Cross-National Variation in Performance Gaps in Reading Literacy between Native and Immigrant Children: A Comparative Analysis of 14 OECD Countries

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In many European and North American countries, the immigrant population has substantially increased during the last few decades. For example, during the 1970s about 430,000 immigrants entered the United States each year, while nearly one million immigrants were admitted in 2001 (Martin and Midgley 2003). In Austria, there were 282,700 foreigners in 1980 and two decades later the number increased to 757,900 (Haug, Comption, and Courbage 2002; OECD 2003a). The rising inflow of immigrants has also increased the number of children who are either foreign-born or the children of immigrant parents: in the U.S., the proportion of immigrant children or children of immigrants among all children increased from 15 percent in 1990 to 20 percent in 1997, resulting in about 14 million first and second generation immigrant children (Zhou 1997, Pong 2003).

Along with the increasing number of children in immigrant families, concerns about the educational success of immigrant children have been growing. Children of immigrant families often encounter difficulties in a new environment of schooling in which the educational systems, culture, and language of instruction differ from those in their origin countries. Numerous studies have documented significant educational disadvantages of immigrant children in a society and they have explored various factors, including socioeconomic conditions of immigrant families, cultural differences, language acquisition, and school organization, which influence the educational performance of immigrant children (e.g., Pong 2003 for the U.S., Eldering and Kloprogge 1989 for some European countries).
Although detailed analyses of educational differences between native and immigrant children in specific countries have contributed to our understanding of educational inequality associated with immigrant status in the corresponding country, there remains still an important research gap. We know little about to what extent countries differ in educational gaps between children from native and immigrant families. Do we expect significant cross-national variation in the extent to which immigrant children show lower educational performance compared to native children? How is such variation associated with cross-national differences in immigration policy that determines the difficulties immigrants face in the process of integration into a society? To address these questions, comparative research across nations with diverse immigration policies that goes beyond within-country studies is required.

In this paper, we compare performance differences in reading literacy between native and immigrant children in 14 OECD countries participating in the Program for International Student Assessment (PISA) 2000: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Luxembourg, New Zealand, Norway, Sweden, Switzerland, the UK, and the US. We first assess the gross difference in performance between native and immigrant children in each country. Then, we examine the extent to which the gross gap is accounted for by family socioeconomic status and languages spoken at home. The literature on immigrants and their children in the US suggests that many of the educational disadvantages of immigrant children are explained by the lower socioeconomic status of immigrant families (Schmid 2001). In addition, language acquisition is one of the most critical hindrances that immigrant children have to pass for success in schools. We can expect that immigrant children who are more fluent in the
language of the country in which they reside may adapt relatively easily to the new system than those immigrant children who do not speak the language well.

In addition to describing the gross and net effects associated with being immigrant children in each of 14 countries, we examine to what extent factors related to immigration policy account for the cross-national variation in those effects. For this purpose, we classify countries into three groups on the basis of their immigration policies: traditional immigration countries (Australia, Canada, New Zealand, the UK, and the US), Continental-European countries (Austria, Belgium, Germany, Luxembourg, and Switzerland), and social democratic countries (Denmark, France, Norway, and Sweden). We describe the different immigration policies of the three groups of countries and the differences in the demographic and socioeconomic characteristics of immigrants resulting from the different immigration policies. A set of hierarchical linear models (HLM) is estimated to assess how the variation in immigration policy is linked to the variation in the degree of immigrant children’s educational disadvantages across the three groups of countries.

MODELS OF IMMIGRATION POLICY

Countries differ significantly in their immigration policies, which have resulted in the different compositions and characteristics of immigrants. For example, some countries such as Australia and Canada have implemented immigration policies selecting immigrants on the basis of labor market demands. Thus, immigrants entering these countries are more likely to be skilled workers, who have relatively fewer difficulties in being integrated into the country (Bauer, Lofstrom and Zimmermann 2000). On the other
hand, asylum seekers and refugees account for the relatively large share of all immigrant inflows in countries such as Norway and Sweden than in any other countries. Because the human capital that asylum seekers and refugees possess may be less valuable in the receiving country than in the origin country, the society may have to pay relatively high costs for helping asylum seekers and refugees being integrated into society (Bauer, Lofstrom and Zimmermann 2000). The fact that countries show substantially different compositions of immigrants influenced by immigration polices makes it necessary to take into account such differences for explaining cross-national variation in educational gaps between native and immigrant children.

Several studies recently have compared immigration policies of different American and European countries and proposed some classification frameworks for grouping countries based on the similarities of their immigration policies and the corresponding demographic and socioeconomic characteristics of immigrants. For example, Castles and Miller (1993) distinguish three different models of immigration policies: the exclusionary model, the republican model, and the multicultural model. Emphasizing ‘birth’ and ‘descent,’ countries characterized as exclusionary have relatively restrictive naturalization requirements and they are basically based on the ideology of ‘not being countries of immigration.’ Castles and Miller classified Belgium, Germany, and Switzerland into this category.

The second group of countries, the republican model, basically allows immigrants to become integrated in the society in terms of political participation and cultural integration. Family union, permanent residence, and citizenship have been permitted. However, as the authors refer to the model as the assimilation model, this model assumes
that immigrants should be assimilated into the majority culture that is supposed to be superior and thus discourages cultural differences between the immigrant population and the host society (Vermeulen 1997). France and the UK represent the republic model.

Finally, the multicultural model includes traditional immigration countries such as Australia, Canada, and the US where immigration was essential for building the country. In these countries, permanent immigration is encouraged providing secure residence status and political rights. In this regard, the multicultural model can be considered similar to the assimilation model. However, beyond political integration, multicultural countries encourage and support cultural pluralism, which is fundamentally different from cultural assimilation emphasized in the republican model. Interestingly, Castles and Miller include Sweden in the multicultural model. Although Sweden has a very different historical background of immigration compared to the classical immigration countries, it shares the essence of the multicultural model by supporting immigrants in developing their own cultural identities as well as granting civil rights and secure permanent residence status to immigrants. Immigration policy in Sweden is closely related to its social democratic politics oriented toward increasing social equity (Vermeulen 1997).

As the authors themselves emphasize, the typology has some limitations. It does not address important differences within countries in the same broad category. It also neglects substantial similarities between countries grouped into different categories and historical changes in immigration policies within a country (Vermeulen 1997). Despite the limitations, however, the classification seems to be useful for comparative analyses linking immigration policies and the overall social, economic, and cultural situations of immigrants.
CLASSIFYING COUNTRIES BY THEIR IMMIGRATION POLICIES

There is relatively less disagreement on separating traditional immigration countries – Australia, Canada, New Zealand, and the US – from other European countries in terms of immigration policies. Although the US may be further distinguished from the other three countries, in general these countries have provided favorable environments for immigrants to become integrated into a society. In particular, immigration policies based on labor market criteria have led to the relatively high performance of immigrants in the labor markets of the traditional immigration countries.

In this regard, we distinguish social democratic countries such as Denmark, Norway, and Sweden from the traditional immigration countries. As Castles and Miller (1993) pointed out, both groups of countries can be classified into the multicultural model. However, compared to a high share of skilled immigrants reflecting immigration policies adopted in the traditional immigration countries, asylum seekers and refugees are a considerably high proportion of all immigrants in the social democratic countries. Therefore, even if both types of countries are similarly open to immigrants, they may have different issues to deal with because of the different compositions of the immigrant populations. In addition, the existence of social democratic politics should be appreciated given their explicit goals of reducing inequalities across various dimensions of society.

Our final group of countries consists of those mostly located in Continental Europe, including Austria, Belgium, Germany, Luxembourg, and Switzerland, which are consistent with the exclusionary model of Castles and Miller (1993). Traditionally, as ‘guest worker countries,’ these countries have been restrictive in allowing immigration for permanent settlements.
Problematic are France and the UK for classification. Although Castles and Miller’s typology classifies the two countries as well as the Netherlands into the republic model, they are quite heterogeneous in terms of immigration history and policies. In addition, some studies suggest putting the UK into the multicultural model in that the level of tolerance for controversial minority demands, represented by the existence of anti-discrimination laws, is considerable in the UK (See Vermeulen 1997). Considering the practical and analytical difficulty in establishing a separate category for only the two countries, we a bit arbitrarily include the UK into the same category as the traditional immigration countries, while France is grouped with the social democratic countries. It may not to be too unreasonable to treat the UK in this way given its similarities to the multicultural model. For France, its closeness to the social democratic politics was taken into account.

Thus, the following three groups of countries are compared in this study;

*Traditional Immigration Countries*: Australia, Canada, New Zealand, the UK, the US

*Social Democratic Countries*: Denmark, France, Norway, Sweden

*Continental-European Countries*: Austria, Belgium, Germany, Luxembourg, Switzerland

Table 1 presents some statistics showing the composition and labor market integration of immigrants for 14 countries grouped into the three categories. The first column of the table indicates the average percentage of foreign or foreign-born population for the years 1996-2000. Note that the traditional immigrant countries (Australia, Canada, New Zealand, and the US) produce immigration data based on immigrants’ place of birth (“foreign-born”), while other European countries produce data on the basis of nationality (“foreigners”). Column (1) shows that in general the share of
foreign or foreign-born is relatively high in the traditional immigrant countries, while social democratic countries have lower shares of foreigners. In particular, the foreign-born population constitutes about 20 percent of the total population in Australia, Canada, and New Zealand.

The inflows of asylum seekers as percentages of the total foreign population in 2001 are presented in Column (2). In the four traditional immigrant countries, there were less than one new asylum seeker per hundred of the foreign-born population in 2001. As described earlier, this is in contrast to the substantially higher proportion of asylum seekers in social democratic countries. The difference in the extent to which countries receive asylum seekers was a main factor in distinguishing the two groups of countries, despite the fact that both the traditional immigrant countries and social democratic countries share the features of the multicultural model as depicted by Castles and Miller (1993). The inflows of asylum seekers in 2001 were relatively high in Austria and the UK as well.

Column (3) shows the naturalization rate expressed as the 5-year (1996-2000) average of the number of naturalized persons per hundred foreigners at the beginning of the year. The relative difficulty for foreigners to acquire the citizenship of a host country may reflect the overall level of the economic and social integration of immigrants in the receiving country (OECD 2003a). The naturalization rate is in general higher in social democratic countries, particularly compared to Austria, Luxembourg, and Switzerland classified as countries of the exclusionary model. Australia and the UK also show a relatively low naturalization rate.
As an indicator of the labor market integration of immigrants, Column (4) presents the unemployment rates of male foreigners relative to those of male natives in 2000-2001. In the traditional immigrant countries, foreign-born males are less likely to be unemployed than their native counterparts. On the contrary, foreigners in the Continental-European and social democratic countries, particularly in Belgium, Switzerland, Denmark and Sweden, have a higher likelihood of unemployment than natives. The distinctively low ratio of foreign to native unemployment rates in the traditional immigrant countries reflects their immigration policies on the basis of the labor market demands of the country, which draw relatively high-skilled workers. The higher proportion of asylum seekers and refugees among immigrant inflows in other European countries may in part explain the relative disadvantages of immigrants in the labor markets.

Finally, to indicate the overall attitude toward immigrants, we first present in Column (5) the percentage of people who mentioned that they would not like to have ‘immigrants/foreign workers’ as their neighbors, calculated from the pooled data of World Values Surveys 1981-9184, 1990-1993, and 1995-1997 (Inglehart et al. 2000). In Column (6), we show the percentage of people who agreed that ‘when jobs are scarce, employers should give priority to nationals over immigrants’ in the same surveys. Note that these measures are very coarse and here we do not establish any explicit relationship between immigration polices and attitudes toward immigrants. However, as many previous studies have shown (e.g., Bauer, Lofstrom, and Zimmermann 2000), there is evidence of significant variation in the attitudes toward immigrants across countries, depending on immigrant policies adopted in the country. For instance, the study of Bauer,
Lofstrom, and Zimmermann (2000) shows that the natives in Canada and New Zealand, which emphasize economic characteristics of immigrants in the selection process, tend to have more favorable attitudes about immigrants than do natives in other countries.

In Column (5) and (6), we observe a similar pattern. Australians, Canadians, and Americans are less likely to refuse immigrants as their neighbors and less likely to agree that employers should give priority to natives over immigrants. People in social democratic countries also tend to have favorable attitudes toward immigrants. In particular, Sweden shows the most positive attitudes toward immigrants. The finding is in the same line with Castles and Miller (1993) who classified Sweden as the multicultural model with the traditional immigrant countries in that these countries encourage cultural differences of immigrants.

In sum, the statistics presented in Table 1 seem to be fairly consistent with our classification of the country’s immigration policies. The traditional immigrant countries have relatively large shares of foreign-born population. Their preference for labor market criteria in choosing immigrants has led to a relatively favorable economic position of immigrants, which is associated with the overall positive attitudes toward immigrants. Social democratic countries also show favorable attitudes toward immigrants and the naturalization rates are relatively high. However, the larger shares of asylum seekers and refugees, and the resulting lower economic position of immigrants distinguish those countries from the traditional immigrant countries. Finally, the Continental-European countries, described as the exclusionary model by Castles and Miller, show the most unfavorable environments for immigrants.
HYPOTHESES

The examination of immigration policies across the three groups of countries leads us to the following hypotheses:

H1. *Gross gaps* in reading literacy: We expect relatively smaller gross gaps in reading literacy between native and immigrant children in the traditional immigrant countries than in the Continental-European and social democratic countries. The socioeconomic difference between native and immigrant families should be smaller in the traditional immigrant countries where immigration policy has selected immigrants based on skills needed in labor markets. Despite the overall high level of openness to immigrants, the large share of asylum seekers and refugees, who are more likely to have lower socioeconomic status, may be associated with significant gross gaps between native and immigrant children in social democratic countries.

H2. *Net gaps* in reading literacy – the traditional immigrant countries vs. social democratic countries: Controlling for the SES of individual students will significantly reduce the educational gaps between native and immigrant children in social democratic countries, while the extent to which SES accounts for the educational gap will be less substantial in the traditional immigrant countries given the relatively favorable economic conditions of immigrants. Therefore, the difference in the native-immigrant educational gap between the traditional immigrant countries and social democratic countries will become significantly smaller, when socioeconomic status is accounted for. It is the
different economic characteristics of immigrant population that lead to the significant difference in gross effect between the two groups of countries.

H3. Net gaps in reading literacy – the traditional immigrant countries vs. Continental-European countries: Controlling for the socioeconomic status of individual students will reduce substantially the educational gaps between native and immigrant children in the Continental-European countries. But the native-immigrant educational gap will remain significant even after SES is taken into account because of the unfavorable policies toward immigrants in those countries. Therefore, the difference in the extent of the educational disadvantages of immigrant children between the traditional immigrant countries and the Continental-European countries will remain significant.

DATA

The data for this study come from the Program for International Student Assessment (PISA) dataset. PISA was initially conducted in 2000 in 32 countries (28 OECD and 4 non-OECD countries). The primary focus of PISA in 2000 was to assess reading literacy of young people at age 15, though mathematical literacy and scientific literacy were also tested. The next collections, scheduled in 2003 and 2006, will shift their focus to mathematical and scientific literacy, respectively (OECD 2001). The desired population of PISA is 15-year-olds enrolled in education, regardless of the grade or type of institution in which they are enrolled. Both students in full-time and part-time education were targeted. Note that most previous international assessments such as TIMSS (Trends in International Mathematics and Science Study) or PIRLS (Progress in
International Reading Literacy Study) sampled students on the basis of the grade level instead of the age.

The two-stage stratified sampling design was used to select PISA samples. At the first stage, individual schools in which 15-year-old students were enrolled were selected systematically with probabilities proportionate to size, the size being a function of the estimated number of eligible (15-year-old) students enrolled. In the next step, students within sampled schools were selected with equal probability from a list of 15-year-old students in each selected school. PISA achieved an overall high quality of coverage of the national desired population.³

From the 32 countries, we select the following 14 OECD countries that have substantial proportions of immigrant children (at least about 5 percent): Australia, Austria, Belgium, Canada, Denmark, France, Germany, Luxembourg, New Zealand, Norway, Sweden, Switzerland, the United Kingdom, and the United States.⁴ Among the total respondents of 97,806 across the 14 countries, 91,226 are finally included in the study after respondents with missing information on the dependent variables are excluded.

MEASURES

Reading literacy

The main outcome variable of this study is reading literacy, given that it was the primary focus of PISA 2000. Reading literacy is defined in PISA as “the ability to understand, use, and reflect on written texts in order to achieve one’s goals, to develop one’s knowledge and potential, and to participate effectively in society (OECD 2001: 21).” As indicated by the definition, reading literacy measured in PISA is a broader
concept than the notion of reading literacy as ‘decoding written material and literal comprehension’ (OECD 2003b: 25). Reading literacy was measured in a single composite scale having an average score of 500 and a standard deviation of 100 across students of the OECD countries participating in PISA. Instead of a fixed value for the reading literacy scale, PISA provides five plausible values for each student, which should be used simultaneously to obtain the estimates of population parameters.

Immigrant Status

In PISA, students were asked if they, their mother, and their father, respectively, were born in the country where they were tested or in another country. Following PISA’s instruction (see OECD 2001: 220-221), we distinguished three groups of students from the three items of country of birth: native, second-generation, and non-native students. Native students refer to those who were born in the country of the test with at least one parent born in that country. Second-generation students are those born in the country of test with both parents born in another country. Finally, students are classified as first generation or non-native students when they were born in another country and at least one parent was born in another country. We report the proportion of each type of students separately but for the multivariate analysis we combine first-generation and second-generation students into one category of immigrant children.

Family Socioeconomic Status (SES)

In PISA, family SES is measured by a composite variable created on the basis of a factor analysis of the following five variables: 1) occupation measured by the
International Socio-Economic Index of Occupational Status (ISEI) (Ganzeboom et al. 1992); 2) parental education; 3) the index of family wealth indicating material items possessed; 4) the index of home educational resources (a dictionary, a quite place to study, a desk for study, textbooks and calculators); and 5) the index of home possessions of “classical” culture (classical literature, books of poetry and works of art). This SES measure, thus, reflects an overall level of family’s economic, social, and cultural status. The variable is standardized to have a mean of 0 and a standard deviation of 1 across students in OECD countries participating in PISA 2000.

Control Variables: Individual Demographic Characteristics

The results from various international or local assessments of reading literacy consistently show gender differences in the subject favoring female students (Mullis et al. 2003). As previously discussed, PISA targeted student populations of the same age of 15 instead of the same grade as did other comparative international assessments like TIMSS or PIRLS. Depending on the national educational system, therefore, there can be a variation in the grades among PISA students aged 15, which makes it necessary to control for the grade. The grade is included in the model as a continuous variable. Students’ reports on the number of siblings older than themselves, younger than themselves, or the same age are combined to yield the total number of siblings students have.

The four types of family structure are distinguished on the basis of students’ reports on who usually lives at home with them. Students are classified to live in a single-parent family if he or she reported living with only one of the following: mother, other
female guardian (e.g., stepmother or foster mother), father, and other male guardian. In an intact family, a student lives with a mother and a father. Mixed family is defined as living with a mother and a male guardian, a father and a female guardian, or two guardians. All other response combinations are classified as others.

Finally, PISA students were asked to indicate whether the language they speak at home most of the time is the language in which they were tested, another official national language, another national dialect, or another (foreign) language. Consistent with the classification used in the PISA report (OECD 2001), we distinguish between students who speak another (foreign) language at home most of the time from other students who speak a language tested, official national language, or another national dialect.

**METHODS**

HLM Analysis Using 14 Countries

In this study we use two different methods to assess the extent to which the gross and net effects of being immigrant children on their reading literacy vary across countries. First, we apply a hierarchical linear modeling (HLM) technique to the pooled data across the 14 countries included in the study (Bryk and Raudenbush 1992). The two-level HLM is estimated with student as the first-level unit and country as the second-level unit. In the student-level equation, the reading literacy score for student $i$ in country $j$ is predicted as follows:

$$(\text{Reading literacy})_{ij} = \beta_{0j} + \beta_{1j}(\text{Immigrant})_{ij} + \sum_{k=2}^{k} \beta_{kj} X_{kij} + r_{ij}$$

Note that we don’t use any centering for the variable of immigrant status, while all other variables at student level are centered around respective grand means. Thus, the
intercept, $\beta_{0j}$, represents mean reading literacy of native students in country $j$ adjusted for differences among countries in other student characteristics included in the model. $\beta_{1j}$ is the average achievement gap in country $j$ between native and immigrant children (a dummy variable of immigrant children contrasted to native children) and $\epsilon_{ij}$ is the student-specific error. The effects of other control variables including family socioeconomic status and student’s demographic characteristics are represented through $\beta_{2j}$ to $\beta_{kj}$.

In HLM, the coefficients in the first-level equation serve as dependent variables in the second-level equation. Each country’s mean reading literacy ($\beta_{0j}$) and the effect of being an immigrant child ($\beta_{1j}$) within a country derived from the student-level equation are modeled to vary across the three groups of countries by their immigration policies using the category of the traditional immigration countries as a reference.

$$
\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Social Democratic})_j + \gamma_{02}(\text{Continental})_j + u_{0j}
$$

$$
\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{Social Democratic})_j + \gamma_{12}(\text{Continental})_j + u_{1j}
$$

In the country-level equation, the overall difference in the native-immigrant gap between the group of the traditional immigration countries and that of social democratic is represented by $\gamma_{11}$. Similarly, $\gamma_{12}$ indicates the difference between the group of the traditional immigration countries and that of the Continental European countries in the extent of the effect associated with immigrant status. Therefore, the HLM approach is useful for testing our hypotheses on variation in educational gaps between native and immigrant children across the three groups of countries.
Five consecutive models are estimated depending on the variables controlled in the student level equation. Model 1 only includes a dummy variable of immigrant status without any controls in the student-level equation to obtain the gross effect of immigrant status. Then, the effect of immigrant status at the student level is predicted by the two dummy variables at the country-level indicating the group of social democratic countries and that of the Continental-European countries. Model 2 adds the variable of grade into the student-level equation. As will be seen later, there are interesting differences across the three groups of countries in the extent to which grade explains educational disadvantages of immigrant children. In Model 3, gender, the number of sibling, and family structure are additionally included. Model 4 adds family SES into the model to assess to what extent differences in SES account for the educational gap between native and immigrant children. In Model 5, we take into account different languages student speak at home. Since our main outcome is reading literacy, language minority status seems to be particularly relevance for explaining the performance gap between native and immigrant children.

**OLS Analysis for Each Country**

After estimating HLM to compare the overall differences in the effect of immigrant status across the three groups of countries, we conduct additional OLS regression analyses for each of the 14 countries separately. The additional analysis may help highlight the possible variation in the effect of immigrant status within each group of countries (e.g., differences between Australia and the US within the category of the traditional immigration countries), which the HLM analysis might not capture properly.
The same set of five consecutive models except for Model 1, described for the HLM analysis, is estimated for each country.

RESULTS

Percentage of Immigrant Children

Figure 1 shows the percentage of second-generation (born in the country of test with both parents born in another country) and non-native students (born in another country with at least one parent born in another country). In general, the share of immigrant children (both second-generation and non-native students) is relatively high in the traditional immigrant countries, while social democratic countries show relatively low percentages of immigrant children. Luxembourg, Switzerland, and Germany among the Continental-European countries also show high shares of immigrant children among total 15-year-olds.

In terms of the relative proportion between second-generation and non-native students, some countries are distinctive. For example, in France and Belgium, there are relatively more second-generation students than non-native students, while opposite is the case for Germany, New Zealand, and Norway. The systematic pattern across the three groups of countries is not evidently observed.

HLM Analysis

The results of the HLM analysis are presented in Table 2. In Model 1, which has only the variable of immigrant status at the student level, we assess the extent to which the gross difference in reading literacy between native and immigrant children varies
across the three groups of countries. Since the group of the traditional immigrant
countries is a reference category, the effects of the two dummy variables in the country-
level equation represent the differences in the native-immigrant gap between the group of
the traditional immigrant countries and social democratic countries and between the
reference group of countries and the Continental-European countries. In other words, the
coefficient (-23.3) of the immigrant status indicates that on average immigrant children in
a traditional immigrant country score 23 point lower than do native students, when no
other variables are taken into account. The performance gap in reading literacy between
native and immigrant children is 55 point in a typical social democratic country (-23.3-
31.9 = -55.2) and 85 point in a typical Continental-European country (-23.3-61.5 = -84.8),
favoring native students.

In Model 1, the intercept ($\gamma_{00}$) indicates the mean score of native students in the
group of the traditional immigrant countries, while the effects associated with the two
variables in the country-level equation present the differences in the mean scores of the
native students between the traditional immigrant and social democratic countries and
between the traditional immigrant and the Continental-European countries. As mentioned
earlier, we use the original metric for the immigrant-status variable. Thus, the mean score
of the native students in the traditional immigrant countries is 531 points, while that is
513 (531-18) points for social democratic and 508 (531-23) points for the Continental-
European countries.

Model 2 includes the variable of grade in the student-level equation and Model 3
additionally control for gender, the number of sibling, and family structure. Family SES
is introduced in Model 4 and language minority status (whether students speak foreign
languages at home) is added in Model 5. Our focus is how the differences in the effect of immigrant status between the group of the traditional immigrant countries and the other two groups of countries change as additional student-level variables are controlled across those five different models. To help interpret the results, Figure 2 presents the reading score gap between native and immigrant students across the consecutive five models for each group of countries derived from the coefficients of the two country-classification variables in the country-level equation. Remember that the coefficient of the student-level variable of immigrant status indicates the average performance gap in reading literacy between native and immigrant status in the group of the traditional immigrant countries.

As we already examined, the performance gap by immigrant status is significantly larger in social democratic and the Continental-European countries that in the traditional immigrant countries (see the darkest bar). The next bar represents the native-immigrant gap when grade is taken into account. In the group of the traditional immigrant countries and social democratic countries, grade does not explain significantly the educational disadvantage of immigrant children. Contrastingly, in the Continental-European countries there is substantial reduction in the educational gap between native and immigrant children when grade is controlled. This seems to indicate that the features of the educational systems in the Continental-European countries may increase educational disadvantages of immigrant children by maintaining greater likelihood of retention among immigrant children.

Next, the white bar indicates the performance gap when gender and other demographic characteristics (the number of sibling and family structure) are accounted by. There is no significant reduction in the gap compared to the second bar, which
suggest that the differences in demographic characteristics are not relevant for explaining the educational disadvantages of immigrant children in all the three groups of countries.

In the next bar, we see that SES differences between native and immigrant families explain the substantial proportion of the educational disadvantages of immigrant children in social democratic countries and the Continental-European countries, whereas SES explains very little in the group of the traditional immigrant countries. The finding is consistent with our expectation from the discussion on immigration policies. The traditional immigration countries have used immigrants’ labor market characteristics as the major criterion. Therefore, immigrants in those countries tend to be high-skilled workers and thus their economic situation may be comparable to that of natives. On the other hand, the relatively large share of asylum seekers and refugees in social democratic countries, and the exclusionary policies toward immigrants in the Continental-European countries led us to expect substantial differences in SES between native and immigrant families. However, note that when SES is taken into account, the difference between the group of traditional immigrant countries and social democratic countries in the extent of the native-immigrant performance gap becomes non-significant.

Finally, in the last bar, controlling for language minority status significantly reduces the educational gap between native and immigrant children in all the three groups of countries. In fact, immigrant children in the traditional immigrant countries do not show significantly lower scores any longer than native students. The difference between the traditional immigrant countries and social democratic countries is not statistically significant, which means that the educational gap between native and immigrant students in social democratic countries is negligible as well. However, there is still substantial
difference in educational performance between native and immigrant children in the Continental-European countries and the gap is significantly larger than the gap in the traditional immigrant and social democratic countries.

Although the intercept is not our main focus in this study, it is interesting to see how the pattern of the differences among the three groups of countries changes depending on the variables controlled. In Model 1, the native students in the group of the traditional immigrant countries show higher mean scores than the native students in the group of social democratic or the Continental-European countries. But when difference among countries in the grade is adjusted in Model 2 by centering the variable of grade around the grand mean, the native students in the traditional immigrant countries in fact seem to score lower than do the native students in the other two groups of countries, though the differences are statistically significant. This change indicates that in general 15-old students in the traditional immigrant countries are in higher grades than students of the same age in other countries, reflecting differences in the educational systems. In the final model (Model 5), the mean score of the native students in the traditional immigrant countries, adjusted for differences in all student-level variables included, is significantly lower than the mean scores in the other two groups of countries.

**OLS Analysis**

In addition to the HLM analysis, we estimated the above five models of OLS regression for each country, separately. In the HLM analysis above, we already observed that adding demographic characteristics (gender, the number of sibling, and family structure) to the model did not substantially change the native-immigrant educational gap.
Thus, in Figure 3 we present the reading literacy gaps between native and immigrant children across the four models: 1) no control; 2) controlling for grade; 3) controlling for grade, demographic characteristics, and SES; and 4) controlling for grade, demographic characteristics, SES, and language minority status.

The findings in Figure 3 are overall consistent with the conclusions drawn from the HLM analysis. First, the effect of grade is much stronger in the Continental-European countries, while it is minimal in the other two groups of countries (France is exceptional). Second, SES explains relatively little for the educational gap between native and immigrant children in the traditional immigrant countries, whereas the effect of SES in the other two groups of countries is considerable. However, within the traditional immigrant countries, the UK and the US are distinctive from the other three countries of Australia, Canada, and New Zealand. In the latter, taking into account SES even seem to increase the reading literacy gap between native and immigrant children, which indicates relatively favorable socioeconomic conditions of immigrant families in these countries. Controlling for SES, however, in the UK and US significantly reduces the native-immigrant gap, resulting in no significant difference in performance between native and immigrant students in the U.S.

Finally, the comparison between the third and fourth bars in the figure shows that language minority status plays an important role for the educational gap between native and immigrant students in all the three groups of countries. After taking into account the fact that immigrant children are more likely to speak foreign languages at home, the reading literacy gap between native and immigrant children becomes negligible in several countries, particularly in all of the traditional immigrant countries except for Canada and
in Norway and to a lesser extent Sweden among social democratic countries. Among the Continental-European countries, Germany shows significant reduction in the native-immigrant gap when language minority status is accounted for, which is no longer statistically significant.

CONCLUSION

The results of the HLM and OLS analyses in general support our hypotheses. The educational gap between native and immigrant children varies across the three groups of countries with different immigration policies. The gap is much smaller in the traditional immigrant countries. Although the gross native-immigrant gap in social democratic countries is substantial, it is significantly reduced when family SES and language minority status is controlled. The difference in the extent of educational disadvantages associated with immigrant status between the traditional immigrant and social democratic countries become negligible with family SES and language minority status controlled. Both countries have implemented immigration policies favorable for immigrant to be integrated into the country. Only difference between the two groups of countries is different characteristics of immigrants associated with immigration policies.

One the other hand, the educational disadvantage of immigrants in the Continental-European countries remains substantial even when family SES and language minority status is taken into account. Under the features of their immigration policies described as the exclusionary model (Castles and Miller 1993), immigrants there have to face more severe social, economic, and cultural discrimination, which makes their settlement more difficult.
Although we have focused on the linkage between immigration policy and the educational gap between native and immigrant children, our results suggest that we also need to examine more specifically the roles of the educational systems that contribute to increasing educational achievement of immigrant children. In our study, grade has been found to have a significant impact on the native-immigrant gap in the Continental-European countries, while the effect of grade is minimal in the traditional immigrant and social democratic countries. That is, in the educational systems in the Continental-European countries immigrant children are more likely to be located in the lower grades than their native counterparts in the same age and this explains a substantial proportion of immigrant children’s lower achievement. To understand how this exactly happens, we need to look at more specifically how these educational systems work.

Not only grade but also language minority status has been found to be significantly associated with the educational gap between native and immigrant children. Interestingly, in all the three groups of countries, language minority status explains substantial proportions of the native-immigrant gap. This indicates that countries should pay special attention to language programs that help immigrant students who speak foreign languages at home.
ENDNOTES

1 For example, Vermeulen (1997) points out that Castles and Miller neglected the similarities between the German model of differential exclusion and the French republic model. He also shows how immigration policies in Sweden have changed from the assimilation model to multicultural model.

2 See OECD (2003: Statistical Annex) for more detailed information on differences in the definition of immigrant population used across countries.

3 See OECD 2001a Annex A3 for detailed introduction to PISA sampling procedures as well as the target population coverage.

4 Although the Netherlands have the substantial proportion of immigrant children in the total sample, OECD suggests that the result of the Netherlands should be read with caution because of its too low response rate (the initial student response rate was only 27 percent). With this reason, we excluded the Netherlands from the analysis.

5 In addition to a combined scale for overall reading literacy, three separate subscales for the three domains of reading literacy – retrieving information, interpreting, and reflecting and evaluating – are also available in the PISA dataset. In this analysis, we use only the combined scale.

6 The category of native students includes the very small numbers of students who were born in another country but whose parents were both born in the country of test.

7 The wording of living arrangement items did not specify whether a mother or a father is a biological parent. However, a stepparent was specifically provided as an example of a guardian. Therefore, it seems to be reasonable to assume that a mother or a father indicates a biological parent.

8 We included respondents with missing information on language minority status. A dummy variable was created for those cases and included in the models, although not reported in the tables.
REFERENCES


Figure 1. Percentage of second-generation and non-native students
Figure 2. The reading literacy gap between native and immigrant children from the HLM analysis.
Figure 3. The reading literacy gap between native and immigrant students for each country: OLS regression

[Bar chart showing the reading literacy gap between native and immigrant students for each country: OLS regression.]
Table 1. Some Indicators regarding Immigration

<table>
<thead>
<tr>
<th>Country</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
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<tbody>
<tr>
<td>Australia</td>
<td>23.4</td>
<td>0.6</td>
<td>2.20</td>
<td>0.99</td>
<td>5.3</td>
<td>45.1</td>
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<tr>
<td>Canada</td>
<td>17.4</td>
<td>0.9</td>
<td>3.13</td>
<td>0.96</td>
<td>5.7</td>
<td>52.5</td>
</tr>
<tr>
<td>New Zealand</td>
<td>19.5</td>
<td>0.5</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>U.S.</td>
<td>9.9</td>
<td>0.3</td>
<td>2.89</td>
<td>0.90</td>
<td>9.7</td>
<td>56.2</td>
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<tr>
<td>U.K.</td>
<td>3.7</td>
<td>3.9</td>
<td>2.49</td>
<td>1.78</td>
<td>11.9</td>
<td>50.9</td>
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<tr>
<td>Austria</td>
<td>9.1</td>
<td>4.0</td>
<td>2.70</td>
<td>2.15</td>
<td>20.2</td>
<td>77.3</td>
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<tr>
<td>Belgium</td>
<td>8.8</td>
<td>2.8</td>
<td>3.99</td>
<td>3.09</td>
<td>17.7</td>
<td>65.3</td>
</tr>
<tr>
<td>Luxembourg</td>
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<td>0.4</td>
<td>0.42</td>
<td>2.08</td>
<td>N.A.</td>
<td>N.A.</td>
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<td>Switzerland</td>
<td>19.1</td>
<td>1.5</td>
<td>1.61</td>
<td>3.31</td>
<td>5.8</td>
<td>57.0</td>
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<td>Germany</td>
<td>8.9</td>
<td>1.2</td>
<td>2.90</td>
<td>1.86</td>
<td>14.1</td>
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<td>France</td>
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<td>1.4</td>
<td>4.18</td>
<td>2.41</td>
<td>9.2</td>
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</tr>
<tr>
<td>Denmark</td>
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<td>Norway</td>
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<td>Sweden</td>
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<td>7.31</td>
<td>2.93</td>
<td>5.8</td>
<td>29.2</td>
</tr>
</tbody>
</table>

*Note:*
1. Percentage of foreign or foreign-born population, 1996-2000 average
2. New asylum seekers per 100 foreigners at the beginning of the year 2001
3. Naturalization rates: the number of naturalized persons per 100 foreigners at the beginning of the year, 1996-2000 average
4. Ratio of unemployment rates between nationals and foreigners: Men, 2000-2001 average
5. Percentage of people who mentioned they would not like to have 'immigrants/foreign workers' as their neighbors: Average of 1981-84, 1990-93, and 1995-97 World Values Surveys
6. Percentage of people who agreed that 'when jobs are scarce, employers should give priority to nationals over immigrants. Average of 1981-84, 1990-93, and 1995-97 World Values Surveys

Source: OECD (2003), authors' own calculation from World Value Survey data
Table 2. The HLM Analysis of the Effects of Immigrant Status on Reading Literacy across 14 Countries

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student-Level Equation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>530.554 (6.141)***</td>
<td>502.870 (14.977)***</td>
<td>507.179 (13.650)***</td>
<td>510.281 (12.087)***</td>
<td>484.978 (12.146)***</td>
</tr>
<tr>
<td>Immigrant Status (ref.: Native)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>60.357 (6.133)***</td>
<td>55.544 (5.632)***</td>
<td>47.087 (4.892)***</td>
<td>46.423 (4.830)***</td>
<td></td>
</tr>
<tr>
<td>Gender (reference: Male)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>27.208 (0.608)***</td>
<td>27.936 (0.573)***</td>
<td>27.742 (0.570)***</td>
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<tr>
<td>Number of Siblings</td>
<td>-7.193 (0.262)***</td>
<td>-5.483 (0.248)***</td>
<td>-5.313 (0.247)***</td>
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<td></td>
</tr>
<tr>
<td>Family Structure (reference: Intact)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Single</td>
<td>-13.660 (0.890)***</td>
<td>-2.461 (0.842)***</td>
<td>-3.010 (0.833)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed</td>
<td>-14.119 (1.086)***</td>
<td>-8.410 (1.018)***</td>
<td>-9.001 (1.013)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>-41.202 (1.869)***</td>
<td>-34.032 (1.763)***</td>
<td>-33.310 (1.757)***</td>
<td></td>
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<tr>
<td>Family SES</td>
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<td>Home Educational Resources</td>
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<tr>
<td>Parent-Child Social Communication</td>
<td></td>
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<tr>
<td>Parent-Child Cultural Communication</td>
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<td></td>
</tr>
<tr>
<td><strong>Country-Level Equation</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Effect on Mean Score (ref.: the traditional immigrant countries)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social democratic countries</td>
<td>-17.575 (9.216)’</td>
<td>38.365 (22.408)</td>
<td>30.537 (20.437)</td>
<td>15.887 (18.096)</td>
<td>50.459 (16.468)’</td>
</tr>
<tr>
<td>Effect on Immigrant Children Slopes (ref.: the traditional immigrant countries)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Traditional Immigrant Countries - Australia, Canada, New Zealand, UK, US Social Democratic Countries - Denmark, France, Norway, Sweden Continental European Countries - Austria, Belgium, Germany, Luxembourg, Switzerland

*** p < .001 ** p < .01 * p < .05 ’ p < .10

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