convergence happens relatively quickly: based on column 5, for mothers with the average educational profile[45], the effect of T^m halves after 14 years spent in the US. Column 6 shows that this pattern (as well as the results on education discussed above) is unaffected by the inclusion of controls for age at migration, which has also been shown to be important for the assimilation of immigrants (Bleakley and Chin, 2010; Nielsen and Schindler Rangvid, 2012).

A possible concern is that our imperfect mapping from the information available from the Census and years of schooling accumulated in country m and in the US might confound our results (see the discussion in footnote 38). To alleviate this concern, Table 15 shows results for a sub-sample of mothers that we are more confident completed their whole education in their country of origin, because we imputed their year of immigration using the most restrictive criterion discussed above. We can see that again the interaction between T^m and mother's years of schooling is still negative and significant, as well as the one between T^m and years since migration.

Overall, our results seem supportive of the fixed cultural trait interpretation, given that our correlation of interest is attenuated by both parental education[46] and integration in the host country. To offer further visual evidence for the first fact, Figure 5 plots, for US Census data, the country-specific (for all countries with at least 100 second generation immigrants in the sample) intercept and coefficient on mother's years of schooling from a regression of our outcome of interest on these variables and the usual controls, with the sample always restricted to second generation immigrants on the mother side. The correlation between students grades and the average test scores in their mother's country of origin is mainly driven by the intercept, while the variation in returns to education, if anything, works in the opposite direction.[47] This pattern is different from the one documented by Schoellman (2012) for immigrants' wages. Schoellman (2012) shows that returns to education (and not the intercept) of US immigrants,

[44] This result provides an additional reason why our decomposition exercise in Section 5 might understate the importance of parental inputs. If immigrant parents from different countries progressively become more similar to each other as they integrate in their host country, we would find a larger role for parental components by focusing on those who have just emigrated, which are still very comparable to non-emigrants in their country of origin. Unfortunately, the lack of data in the PISA sample on date of immigration prevents us from allowing for this type of heterogeneity.

[45] This corresponds to 8.15 years of education in the home country and 2.12 years of education in the US

[46] We verified that this pattern holds also for the PISA data. These results are not shown and are available upon request.

[47] We built the same figure using the PISA data and the results are exactly the same.

depending on their country of origin, are positively related to GDP per capita and PISA scores in their home country and interprets this as evidence in favour of the fact that school quality varies greatly across countries. Our results show that, while differences in school quality might be important for labor market outcomes of immigrants, they do not seem to account for the differential school performance of their children. What matters in this case seem to be fixed cultural traits incorporated in the country specific intercepts.

6.2 Time Use

In this section we investigate whether the way in which immigrant parents from high PISA countries and their children spend their time might help us interpreting our main results.

Table 17 starts by looking at parents. Columns 1 to 3 refer to total child care, while columns 4 to 6 break down the time spent with children in the educational, recreative and basic categories described in Section 2. Across all specifications and time use categories, interviewed parents from high PISA countries stand out for spending more time with their children. The result is robust to the inclusion of state fixed effects and several controls on demographic characteristics of both parents and children. Since time use variables are measured in minutes and refer to a single day, from column 3 it emerges that an increase of one standard deviation in the PISA score in a parent's country of origin corresponds to a higher investment of approximately one hour per week in total child care. This extra hour is quite evenly spread across the three time use subcategories.

Table 19 examines instead time use habits of children. Here we restrict the sample to students between 15 and 18 years old, which are enrolled in full time education; moreover, as usual, we restrict attention to second generation immigrants on the mother side in the main text. Our dependent variable is time spent studying, as a proxy for one the main inputs in the educational process. While the sample size is quite small, we find a strong and significant correlation with the average test score of the mother country of birth (T_m). According to column 3, the most complete specification, an increase of a standard deviation in T^m is associated with 3.6 extra hours of studying per week.

The results in this section seem to indicate that second generation immigrants do differ in terms of observable practices as a function of the country of origin of their parents. In absence of a credible estimate of the effectiveness of parental child care and children's study time, it is of course difficult to establish where these differences might be driving the results found in the previous sections.

6.3 Country Level Characteristics

We now present results from specification (1), augmented by a series of controls at the mother's country of origin level. The main objective of this analysis is to verify that the estimate of our coefficient of interest does not pick up variation across different country-level characteristics, that might also plausibly affect second generation immigrants' school performance.

Table 20 includes controls related to the level of economic development and to the quality of the education system in country m. In particular, we include log GDP per capita, the percentage of native mothers with at least some tertiary education, average years of education of natives between 20 and 30 years old in 1990 and the pupil to teacher ratio in primary schools in country m. The introduction of these controls does not significantly affect the coefficient on T^m.[48] It is interesting to notice that GDP per capita in the country of origin appears to be negatively correlated with the performance of second generation immigrants. As argued by Levels et al. (2008), such a result might reflect the fact that immigrants from poorer countries are more positively selected than immigrants from richer countries, a pattern that holds in our data as well.[49] Nevertheless, while of the expected sign, the change in the coefficient of T^m is quite small, suggesting that this differential selection is unlikely to be quantitatively important.

Table 21 includes controls related to religion and cultural values. Columns 2 controls for the religious composition of the population in 1970, while column 3 controls for some answers to various World Value Survey questions that should capture attitudes towards education and hard work.[50] While some of the controls introduced seem to have explanatory power on the performance of second generation immigrants, our coefficient of interest is virtually unaffected. The parental component underlying our results does not seem to be easily measurable through the cultural proxies commonly adopted in the literature.

[48]Regressions with other controls of school quality are available under request. The main result is unaffected across all specifications we have experimented with.

[49]The selection analysis with respect to GDP is available upon request.

[50]We experimented with several additional questions, as well as with averaging across all relevant variables. The results, available upon request, are similar to the ones displayed here.

7 Conclusions

While PISA scores are often taken as a metric to compare the quality of different educational systems, this is not the whole story. In this paper we argue that an important share of the cross-country variation in test scores is driven by differences in broadly defined parental inputs. We arrive to this conclusion by comparing the PISA performance of second generation immigrants, which are born and educated in the same country and school, but have parents of different nationalities. While we cannot entirely rule out the possibility that some unobservable characteristic plays a role in driving our results, we show through various checks that this is unlikely to be the case, and that any residual pattern of differential selection would probably go against finding our result.

We also provide evidence against the possibility that the superior performance of second generation immigrants from high PISA countries is due to an intergenerational spillover of the high quality education received by their parents. There seems to be some deep cultural factor that makes parents born in some specific countries invest more in their children's education.

Our paper leaves open important avenues for future research. While our main contribution is to identify and quantify an important parental quality component in average PISA scores, our evidence on the specific mechanisms behind this component is only suggestive. We believe it would be important to deepen our understanding of what East Asian parents do differently from Southern European ones (to pick a stark comparison) when raising their children, and whether these differences are optimal responses to the economic environments they are placed in, or maybe the byproduct of differences in preferences shaped by the historical experiences of the two regions.

Moreover, our results could be viewed as a sign of caution for policymakers aiming to raise their students' performance in standardized tests. Since cross-country gaps seem to go beyond differences in school quality, it is unclear to what extent various policies can be effective to this end, given that the cultural factors that lead parents to invest more or less in children's education might be deeply entrenched and persistent over time.

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Figures

Figure 1: Performance of Second Generation Immigrants and Natives from Country m

Source: PISA (2003-2012). The left panel plots the average PISA score of second generation immigrants whose mother is from country m (y-axis) with respect to the average PISA score of natives in country m (x-axis), for all countries with at least 100 second generation immigrants on the mother side in the sample. The right panel plots the estimated country of origin fixed effect from a regression with individual math scores as dependent variable and gender, both parents' education, father's immigration status and school fixed effects as additional controls, with the sample restricted to second generation immigrants on the mother side. The fixed effect for China is normalized to 1. The size of the circles is proportional to the number of second generation immigrants on the mother side in the sample.

Figure 2: Different Types of Selection

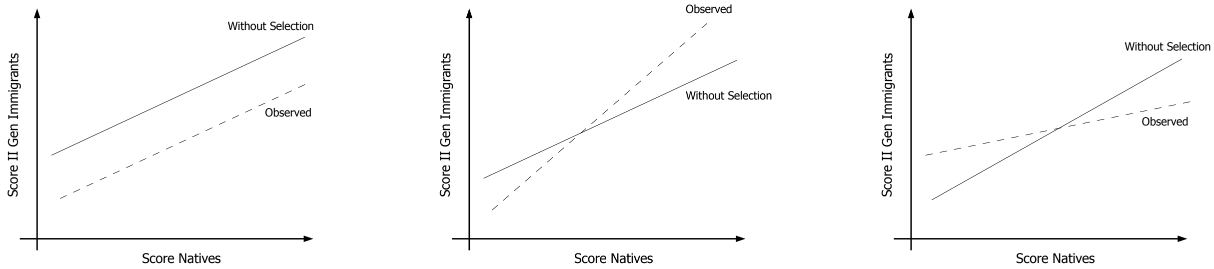
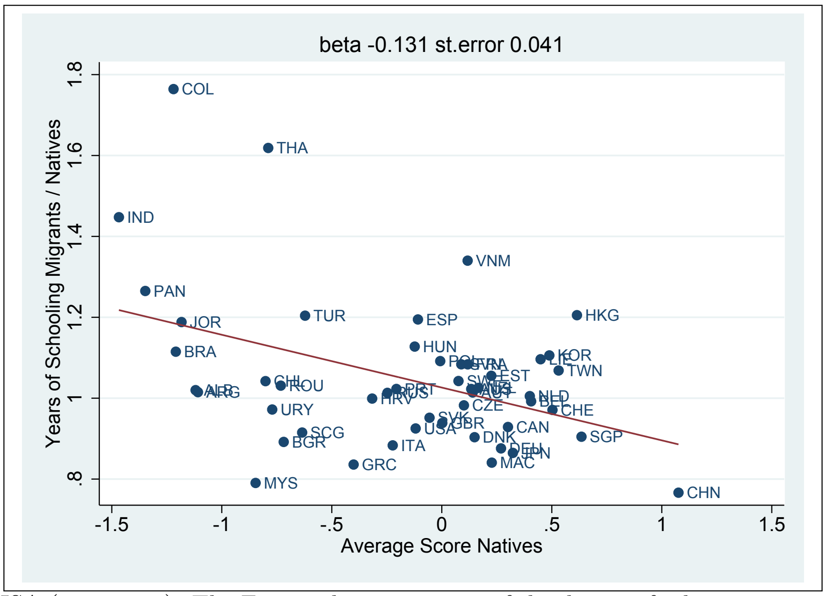
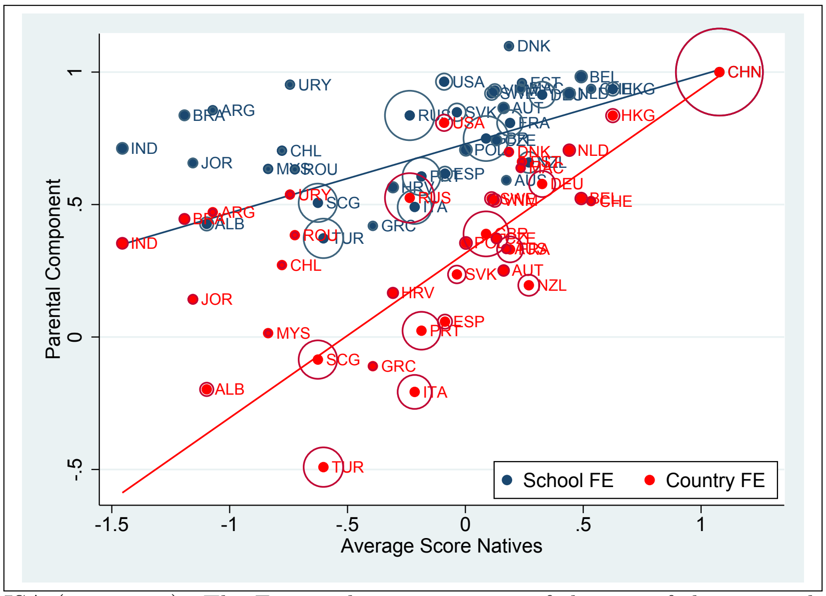


Figure 3: Selection on Parental Education



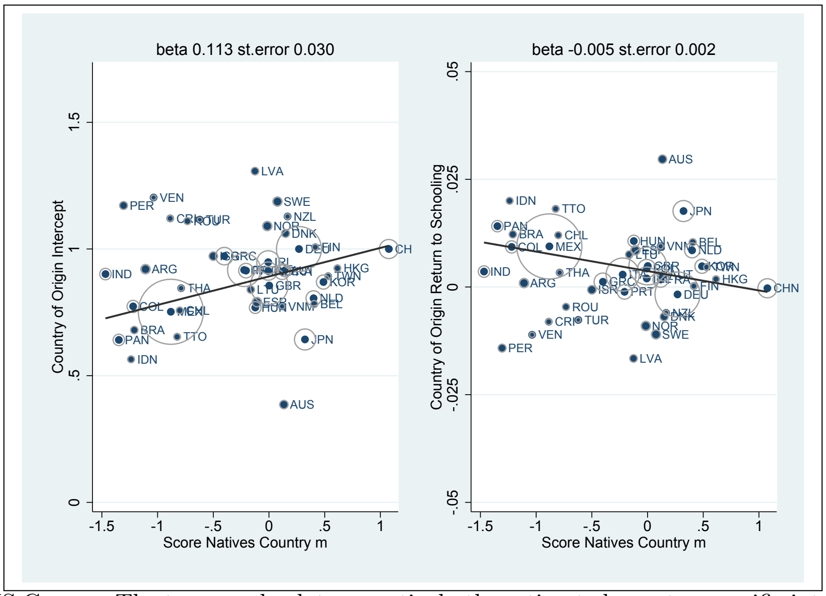
Source: PISA (2003-2012). The Figure plots a measure of the degree of selection into migration in country m (the average years of schooling of emigrant parents over the average years of schooling of remaining parents) (y-axis) with respect to the average PISA score of natives in country m (x-axis).

Figure 4: Parental Component



Source: PISA (2003-2012). The Figure plots an estimate of the size of the parental component ($Parents_c$ in the decomposition described in Section 5, normalized such that it takes value 1 for China) (y-axis) with respect to the average PISA score of natives in country m (x-axis). Only countries with at least 100 second generation immigrants in the sample are included.

Figure 5: Country Specific Intercept and Returns to Parental Education - US Census



Source: US Census. The two panels plot respectively the estimated country-specific intercepts and coefficients on mother's years of schooling from a regression of a dummy for not having repeated any grade (as described in the text) on these variables and gender, child age dummies, parents' age, family size, log family income, year fixed effect,state fixed effect, (year specific) quarter of birth fixed effect, father's years of schooling, father's immigration status and commuting zone fixed effects as additional controls, with the sample restricted to second generation immigrants on the mother side. Only countries for which at least 100 second generation immigrants on the mother side are included. The intercept for China is normalized to 1. The size of the circles is proportional to the number of second generation immigrants on the mother side in the sample.

Tables

Table 1: Average PISA Scores across Regions

	Math	Reading	Science	# Countries
East Asia	0.42	0.24	0.40	7
EU North	0.17	0.11	0.23	15
Oceania	0.14	0.16	0.26	2
North America	-0.09	0.06	0.06	2
EU South	-0.20	-0.17	-0.09	5
EU East	-0.28	-0.43	-0.25	19
Middle East/NA	-0.75	-0.54	-0.63	7
Other Asia	-1.05	-0.93	-0.92	5
Latin America	-1.10	-0.90	-0.95	11

The Table shows the average score for each region, across all available waves (for Science, only waves from 2006 onwards are considered). The averages are computed using the provided sample weights. Scores are standardized to have mean 0 and (individual-level) standard deviation 1 across the (pooled, equally weighted) OECD countries participating in the wave where the subject-specific scale was set.

Table 2: Summary statistics - PISA (Mothers)

Variable	Mean	Std. Dev.	Min	Max
Score	-0.098	1.01	-3.54	3.09
Score Country m	-0.07	0.60	-1.47	1.08
Mother Sec Edu	0.52	0.50	0	1
Mother Ter Edu	0.30	0.46	0	1
Father Sec Edu	0.51	0.50	0	1
Father Ter Edu	0.34	0.472	0	1
Immigrant Mother	1	0	1	1
Immigrant Father	0.65	0.48	0	1
Observations		43494		

The Table shows descriptive statistics for second generation immigrants on the mother's side. Sample includes only cases where both parents report a country of origin and the country of origin of the mother runs a PISA test on natives. Scores are from the math test and are standardized to have mean 0 and (individual-level) standard deviation 1 across the (pooled, equally weighted) OECD countries participating in 2003. Observations weighted accordind to the provided sample weights.

Table 3: Second Generation Immigrants by Country of Origin - PISA Data

	Mothers			Fathers		
Country of Origin	Number	# Host Countries	Top Host Country	Number	# Host Countries	Top Host Country
Albania	360	5	Greece (200)	332	5	Greece (173)
Argentina	83	2	Uruguay (82)	80	1	Uruguay (80)
Australia	169	2	New Zealand (168)	133	2	New Zealand (132)
Austria	260	2	Switzerland (192)	188	2	Switzerland (144)
Belgium	276	3	Luxembourg (261)	258	2	Luxembourg (238)
Brazil	214	4	Uruguay (92)	192	4	Uruguay (86)
Bulgaria	34	1	Turkey (34)	17	1	Turkey (17)
Canada	2	1	Ireland (2)	2	1	Ireland (2)
Chile	71	1	Argentina (71)	57	1	Argentina (57)
China	14905	13	Macao (9570)	14224	11	Macao (8788)
Colombia	5	1	Costa Rica (5)	6	1	Costa Rica (6)
Croatia	229	3	Serbia-Mont. (121)	195	3	Serbia-Mont. (93)
Czech Republic	216	2	Slovakia (206)	187	2	Slovakia (177)
Denmark	82	2	Norway (81)	103	1	Norway (103)
Estonia	84	1	Finland (84)	56	1	Finland (56)
France	1398	7	Switzerland (650)	1181	7	Switzerland (469)
Germany	1470	9	Switzerland (658)	1175	9	Switzerland (478)
Greece	94	2	Australia (70)	144	2	Australia (118)
Hong Kong	248	2	Macao (174)	451	3	Macao (363)
Hungary	19	2	Austria (17)	17	2	Austria (13)
India	234	4	Australia (201)	235	4	Australia (197)
Italy	1630	9	Switzerland (1061)	2805	9	Switzerland (1844)
Jordan	184	1	Qatar (184)	145	1	Qatar (145)
Liechtenstein	40	1	Switzerland (40)	28	1	Switzerland (28)
Macao	149	1	Hong Kong (149)	132	1	Hong Kong (132)
Malaysia	67	4	Australia (54)	57	4	Australia (46)
Netherlands	242	5	Belgium (208)	290	5	Belgium (211)
New Zealand	859	1	Australia (859)	859	1	Australia (859)
Panama	11	1	Costa Rica (11)	16	1	Costa Rica (16)
Poland	313	3	Germany (237)	246	3	Germany (196)
Portugal	2824	4	Luxembourg (1906)	2687	5	Luxembourg (1865)
Romania	62	2	Austria (60)	67	3	Austria (53)
Russia	4770	13	Estonia (1391)	4643	13	Estonia (1390)
Serbia-Mont.	2814	9	Switzerland (1637)	2860	9	Switzerland (1649)
Singapore	9	1	Indonesia (9)	10	2	Indonesia (9)
Slovakia	554	2	Czech Republic (549)	657	2	Czech Republic (652)
Slovenia	15	2	Austria (11)	18	2	Austria (11)
South Korea	48	2	Australia (33)	49	2	Australia (36)
Spain	354	5	Switzerland (336)	432	4	Switzerland (412)
Sweden	383	2	Finland (239)	296	2	Finland (182)
Switzerland	114	1	Liechtenstein (114)	97	1	Liechtenstein (97)
Taiwan	27	1	Hong Kong (27)	10	2	Hong Kong (6)
Thailand	14	1	Finland (14)	2	1	Finland (2)
Turkey	2864	8	Denmark (621)	3134	8	Switzerland (632)
UK	3820	5	Australia (2316)	3975	5	Australia (2500)
United States	457	5	Mexico (228)	586	5	Mexico (360)
Uruguay	88	1	Argentina (88)	82	1	Argentina (82)
Vietnam	327	4	Australia (260)	324	3	Australia (251)
Average	906.1	3.4		911.3	3.4	

The Table shows summary statistics on second generation immigrants on the mother and father side from each country of origin in the PISA sample included in our decomposition exercise, across all available waves. *# Host Countries* is the number of different host countries in which second generation immigrants of a given nationality are observed. *Top Host Country* is the host country where the highest number (reported in brackets) of second generation immigrants of a given nationality are observed.

Table 4: Second Generation Immigrants by Host Country - PISA Data

Host Country	Mothers: Number	Mothers: # Countries of Origin	Mothers: Top Country of Origin (in PISA)	Fathers: Number	Fathers: # Countries of Origin	Fathers: Top Country of Origin (in PISA)
Argentina	631	6	Uruguay (88)	585	6	Uruguay (82)
Australia	9022	17	UK (2316)	9394	17	UK (2500)
Austria	1979	15	Turkey (487)	1965	15	Turkey (519)
Belgium	3126	7	Turkey (434)	3524	7	Turkey (492)
Costa Rica	460	3	Panama (11)	537	3	Panama (16)
Croatia	2160	4	Serbia-Mont. (363)	1948	4	Serbia-Mont. (348)
Czech Republic	780	6	Slovakia (549)	1014	6	Slovakia (652)
Denmark	2712	6	Turkey (621)	2814	6	Turkey (625)
Estonia	1708	2	Russia (1391)	1839	2	Russia (1390)
Finland	1103	10	Sweden (239)	1266	10	Sweden (182)
Georgia	97	2	Russia (69)	76	2	Russia (51)
Germany	1429	10	Turkey (512)	1515	10	Turkey (559)
Greece	1270	3	Russia (214)	760	3	Albania (173)
Hong Kong	5447	4	China (4758)	5296	4	China (4938)
Indonesia	44	5	Singapore (9)	55	5	Singapore (9)
Ireland	1173	17	UK (946)	1043	15	UK (814)
Israel	2321	5	Russia (606)	2474	5	Russia (596)
Kazakhstan	1174	2	Russia (982)	1117	2	Russia (918)
Kyrgyzstan	480	2	Russia (106)	297	2	Russia (106)
Latvia	2295	4	Russia (967)	2593	4	Russia (1107)
Liechtenstein	330	11	Switzerland (114)	281	11	Switzerland (97)
Luxembourg	4448	10	Portugal (1906)	4540	10	Portugal (1865)
Macao	10202	5	China (9570)	9654	7	China (8788)
Mauritius	84	4	China (11)	57	4	China (8)
Mexico	1085	4	United States (228)	1398	4	United States (360)
Moldova	203	3	Russia (68)	192	4	Russia (59)
Netherlands	1741	16	Turkey (203)	1832	16	Turkey (228)
New Zealand	1989	8	UK (528)	2144	8	UK (620)
Norway	1145	3	Sweden (144)	1149	3	Sweden (114)
Portugal	1576	5	Brazil (61)	1353	5	Brazil (64)
Qatar	5908	4	Jordan (184)	5159	4	Jordan (145)
Serbia-Mont.	2333	4	Croatia (121)	1782	4	Croatia (93)
Slovakia	593	3	Czech Republic (206)	583	3	Czech Republic (177)
Slovenia	1841	3	Italy (8)	1880	3	Italy (10)
South Korea	29	5	China (11)	-	-	-
Switzerland	8453	11	Serbia-Mont. (1637)	8320	11	Italy (1844)
Turkey	229	5	Germany (67)	190	5	Germany (33)
UK	2199	7	China (25)	2380	7	China (26)
Uruguay	313	4	Brazil (92)	338	4	Brazil (86)
Average	2156.7	6.3		2137.1	6.2	

The Table shows summary statistics on second generation immigrants on the mother and father side observed in each country in the PISA sample, across all available waves. Only host countries with second generation immigrants from at least one country of origin in the PISA sample are included. *# Countries of Origin* is the number of different countries of origin of second generation immigrants in a given host country. *Top Country of Origin (in PISA)* is the country of origin from which the highest number (across all countries in the PISA sample, not considering other countries of origin) of second generation immigrants in a given host country are observed (number reported in brackets).

Table 5: Main results-PISA

	Dependent Variable: Math Test Score					
	[1]	[2]	[3] All	[4]	[5]	[6] No East Asia
Score Country m	0.685***	0.526***	0.252***	0.247***	0.201***	0.248***
	(0.022)	(0.045)	(0.033)	(0.033)	(0.033)	(0.068)
Female	-0.130***	-0.137***	-0.212***	-0.209***	-0.205***	-0.191***
	(0.027)	(0.024)	(0.019)	(0.019)	(0.019)	(0.023)
Father Sec Edu				0.032	0.027	0.032
				(0.034)	(0.034)	(0.058)
Father Ter Edu				0.103**	0.096**	0.105*
				(0.040)	(0.039)	(0.058)
Mother Sec Edu				0.009	-0.011	0.019
				(0.029)	(0.028)	(0.047)
Mother Ter Edu				0.036	0.010	0.034
				(0.037)	(0.037)	(0.054)
N	43494	43494	43494	43494	43494	28106
# Country m	49	49	49	49	49	42
R Squared	0.16	0.25	0.67	0.67	0.67	0.63
Host Country FE	No	Yes	Yes	Yes	Yes	Yes
School FE	No	No	Yes	Yes	Yes	Yes
Continent m FE	No	No	No	No	Yes	Yes

The Table shows results for second generation immigrants on the mother's side. The sample includes only cases where both parents report a country of origin and the country of origin of the mother runs a PISA test on natives. Score Country m refers to the average math PISA score of natives (standardized to have mean 0 and standard deviation 1 across the OECD countries participating in 2003) in the country of birth of the mother, across all available waves. All specifications control for intercept, wave fixed effect and a dummy for father immigrant status. Observations weighted according to the provided sample weights. Robust standard errors clustered by mother country of origin. All coefficients and standard errors are estimated according to the "Unbiased Shortcut" procedure (PISA Technical Report, 2009), using the replicate weights provided by PISA. * denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Table 6: Summary statistics - US Census (Mothers)

Variable	Mean	Std. Dev.	Min	Max
No Grade Repeated	0.81	0.39	0	1
Score Country m	-0.16	0.55	-1.80	1.08
Mother Sec Edu	0.48	0.50	0	1
Mother Ter Edu	0.21	0.40	0	1
Father Sec Edu	0.39	0.49	0	1
Father Ter Edu	0.34	0.47	0	1
Mother Immigrant	1	0	1	1
Father Immigrant	0.46	0.50	0	1
Yrs Since Migr Mother	20.08	8.75	2	57
Female	0.49	0.50	0	1
Student Age	11.35	2.29	8	15
# Obs from Country m	870.18	2117.57	1	13691
Observations		53081		

The Table shows descriptive statistics for second generation immigrants on the mother's side. The sample includes only cases where both parents report a country of origin and the country of origin of the mother runs a PISA test on natives. *No Grade Repeated* is a dummy taking value 1 for students attending a grade larger or equal to the mode of the corresponding year of birth, quarter of birth, state and year cell. *Score Country m* is the average math PISA score of natives (standardized to have mean 0 and standard deviation 1 across the OECD countries participating in 2003) in the country of birth of the mother. Observations weighted accordind to the provided sample weights.

Table 7: Main results-US CENSUS

	Dependent variable: 1=never repeated a grade					
	[1]	[2]	[3] All	[4]	[5]	[6] No East Asia
Score Country m	0.043***	0.043***	0.027***	0.025***	0.013**	0.019*
	(0.011)	(0.012)	(0.008)	(0.009)	(0.006)	(0.011)
Female	0.068***	0.067***	0.067***	0.068***	0.067***	0.071***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Mother Sec Edu			0.049***	0.047***	0.046***	0.045***
			(0.011)	(0.011)	(0.011)	(0.012)
Mother Ter Edu			0.056***	0.053***	0.052***	0.049***
			(0.009)	(0.010)	(0.009)	(0.010)
Father Sec Edu			0.035***	0.036***	0.033***	0.041***
			(0.011)	(0.010)	(0.011)	(0.009)
Father Ter Edu			0.056***	0.057***	0.053***	0.063***
			(0.012)	(0.011)	(0.011)	(0.011)
N	53081	53081	53081	53081	53081	49132
# Country m	61	61	61	61	61	54
R Squared	0.08	0.10	0.10	0.10	0.11	0.11
Comm Zone FE	No	Yes	Yes	Yes	Yes	Yes
Years Since Migr Mother	No	No	No	Yes	Yes	Yes
Continent m FE	No	No	No	No	Yes	No

Score Country m refers to the average math PISA score of natives (standardized to have mean 0 and standard deviation 1 across the OECD countries participating in 2003) in the country of birth of the mother, across all available waves. All specifications control for intercept, child age dummies, parents' age, family size, log family income, year fixed effect,state fixed effect, (year specific) quarter of birth fixed effect and father immigrant status. Observations weighted accordind to the provided sample weights. Robust standard errors clustered by mother country of origin. * denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Table 8: Selection

	Mothers		Fathers	
	Years $\text{Edu}_i/\overline{\text{Years Edu}_m}$		Years $\text{Edu}_i/\overline{\text{Years Edu}_f}$	
	[1]	[2]	[3]	[4]
Score Country m	-0.125*	-0.216**		
	(0.068)	(0.081)		
Score Country f			-0.107*	-0.174***
			(0.055)	(0.058)
N	45032	45032	44385	44385
R Squared	0.08	0.47	0.09	0.50
Host Country FE	Yes	Yes	Yes	Yes
School FE	No	Yes	No	Yes

The sample includes only second generation immigrants on the mother side for specifications (1) and (2) and on the father side for specifications (3) and (4). $\overline{\text{Years Edu}_m}$ and $\overline{\text{Years Edu}_f}$ are the average years of education of mothers and fathers in the country of birth of the mother and father respectively. Score Country m and Score Country f refer to the average math PISA score of natives (standardized to have mean 0 and standard deviation 1 across the OECD countries participating in 2003) in the country of birth of the mother and the father, across all available waves. All specifications control for intercept and wave fixed effect. Robust standard errors clustered by mother's country of origin in specifications (1) and (2) and by father's country of origin in specifications (3) and (4). * denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Table 9: Selection into Schools

	Avg Score School	School FE	Academic Admission	% Qual Teachers	Dropout Rate
	[1]	[2]	[3]	[4]	[5]
Score Country m	0.198**	0.192**	0.049**	0.027**	-0.008**
	(0.089)	(0.084)	(0.023)	(0.011)	(0.004)
Female	0.062***	0.075***	0.014	0.007	-0.002
	(0.021)	(0.020)	(0.010)	(0.007)	(0.002)
Father Sec Edu	0.105***	0.102***	0.061**	-0.021	-0.007
	(0.028)	(0.027)	(0.027)	(0.014)	(0.009)
Father Ter Edu	0.259***	0.244***	0.084***	0.004	-0.008
	(0.041)	(0.038)	(0.028)	(0.016)	(0.010)
Mother Sec Edu	0.162***	0.157***	0.019	0.010	-0.036
	(0.026)	(0.025)	(0.015)	(0.007)	(0.028)
Mother Ter Edu	0.255***	0.240***	0.025	0.010	-0.037
	(0.051)	(0.048)	(0.024)	(0.015)	(0.025)
N	42952	42903	43494	32356	10184
# Country m	49	49	49	48	41
R Squared	0.34	0.35	0.17	0.41	0.06
Host Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

The sample includes only second generation immigrants on the mother side. Score Country m refers to the average math PISA score of natives (standardized to have mean 0 and standard deviation 1 across the OECD countries participating in 2003) in the country of birth of the mother, across all available waves. All specifications control for intercept and father immigrant status. Robust standard errors clustered by mother's country of origin. * denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Table 10: Language

	Dependent Variable: Math Test Score			
	[1]	[2]	[3]	[4]
Score Country m	0.228***	0.224***	0.229***	0.173***
	(0.029)	(0.034)	(0.034)	(0.028)
Female	-0.206***	-0.208***	-0.206***	-0.171***
	(0.025)	(0.019)	(0.02)	(0.02)
Father Sec Edu	0.027	0.026	0.027	0.131***
	(0.046)	(0.033)	(0.033)	(0.049)
Father Ter Edu	0.084*	0.080**	0.085**	0.202***
	(0.049)	(0.039)	(0.040)	(0.054)
Mother Sec Edu	0.009	0.000	0.009	0.007
	(0.035)	(0.028)	(0.028)	(0.044)
Mother Ter Edu	0.062	0.053	0.063*	0.071
	(0.049)	(0.037)	(0.037)	(0.046)
Foreign Language at Home		-0.094***		
		(0.031)		
Mother Same Native Lang			-0.002	
			(0.034)	
Father Same Native Lang			-0.036	
			(0.043)	
Mother Linguistic Distance				0.127**
				(0.049)
Father Linguistic Distance				0.010
				(0.053)
N	40923	40923	40923	21346
# Country m	49	49	49	42
R Squared	0.663	0.664	0.663	0.582
Host Country FE	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes

The Table shows results for second generation immigrants on the mother's side. Sample includes only cases where both parents report a country of origin and the country of origin of the mother runs a PISA test on natives. Score Country m refers to the average math PISA score of natives (standardized to have mean 0 and standard deviation 1 across the OECD countries participating in 2003) in the country of birth of the mother, across all available waves. All specifications control for intercept, wave fixed effect and a dummy for father immigrant stautus. Observations weighted according to the provided sample weights. Robust standard errors clustered by mother's country of origin. All coefficients and standard errors are estimated according to the "Unbiased Shortcut" procedure (PISA Technical Report, 2009), using the replicate weights provided by PISA. * denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Table 11: Decomposition Results - Cross-Country Variance

$V_{Parents}$ (%)		V_{FE} (%)	
School FE	Host Country FE	School FE	Host Country FE
10.2	29.91	9.59	26.86
(1.90)	(3.71)	(1.88)	(3.75)

The Table shows the share of the cross-country variance accounted by the whole parental component ($V_{Parents}$) and by the country specific intercept (V_{FE}). Only countries with at least 100 second generation immigrants in the sample are included in the computation. Standard errors (in parentheses) are computed through a bootstrap with 200 replications at the student level.

Table 12: Decomposition Results - Countries

		$Parents_c$		$S_{Parents}(c, \text{CHINA})$ (%)		$S_{FE}(c, \text{CHINA})$ (%)	
Country	PISA Score	School FE	Country FE	School FE	Country FE	School FE	Country FE
China	1.08	1	1	-	-	-	-
Hong Kong	0.63	0.94	0.83	14.17	36.84	7.11	12.09
				(19.87)	(19.82)	(19.85)	(19.7)
Switzerland	0.53	0.94	0.51	11.67	89.91	13.50	97.60
				(18.73)	(26.77)	(18.71)	(26.78)
Belgium	0.49	0.98	0.52	2.94	81.77	7.26	95.95
				(23.02)	(34.07)	(23.04)	(34.16)
Netherlands	0.44	0.92	0.70	12.74	46.55	14.84	53.94
				(13.91)	(17.90)	(13.91)	(17.92)
Germany	0.33	0.91	0.58	11.37	56.34	12.08	60.08
				(8.25)	(11.81)	(8.24)	(11.82)
New Zealand	0.27	0.66	0.20	42.17	99.54	42.09	99.99
				(6.36)	(6.96)	(6.37)	(6.92)
Estonia	0.24	0.96	0.66	4.96	40.57	6.34	45.99
				(22.15)	(21.63)	(22.16)	(21.67)
Macao	0.23	0.94	0.64	7.42	43.03	2.59	24.51
				(9.69)	(11.07)	(9.69)	(11.03)
France	0.19	0.81	0.33	21.63	75.22	22.49	78.89
				(5.75)	(8.09)	(5.76)	(8.09)
Denmark	0.18	1.10	0.7	-10.98	33.85	-8.25	43.08
				(17.87)	(16.93)	(17.89)	(16.94)
Australia	0.17	0.59	0.33	45.15	73.97	46.11	77.80
				(14.65)	(18.97)	(14.65)	(18.98)
Austria	0.16	0.86	0.25	14.77	81.88	15.3	84.85
				(10.44)	(14.77)	(10.44)	(14.79)
Czech Republic	0.13	0.74	0.37	27.24	66.85	25.91	64.05
				(10.05)	(14.41)	(10.07)	(14.40)
Vietnam	0.12	0.93	0.52	7.29	50.55	1.76	30.10
				(7.25)	(7.81)	(7.24)	(7.77)
Sweden	0.11	0.92	0.52	8.33	49.61	11.44	59.83
				(8.24)	(9.83)	(8.25)	(9.85)
United Kingdom	0.09	0.75	0.39	25.33	61.63	26.35	65.67
				(3.88)	(4.09)	(3.89)	(4.08)
Poland	0	0.71	0.35	27.26	60.03	25.31	55.2
				(5.70)	(7.53)	(5.70)	(7.52)
Slovakia	-0.04	0.85	0.23	13.62	68.78	12.30	65.78
				(7.98)	(9.88)	(7.98)	(9.90)
Spain	-0.09	0.62	0.06	32.94	81.01	31.52	74.90
				(5.66)	(10.20)	(5.66)	(10.21)

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Country	PISA Score	$Parents_c$ School FE	$Parents_c$ Country FE	$S_{Parents}(c, \text{CHINA})$ (%) School FE	$S_{Parents}(c, \text{CHINA})$ (%) Country FE	$S_{FE}(c, \text{CHINA})$ (%) School FE	$S_{FE}(c, \text{CHINA})$ (%) Country FE
United States	-0.09	0.96	0.81	3.10	16.52	4.97	22.99
				(5.59)	(8.14)	(5.59)	(8.11)
Portugal	-0.19	0.61	0.02	31.17	77.22	27.22	61.09
				(3.70)	(5.24)	(3.70)	(5.25)
Italy	-0.22	0.49	-0.21	39.38	93.43	38.27	90.35
				(4.19)	(5.91)	(4.19)	(5.92)
Russia	-0.24	0.84	0.53	12.46	36.10	14.43	42.90
				(3.97)	(4.25)	(3.97)	(4.26)
Croatia	-0.31	0.57	0.16	31.40	60.36	31.70	62.07
				(6.76)	(10.07)	(6.76)	(10.06)
Greece	-0.39	0.42	-0.11	39.48	75.52	39.23	74.38
				(7.13)	(8.55)	(7.13)	(8.54)
Turkey	-0.60	0.37	-0.49	37.36	88.95	33.92	74.45
				(2.57)	(3.30)	(2.57)	(3.28)
Serbia-Mont.	-0.63	0.51	-0.09	28.97	63.77	29.66	66.46
				(2.60)	(3.76)	(2.60)	(3.78)
Romania	-0.72	0.63	0.38	20.39	34.18	20.78	35.75
				(5.50)	(6.66)	(5.50)	(6.65)
Uruguay	-0.74	0.95	0.54	2.60	25.31	1.55	20.46
				(8.37)	(11.75)	(8.38)	(11.77)
Chile	-0.78	0.70	0.27	15.99	39.36	15.09	36.32
				(8.35)	(12.58)	(8.35)	(12.58)
Malaysia	-0.84	0.63	0.02	19.09	51.44	18.14	48.49
				(9.85)	(15.45)	(9.85)	(15.46)
Argentina	-1.07	0.86	0.47	6.70	24.54	6.17	21.54
				(6.20)	(7.81)	(6.19)	(7.8)
Albania	-1.10	0.43	-0.20	26.35	55.16	25.64	53.05
				(2.80)	(3.37)	(2.79)	(3.37)
Jordan	-1.16	0.66	0.14	15.36	38.40	15.27	37.77
				(3.31)	(3.80)	(3.31)	(3.80)
Brazil	-1.19	0.84	0.45	7.19	24.34	5.78	18.46
				(5.09)	(8.45)	(5.09)	(8.46)
India	-1.46	0.71	0.36	11.36	25.41	9.90	19.59
				(2.47)	(3.35)	(2.47)	(3.35)
Average	-0.17	0.76	0.33	18.56	56.24	18.16	54.90
				(3.32)	(4.11)	(3.32)	(4.13)

The Table shows the decomposition results across countries. Only countries with at least 100 second generation immigrants in the sample are included. $Parents_c$ is the estimated parental component, normalized such that $Parents_{\text{CHINA}} = 1$. Standard errors (in parentheses) are computed through a bootstrap with 200 replications at the student level.

Table 13: Decomposition Results - Regions

		$Parents_c$		$S_{Parents}(c, \text{EA})$ (%)		$S_{FE}(c, \text{EA})$ (%)	
Region	PISA Score	School FE	Country FE	School FE	Country FE	School FE	Country FE
East Asia	0.90	1	1	-	-	-	-
EU North	0.24	0.88	0.53	18.23	70.69	21.64	83.32
				(6.82)	(7.87)	(6.82)	(7.89)
Oceania	0.19	0.63	0.38	52.51	88.07	55.26	98.44
				(16.17)	(20.79)	(16.17)	(20.79)
US	-0.09	0.99	0.87	1.16	12.71	4.62	24.86
				(6.95)	(9.88)	(6.96)	(9.84)
EU South	-0.18	0.56	-0.02	40.46	94.46	40.05	92.78
				(5.01)	(6.39)	(5.02)	(6.40)
EU East	-0.21	0.80	0.50	18.10	45.17	20.15	52.82
				(4.65)	(4.78)	(4.66)	(4.77)
Other Asia	-0.61	0.80	0.37	13.33	41.78	11.70	35.47
				(5.14)	(7.27)	(5.15)	(7.28)
Middle East/NA	-0.64	0.42	-0.38	37.82	89.61	35.14	77.85
				(3.25)	(3.66)	(3.26)	(3.65)
Latin America	-1.14	0.86	0.50	7.01	24.28	6.25	20.49
				(5.25)	(8.31)	(5.25)	(8.31)
Average	-0.17	0.74	0.34	23.58	58.35	24.35	60.75
				(4.37)	(5.03)	(4.37)	(5.03)

The Table shows the decomposition results across regions. The region-specific PISA Scores and $Parents_c$ are computed as weighted averages across all countries belonging to each region for which at least 100 second generation immigrants are available in the sample, where the weights are given by the size of the native population being tested. $Parents_c$ is normalized such that $Parents_{\text{EA}} = 1$. Standard errors (in parentheses) are computed through a bootstrap with 200 replications at the student level.

Table 14: Interactions - US CENSUS

	Dependent variable: 1=never repeated a grade					
	[1]	[2]	[3]	[4]	[5]	[6]
Score Country m	0.027***	0.088***	0.027***	0.088***	0.137***	0.154***
	(0.007)	(0.023)	(0.007)	(0.024)	(0.031)	(0.035)
Female	0.067***	0.067***	0.067***	0.067***	0.067***	0.067***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Yrs Schooling Father	0.005***	0.005***	0.005***	0.005***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Yrs Schooling Mother	0.006***	0.005***				
	(0.001)	(0.001)				
Score Country m * Yrs Schooling Mother		-0.006***				
		(0.002)				
Yrs Schooling Moth in US			0.006***	0.005***	0.002	0.005***
			(0.001)	(0.001)	(0.002)	(0.001)
Yrs Schooling Moth in m			0.006***	0.005***	0.005***	0.004***
			(0.001)	(0.001)	(0.001)	(0.001)
Score Country m * Yrs Schooling Moth in US				-0.006***	-0.002*	-0.003*
				(0.001)	(0.001)	(0.001)
Score Country m * Yrs Schooling Moth in m				-0.005***	-0.006***	-0.006***
				(0.002)	(0.002)	(0.002)
Yrs Since Migr Mother					0.002**	0.002***
					(0.001)	(0.001)
Score Country m * Yrs Since Migr Mother					-0.003***	-0.003***
					(0.001)	(0.001)
Age Migration Moth						0.006***
						(0.002)
(Age Migration Moth)^2						-0.000***
						(0.000)
Score Country m * Age Migration Moth						-0.001
						(0.001)
N	53081	53081	53081	53081	53081	53081
# Country m	61	61	61	61	61	61
R Squared	0.10	0.10	0.10	0.10	0.11	0.11
Comm Zone FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Score Country m refers to the average math PISA score of natives (standardized to have mean 0 and standard deviation 1 across the OECD countries participating in 2003) in the country of birth of the mother, across all available waves. All specifications control for intercept, child age dummies, parents' age, family size, log family income, year fixed effect,state fixed effect, (year specific) quarter of birth fixed effect and father immigrant status. Observations weighted accordind to the provided sample weights. Robust standard errors clustered by mother's country of origin. * denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Table 15: Interactions - US CENSUS (Mothers Entirely Educated in Home Country)

	Dependent variable: 1=never repeated a grade			
	[1]	[2]	[3]	[4]
Score Country m	0.034***	0.093***	0.138***	0.147***
	(0.009)	(0.023)	(0.034)	(0.035)
Female	0.067***	0.067***	0.068***	0.068***
	(0.005)	(0.005)	(0.005)	(0.005)
Yrs Schooling Father	0.006***	0.006***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
Yrs Schooling Mother	0.005***	0.003*	0.004**	0.003**
	(0.001)	(0.002)	(0.002)	(0.002)
Score Country m * Yrs Schooling Mother		-0.006***	-0.007***	-0.007***
		(0.002)	(0.002)	(0.002)
Yrs Since Migr Mother			0.003***	0.003***
			(0.001)	(0.001)
Score Country m * Yrs Since Migr Mother			-0.003**	-0.003**
			(0.001)	(0.001)
Age Migration Moth				0.005**
				(0.002)
(Age Migration Moth)^2				-0.000**
				(0.000)
Score Country m * Age Migration Moth				-0.000
				(0.001)
N	29963	29963	29963	29963
# Country m	61	61	61	61
R Squared	0.12	0.12	0.12	0.12
Comm Zone FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

The sample includes only cases where the mother was entirely educated in her home country. Score Country m refers to the average math PISA score of natives (standardized to have mean 0 and standard deviation 1) in the country of birth of the mother, across all available waves. All specifications control for intercept, child age dummies, parents' age, family size, log family income, year fixed effect,state fixed effect, (year specific) quarter of birth fixed effect and father immigrant status. Observations weighted according to the provided sample weights. Robust standard errors clustered by mother's country of origin. * denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Table 16: Summary statistics - Time Use Survey (Parents)

Variable	Mean	Std. Dev.	Min	Max
Total Child Care	86.76	122.3	0	1055
Educational Child Care	9.809	30.29	0	420
Recreational Child Care	21.11	59.76	0	639
Basic Child Care	55.85	90.96	0	1055
Score Country p	-0.69	0.59	-1.47	1.08
Yrs Since Migration	15.70	10.63	1	58
Mother	0.48	0.50	0	1
Age Parent	37.72	8.46	18	80
Age Spouse	37.95	8.86	16	80
Parent Sec Edu	0.24	0.43	0	1
Parent Ter Edu	0.38	0.495	0	1
Spouse Sec Edu	0.23	0.42	0	1
Spouse Ter Edu	0.39	0.49	0	1
Number of Children	2.04	0.97	1	7
Avg Age Children	8.13	5	0	18
Number of Male Children	1.04	0.85	0	5
# Obs from Country p	91.21	351.20	2	2624
Observations		5199		

The Table shows descriptive statistics for interviewed immigrant parents in the Time Use Survey. *Total* refers to the total time spent in child care activities, while *Educational*, *Recreational* and *Basic* refer to the time use categories as defined in the text. *Score Country p* is the average math PISA score of natives (standardized to have mean 0 and standard deviation 1) in the country of birth of the interviewed parent. Observations weighted according to the provided sample weights.

Table 17: Time Use of Parents

	Total	Total	Total	Educational	Recreational	Basic
	[1]	[2]	[3]	[4]	[5]	[6]
Score Country *p*	14.329*	11.938**	8.052**	1.370*	3.249**	3.433
	(7.699)	(5.005)	(3.234)	(0.695)	(1.372)	(2.249)
Mother			67.812***	7.398***	3.480	56.933***
			(4.030)	(0.667)	(3.523)	(2.493)
Parent Sec Edu			-5.355	3.123***	-4.532	-3.946
			(5.426)	(0.622)	(2.870)	(2.445)
Parent Ter Edu			10.491**	4.372***	-2.524	8.643***
			(5.075)	(1.076)	(3.223)	(2.475)
Spouse Sec Edu			3.159	-2.787***	7.949***	-2.002
			(3.491)	(0.519)	(2.766)	(1.265)
Spouse Ter Edu			12.173***	0.739	6.868*	4.567**
			(2.950)	(1.722)	(3.571)	(2.213)
Age Parent			0.499	0.134**	0.144	0.221
			(0.481)	(0.063)	(0.450)	(0.145)
Age Spouse			0.348*	0.194**	-0.062	0.216
			(0.206)	(0.084)	(0.262)	(0.197)
Number of Children			16.891***	2.815***	1.068	13.009***
			(2.046)	(0.957)	(0.865)	(1.625)
Avg Age Children			-9.140***	-0.354***	-3.387***	-5.399***
			(1.315)	(0.119)	(0.539)	(0.774)
Number of Male Children			-0.659	1.155***	-2.037**	0.222
			(1.741)	(0.417)	(0.793)	(1.203)
Yrs Since Migration			-0.020	-0.154***	-0.071	0.205*
			(0.162)	(0.033)	(0.098)	(0.122)
N	5199	5199	5199	5199	5199	5199
# Country *p*	57	57	57	57	57	57
R Squared	0.00	0.03	0.23	0.06	0.10	0.21
State FE	No	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes

The sample includes only immigrant parents of children with at most 18 years. *Total* refers to the total time spent in child care activities, while *Educational*, *Recreational* and *Basic* refer to the time use categories as defined in the text. Score Country p is the average math PISA score of natives (standardized to have mean 0 and standard deviation 1) in the country of birth of the interviewed parent, across all available waves. Additional controls in specifications (3) to (6) are dummies for retired, full time students and disabled parents. Robust standard errors clustered by parent country of origin. * denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Table 18: Summary statistics - Time Use Survey (Students)

Variable	Mean	Std. Dev.	Min	Max
Study Time	57.86	88	0	525
Score Country m	-0.65	0.58	-1.47	1.08
Native Father	0.19	0.40	0	1
Female	0.42	0.49	0	1
Mother Sec Edu	0.22	0.41	0	1
Mother Ter Edu	0.38	0.49	0	1
Father Sec Edu	0.19	0.39	0	1
Father Ter Edu	0.38	0.49	0	1
Age	16.39	1.04	15	18
# Obs from Country m	10.56	38.26	1	248
Observations		433		

The Table shows descriptive statistics for second generation immigrants on the mother side. *Score Country* m is the average math PISA score of natives (standardized to have mean 0 and standard deviation 1) in the country of birth of the mother. Observations weighted according to the provided sample weights.

Table 19: Time Use of Students

	Dependent Variable: Study Time		
	[1]	[2]	[3]
Score Country m	39.955***	39.162***	30.943**
	(14.549)	(13.584)	(12.413)
Native Father	-24.320	-18.575	-30.602
	(20.566)	(23.921)	(25.028)
Female			-4.267
			(8.857)
Mother Sec Edu			-7.065
			(11.812)
Mother Ter Edu			27.171**
			(12.936)
Father Sec Edu			21.818
			(15.854)
Father Ter Edu			17.969
			(16.323)
Age			1.431
			(4.568)
N	433	433	433
# Country m	41	41	41
R Squared	0.07	0.17	0.20
State FE	No	Yes	Yes
Year FE	No	Yes	Yes

The sample includes only second generation immigrants on the mother side that are full time students and at most 18 years old. Score Country m is the average math PISA score of natives (standardized to have mean 0 and standard deviation 1) in the country of birth of the mother, across all available waves. Robust standard errors clustered by mother's country of origin. * denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Table 20: Country of Origin Characteristics - Economic and Educational Development

	Dependent variable: Math Test Score					
	[1]	[2]	[3]	[4]	[5]	[6]
Score Country m	0.255***	0.283***	0.193***	0.224***	0.243***	0.239***
	(0.032)	(0.041)	(0.065)	(0.034)	(0.035)	(0.038)
Female	-0.208***	-0.207***	-0.205***	-0.207***	-0.208***	-0.203***
	(0.026)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Father Sec Edu	0.031	0.029	0.030	0.031	0.031	0.024
	(0.047)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
Father Ter Edu	0.108**	0.107***	0.105***	0.108***	0.108***	0.098**
	(0.051)	(0.040)	(0.040)	(0.040)	(0.040)	(0.039)
Mother Sec Edu	-0.003	-0.003	-0.018	-0.008	-0.005	-0.020
	(0.036)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Mother Ter Edu	0.028	0.028	0.006	0.020	0.024	0.003
	(0.050)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Log GDP		-0.060**				-0.069**
		(0.028)				(0.03)
% Skilled Moth in m			0.216***			0.500***
			(0.078)			(0.119)
Avg Years Edu in m				0.012		-0.006
				(0.009)		(0.011)
Pri Pupil/Teacher in m					-0.001	0.009***
					(0.002)	(0.002)
N	42738	42738	42738	42738	42738	42738
# Country m	44	44	44	44	44	44
R Squared	0.67	0.67	0.67	0.67	0.67	0.67
Host Country FE	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes

The sample includes only second generation immigrants on the mother side. Score Country m is the average math PISA score of natives (standardized to have mean 0 and standard deviation 1) in the country of birth of the mother, across all available waves. Observations weighted according to the provided sample weights. Robust standard errors clustered by mother's country of origin. All coefficients and standard errors are estimated according to the "Unbiased Shortcut" procedure (PISA Technical Report, 2009), using the replicate weights provided by PISA. * denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.

Table 21: Country of Origin Characteristics - Religion and Culture

	Dependent variable: Math Test Score			
	[1]	[2]	[3]	[4]
Score Country m	0.247***	0.240***	0.258***	0.220***
	(0.028)	(0.053)	(0.035)	(0.050)
Female	-0.209***	-0.205***	-0.209***	-0.207***
	(0.025)	(0.019)	(0.019)	(0.019)
Father Sec Edu	0.032*	0.033	0.033	0.033
	(0.046)	(0.034)	(0.034)	(0.034)
Father Ter Edu	0.103**	0.101**	0.104**	0.105***
	(0.050)	(0.039)	(0.040)	(0.039)
Mother Sec Edu	0.009	-0.005	0.010	0.004
	(0.036)	(0.029)	(0.029)	(0.029)
Mother Ter Edu	0.036	0.016	0.037	0.030
	(0.050)	(0.037)	(0.037)	(0.037)
% Catholic in m		-0.142		
		(0.107)		
% Protestant in m		0.002		
		(0.127)		
% Other Christian Rel in m		0.036		
		(0.296)		
% Orthodox in m		-0.142		
		(0.183)		
% Jews in m		3.931		
		(4.031)		
% Muslim in m		-0.228*		
		(0.122)		
% Hindu in m		0.526***		
		(0.179)		
% Buddhist in m		0.282		
		(0.213)		
% Eastern Religions in m		0.488***		
		(0.153)		
% Other Religion in m		-0.146		
		(0.362)		
Leisure Important in Life				-0.422***
				(0.095)
Child Quality: Hard Work				-0.059
				(0.117)
Child Quality: Obedience				0.111
				(0.231)
Locus of Control				0.091**
				(0.038)
N	43494	43494	43294	43294
# Country m	49	49	46	46
R Squared	0.67	0.67	0.67	0.67
Host Country FE	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes

The sample includes only second generation immigrants on the mother side. Score Country m is the average math PISA score of natives (standardized to have mean 0 and standard deviation 1) in the country of birth of the mother, across all available waves. Observations weighted according to the provided sample weights. Robust standard errors clustered by mother's country of origin. All coefficients and standard errors are estimated according to the "Unbiased Shortcut" procedure (PISA Technical Report, 2009), using the replicate weights provided by PISA. * denotes significance at 10%, ** denotes significance at 5%, *** denotes significance at 1%.