Immigrant Children's Educational Achievement in Western Countries: Origin, Destination, and Community Effects on Mathematical Performance

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This article explores the extent to which macro-level characteristics of destination countries, origin countries, and immigrant communities help explain differences in immigrant children's educational achievement. Using data from the 2003 PISA survey, we analyze the mathematical performance of 7,403 pupils from 35 different origin countries in 13 Western countries of destination. While compositional differences offer some explanatory power, they cannot fully explain cross-national and cross-group variance. Contextual attributes of host countries, origin countries, and communities are also meaningful. In this regard, strict immigration laws explain immigrant children's better educational performance in traditional immigrant-receiving countries. Results further suggest that origin countries' level of economic development can negatively affect immigrant children's educational performance, and that immigrant children from more politically stable countries perform better at school. Finally, socioeconomic differences between immigrant communities and a native population, and relative community size, both shape immigrant children's scholastic achievement.

Following the "age of migration" (Castles and Miller 2003), most Western countries now host a substantial and growing population of immigrants, a considerable number of whom are children. The first- and second-generation children, who accompany their parents to a new country or are born there, often experience problems in the destination country's society. Though education arguably is not the proverbial silver bullet, many Western countries regard it as vital for both the social integration and the socioeconomic success of immigrants' children. Indeed, policymakers have often made immigrant children's educational performance a core concern, as have social scientists.

Research highlights two macro-level empirical regularities in need of explanation. First, the educational performance of children with immigration backgrounds differs cross-nationally. Second, achievement varies by the origin group of immigrant children. The relevance of classic individual-level determinants for explaining the educational achievement of children with immigration backgrounds is well documented (Kao and Thompson 2003). By aggregate, these micro-level effects partly explain why immigrant children perform better in some host coun-

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tries than in others. They also explain why immigrant children from certain origin groups perform better than children from other origin groups. After controlling for individual background attributes, however, macro-level differences remain (Levels and Dronkers forthcoming). Researchers thus suggest that the contextual properties of origin groups, destination countries, and immigrant communities have unique effects. In this article, we analyze the relevance of contextual effects for immigrant children and their scholastic achievement.[1]

Contextual effects, of course, are subject to vigorous scholarly debate. To examine such macro-level differences, researchers commonly adopt one of two main analytical strategies. The first centers on examining multiple origin groups within one single destination country. Scholars have used this design to study the educational performance of immigrant children from different origin groups in the Netherlands (Kalmijn and Kraaykamp 2003), Belgium (Timmerman, Vanderwaeren, and Crul 2003), and Germany (Worbs 2003). Most of the literature, however, studies origin-related performance differences in the United States (e.g., Feliciano 2005a; Fuligni 1997; Portes and Rumbaut 1996, 2001). Controlling for individual-level differences, immigrant children from different origin groups perform differently in school. To explain these apparent origin effects, researchers commonly explore the extent to which the origin groups' contextual characteristics hinder or facilitate immigrant educational performance. Often, in this regard, origin differences are attributed to cultural orientations toward educational performance, the influence of ethnic social capital, and the interaction between them (Fordham and Ogbu 1986; Fuligni 1997; Portes and Zhou 1993; Zhou and Bankston 1994, 1998). Structural explanations are also noted, such as educational selectivity, the socioeconomic composition of schools, and structural opportunities for upward mobility (Feliciano 2005a; Sue and Okazaki 1990; Tyson, Darity, and Castellino 2005).

The second research approach typically used focuses on the impact of destination countries' properties on immigrant children's educational performance. Cross-national designs compare the educational achievement of single origin groups in different destination countries (e.g., children with a Punjabi Sikh background in the United States and Britain [Gibson and Bhachu 1988]). Because of the lack of suitable data, though, most of this work has ignored origin-group differences. Instead, this research compares the scholastic performances of first- and second-generation immigrant children with that of non-immigrant pupils (Marks 2005; Schnepf 2006). In general, immigrant children perform differently in different countries of destination, even when controlling for individual-level characteristics. Destination effects have been attributed to immigration policies (Entorf and Minoiu 2005), yet more research is clearly warranted.

Analyses of origin-group differences tend to overlook relevant properties of destination countries, whereas prior work on destination effects largely sidelines potentially influential attributes of origin groups. This is problematic since destination effects may have important implications for testing hypotheses on apparent origin differences (and vice versa). For example, some attribute the relatively good educational performance of Asian and South-East Asian children in the United States to culture. Contextual characteristics typical to the United States, however, may explain this outcome. Hypotheses on origin effects cannot be adequately tested when host country characteristics are disregarded. To conclusively assign Asian and South-East Asian immigrant children's good educational performance to cultural qualities, one would have to show that these children also outperform immigrant children from other origin groups in other destination countries.

In a similar vein, research cannot test hypotheses on destination effects rigorously if origin effects are disregarded. Given the apparent relevance of children's origin, and the unequal distribution of children from different countries of origin over various destination

[1] We aim to explain the educational performance of 15-year-old children who have a background of immigration. Our group of interest includes immigrant children, the children of immigrants, and children who descend from one native parent and one immigrant parent. Our analyses do distinguish between these theoretically distinct groups. For brevity, though, we use the term "immigrant children" to refer to the combination of the above-mentioned groups.

countries, combining immigrant children from different origins may lead to biased parameter estimations. In the worst scenario, incorrect conclusions will be deduced regarding the importance of characteristics of destination countries. To rule out such misinterpretations, origin and destination effects must be disentangled. In this study, we use a double comparative design (van Tubergen 2006) to perform a simultaneous analysis on both origin and destination effects. Using the 2003 PISA data (Organization for Economic Co-operation and Development [OECD] 2004a), we test hypotheses on macro-level effects on the mathematical performance of 7,403 immigrant children, age 15, from 35 different origin groups in 13 host countries.

By disentangling origin and destination effects, we can explore the generalizability of some key theoretical possibilities pertaining to macro-level effects. Whereas findings from earlier studies on origin group differences are generalizable to one destination country, we test hypotheses on differences between origin groups after controlling for destination effects. Furthermore, where earlier cross-national research treats immigrant children as a homogenous group, we test hypotheses on cross-national differences after controlling for origin effects. Our analyses are therefore more representative of origin and destination effects (van Tubergen 2006).[2]

Furthermore, our design separates analysis of distinct properties of origin communities within the setting of different destination countries. Community effects occur when distinct properties of immigrant communities affect immigrant children's scholastic performance independent of origin and destination effects (i.e., the relative size of immigrant communities within a destination country). Because of selective migration, origin groups are proportionally larger in some destination countries than in others. Hence, the effect of the relative community size cannot be reduced to origin or destination per se. Our design distinguishes community effects from those of destination country and origin group.

Finally, the double comparative design more realistically captures the effects of an immigrant background on educational performance. Because immigration is intrinsically a transnational phenomenon, it should be studied accordingly (Portes 1999). Children of immigrants share certain immigration-related qualities that distinguish them from each other and from nonimmigrant classmates. Therefore, when explaining the educational performance of immigrant children, an exclusive focus on indicators related to educational performance does not suffice. We expand the existing literature by focusing on determinants related to the process of migration as well.

EXPLAINING MACRO-LEVEL DIFFERENCES IN IMMIGRANT CHILDREN'S EDUCATIONAL PERFORMANCE

Two types of effects can explain observed macro-level differences between origin groups and between destination countries. First, composition effects occur when the population composition of a group (i.e., relevant micro-level characteristics) partly explains the between-group variation in the dependent variable. However, macro units also affect individuals' educational achievement independent of composition effects. Destination countries and origin groups have distinct properties that influence individuals' academic performance. Such context effects, which surpass compositional differences, are the focus of our study. We theoretically distinguish between origin, community, and destination effects. We assume that destination countries have differing effects on the educational performance of all immigrant children, regardless of their origin. Furthermore, we assume that origin countries have certain characteristics that affect the educational outcomes of immigrant children from these countries, regardless of their destination country. Finally, we propose that the characteristics of immigrant communities, defined as specific origin groups within specific destination countries, have an effect independent of origin and destination countries per se.

[2] This design also allows for the analysis of individual-level effects while controlling for host country differences and origin group effects. Because our theoretical aim here is to explain contextual macro-level effects, we did not test hypotheses on individual characteristics. We do, however, report our findings on individual-level effects.

Destination Effects

We first focus on the characteristics of destination countries that affect all immigrant children, regardless of their origin. As Portes and Zhou (1993) argue, the level of prejudice against minorities is a trait of the host society. In Western countries, the law prohibits ethnic and racial discrimination, but subtle forms of discrimination still remain that negatively affect immigrant children's chances for occupational mobility and social integration. The extent of this discrimination varies cross-nationally and partly depends on the existence of laws designed to counter it. The legislative measures that national governments adopt are tied to the countries' dominant ideologies. Compared to right and centrist political parties, those on the left usually favor multiculturalism, and hence formulate less stringent demands on immigrants' cultural assimilation. This tolerance is mirrored in left-wing governments' legislation. For example, laws that encourage positive action are meant to counter discrimination against minorities. We expect that countries with a longer tradition of left-wing government probably have adopted more legislation intended to counter subtle discrimination. For immigrant children, discrimination raises the probability of assimilation into the lower socioeconomic strata of society (Portes and Zhou 1993). Discrimination may also hamper scholastic performance. We thus hypothesize that immigrant children in countries with a longer history of left-wing government will have better scholastic performance (Hypothesis 1).

Pertaining to the selection of immigrants, traditional immigrant-receiving countries, such as Australia and New Zealand, have adopted admission policies somewhat deviant from those of other Western states (McLaughlan and Salt 2002). These countries have much experience with the reception of immigrants, and their governments have tried to regulate immigration through specific policy measures. During the past 50 years, both countries abolished considerations regarding ethnic background and adopted a qualification system to encourage the selection of highly skilled migrants (Winkelmann 2001). The most qualified immigrants have the highest chance of admission (Borjas 2001). Through this selection, governments influence the composition of the immigrant groups in their countries. Consequently, adult immigrants in such countries are, on average, better educated and more skilled than comparable migrants in countries without such selection policies. Although these policies primarily select adult immigrants, they also affect immigrant children.

Immigrant children perform relatively well at school in traditional immigrant-receiving countries (OECD 2006), but this performance is not well understood. Given that selected immigrant parents socially reproduce their human capital, it is tempting to assume that immigrant children's relatively high achievement is attributable to compositional differences in their parents' socioeconomic status (Entorf and Minoiu 2005). Researchers also suggest, though, that in traditional immigration countries, non-immigrants hold a more favorable view toward immigrants' contribution to the economy (Bauer, Lofstrom, and Zimmermann 2000). With immigrants' economic viability in mind, legislators have passed national and state policy measures to reform the educational system to cope with the specific educational needs of immigrant children (Iredale and Fox 1997). Although the merits of such policies are subject to debate, these initiatives may also explain why immigrant children perform relatively well in traditional immigrant-receiving countries. This effect would supersede composition effects. We therefore hypothesize that when controlling for composition effects, immigrant children in traditional immigrant-receiving countries perform better than immigrant children in non-traditional immigration countries (Hypothesis 2).

Origin Effects

The country of origin may affect an immigrant child's scholastic achievement regardless of the destination country. Origin countries have economic, political, and cultural properties that may affect adult immigrants and their children. Most migration is economically motivated; consequently, the economic situation in an origin country affects adult immigrants' chances in a destination country. Past studies show that skill selection of adult immigrants in destination countries partly depends on the economic development of both origin and destination countries (Borjas 1987; Chiswick 1978, 1979). Compared with adult immigrants from more economically developed countries, adult immi-

grants from developing countries, on average, have less human capital and more trouble both using origin human capital and acquiring new human capital in their host countries. This reasoning does not necessarily apply to immigrant children. In the United States, adult immigrants from developing countries are often well educated compared to the remaining population in their origin countries (Feliciano 2005a). Although adult immigrants have education levels that are relatively low by U.S. standards, they are still more educated compared with the average of their origin countries. Jencks and colleagues (1979) show that children of parents with high education levels experience more pressure to perform well in school and are generally more stimulated. Highly selected immigrants also exert more pressure on their children to reach high levels of educational attainment, and they provide their children with more cultural capital to do so. Through this mechanism, educational selectivity of immigrant parents positively affects children's educational attainment. This may explain a significant proportion of the variance in educational attainment between immigrant children from different origin countries in the United States (Feliciano 2005b). We investigate this hypothesis controlling for destination effects. We postulate that immigrant children will have better scholastic performance the lower the level of economic development in their country of origin (Hypothesis 3).

A second origin effect may derive from the various levels of political stability in the countries of origin. Politically motivated immigrants are not so much attracted by the expected better economic conditions in their destination countries, but are more or less pushed out by threats experienced in their origin countries. This surely has consequences for the way they participate in their destination countries. These immigrants are often traumatized and therefore less efficient in acquiring human capital. We expect that their children also experience negative effects of the migration process. First-generation immigrant children may have experienced trauma themselves, and children of political immigrants have a greater chance of growing up in a family of traumatized parents. We therefore expect that immigrant children from politically unstable countries of origin will have poorer scholastic performance compared with other immigrant children (Hypothesis 4).

Community Effects

Research has long considered cultural assimilation to be a prerequisite for adult immigrants' socioeconomic advancement (Warner and Srole 1945)—to be successful, immigrant children should fully internalize their host countries' dominant cultural patterns, values, and norms. However, second-generation immigrants are more likely to experience segmented assimilation than straight-line assimilation (Portes and Zhou 1993). Portes and Zhou argue that young immigrants today can assimilate into three different segments of society, all of which provide different cultural identities for assimilation. Due to this segmentation, immigrant children develop different perspectives on the utility of schooling and distinctive economic outlooks. Only immigrant children who assimilate into white middle-class culture, and those who assimilate into existing ethnic communities that have strong social ties and positive evaluations of the returns on schooling, have a chance at upward mobility. Discrimination, geographic concentration of immigrant populations, and economic vulnerability mark the path toward assimilation into the lower strata of society. The extent to which natives experience feelings of social distance toward immigrants varies among origin groups (Owen, Eisner, and McFaul 1981), and the degree of social distance depends on the extent to which immigrants are similar to natives in terms of cultural, physical, and social-economic traits (Portes and Rumbaut 2001).

Segmented assimilation theory further predicts that immigrant children's scholastic achievement is closely related to their communities' economic context (Portes and Rumbaut 2001). The core focus of Western economies has shifted over the past few decades from manufacturing and services toward technological development and communications. Immigrants mainly perform the lower paying "old-economy" labor and so are overrepresented in the lower economic strata (Shields and Behrman 2004). Immigrants who foster aspirations of upward mobility in the United States face a widening wage gap (Portes, Fernandez-Kelly, and Haller 2005), which affects their opportunities for incorporation. Adults from immigrant commu-

nities with more socioeconomic capital relative to the native population are less likely to be regarded with prejudice by natives, they have a better chance of providing their children with resources that stimulate upward mobility, and they have fewer problems convincing their children that upward mobility is both conceivable and possible. We therefore hypothesize that children from immigrant communities with better socioeconomic capital relative to the native population will have higher scholastic performance than those from other communities (Hypothesis 5).

If the chance of incorporation into higher socioeconomic strata is limited, immigrant children may search for viable alternative careers. In ethnic economic niches, immigrant children may find an occupation that does not necessitate an advanced education (Zhou 1997). In host societies in which upward mobility is problematic for certain ethnic groups, the use of ethnic social capital can prove beneficial (Portes and Zhou 1993). The size of an immigrant community is a necessary precondition for the emergence of an ethnic economy in which immigrant children may pursue a career. The need for cultural adaptation thus becomes less urgent in larger immigrant communities whose members can rely on ethnic social ties. For this reason, we expect children from relatively large immigrant communities will have poorer scholastic performance than those from smaller communities (Hypothesis 6).

Composition Effects

To rigorously test hypotheses on contextual macro-level effects, we control for a number of individual-level characteristics that codetermine the educational performance of immigrant children. For example, having both parents at home provides valuable social capital for immigrant children and is preferable over other family forms (Dronkers 1999; Zhou 1997). Gender is also relevant: immigrant girls do better in school (Qin 2006), but boys are generally better in mathematics (OECD 2004b). High parental occupational status provides economic resources that facilitate school performance (Blau and Duncan 1967). Feliciano (2005a, 2005b) shows that immigrant parents are often highly educated compared to their origin country's population and experience downward mobility after migration. This suggests that the effect of family occupational status on educational achievement is somewhat less important for immigrant children. We therefore also control for parental education level. Another important predictor for immigrant children's educational achievement is their generation status. Rumbaut (2004) reports that second-generation immigrant children achieve better educational outcomes than both their first generation counterparts and foreign-born children who migrated before age 12 (i.e., the 1.5 generation). Immigrant children who belong to the 2.5 generation (i.e., children born in their host country who have one native-born and one foreign-born parent) also differ from second generation immigrant children. There is an ambiguous relationship, though, between school achievement and having one native-born parent. Some studies report that 2.5 generation immigrant children perform better than their second-generation counterparts (Ramakrishnan 2004). Other studies suggest that the 2.5 generation is closer to the third generation and therefore would perform less well in school. We control for these generational differences.

Finally, language skills are essential for good educational performance. Again, the literature does not provide a clear finding. In one view, speaking a foreign language at home hampers proficiency in the host country's language (Kalmijn 1996). Speaking a foreign language may therefore hinder educational performance. Recurrent findings from cross-national studies on immigrant children's educational performance support this interpretation (Entorf and Minoiu 2005; Marks 2005; Schnepf 2006). However, studies also report that fluently bilingual immigrant children in the United States perform better in school than do children who are fluent only in English (Portes and Rumbaut 2001; Zhou and Bankston 1998). To account for these effects, we control for speaking a language at home that is not a national language of the host country.

DATA AND MEASUREMENTS

The double comparative design (van Tubergen 2006) necessitates the use of large-scale datasets that contain sufficient destination countries, countries of origin, and respondents. The 2003 wave of the Project for International Student

Assessment (PISA) is the first OECD dataset on educational performance that comes close to meeting these requirements (OECD 2004a). The OECD instigated the PISA project to measure how well prepared young adults in OECD countries are to meet the challenges of knowledge-based societies when they conclude their obligatory education (OECD 2004b). The OECD interviews 15-year-old pupils from its member and partner states every three years. They formally test the students' knowledge and skills in mathematics, reading, and science. In 2003, for the first time, the survey asked respondents about their country of birth and the countries of birth of their parents.

The PISA dataset has some drawbacks. The OECD allows participating countries to influence the level of specificity with which respondents answer questions regarding their origin, thereby ensuring that countries can identify their most important immigrant groups. Germany, for example, included Russia, former Yugoslavian countries, Greece, Italy, Poland, and Turkey as possible countries of birth; students in Scotland could select China, India or Middle-Eastern, African, Caribbean, and several European countries. Canada, France, Hungary, Iceland, Poland, Portugal, Spain, Sweden, and the United States do not ask for the countries of origin of respondents; they only distinguish between natives and non-natives. Other countries only allow for categories that are insufficiently specified for our research questions. To consider origin effects, we must unambiguously identify a country of origin. Consequently, we cannot use data from these countries. We can distinguish origin groups in 12 destination countries: Australia, Austria, Belgium, Denmark, Germany, Greece, Ireland, Latvia, Luxembourg, New Zealand, Switzerland, and Scotland. By making additional assumptions, we can include the Netherlands as well, bringing the final number of destination countries to $N_D = 13$.[3]

We assign a country of origin to all respondents, based on their country of birth and their parents' countries of birth. To do this, we make several decisions regarding missing values and priorities of possible countries of birth.[4] In total, we identify $N_O = 35$ countries of origin. Combining the different countries of origin and destination, a total number of $N_C = 35 \times 13 = 455$ communities are possible. Not all origin groups are present in all destination countries, so our dataset factually contains $N_C = 67$ different immigrant communities. Subsequently, we identify as immigrant children all pupils who have at least one parent born abroad. In total, we analyze $N_I = 7{,}403$ immigrant children.[5]

Measurement of Mathematical Performance

We base our dependent variable on the PISA measurement of mathematical literacy. This concept is measured through 85 items and tests students' basic mathematical knowledge and their ability to apply this knowledge to everyday problems. The survey presents respondents with a selection of these items. Item response modeling was used to calculate five plausible values on general mathematical literacy, as well as five plausible values on mathematical literacy in four subdimensions. Together, these values on general mathematical literacy provide an unbiased estimate of the answers on all the mathematical items (OECD 2004b). We use the mean score of the five plausible values on general mathematical literacy as our dependent variable. The OECD mean of this score is 500, with a standard deviation of 100. In our study of immigrant children, the mean score is 480.5, with a standard deviation of 96.4.

[3] In the Netherlands, pupils were asked if their parents were born in a European or a non-European country. The highest proportion of European immigrants in the Netherlands originate from Germany and the highest proportion of non-European Dutch immigrants come from Turkey; we code these immigrants accordingly. This procedure enables us to use the Netherlands as a destination country, but it also reduces the variation in origin countries, leading to a stricter test of hypotheses.

[4] Information on adopted decision rules is available from the authors.

[5] We exclude communities with fewer than five members. The total numbers of immigrant children by country of destination, by country of origin, and by immigrant community are presented in the Appendix, Table A1.

Independent Variables

As independent variables, we use characteristics of countries of destination, countries of origin, and immigrant communities. We also control for a number of relevant individual characteristics, as well as characteristics at the macro-level. The following paragraphs briefly elaborate on the construction of these variables. Table 1 presents the descriptive statistics.

Macro-Level Variables

Average non-immigrant math score. For each destination country, we select all PISA respondents who could not be classified as immigrant children and calculate their average score on our dependent variable. We use this measure as a macro-level control, thereby accounting for cross-national performance differences caused by country effects that do not necessarily pertain to immigration-related characteristics.

Left-wing government influence. We examine the presence of left-wing parties in the government of each destination country in our data between 1978 and 2003 to create an index that measures left-wing party rule. To assess the ideological positioning of political parties, we use the World Bank Political Indicators (Beck et al. 2001). Using information on party preferences concerning state control of the economy, these indicators place political parties on the left, center, or right of a classic left–right scale. For each separate year between 1978 and 2003 we code governments of our destination countries as 1 for left-wing parties, .5 for a coalition with a right-wing or centrist party, and 0 for a government that does not include any left-wing party. We then sum the 26 year-scores.

Traditional immigration country. We include a dummy variable for a traditional immigration country, including Australia and New Zealand. Other countries of destination are the reference group.

Economic development. We use the gross domestic product (GDP) per capita in 1,000 US Dollars in 2003 (World Bank 2005).

Political stability. We use the World Bank Government Indicator on this subject

Table 1. Descriptive Statistics of Variables (N = 7,403)

	Minimum	Maximum	Mean	SD
Dependent Variable				
Mathematical peformance	151.07	789.56	480.49	96.43
Destination Variables				
Average non-immigrant math score	445.50	554.90	522.43	22.62
Left-wing government influence	0	19	10.46	4.22
Traditional immigration country	0	1	.25	.43
Origin Variables				
Economic Development	.08	34.79	9.41	9.37
Political stability	–2.35	1.42	.16	.87
Community Variables				
Relative group size	0	290	38.15	53.38
Community relative socioeconomic capital	–19.18	28.46	–6.22	7.22
Individual-Level Variables				
Parental education	0	6	3.87	1.88
Parental occupational status	16	90	44.64	16.27
Home possessions	–3.79	1.94	–.17	.91
Second generation	0	1	.48	.50
One native parent	0	1	.06	.24
Foreign language used at home	0	1	.36	.47
Two-parent family	0	1	.72	.45
Boy	0	1	.51	.50

Source: PISA 2003.

(Kaufmann, Kraay, and Mastruzzi 2005). This item represents the perceived chance that governments will be overthrown by unconstitutional or violent means. A high score refers to a high level of political stability.

RELATIVE GROUP SIZE. We calculate this variable as the number of immigrants from a specific country of origin per thousand inhabitants of a specific destination country. To establish these relative group sizes, we use census data from the national statistical bureaus of the destination countries. This item ranges from 0 (not all the origin groups are present in all the countries of destination) to 290 (the Russian immigrants in Latvia).

COMMUNITY-RELATIVE SOCIOECONOMIC CAPITAL. Based on the 2003 PISA data, we calculate the differences in the average parental education levels of non-immigrant and immigrant children from each country of origin in each country of destination. We use the educational level of the best-educated parent to construct this variable.

INDIVIDUAL-LEVEL VARIABLES

To account for compositional differences, we control for the following individual-level characteristics.

PARENTAL EDUCATION LEVEL. The PISA data contain multiple measures of parents' education. We use the level of education of the most-educated parent, measured according to the ISCED scale (United Nations Educational, Scientific, and Cultural Organization 1997). The measure ranges from 0 to 6.

PARENTAL OCCUPATIONAL STATUS. PISA contains information on parental occupational status, measured according to the ISEI scale (Ganzeboom et al. 1992). We use the ISEI index score of the parent with the highest occupational status. The ISEI index ranges from 16 to 90.

HOME POSSESSIONS. PISA provides a summary index of household items, which allows for the measurement of each family's possession of certain material and cultural goods associated with school performance. Respondents are asked whether their homes provide them with a study desk, a private room, a quiet place to study, a computer, educational software, access to the Internet, classic literature or poetry books, works of art, books to help with school work, a dictionary, a dishwasher, and more than 100 books. Our index is comprised of these 14 items using item response modeling. A higher score indicates a higher level of these household items.

SECOND GENERATION. We use information on the birth countries of respondents and their parents to construct a dichotomous variable. We define second-generation immigrants as pupils born in their destination countries but whose parents were born elsewhere. We define first-generation immigrants as pupils who were not born in their destination countries and whose parents were born abroad. First-generation immigrants are the reference group.

ONE NATIVE PARENT. We use a dummy variable to identify pupils with one immigrant and one native-born parent. Pupils with two non-native parents are the reference group.

FOREIGN LANGUAGE USED AT HOME. We include a dummy variable for children whose families use a language other than that of their destination country. Pupils who speak one of the national languages at home are the reference group.

TWO-PARENT FAMILY. We include a dummy variable for family structure, which measures whether children live in two-parent households. Those from other family structures are the reference group.

BOYS. We control for gender using a dummy variable for sex; girls are the reference group.

ANALYSES

Using a double comparative design requires multilevel techniques. Using individual-level techniques (such as OLS regression) on data with multiple levels underestimates standard errors of the macro-level effects, thereby inflating significance (Raudenbush and Bryk 2002;

Snijders and Bosker 1999). To analyze nonhierarchically structured data, cross-classified multilevel regression analyses are appropriate (Raudenbush and Bryk 2002; Snijders and Bosker 1999). We use Markov Chain Monte Carlo (MCMC) estimation techniques from the statistical analysis program MLwiN to estimate models (Browne 2003).[6]

Descriptive Results

In Table 2, we present average mathematical literacy scores by country of origin and destination. This table shows the diversity of mathematical literacy of immigrant children from different countries of origin in different countries of destination. The average math score of all immigrant children in our data is 480, 20 points lower than the OECD mean.

The variant scores of immigrant children from different origin countries indicate the existence of origin effects. On average, immigrant children from Italy have a lower level of mathematical literacy (473) than the overall mean of immigrant children; those from Germany (521) have above average mathematical literacy. These differences between German and Italian immigrant children are noticeable in both destination countries for which we have information on these origin groups. This indicates that origin countries may affect immigrant children's scholastic achievement.

The table also indicates variance between countries of destination, which may imply destination effects. Immigrant children in Greece (402), Denmark (437), and Latvia (488) have relatively low math scores. In Ireland, immigrant children reach an average math score (504) that is close to the mean math score of all immigrant children. In Scotland (555), New Zealand (548), and Australia (527), immigrant children reach the highest levels of mathematical literacy. For some immigrant groups, the average math scores differ across destination countries along these lines. For example, Russian immigrant children achieve lower math literacy in Greece (400) than in Latvia (495), and they have higher mathematical literacy in Ireland (535).

Finally, Table 2 indicates the existence of community effects. As an indicator of community-specific characteristics that affect immigrant children's educational performance, we examine deviations from the literacy scores predicted purely on the marginal scores that signify origin and destination effects. For example, Polish immigrant children in Austria (554) score 55 points higher, on average, than the overall average for Polish immigrant children. In Belgium, children from Polish backgrounds score considerably lower (493). These effects cannot be attributed to destination effects because the overall mean score for all immigrant children is somewhat lower in Austria than in Belgium. This indicates that specific characteristics of these immigrant communities could account for these differences.

Variance Components

Table 2 provides an insightful description of the variation in mathematical literacy between immigrant children from different origin groups in various destination countries. Conclusions about origin, destination, and community effects are preliminary, however. Table 3 provides a more rigorous insight into the extent to which the variance in the educational performance of immigrant children may be attributed to differences between origin countries, destination countries, communities, and individuals. We present the variance components model of our cross-classified multilevel regression analyses. Model 0 is an empty model that does not contain explanatory variables at any level. As expected, the most variance (79 percent) occurs at the individual level (Ω = 7,271). Because our dataset contains only 13 relatively homogeneous (Western) destination countries, the meager variance at the destination level (Ω = 755; SD = 560) is not surprising. In total, variation between destination countries makes up 8 percent of the total variance. Exactly the same percentage of the total variance in immigrant children's educational performance can be attributed to variance between origin groups

[6] For elaborate information on cross-classified models, see Raudenbush and Bryk (2002) and van Tubergen (2006). The latter demonstrates extensively how cross-classified models can be applied to empirically test hypotheses. We perform analyses on 13 destination countries, which is a relatively low number. Additional analyses (available from the authors on request) indicate that our estimations are nonetheless robust.

Table 2. Average Mathematical Performance of Immigrant Children per Country of Destination and Country of Origin (N = 7,403)

	Countries of Destination													
Countries of Origin	AU	AT	BE	CH	DE	DK	EL	IE	LV	LU	NL	NZ	SC	Mean
Albania	—	424	—	412	—	—	403	—	—	—	—	—	—	408
Australia	—	—	—	—	—	—	—	—	—	—	—	535	—	535
Belarus	—	—	—	—	—	—	—	—	490	—	—	—	—	490
Bosnia Herzegovina	—	—	—	—	466	451	—	—	—	—	—	—	—	457
Bulgaria	—	—	—	—	—	—	393	—	—	—	—	—	—	393
China	570	—	—	—	—	—	—	—	—	—	—	556	555	564
The Congo	—	—	450	—	—	—	—	—	—	—	—	—	—	450
Croatia	—	—	—	—	460	—	—	—	—	—	—	—	—	460
France	—	—	460	520	—	—	—	—	—	—	—	—	—	477
Germany	529	—	—	528	—	—	—	516	—	—	507	—	—	521
Greece	470	—	—	—	463	—	—	—	—	—	—	—	—	469
Hungary	—	555	—	—	—	—	—	—	—	—	—	—	—	555
India	577	—	—	—	—	—	—	—	—	—	—	534	525	563
Italy	503	—	—	472	420	—	—	—	—	473	—	—	—	473
Lebanon	471	—	—	—	—	—	—	—	—	—	—	—	—	471
Morocco	—	—	452	—	—	—	—	—	—	—	—	—	—	452
The Netherlands	502	—	530	—	—	—	—	—	—	—	—	—	—	521
New Zealand	508	—	—	—	—	—	—	—	—	—	—	—	—	508
Nigeria	—	—	—	—	—	—	—	460	—	—	—	—	—	460
Pakistan	—	—	—	—	—	447	—	—	—	—	—	—	483	463
Philippines	502	—	—	—	—	—	—	—	—	—	—	—	—	502
Poland	—	554	493	—	495	—	—	—	—	—	—	—	—	499
Portugal	—	—	—	473	—	—	—	—	—	444	—	—	—	452
Romania	—	441	—	—	—	—	—	—	—	—	—	—	—	441
Russia	—	—	—	—	—	—	400	535	495	—	—	—	—	468
Serbia Montenegro	—	459	—	456	466	—	—	—	—	—	—	—	—	458
Slovakia	—	512	—	—	—	—	—	—	—	—	—	—	—	512
Slovenia	—	509	—	—	—	—	—	—	—	—	—	—	—	509
South Africa	—	—	—	—	—	—	—	—	—	—	—	549	—	549
Spain	—	—	—	477	—	—	—	—	—	—	—	—	—	477
Turkey	—	433	429	437	413	424	—	—	—	—	484	—	—	447
Ukraine	—	—	—	—	—	—	—	—	472	—	—	—	—	472
United Kingdom	539	—	—	—	—	—	—	502	—	—	—	551	565	541
United States	—	—	—	—	—	—	—	520	—	—	—	—	—	520
Vietnam	565	—	—	—	—	—	—	—	—	—	—	—	—	565
Mean	527	455	459	461	442	437	402	504	488	449	488	548	555	480

Source: PISA 2003.

Notes: AU = Australia; AT = Austria; BE = Belgium; CH = Switzerland; DE = Germany; DK = Denmark; EL = Greece; IE = Ireland; LV = Latvia; LU = Luxembourg; NL = The Netherlands; NZ = New Zealand; SC = Scotland.

Table 3. Variance Components of Immigrant Children's Mathematical Performance

	Destination Countries	Origin Countries	Communities	Individuals
Model 0	754.856	750.689	490.292	7,270.911
(empty model)	(559.551)	(384.239)	(176.046)	(119.307)

Source: PISA 2003.

Notes: Presented data represent variance components of cross-classified multilevel analyses with standard deviations shown in parentheses. $N_D = 13$, $N_O = 35$, $N_C = 67$, $N_I = 7{,}403$.

($\Omega = 751$). Differences between communities subsequently account for 5 percent of the total variance ($\Omega = 490$).

Tests of Hypotheses

Table 4 presents results for our cross-classified multilevel analyses examining immigrant children's mathematical performance. The first model contains only individual effects. We use this model to show composition effects, which match findings from previous studies. Immigrant children of parents who are either higher educated (b = 1.642) or have obtained a higher occupational status (b = .965) achieve higher levels of mathematical literacy. Also, the more material goods immigrant children have access to in their homes, the better they perform in school (b = 25.785). As expected, second-generation migrants perform better than first-generation migrants (b = 8.377). Also, immigrant children who have one native parent perform better than the children of two immigrant parents (b = 9.360). We find that speaking a foreign language at home hinders the scholastic achievement of immigrant children (b = –10.144). Finally, children of two-parent families score better than children from other family forms (b = 13.631), and boys tend to be more mathematically literate than girls (b = 12.643). The variance components show the extent to which these variables explain the initial variance at various levels of analysis. Adding individual-level predictors to the empty model reduces initial unexplained variance at the individual level by 15 percent. Compositional differences explain no less than 66 percent of the initial variance between destination countries. Compared to our empty model, such differences explain about 41 percent of the initial variance between origin countries. Composition effects account for almost half of the variance at the community level. This finding underlines the importance of aggregate individual qualities for explaining macro-level differences.

Model 2 examines which characteristics of countries of destination, countries of origin, and communities influence immigrant children's mathematical literacy. It does not control for composition effects. Non-immigrant children's average mathematical literacy is positively associated with the math performance of immigrant children (b = .597). In this model, we do not find evidence that the longer governmental presence of left-wing political parties facilitates immigrant children's educational performance. We also find that immigrant children in traditional immigrant-receiving countries perform better in school (b = 33.470). Pertaining to origin countries' characteristics, Model 2 shows that the level of economic development negatively affects the mathematical performance of immigrant children (b = –1.134). The level of political stability (b = 18.505) of origin countries positively influences the scholastic performance of immigrant children. Model 2 also tests community effects. The immigrant communities' socioeconomic capital relative to that of the native population has a positive effect on the mathematical performance of community members (b = 3.782). Contrary to our expectations, our results further indicate that the relative group size of immigrant communities has a positive effect on the scholastic achievement of group members (b = .183). The variance components show that macro-level effects explain 95 percent of the destination-level variance that we measured in our empty model. Such effects account for 76 percent of the initial variance at the origin level. Macro-level effects further explain 40 percent of the initial variance between communities, and they do not explain any variance at the individual level.

Model 3 simultaneously tests micro- and macro-level effects. Comparing these results to Model 2 shows the extent to which macro-level effects are interpretable as compositional or contextual differences. Not being associated with immigrant children's composition, the effect of the average non-immigrant math scores unsurprisingly remains significant. In this model, the effect of governmental presence of left-wing parties remains in the expected direction, but non-significant. We therefore find no support for our first hypothesis. Compared to Model 2, the dummy for traditional immigrant-receiving countries becomes non-significant (b = 19.045). This implies that skill selection policies in these countries explain the relatively good educational performance of immigrant children. This does not support our expectations in Hypothesis 2. Controlling for compositional differences, the effect of the level of economic development of origin countries remains significant (b = –1.474). *Ceteris*

Table 4. Macro- and Micro-Level Effects on Immigrant Children's Mathematical Performance

	Model 1	Model 2	Model 3
Intercept	424.208**	182.804**	156.951*
	(7.906)*	(86.960)	(93.369)
Destination Effects			
Average non-immigrant math score		.597**	.517**
		(.162)	(.174)
Left-wing government influence		.146	.953
		(.999)	(.901)
Traditional immigration country		33.470**	19.045
		(10.290)	(10.634)
Origin Effects			
Economic development		–1.134**	–1.474**
		(.559)	(.524)
Political stability		18.505**	15.750**
		(5.602)	(5.160)
Community Effects			
Community relative socioeconomic capital		3.782**	2.255**
		(.517)	(.476)
Relative group size		.183**	.145**
		(.081)	(.070)
Individual-Level Effects			
Parental education	1.642**		1.623**
	(.618)		(.615)
Parental occupational status	.965**		.942**
	(.069)		(.069)
Home possessions	25.785**		25.614**
	(1.161)		(1.174)
Second generation	8.377**		8.258**
	(2.234)		(2.223)
One native parent	9.360**		9.638**
	(4.317)		(4.283)
Foreign language used at home	–10.144**		–9.666**
	(2.613)		(2.620)
Two-parent family	13.631**		13.873**
	(2.126)		(2.120)
Boy	12.643**		12.624**
	(1.853)		(1.853)
Variance Components			
Destination countries	257.254	38.313	61.690
	(233.042)	(83.763)	(113.201)
Origin countries	445.745	177.732	170.103
	(225.859)	(171.704)	(189.009)
Communities	251.927	292.727	213.657
	(110.188)	(127.876)	(135.706)
Individuals	6210.871	7271.310	6217.865
	(101.174)	(121.326)	(103.222)

Source: PISA 2003.

Notes: The presented data are cross-classified multilevel regression coefficients with standard deviations in parentheses. $N_D = 13$, $N_O = 35$, $N_C = 67$, $N_I = 7{,}403$.

* = 0 not in 90 percent CI; ** = 0 not in 95 percent CI .

paribus, children from countries with higher levels of economic development perform less well in school. These findings support Hypothesis 3. Compositional differences do not seem to cause the positive effect of political stability that we find in Model 2. These findings support Hypothesis 4. Last, we examine the extent to which the effects of immigrant com-

munity size and communities' relative socioeconomic capital are caused by composition or context effects. Much of the effect of average socioeconomic capital of communities relative to natives can be explained by compositional differences between these communities (b = 2.255 in Model 3 versus b = 3.782 in Model 2). However, we find that the effect of community socioeconomic capital supersedes the effect of composition. These findings support Hypothesis 5. They also contradict Hypothesis 6: controlling for composition effects, the relative group size continues to have a positive effect on immigrant children's educational performance (b = .145). The variance components indicate that our variables explain 92 percent of the variance at the destination-level that we find in Model 0, and 77 percent of the origin-level variance. These variables explain about 56 percent of the initial variance between communities and 14 percent of the empty model variance at the individual level.

CONCLUSIONS AND DISCUSSION

This research examined the mathematical achievement of immigrant children from different origins in different destination countries while accounting for macro-level characteristics of these countries. We used the 2003 PISA data, containing 7,403 immigrant children from 35 origin countries in 13 countries of destination. Previous analyses using these data reveal that immigrant children's scholastic achievement differs between countries of destination as well as between countries of origin (OECD 2006). Using cross-classified multilevel analysis, we examined which characteristics of destination countries, countries of origin, and communities are relevant to understanding immigrant children's educational performance.

To explain destination effects, we focused on two specific policies: those designed to regulate immigration and those intended to facilitate immigrants' economic integration by countering discrimination. To measure the effect of integration policies on immigrant children's educational performance, we reasoned that left-wing governments are more likely to implement policies to counter discrimination than are right-wing or centrist governments. Therefore, left-wing economic integration policies could have positive consequences for immigrant children's scholastic achievement. We found no evidence to support this hypothesis, which might imply that these laws do not have the intended effect, or that what occurs at the level of federal legislation does not trickle down to the level of educational process and students' experiences. Future research should use direct measures of antidiscrimination laws to better explore their effects.

To analyze the effects of policies regulating immigration, we focused on traditional immigrant-receiving countries (i.e., Australia and New Zealand). In these countries, immigrant children perform better at school (OECD 2006). We found that composition effects from restrictive immigration policies explain this better performance. Such policies ensure that better qualified adult immigrants are more eligible for admission into these countries. The relatively high educational and occupational status of immigrant parents in these countries fully explains the better educational performance of immigrant children in these countries. We did not find evidence supporting alternative explanations. Our analyses do not support the hypothesis that the better performance of immigrant children in traditional immigration countries can be explained by a more receptive attitude toward immigrants in these countries, nor by education policies specifically designed to meet the needs of immigrant children. Apparently, traditional immigrant-receiving countries do not differ from other Western countries in these respects. More research is needed to test the generalizability of this finding for the other traditional immigrant-receiving countries.

To explain performance differences between immigrant children from different countries of origin, we explored the political, economic, and cultural characteristics of origin countries. For economic characteristics, we focused on the level of economic development of origin countries. We found that, *ceteris paribus,* immigrant children and the children of immigrants from countries with a lower level of economic development perform relatively well in school. This finding might imply that adult immigrants who leave their origin countries for economic reasons are more inclined to meet their economic expectations and stimulate their children to do well in school. Another possibility, of course, is that children from less developed countries, who have a transnational orientation toward achieve-

ment, compare themselves with peers in their origin countries and thus have relatively optimistic expectations for their futures (cf. Feliciano 2005a, 2005b, 2006; Louie 2006). Our findings thus suggest that the explanatory scope of educational selectivity theory is not limited to the United States and can be generalized to other immigrant receiving nations as well. Future research should explore this claim by including direct measurements of average education levels of origin countries' populations.

Our analyses also examined the extent to which origin countries' levels of political stability affect immigrant children's scholastic achievement. As hypothesized, children from more politically stable countries perform better in school. The ordeals that politically motivated immigrants experienced in their origin countries affect their children too, regardless of whether or not the children are born in the origin country. Political immigrants face serious negative consequences stemming from the political situations in their origin countries, and these consequences carry across generations to affect their children's chances as well. Politically motivated immigrants often expect to stay in their destination countries permanently (Portes and Rumbaut 1996), so our findings may have urgent implications for policymakers in countries that receive a large number of politically motivated immigrants. To ensure that the children of politically motivated immigrants achieve their full potential, specific educational programs designed to counter the negative effects of political migration may be essential.

Finally, we examined the extent to which characteristics of immigrant communities from a certain country of origin in a certain country of destination influence the scholastic achievement of community members. If a community has more socioeconomic capital than does the native population of a destination country, in terms of socioeconomic status, their children tend to perform better at school than do comparable children from other communities. The socioeconomic status difference between individuals, though, does not fully explain the relatively good performance of these children. These results suggest that the socioeconomic distance between immigrant communities and the non-immigrant population has an additional effect on immigrant children's scholastic performance. This interpretation implies that children from communities that have more socioeconomic capital relative to the native population encounter less prejudice from non-immigrants. Or, they may have a more positive outlook on their future chances for upward mobility. Also regarding community effects, we explored the extent to which the relative size of immigrant communities affects immigrant children's educational performance. Community size is a necessary precondition for the occurrence of ethnic economic niches. As such, we expected that children from larger immigrant communities would have greater opportunities to find employment in such niches, and that they might therefore lack the incentive to perform well in school. We did not find evidence to support this hypothesis. On the contrary, the relative size of immigrant communities positively affects the educational performance of immigrant children. As earlier research has suggested, immigrant children from larger communities may have more access to positive ethnic social capital.

Our analyses offer meaningful explanations for macro-level differences in immigrant children's educational performance, but future research can improve these findings by using more elaborate data. For example, with these data we could not measure the extent to which immigrant children experience prejudice or discrimination from non-immigrant peers or teachers. Furthermore, future research should use data covering more destination countries. PISA 2003 is the first large cross-national OECD dataset to contain information on the origin of first- and second-generation migrants. A number of participating countries did not provide sufficiently specified information on children's origin countries. Because of these countries' reluctance during data collection, we had to analyze a relatively small number of destination countries. We could not analyze some important traditional immigrant-receiving countries, such as the United States and Canada. By using information from a larger number of countries, researchers can conduct more robust tests of hypotheses concerning macro-level effects. Our findings further indicate that migration-related factors have to be considered when analyzing immigrant children's educational performance.

We draw three main conclusions from our analyses. First, researchers should consider

macro-level characteristics when studying the educational performance of immigrant children. Origin, destination, and community matter, and simultaneously so, for immigrant children's scholastic achievement. Hypotheses on origin effects cannot be adequately tested when destination effects are disregarded, and vice versa. Future macro-level research should therefore either use a design that disentangles these effects or make the necessary reservations when interpreting results.

The second conclusion concerns the theoretical implications of our results. We deduced our hypotheses on origin and community effects from theories developed primarily to explain origin-related performance differences in the United States. Most notably, we used segmented assimilation theory (Portes and Zhou 1993) and theoretical notions on transnational views on educational performance (Feliciano 2005a; 2005b). Our findings indicate that the explanatory scope of these theories most certainly exceeds the U.S. setting. These theories can provide a fruitful theoretical perspective for understanding immigrant children's educational performance differences throughout the Western world. Future research on this topic should therefore take these theories into serious consideration.

Lastly, the policy implications of this study are worth discussion. As mentioned earlier, policymakers in Western countries commonly regard education as critical for the socioeconomic success of immigrant children. To ensure successful future societal participation, immigrant children must perform well in school. Cross-national rankings of scholastic performance scores are commonly used to indicate the extent to which countries succeed in educating their immigrant children. Given the relatively high performance of immigrant children in traditional immigrant-receiving nations, many argue that, in this respect, relatively young immigration countries can learn from the experiences of traditional immigration countries. We have shown that the relatively good performance of immigrant children in Australia and New Zealand is attributable to their selective immigration laws. Our analyses thus indicate that selective immigration policies can elevate the general performance of immigrant children throughout the rest of the Western world. However, a sole focus on such policies does not suffice because selective admission policies do nothing to facilitate the educational success of the immigrant children who already reside in these countries. To reach that goal, supplementary policy measures must be adopted. Our results indicate that children of politically motivated immigrants, children from small immigrant communities, and children from communities with low socioeconomic status are relatively disadvantaged. The effectiveness of policies designed to increase the educational performance of immigrant children could benefit from targeting these specific groups.

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APPENDIX

Table A1. Numbers of Immigrant Children, by Countries of Destination and Countries of Origin

	Countries of Destination													
Countries of Origin	AU	AT	BE	CH	DE	DK	EL	IE	LV	LU	NL	NZ	SC	Total
Albania	—	11	—	255	—	—	195	—	—	—	—	—	—	461
Australia	—	—	—	—	—	—	—	—	—	—	—	46	—	46
Belarus	—	—	—	—	—	—	—	—	123	—	—	—	—	123
Bosnia Herzegovina	—	—	—	—	14	21	—	—	—	—	—	—	—	35
Bulgaria	—	—	—	—	—	—	8	—	—	—	—	—	—	8
China	129	—	—	—	—	—	—	—	—	—	—	73	9	211
Croatia	—	—	—	—	11	—	—	—	—	—	—	—	—	11
The Congo	—	—	91	—	—	—	—	—	—	—	—	—	—	91
France	—	—	236	96	—	—	—	—	—	—	—	—	—	332
Germany	45	—	—	94	—	—	—	6	—	—	65	—	—	210
Greece	49	—	—	—	7	—	—	—	—	—	—	—	—	56
Hungary	—	8	—	—	—	—	—	—	—	—	—	—	—	8
India	99	—	—	—	—	—	—	—	—	—	—	38	7	144
Italy	73	—	—	283	33	—	—	—	—	120	—	—	—	509
Lebanon	131	—	—	—	—	—	—	—	—	—	—	—	—	131
Morocco	—	—	146	—	—	—	—	—	—	—	—	—	—	146
The Netherlands	27	—	65	—	—	—	—	—	—	—	—	—	—	92
New Zealand	238	—	—	—	—	—	—	—	—	—	—	—	—	238
Nigeria	—	—	—	—	—	—	—	5	—	—	—	—	—	5
Pakistan	—	—	—	—	—	31	—	—	—	—	—	—	24	55
Philippines	136	—	—	—	—	—	—	—	—	—	—	—	—	136
Poland	—	11	36	—	99	—	—	—	—	—	—	—	—	146
Portugal	—	—	—	206	—	—	—	—	—	603	—	—	—	809
Romania	—	20	—	—	—	—	—	—	—	—	—	—	—	20
Russia	—	—	—	—	—	—	99	7	238	—	—	—	—	344
Serbia Montenegro	—	272	—	403	15	—	—	—	—	—	—	—	—	690
Slovakia	—	6	—	—	—	—	—	—	—	—	—	—	—	6
Slovenia	—	6	—	—	—	—	—	—	—	—	—	—	—	6
South Africa	—	—	—	—	—	—	—	—	—	—	—	67	—	67
Spain	—	—	—	80	—	—	—	—	—	—	—	—	—	80
Turkey	—	137	137	146	188	49	—	—	—	—	372	—	—	1,029
Ukraine	—	—	—	—	—	—	—	—	114	—	—	—	—	114
United Kingdom	457	—	—	—	—	—	—	136	—	—	—	125	191	909
United States	—	—	—	—	—	—	—	9	—	—	—	—	—	9
Vietnam	126	—	—	—	—	—	—	—	—	—	—	—	—	126
Total	1,510	471	711	1,563	367	101	302	163	475	723	437	349	231	7,403

Source: PISA 2003.

Notes: AU = Australia; AT = Austria; BE = Belgium; CH = Switzerland; DE = Germany; DK = Denmark; EL = Greece; IE = Ireland; LV = Latvia; LU = Luxembourg; NL = The Netherlands; NZ = New Zealand; SC = Scotland.

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