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Immigrant Student Investigation in PISA 2006: A Call for a More Nuanced Examination[1,2]

Abstract

Reports using past PISA data have suggested that in many of the OECD countries, immigrant students are underperforming in comparison to their non-immigrant peers. With the rapidly increasing number of immigrant students throughout Europe, these disturbing findings have drawn much attention to how well various immigrant-receiving countries are addressing the needs of their immigrant student population. But how accurate are these findings? In this paper, we argue that, when analyzed at the aggregate, surface level, there are three possible pitfalls that may give researchers and policymakers an incomplete or biased picture of how immigrant students in various OECD countries are faring. These shortcomings stem from 1) how immigrant students are selected or categorized, 2) the test language proficiency level of the first-generation students, and 3) the way in which the first and second generation immigrant students are grouped. In this paper, these shortcomings are addressed and possible remedies are discussed.

Keywords

education, immigration, language, PISA

Untersuchungen zu Schülern mit Migrationshintergrund bei PISA 2006: Eine Aufforderung zu nuancierteren Analysen

Zusammenfassung

Die Berichterstattung auf Basis vorliegender Daten aus PISA weist aus, dass Schüler mit Migrationshintergrund in vielen der OECD-Mitgliedstaaten im Vergleich zu ihren Mitschülern ohne Migrationshintergrund schlechtere Testergebnisse erzielen. Angesichts der rasch wachsenden Zahl von Schülern mit Migrationshintergrund in Europa haben diese beunruhigenden Befunde viel Aufmerksamkeit auf die Frage gelenkt, wie gut es verschiedenen Aufnahmeländern für Migranten gelingt, die Bedürfnisse ihrer Schülerschaft mit Migrationshintergrund zu berücksichtigen. Aber

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wie akkurat sind diese Befunde? In diesem Aufsatz argumentieren wir, dass es bei Analysen auf Aggregatebene drei mögliche methodische Fallstricke gibt, die Forscher und Bildungspolitiker zu unvollständigen oder verzerrten Einschätzungen darüber führen können, wie gut Schüler mit Migrationshintergrund in den verschiedenen OECD-Staaten abschneiden. Diese Defizite ergeben sich 1) aus der Frage, wie Schüler mit Migrationshintergrund ausgewählt oder kategorisiert werden, 2) aus dem Niveau der Kompetenz in der Testsprache bei Migranten der Ersten Generation, und 3) durch die Art und Weise, wie Migranten der Ersten und der Zweiten Generation gruppiert werden. In diesem Aufsatz werden diese Unzulänglichkeiten und mögliche Lösungen für sie diskutiert.

Schlagworte
Erziehung, Bildung, Migration, Sprache, PISA

1.   Introduction

Reports using past PISA data have suggested that in many of the OECD countries, immigrant students are underperforming in comparison to their non-immigrant peers. In general, with the exception to few countries, such as Australia, Canada, and New Zealand, immigrant students have, on average, shown lower math, reading, and science scores at age 15 than their non-immigrant counterparts (OECD, 2006). According to the European Commission, students of immigrant backgrounds are, on average, one or two years behind their native-born peers (Eurydice, 2004). In addition, in some countries, such as Austria, Germany, and New Zealand, it has been cited that the second-generation immigrant students even underperform first-generation arrivals (OECD, 2006). With the rapidly increasing number of immigrant students throughout Europe, these disturbing findings have drawn much attention to how well various immigrant-receiving countries are addressing the needs of their immigrant student population (e.g., Entorf & Minoiu, 2005; Marks, 2005; Rangvid, 2007). But how accurate are some of these findings? Do these results really help scholars and policymakers compare across various OECD countries, or are there some weaknesses in the way in which immigrant student data are gathered and analyzed to make some countries appear more or less effective in their incorporation of their immigrant-student population? The purpose of this paper is to highlight some notable shortcomings in the way in which OECD has investigated the outcomes of immigrant students and to suggest possible remedies.

2.   Background Information

The Programme for International Student Assessment (PISA) is an internationally-standardized survey that is administered every three years to 15-year-olds in mathematics, science, and reading comprehension. The survey was implemented

in 43 countries in the 1st assessment in 2000, 41 countries in the 2nd assessment in 2003, and 56 countries in the 3rd assessment in 2006. For the 2009 study, 62 countries have signed up to participate. Tests are typically administered to 4500 to 10000 students in each country. Schools in each country are randomly selected by the international contractor for participation in PISA. At these schools, the survey is given to students who are between age 15 years 3 months and age 16 years 2 months at the time of the test, rather than to students in a specific year of school. This average age of 15 was chosen because at this age young people in most OECD countries are nearing the end of compulsory education. The survey also includes school and parent questionnaires.

As a large-scale international assessment, PISA test 15-year old students in three subjects – reading proficiency, mathematics, and science. Within these subject areas, the main goal is not to see how well they had mastered their school's specific curriculum, but to assess their ability to apply the knowledge and skills they have learned at school to real-life challenges (OECD, 2007). Although the three subjects are tested in each survey, each cycle has a different focus. In 2000, the focus was on reading comprehension; 2003 on mathematical literacy; and in 2006, the focus was on science literacy. The study is also cross-sectional in nature. The scores are standardized to an international mean of 500 and a standard deviation of 100.

Starting in 2003 and continuing in 2006, numerous papers were published interpreting the results of immigrant students in various immigrant-receiving countries (e.g., Levels & Dronkers, 2008; Marks, 2005; Park, 2007; Park & Sandefur, 2004; Rangvid, 2006; Schnepf, 2006). In general, these studies have concluded that immigrant students are struggling compared to their non-immigrant counterparts, with bulk of the gap being attributed to socio-economic difference between immigrant and their non-immigrant peers. This gap in achievement has been cited as quite large in many of the OECD countries (e.g., Austria, Belgium, Denmark, France, Germany, the Netherlands, and Switzerland) and small or nonexistent (or even reversed) in others (e.g., Australia, Canada, New Zealand, and Macao-China). Furthermore, within the immigrant student population, the second-generation outperformed the first generation in all but three countries – Austria, Germany, and New Zealand (OECD, 2006, 2007).

The question that we pose in this paper, however, is: How are we to interpret these results? Should we, as many have already done, conclude that countries like Canada and Australia are more effectively meeting the needs of their immigrant students whereas countries like Germany and Austria are floundering? Or is there something amiss that is perhaps misrepresenting the data to make some countries look better or worse in terms of how well or poorly they are incorporating their immigrant children into their school system?

In this paper, we argue that, when analyzed at the aggregate, surface level, there are three possible pitfalls that may give researchers and policymakers an incomplete or biased picture of how immigrant students in various OECD countries are faring. These shortcomings stem from 1) how immigrant students are select-

ed or categorized, 2) the varying percentage of first-generation immigrant students with very limited test language proficiency, and 3) the way in which the first and second generation immigrant students are grouped.

3. Immigrant Selection

How does PISA select or label various groups of students as "immigrants"? Do those immigrant students who are similar to the native population, in terms of language, culture, phenotype, and parental education level do better than their peers who are not (e.g., Irish students in England versus an Iraqi student in Sweden)? And how does the way in which PISA goes about categorizing these students as immigrants or "native," and the similarities/dissimilarities between the immigrant and majority population, affect the way in scholars assess how well or how poorly various countries are seen meeting the needs of their immigrant student population? In this section, we will examine the immigrant student data reported from Ireland, as one example, to highlight possible weaknesses in the way PISA may be assessing the academic wellbeing of immigrant students in some of the immigrant-receiving countries in their study.[3]

In PISA 2006, immigrant students represented roughly 9 % of all the students in the study. The percentages varied widely however, from as low as 2 % in Hungary to as high as 36 % in Luxembourg.[4]

Table 1: PISA 2006 Scores for Ireland and OECD

		Math	Reading	Science
Ireland	Native	503.5	520.4	510.5
	Immigrant	486.9	504.0	498.1
	Difference	**16.6**	**16.4**	**12.4**
OECD	Native	488.7	488.2	496.7
	Immigrant	458.7	454.5	456.3
	Difference	**30.0**	**33.6**	**40.4**

Source: OECD (2007).

For Ireland, the percentage of immigrant students in the PISA's sample was 9 %, a similar proportion as compared to the 8.2 % in the Irish pre-tertiary student population (Central Statistics Office Ireland, 2006). According to the PISA 2006 study, the immigrant student population in Ireland was performing fairly well relative to the OECD average. The difference was such that while the average gap between na-

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3   There is nothing particularly "special" or deviant about Irish situation, per se. It was simply chosen because it was one of the more clear examples to illustrate our point. Same applies to other countries chosen in the latter part of the paper.
4   Only weighted data was used for all the statistical analyses in this paper.

tive and immigrant in OECD countries ranged from 30.0 to 40.4 points, the gap in Ireland was between 12.4 and 16.6 points.

From this initial assessment, we might conclude that Ireland is doing well in its ability to incorporate its immigrant student population in its educational system. However, upon closer examination, we see that this may not necessarily be the case.

One key question to ask would be, along with controlling for socio-economic backgrounds, where are the immigrant students in Ireland coming from? When we examine the immigrant population, we see that for Ireland, immigrant students with Northern Ireland and Great Britain backgrounds[5] comprised approximately 48 % of the immigrant student population in the sample (see Table 2). Questions then arise as to how researchers should account for immigrant students from countries with same or similar language, culture, and phenotype as those of the host society? Could these immigrants from similar backgrounds as that of their host country members somehow paint the data in favor of the host countries' educational system in its ability to incorporate their immigrant student population?

Table 2: PISA 2006 Scores for Native and Immigrant Students in Ireland

	Math	Reading	Science
Native*	503.5	520.4	510.5
Immigrant: All*	486.9	504.0	498.1
Immigrant: NI and UK±	513.7	537.6	533.8
Immigrant: Other (52%)±	462.8	473.7	466.0

Source: *OECD (2007); ± Our own calculation.

From Table 2, we see that in the Irish study, children of immigrant parents from Northern Ireland and the UK have noticeably higher test scores (10 to 23 points) than their native Irish peers. Additionally, we see that those students not from Northern Ireland and the UK were roughly 40 to 47 points behind their native counterparts, an immigrant-native gap that is actually bigger than what we see in the OECD as a whole. And this gap remains even after we control for socio-economic status and gender.[6] But could it be that Ireland is just an anomaly? What other countries have a significant number of their immigrant students coming from similar linguistic and cultural backgrounds?

Our analysis shows that Ireland is not the only case with a significant portion of their immigrant students coming from backgrounds similar to the majority group. Australia, for example, has almost 33 % of their immigrant students in their sample coming from English-speaking countries/backgrounds, with the biggest two

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5 These students were either born in Northern Ireland or Great Britain (categorized as "first-generation immigrants") or were born in Ireland with parents born abroad, in either Northern Ireland or Great Britain (categorized as "second-generation immigrants").

6 This finding is even more unsettling when we factor in the fact that the parents of these non Northern Ireland and UK immigrant students had parents with *higher* levels of education than their Northern Ireland and UK counterparts.

groups having British and New Zealand backgrounds. Could this explain why in these two countries, there is little or no significant gap between their immigrant and non-immigrant students? [7]

Cases like Ireland and Australia PISA 2006 raise some important questions in regard to their findings on immigrant students in various OECD countries. Who is responsible for categorizing who is or is not an immigrant? What role does similar language, culture, phenotype, and parental education level play in assessing how well or how poorly various immigrant-receiving countries are incorporating their immigrant student population? Without taking these factors into account, can we practically and fairly assess how well countries like Ireland and Australia where a significant portion of the immigrant students in their study are from similar cultural, geographic, linguistic, and phenotypic backgrounds are faring in comparison to a country like Belgium where their two biggest immigrant groups are from such "un-Belgian" places like North Africa and Turkey?

4. Proportion of Students with Inadequate Test Language Proficiency

What language is the PISA testing their immigrant students? According to the PISA Standards:

> *The language of the PISA test administered to a student must be a language of instruction provided by the sampled school to that sampled student* (OECD, n.d., p. 6).

What about for many of the immigrant students, especially the newly-arrived first generation immigrant students, who may have insufficient mastery of their host society's language? How does PISA determine who is or is not proficient enough to adequately understand and answer the questions on their test?

Under PISA 2006 guidelines, the schools participating in the study are to exclude those with *insufficient* language proficiency from partaking in PISA. The guideline specifically states, "Students with insufficient language proficiency to take the PISA test in the test language are students who have received *less than one year* of instruction in the language of the test can be excluded" (OECD, n.d., p. 4; italics by author). Thus, according to PISA, immigrant students who have had a year or more of exposure to the host society's language are proficient enough in

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7   It also important to mention that Ireland and Australia are among the very few OECD countries (along with Canada and New Zealand) where the immigrant students have parents with higher educational levels than their native counterparts (OECD, 2006, 2007). In addition, in countries with higher than average gap between immigrant and non-immigrant students, there was also a higher than average gap in terms of the mean educational level between the immigrant and native parents, e.g., Austria, Germany, and Belgium (OECD, 2006).

their host language to participate in their survey. But is this one-year cut-off point based on solid scholarly data on second language acquisition?

Studies in second language acquisition since the early 1980s have shown that immigrant students can quickly acquire considerable conversational fluency in the host language of the society when they are adequately exposed to it in their environment, e.g., home, neighborhood, and school. However, despite this rapid growth in conversational fluency, the overall consensus in literature is that it generally takes a *minimum* of about five years (and often much longer) for immigrant students to catch up to the native speakers in academic aspects of the language, as often measured on standardized tests (Collier, 1987; Cummins, 2000; Cummins & Nakajima, 1987; Hakuta, Butler, & Witt, 2000; Klesmer, 1984; Spolsky & Shohamy, 1999). One study even suggested that arrivals at age 12-15 experienced the greatest difficulty and were projected to require as much as 6 to 8 years reach grade-level proficiency, even after being taught entirely in their second language (Collier, 1987).

Table 3: Age of Arrival of First-Generation Immigrant Students in PISA 2006 (in percent per age group)

Country	0 to1	2 to 5	6 to 10	11 to 15
Australia	13.6	26.2	27.1	33.0
Austria	29.6	34.8	17.3	18.4
Belgium	21.4	26.3	25.3	27.0
Canada	15.0	25.9	25.9	33.2
Denmark	22.6	40.2	26.3	10.9
France	31.7	20.3	26.2	21.8
Germany	16.6	41.2	27.0	15.2
Greece	24.4	43.6	25.0	6.9
Iceland	23.1	35.6	30.8	10.5
Ireland	19.8	28.4	29.3	22.5
Italy	18.8	20.9	28.1	32.1
Luxembourg	27.2	32.2	24.4	16.3
Mexico	46.8	28.9	15.5	8.8
Netherlands	22.3	36.7	33.5	7.6
New Zealand	10.6	24.1	31.4	33.9
Norway	23.1	34.7	23.1	19.0
Portugal	17.7	23.2	30.5	28.6
Spain	10.8	14.8	26.9	47.5
Sweden	32.6	36.5	13.1	17.7
Switzerland	28.8	29.5	24.4	17.3
United Kingdom	16.6	29.6	25.2	28.7
United States	19.1	30.5	30.2	20.2
OECD Average	**21.0**	**28.4**	**25.7**	**25.0**

Note. Countries with the first-generation student sample size of less than 200 have been excluded.
Source: OECD (2007).

Why such discrepancy? Researchers in second language acquisition suggest that considerably less knowledge of language itself is usually required to function appropriately in interpersonal communicative situations than is required in academic situations. In a face-to-face conversation, the social expectations of the learner and sensitivity to contextual and interpersonal cues (e.g., eye contact, facial expression, intonation, hand gestures, and etc) greatly facilitate communication of meaning. These social cues, however, are largely absent in most academic situations that depend on knowledge of the language itself for successful task completion, such as in standardized testing format.

Unfortunately, according to the PISA 2006 study, among the first-generation immigrant students, those who had immigrated between the ages of 11 to 15 were, on average, as high as 25 % for all OECD countries. Some countries like Spain, Australia, Canada, and New Zealand had 33 % to 48 % who fit into this category whereas countries like Greece and the Netherlands have less than 8 % (see Table 3). Consequently, without carefully screening out these newly-arrived immigrant children, either prior to the actual test or afterwards via controlled statistical analysis, the test gap between the immigrant and native students may be inadvertently affected merely by the difference in the proportion of these students in the sample population of the various countries under examination.

To assess if this indeed is possibly the case, we examined the role of language is by comparing the test scores of those who have immigrated at age 11 or older with those who immigrated age 1 and younger. Across all OCED countries (except for Canada), those immigrant students who had immigrated between the ages of 0 and 1 had higher test scores than their counterparts who immigrated between the ages of 11 and 15.

Table 5: Age of Arrival and Test Scores for First Generation Immigrant Students in PISA 2006

	Math		Reading		Science	
Country	0 to 1	11 to 15	0 to 1	11 to 15	0 to 1	11 to 15
Belgium	498.3	423.3	483.0	417.7	494.9	425.0
Denmark	502.6	452.9	502.8	432.9	486.6	442.9
Greece	461.0	379.1	459.7	405.8	482.6	385.7
Sweden	463.3	412.8	476.0	394.6	462.9	402.4
OECD	477.8	467.8	469.0	452.9	474.1	463.6

Source: OECD (2007).

As we can see from Table 5, while the difference in test scores between the earlier and latter-arriving immigrant students are not as large as a whole (OECD average), there were a few cases, namely Belgium, Denmark, Greece, and Sweden, where the average differences ranged from 44 to 97 points. In addition, further analysis shows that, except in a few cases, this effect of age of arrival on test scores

of first-generation immigrant students was evident in these select countries, even after controlling for parental education level and gender (see Table 6).

Table 6: Effect of Age of Arrival of First-Generation Students on PISA 2006 Test Scores, Controlling for Parental Education Level and Gender

Country	Math		Reading		Science	
	beta	p	beta	p	beta	p
Belgium	-0.216	0.000	-0.079	0.106	-0.123	0.011
Denmark	-0.209	0.011	-0.229	0.006	-0.154	0.063
Greece	-0.299	0.000	-0.171	0.002	-0.361	0.000
Sweden	-0.180	0.012	-0.187	0.009	-0.154	0.031
OECD	-0.007	0.466	-0.045	0.001	-0.009	0.408

Note. Weighed data has been used in this analysis using standardized beta coefficients.

With such drastic difference in test scores in relation to their age of arrival (depending on the country under examination), and with heavy reliance on the language of host society in the test itself, researchers using PISA should be very cautious when assessing what PISA data can tell us in regards to how well or how poorly recent first-generation immigrants students are faring in relation to their native and second-generation peers.[8] In addition, such considerable dependence on the host language in PISA should also make researchers leery of cross-national findings and conclusions (and policy suggestions) based on descriptive level immigrant-to-native comparisons between countries with a significant portion of the immigrant students coming from countries with the same language background as that of the host country (e.g., Ireland and Australia) and that of other major immigrant-receiving countries in which most or almost all of the immigrant students come without the benefit of a shared common language (e.g., Austria and Germany).

5. Generational Effects

Comparison of the test outcomes of first and second-generation immigrant students have been a topic of many studies and reports examining student outcomes across various OECD countries (Crul & Vermeulen, 2004; Levels & Dronkers,

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8 Although some studies do control for language spoken at home (e.g., Levels & Dronkers, 2008; Marks, 2005), they may not appropriately account for varying levels of test language proficiency within the first-generation student population. For example, in some countries like New Zealand and Australia, when the first-generation immigrant students are separated by their country of origin, the language spoken at home serves not as an indicator or proxy for test language proficiency, but rather as the effect of coming from countries that do or do not share the language of the host country. In other words, for almost all of these first-generation students in Australia and New Zealand (90 % to 100 %), the language spoken at home was that of the language of their countries of origin with little or no difference within each ethnic group; and because of the small sample size, the differences in their test outcomes were often not found to be statistically significant.

2005; OECD, 2006, 2007; Riphahn, 2003). In 2003 and 2006, OECD reported that, except for a few exceptions (e.g., Austria, Germany, and New Zealand), the second-generation immigrant students (individuals born in the test countries with parents born abroad) outperformed their first-generation peers (individuals born abroad). As a whole, the 2006 OECD findings reported that the second generation immigrant students outscored their first generation counterparts in all three subjects tested by a margin of roughly 13 to 25 points (see Table 7). Such outcome would be understandable and expected as the second-generation students are less likely to be limited in their language proficiency of their host country's language.

Table 7: Comparison of First and Second Generation Immigrants in PISA 2006

	Math	Reading	Science
Native	488.7	488.2	496.7
Immigrant: First Generation	451.4	441.6	449.0
Immigrant: Second Generation	464.3	466.5	461.9
Immigrant: All	458.7	454.5	456.3

Source: OECD (2007).

The problem with such aggregated approach to comparing the first and second generation immigrant students is that, in light of shifting demographic changes of the immigrant population in various OECD countries, how accurately does the second generation reflect the demographics of their first-generation peers? Could it be possible that the demographics of the first and second generation immigrants in many of the OECD countries are much too different for a fair and accurate generational comparison? In other words, are we comparing apples to oranges when it comes to examining the test outcomes of first and second generation immigrant students in the PISA study? Let us look at Sweden as an example.

As of 2006, just under 15 % of Sweden's population was foreign born (Statistics Sweden, 2007). In the PISA 2006 study, 11 % of their students were labeled either first or second-generation immigrants. The initial findings show that, on average, second-generation immigrant students in Sweden outscored their first generation peers by a greater margin than other major immigrant-receiving OECD countries as a whole.

Table 8: Comparison of First and Second Generation Immigrant PISA Scores in Sweden and OECD

	Math			Reading			Science		
	Native	First	Second	Native	First	Second	Native	First	Second
Sweden	510.0	443.4	468.1	513.6	442.5	488.0	511.9	434.0	465.8
OECD	488.7	451.4	464.3	488.2	441.6	466.5	496.7	449.0	461.9

Source: OECD (2007).

In Table 8, we see that while the average gap in test scores between the first and second generation immigrant students ranged from roughly 13 to 25 points in the OECD countries, the gap in Sweden between their first and second generation immigrant students ranged from roughly 25 to 46 points. In fact, of the major immigrant-receiving countries in OECD, the positive gain between the first and second generation in Sweden is among the highest.

Does this mean that in Sweden, immigrant students are being incorporated more successfully than in other OECD countries? What is Sweden doing to allow them to "out-incorporate" their immigrant population compare to other OECD countries? How can we explain this exceptional "improvement" between first and second generation students in Sweden? In this section, we will examine the role of shifting immigrant demographics to explain the bigger-than-average difference between first and second generation immigrant student outcomes in Swedish PISA data.

As the largest Nordic country by size and population, most of Sweden's immigrants arrived after the end of World War II. Their modern era of immigration can be divided into four distinct stages, with each stage representing different concentration of immigrant groups (Westin, 2006):

(1938 to 1948):   Refugees from neighboring Nordic countries.
(1949 to 1971):   Labor immigrants from Finland and Southern Europe.
(1972 to 1989):   Family reunification and refugees from developing countries.
(1990 to present): Asylum seekers and refugees from southeastern and Eastern Europe, Africa, Middle East, and Latin America countries; as well as free movement of EU citizens within the European Union.

As a result of these divergent flows of immigrants, the Scandinavians who once composed over half of Sweden's foreign-born population in 1960, made up just over quarter of the foreign born in 2004 (see Figure 1). A significant number of the foreign born in Sweden currently are from countries outside the European borders, often from politically and economically-unstable regions.

From the Figure 1, we can see that in the last 40 years, there has been almost two to three-fold increase in the number of refugee and asylum-seeking immigrants coming into Sweden, a significant portion from politically-unstable and war-torn countries like Chile, Ethiopia, Iran, Iraq, Lebanon, Former Yugoslavia, and Somalia – and many within the last ten years.

In regard to OECD's analysis of first and second-generation immigrant students in Sweden, this demographic shift is important to note in that recent studies by Levels and his colleagues (2008) have found that immigrant children from more politically-unstable countries had lower test scores in PISA 2003. In addition, past PISA findings cite that regardless of their destinations and the type of school system in which they are placed, immigrant students from Southern and Central America, Northern Africa, Western Asia and immigrants from Western Europe who have low socio-economic backgrounds achieve substantially lower levels of mathe-

Figure 1: Immigrants to Sweden from Major Sending Regions, 1960 to 2004
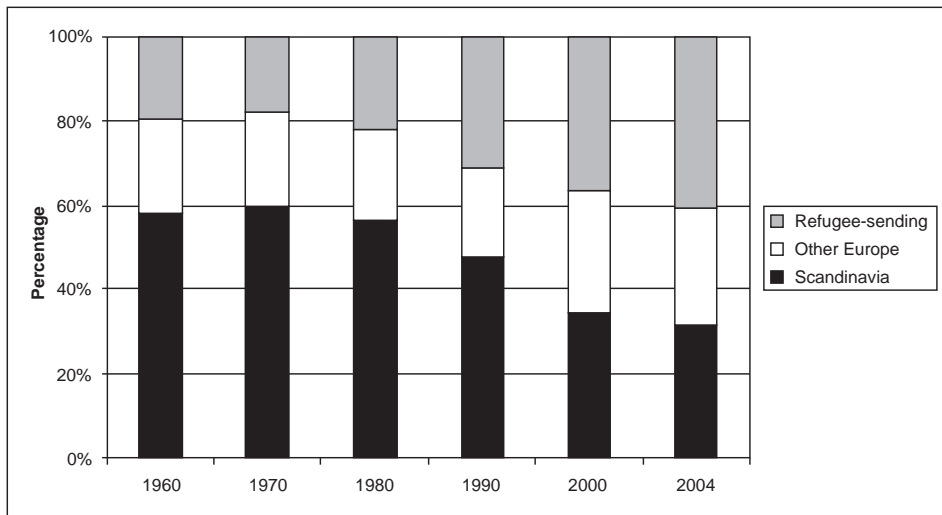
Source: Statistics Sweden (2007).

matical proficiency than their comparable native counterparts (Levels & Dronkers, 2005; Nordin, 2006).

In light of the findings citing the relationship between test scores and immigrant students from certain troubled regions around the world, how much of the drastic gains in test scores between the first and second-generation immigrant students in Sweden is due to the role of Swedish schools (and the society at large) successfully integrating their immigrant population or merely the effect of shifting demographics of their immigrant population? How can the experiences of the more recent first-generation immigrant students in Sweden be compared to the sons and daughters (the second generation) of the earlier arrivals? To get at the answer, many scholars have called for accounting for the country of origin in their analysis of immigrant students (Levels & Dronkers, 2008).

Unfortunately, Sweden, along with some other major immigrant-receiving countries in the PISA study (e.g., Canada, France, and the United States), does not keep record of their immigrant students' countries of origin. In fact, according to Levels and his colleagues (2008), only 13 of the major immigrant-receiving countries in OECD in the PISA study have information on country-of-origin categories that would allow for any thorough investigation regarding immigrant students' national origin. These countries include: Australia, Austria, Belgium, Denmark, Germany, Greece, Ireland, Latvia, Luxembourg, New Zealand, the Netherlands, Switzerland, and the UK.

Without knowing where the immigrant students had originated from, how can scholars appropriately assess whether the "gains" made by the second-generation immigrants in countries like Sweden can be attributed to their success in their educational system to incorporate their immigrant population or just the result of so-

cial and cultural capital, or the lack there of, brought along by different generations of immigrants?

If demographic differences between first and second-generation students in PISA 2006 can be used to possibly explain "outstanding" generational gains, could it also be used to explain notable generational declines as well? According to the PISA 2006 findings, Austria, Germany, and New Zealand were cited as the only OECD countries having downward mobility for the immigrant students, such that their second-generation students were faring worse than their first-generation peers (OECD, 2006).

Table 9: Comparison of First and Second Generation Immigrant Student PISA 2006 Scores in Austria, Germany, New Zealand, and OECD

	Math			Reading			Science		
	Native	First	Second	Native	First	Second	Native	First	Second
Austria	515.4	449.9	434.1	499.2	451.4	419.3	523.5	435.0	430.4
Germany	518.0	451.0	440.9	509.9	436.8	427.6	531.9	450.7	438.5
New Zealand	523.5	528.1	510.6	526.4	508.2	520.7	535.6	525.8	507.0
OECD	488.7	451.4	464.3	488.2	441.6	466.5	496.7	449.0	461.9

Source: OECD (2007).

From Table 9, we see that in OECD as a whole, the immigrant and non-immigrant student gap narrows from first to second generation by 12 to 25 points. In Austria, German, and New Zealand, however, we see that the reverse is true, such that the second-generation students are performing worse than their first-generation peers in terms of their achievement gap with the native population, anywhere from 5 to 32 points. However, when we disaggregate the data to see where the students are coming from and to see how they are distributed across the two generations, we get a different picture.

Focusing on math scores, in Austria, the Turkish students with their relatively lower test outcomes (mean: 391) were overrepresented in the second generation (2:1) and the relatively higher-achieving Former Yugoslavians (mean: 429) were underrepresented (1:3.5). Together, these two groups made up over 53 % of all the immigrant students in the Austrian study (see Figure 2).

Similarly, in Germany, among the second-generation cohort, the Turkish students (mean: 414) were again overwhelmingly represented among the second-generation immigrant cohort (9:1), and their high-performing former USSR counterparts (mean: 472) were underrepresented (1:5.5). Together, these two groups made up 42 % of all immigrant students in the German study (see Figure 3).

And lastly, in New Zealand, among the second-generation immigrants, Samoans (mean: 457) was overrepresented (3:1) and Chinese and Koreans (mean: 578 and 619, respectively) were underrepresented (1:5). The inverse was true among the

first-generation cohort. Together, these three groups comprised 40% of the immigrant students in the NZ study (see Figures 4).

After concluding that there are indeed demographic differences between the first and second-generation students in these three countries, we examined the data more appropriately by disaggregating the numbers to account for the different countries of origin of the immigrant students in these three countries. Doing so, we found a more nuanced result (see Table 10).

Figure 2: Percentage of First and Second Generation Immigrants in Austria, PISA 2006
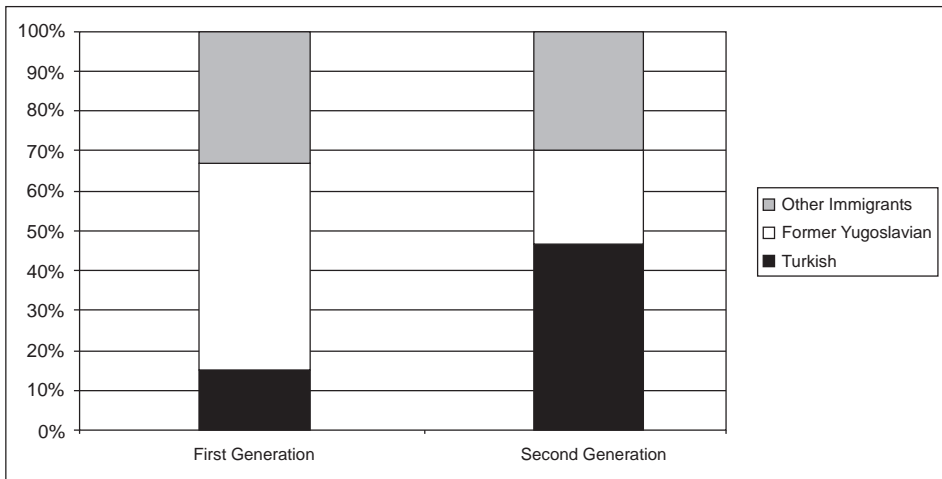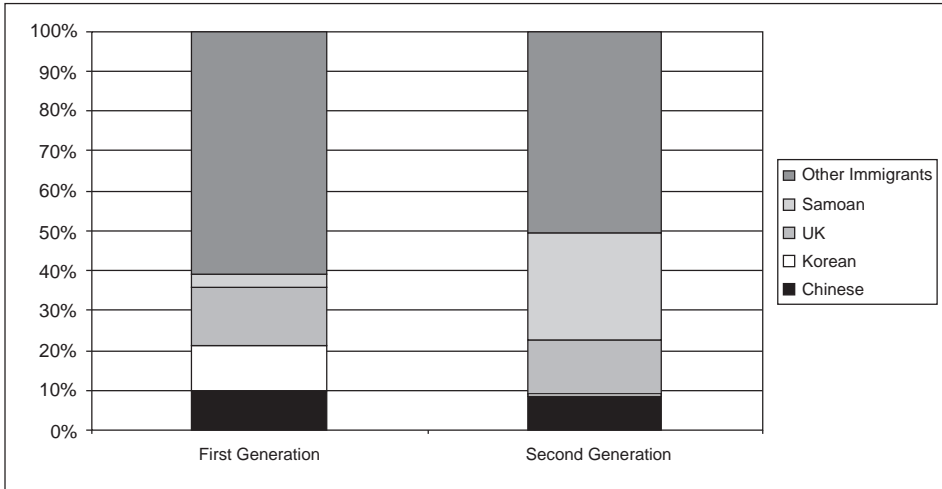

Source: OECD (2007).

Figure 3: Percentage of First and Second Generation Immigrants in Germany, PISA 2006
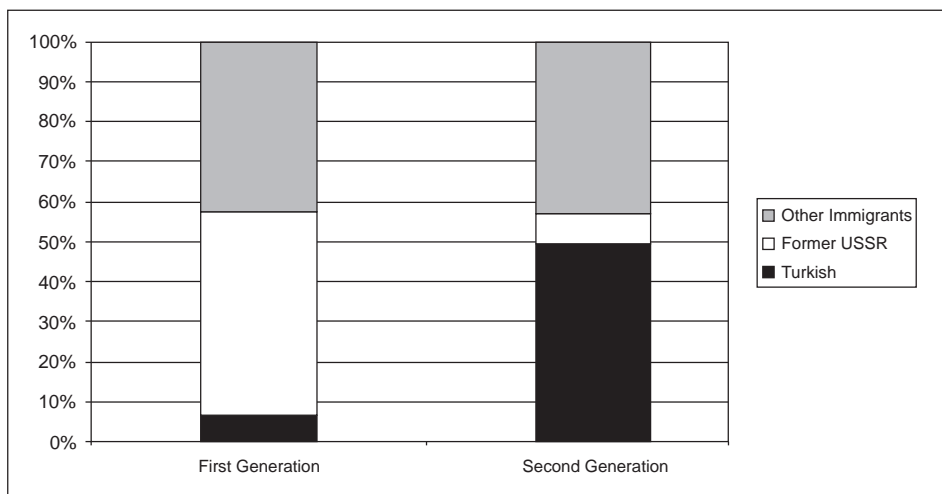
Source: OECD (2007).

Figure 4: Percentage of First and Second Generation Immigrants in New Zealand, PISA 2006

Source: OECD (2007).

Table 10: PISA 2006 Results for First and Second Generation Immigrant Students in Austria, Germany, and New Zealand

	Math		Reading		Science	
	First	Second	First	Second	First	Second
Austria						
Turkish	388	391	368	369	345	380*
Former Yugoslavia	446	429	452	435	440	437
Other Immigrants	481	504	486	483	466	502*
Germany						
Turkish	423	414	410	395	425	408
Former USSR	483	472	483	474	485	480
Other Immigrants	417	466*	386	456*	413	465*
New Zealand						
Chinese	557	578	515	559	531	574
Korean†	556	619	508	639	532	639
UK	547	541	543	572	569	559
Samoan	401	457*	348	461*	358	436*
Other Immigrants	528	527	513	539*	532	526

Note. Based on our own calculations. * Statistically significant after controlling for parental education level and gender. † There was only one case in the second generation.

In Austria, only the Former Yugoslavian students showed downward mobility, such that the second-generation students were underperforming in comparison to their first-generation peers. That was not the case for Turkish and "other" immigrant students who, in fact, had their second-generation students outperform their first-generation counterparts. Moreover, after controlling for background variables, only the generational *gains* made by the Turkish and "other" immigrant students in the science portion the test were found to be statistically significant.

In Germany, we found that after disaggregating the immigrant student by their countries of origin, the Turkish and Former Russian students were showing downward mobility from first to second generation. The remaining immigrant students, however, showed positive generational gains, by as much as 50 to 70 points. But after the control variables were added, only the generational *gain* made by the "other" immigrant student group in Germany was found to be statistically significant.

Finally for New Zealand, we see that, after controlling for country of origin, almost all the second-generation immigrant students outperformed their first-generation peers. The few cases in which the second generation fared worse than the first generation were with the UK students in science and the "other" immigrant students in math and science. But as we can see from Table 8, the differences in points in these three New Zealand cases were very slight, from 4 to 10 points; and after adding background variables, these small differences were not found to be statistically meaningful. Additionally, our analysis showed that only the generational *gains* made by the Samoans (along with "other" immigrants in reading) were found to be statistically significant in math, reading, and science, even after controlling for background variables.

Thus we see that, in all these three countries – Austria, Germany, and New Zealand, which have been cited by OECD to have downward generational mobility for their immigrant students (OECD, 2006), controlling for their immigrant students' country of origin and other background variables produced results which seem to undermine their conclusions. In fact, our analysis shows statistically significant evidence only for *positive* generational gains made by these three countries in terms of their immigrant student population.[9]

In essence, whether it was because of cultural, social, or economic reasons (or possibly a combination of all three), some immigrant students from certain countries were lower achieving than others. And thus when the lower-achieving immigrant students from various countries of origin were overrepresented among the second-generation immigrant cohort, it generally brought down the mean score of the entire group, thus making it appear that as a whole, the second-generation students were doing worse than their first-generation peers. Such was the case with the immigrant students in Austria, Germany, and New Zealand.

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9   This result could be due to the low number of cases found in some of the ethnic groups. For example, in Germany, there were only 18 first-generation Turkish students in their sample; and in New Zealand, there was only one first-generation Korean immigrant.

As immigrant histories in various immigrant-receiving countries chronicle, the demographics of first and second-generation immigrants can vary significantly, depending on the needs of the labor market (blue-collar versus white collar immigrants), socio-political climate (e.g., refugees, asylum seekers, and blocking of nationals from certain countries), and ever-changing selective requirements. For example in some countries, like Australia and Canada, have strict point system, so that only immigrants with certain level of education can be admitted; whereas in other countries, like the US and some of the Nordic Countries, family reunion and refugee status may play a more significant role. All these factors could influence who gets in and who does not. Thus, Levels and Dronkers (2008) posit that without properly taking into account country of origin effects, analyzing migrants' integration in host societies will lead to flawed results. This is true especially when comparing first and second generation immigrants where depending on the shifting composition of the incoming migrant population in a certain society, results may be too optimistic or too pessimistic.

6. Conclusion and Recommendations

The strength of PISA for examining immigrant students is that it provides an internationally-comparable basis to investigate students' learning across and within countries. It allows scholars and policymakers to ask questions such as: How do immigrant students perform compared to their native peers, and how do relative achievement levels vary across various immigrant-receiving countries? How do economic, social, and cultural background characteristics relate to their achievement? And what factors might contribute to between-country differences in immigrant student outcomes, and what could be potential target points of intervention to improve the situation of immigrant students (OECD, 2006)?

In this paper, we focused on PISA and their analysis of immigrant students in many of the major immigrant-receiving countries. Specifically, we have argued that there are three significant weaknesses in which PISA 2006 data were collected and analyzed to give an incomplete or biased picture of how immigrant students in various OECD countries are faring. These weaknesses stem from 1) how immigrant students are selected or categorized, 2) the varying percentage of first-generation immigrant students with very limited test language proficiency, and 3) the way in which the first and second generation immigrant students are grouped.

In terms of how PISA selects their immigrant students, we suggested that immigrant test scores can be affected greatly by the level to which the immigrant students resemble or match the cultural and linguistic (as well as possible phenotypic and socio-economic status) aspects of their host country members. We gave examples of countries like Ireland and Australia, both countries noted for the little or no gap between their immigrant and non-immigrant students, which had a significant portion of their immigrant students coming from countries with similar linguistic

and cultural (as well as socio-economic, specifically in regards to parental education levels) backgrounds as that of their host members. We cited that perhaps comparing such countries' immigrant outcomes with that of countries in which their immigrant population was vastly dissimilar in their socio-economic, cultural, linguistic, and phenotypic factors may not necessarily be a fair and appropriate comparison.

As for the effect of limited test language proficiency among first-generation immigrant students, we posit that there exists a potential for test gap between first-generation immigrants and their second-generation or native counterparts to be overly contingent on the size and proportion of the very recently-arrived immigrant student population among the students tested. Thus, in countries where the majority of the immigrant students are from countries with shared language as the host countries, there may be a notable bias in their favor, in comparison to other countries with high proportion of immigrant students coming from countries with different language backgrounds.

And lastly, with regards to PISA's first and second-generation immigrant comparisons, we suggested that researchers be mindful of the shifting demographics of the first and second- generation immigrants in many immigrant-receiving countries (e.g., Sweden), as the different proportions of students from different regions of the world in each generation may falsely skew the outcome based on where they are more or less concentrated. In addition, we pointed out that not taking into account country-of-origin variable could result in inaccurate or incomplete picture of the generational trends among immigrant students. By using Austria, Germany, and New Zealand as examples, our analysis showed that aggregate data analysis was poorly used to show evidence of generational decline, whereas by controlling for country of origin and other background variables, most of the immigrant students in these three countries showed positive generational mobility. In fact, our analysis showed that only positive gains made by the second generation in relation to their first-generation peers were found to be statistically meaningful in Austria, Germany, and New Zealand.

In light of the findings that we have discussed in this paper, we suggest following recommendations for scholars and researchers serious about using PISA data to analyze immigrant-student outcomes in the many of the immigrant-receiving countries represented in the PISA study:

1. When conducting cross-national comparisons, be mindful of the similarities and differences (e.g., linguistic, cultural, racial, and religious) between the sending and receiving countries before attempting to draw conclusions on which countries are faring better or worse in incorporating their immigrant student population.

2. When gathering data for first generation immigrant students, select participants who have completed at least five years of education in the host country's educational system to avoid the unnecessary impact of many of the very recent-arrivals who may not be adequately prepared to take the test in the language of their

new host country. (Researchers and analysts can utilize many of the statistical programs to remove or set aside these students when performing any needed analysis.)

3. When comparing the test outcomes of first and second generation of immigrant students, make sure the two groups are fairly comparable in terms of their backgrounds, such as countries of origin (as well as SES and gender) to avoid making inaccurate conclusions that can be explained by the changing demographics between the two groups.

PISA, along with other internationally-comparative tests like TIMSS (Trends in International Mathematics and Science Study) and PIRLS (Progress in International Reading Literacy Study), offers researchers and policymakers a valuable opportunity to compare how well various students in different countries are faring in their educational attainments. By assessing the test outcomes of these students in light of the context in which their schooling takes place, scholars can draw much-needed information on why some prosper while others struggle. But while factors like parental education levels, gender, and home environment have been accounted for in many of the studies using these international datasets, many scholars examining immigrant outcomes have failed to add country of origin, language proficiency, and generational differences in terms of demographic composition as critical pieces of information in their analysis. Although many of the immigrant students in various immigrant-receiving countries share the same classroom and teachers as their native counterparts, their cultural, linguistic, and social backgrounds (among others) may often set them apart in ways that can either act as a possible hindrance in their educational experiences. Thus, for those who are studying educational and schooling outcomes of immigrant students, accounting for these and other factors may give researchers and policymakers a more nuanced picture of how immigrant students are faring in various parts of the globe.

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