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Immigrant Students' Age at Arrival and Assessment Results

Age at arrival is an important factor in helping to describe much of the performance gap between immigrant and non-immigrant students. In general, the later in their life immigrant student arrived in the host-country, the lower their performance in PISA. Mastery of the assessment language, once more, plays an important role in explaining this pattern. Late-arrival penalties vary across countries, but they are more pronounced for those immigrant students who do not speak the assessment language at home.

INTRODUCTION

The aim of this chapter is to examine the effect of age at arrival on the performance of immigrant students in the PISA.[1] The general expectation following earlier research (e.g. OECD, 2010) is that the later children arrive in a destination country, the further they will lag behind non-immigrant students in that country. This might be due to language difficulties or to more general difficulties in adapting to a different culture and school system, or to cross-national differences in educational standards at different ages.

This chapter focuses particularly on whether the effect of age at arrival varies according to the country of origin and the country of assessment. It is not so much the levels of performance which are of interest but rather the rate of change in performance with respect to age at arrival. Putting it more colloquially, the question is whether young people coming from or arriving in particular countries are especially vulnerable to what might be termed a "late-arrival penalty". These penalties may in turn have long-lasting implications on young people's opportunities for further educational progress, integration into the labour market, and improvement of life chances in the destination country. Substantial penalties may leave long-term negative effects with important implications for both the migrants affected and for the wider society. Chapter 6 studies these issues in the context of educational attainment in Canada and Switzerland.

Research on what might be termed the "absolute" levels of student test performance suggests that young people from certain origins (for example China) tend to score particularly well no matter the country they migrate to. However, in the case of the "late-arrival penalty", the combination of certain origins with particular destinations is likely to be of paramount importance and there are two main arguments that suggest this may be the case.

First of all, it is likely that children arriving from, say, a developed western nation will already have performed quite well at school before migrating, while those coming from a less-developed country with less-developed educational institutions and lower general levels of performance might lag further behind. For example, PISA test scores show Turkey to be below the OECD average, and so children arriving from Turkey in, say, Germany are likely to start at a considerable disadvantage. In contrast children migrating from the Netherlands to Germany are likely to be achieving already at a similar (or even at a higher) level to their peers in Germany. This suggests that the effect of age at arrival will be relatively flat in the case of immigrants from the Netherlands to Germany but could be steeper in the case of young people arriving from Turkey since the later they arrive in Germany, the greater the differential is likely to be.

Second, it is likely that, even if children were high achievers in their origin country, they will suffer a penalty on arrival if they do not speak the destination-country language. For example, children migrating from, say, the United Kingdom to continental Europe will typically have to learn a new language, whereas those migrating from the United Kingdom to Australia or New Zealand will not. One therefore expects to find that the effect of age at arrival will be more marked where children have to learn a new language.

To be sure, the possibility that there could also be some more general processes at work which affect all young people who migrate to a particular destination is not excluded. These might for example relate to the kinds of help that countries or educational systems give to the integration of newcomers, but the general expectation is that the major processes are those that involve particular origin and destination combinations.

While this kind of research cannot on its own provide direct implications for what policies to adopt, it can usefully indicate the sorts of students and countries where there are especially large "late-arrival penalties", and where some kind of policy response may be warranted. The findings may also indicate whether there are any countries which have been particularly successful at avoiding these penalties and whose institutional arrangements may be worthy of more in-depth study in order to assist policy transfer. They suggest that policies which delay family reunification may have unintended consequences on the outcomes of immigrant students and on their downstream integration into the labour market and societies of host countries.

PREVIOUS EVIDENCE ON AGE-AT-ARRIVAL PENALTIES

A small number of single-country studies have explored the effects of age at arrival on a variety of educational outcomes, while the *PISA 2009 Results Volume II: Overcoming Social Background* (OECD, 2010) compares the effects of early and late arrival on immigrant students' reading scores in different countries.

Country-specific studies

A major focus of country-specific studies has been the question of whether there is a "critical" age at arrival for learning a new language after which there is a strong negative impact on language acquisition and on educational performance more generally (given that proficiency in the destination-country language is also assumed to be crucial for wider educational success). Using Swedish register data, Böhlmark (2008) found that the critical age at arrival for grade point average (GPA) at age 16 was about nine, with the slopes of the age-at-immigration/performance profiles being similar for boys and girls and for children from different family backgrounds, but varying widely by region of origin. For Asian children the profile was substantially steeper than for Western

children, Böhlmark's interpretation being that the steep profile among the Asian children probably reflected "large differences in Sweden-specific skills between children of relatively high and those of relatively low age at migration" whereas the flatter profile for Western children probably reflected the fact that "there is not much to catch up on, i.e. that the human capital they have acquired in the source country does not differ much from that acquired in Sweden." (Böhlmark, 2008, p. 1382). He attributes the finding that immigration at age nine or later has a negative impact on GPA to the fact that these students have passed their prime age for language-learning and also because their acquisition of other subject skills is less efficient while the students are still struggling to learn the new language (Böhlmark, 2009).

In an American study, Myers and his colleagues also investigate whether a particular age at arrival is critical for self-reported fluency in English and a variety of other socio-economic outcomes. Using the 2000 census and focussing on the experiences of Mexican immigrants, their results indicated that the effect of early arrival was much greater for English proficiency than for other outcomes. They found "little evidence at any age of a sharp discontinuity demarcating a 1.5 generation from older immigrants and, in fact, a series of classifications or a continuous measurement of age at arrival may be preferred in some cases" (Myers, et al., 2009, p. 205). More generally Myers and his colleagues show that linear and curvilinear models perform better than categorical ones, with curvilinear models being slightly superior to linear ones.

In another study conducted in Israel, Cahan and his colleagues investigated the effects of age of arrival on verbal and mathematics scores on tests administered to 8th grade students. Like Böhlmark in Sweden, they found no difference between boys and girls in the effects of age at arrival. They did find, however, that the effects were stronger for verbal than for mathematics scores, and they also found clear differences between ethnic background groups. However, in their case the decrease in attainment with later arrival was greater for the Western groups (coming from Europe and North America) than among the Eastern groups (coming from Asia and North Africa) (Cahan, et al., 2001, p. 591). They also tested the "vulnerable age" hypothesis which had been advanced by earlier scholars – that is to say a U-shaped relationship between age at arrival and educational performance, with higher performance being found among early and late arrivals and the lowest performance among those arriving during the intermediate "vulnerable" years. However, they found absolutely no support for this hypothesis.

In a Dutch study, van Ours and Veenman compared age at arrival effects for Turks and Moroccans with those for Surinamese and Antilleans. Their main finding was that migration at an older age appears to be more of a disadvantage for the educational achievements (measured by level of education achieved not by test scores) of the Turks and Moroccans than for the Surinamese and Antilleans. Van Ours and Veenman's interpretation of the differences in the effects of age at arrival of the two groups focused on the congruence between the educational systems of the different origin countries and those of the Netherlands. "Since there are no indications that these differences are related to the destination country (e.g. the characteristics of the [Dutch] educational system), the explanation must be searched for in the origin country or cultural background. In this respect it seems important that the educational system in Surinam and the Antilles, being (former) Dutch colonies, has a lot in common with the Dutch educational system. Since this is not the case with the Turkish and Moroccan educational systems, this might explain the greater difficulties for the Turks and Moroccans. Migration to the Netherlands is for them a larger step than for the Surinamese and the Antilleans" (Van Ours and Veenman, 2006, pp. 314-6). They also checked whether their results were sensitive to the inclusion of statistical controls for parental education or interacted with them. They found that the results barely changed after including parental controls or splitting the sample between higher and lower-educated parents.

International evidence

Turning next to cross-national comparisons based on the PISA data, the *PISA 2009 Results Volume II: Overcoming Social Background* confirms this picture of a late-arrival penalty with respect to reading scores. Table II.4.8 of the report shows that first-generation students who arrived in the host country at a younger age outperform those who arrived when they were older with a difference of 42 points (roughly equivalent to one school year or grade level) between those who arrived when they were 5-years-old and those who arrived after they were 12-years-old. "This suggests that where the education system of the host country had a longer opportunity to shape the learning outcomes of immigrant students, it was able to improve student performance" (OECD, 2010, p. 75).

The size of these gaps, however, varied considerably across countries, with the largest late-arrival penalties being found in Italy, Belgium, Sweden and Ireland. There were also a small number of non-Western countries and economies, such Macao-China, where there were late arrival "premia" rather than penalties.[2] That is to say the late arrivals performed better in the reading test than those who arrived earlier. One possible explanation for these puzzling cross-country variations that the 2010 report was unable to address is that the kinds of students, for example their national origins, who arrive early and late may vary between destination countries. These "compositional" differences will need to be considered carefully.

COUNTRY DIFFERENCES IN LATE-ARRIVAL PENALTIES

The focus of the PISA analysis to follow is the test of reading literacy, which is particularly important for educational success and integration more generally, and for which age-at-arrival effects appear to be stronger than for mathematics or science. For this analysis the data are pooled for all relevant years in which PISA collected the necessary information (2003, 2006 and 2009), for all countries and for all origin groups. The results are also pooled for boys and girls. While girls generally perform better than boys, there is no significant gender difference with respect to late-arrival penalties. In other words, the female advantage over males is broadly similar at all ages of arrival.

This section begins with some descriptive statistics showing for each participating country and economy the differences in reading test scores between early and medium, and between early and late arrivers. Early arrivers are defined as those who arrived at or before age 5, which will generally cover children who arrived before the start of compulsory schooling (OECD, 2010). Late arrivers are defined as those who arrived after age 12. This latter group will thus have had a maximum of three years schooling in the destination country at the time of the test. Figure 4.1 shows the differences in the reading scores of the late- and mid-arrivers in comparison with those of the early-arrivers in each country and economy (which are set to zero). (The full details are provided in Table B4.3 in Annex B.) The results are shown only for cases where there are reasonable numbers of immigrant students in the sample for each country.[3] For a few countries (shown at the bottom of Figure 4.1) there are a sufficient number of cases to show the differences between mid- and early-arrivers but not sufficient for investigating late-arrivers.

The patterns shown in Figure 4.1, and throughout this chapter, are derived from cross-sectional not from panel data. That is to say, they show the differences in reading scores at the end of lower secondary education between 15-year-olds who arrived in the destination country at different ages, and have thus spent a longer or shorter time in the country of current residence. As noted earlier, since they are not derived from a panel study, the figures do not show how test scores for the same individuals change over time, although it will often be reasonable to suppose that a panel study might show patterns similar to those documented here.

These introductory descriptive statistics should be interpreted with caution and need to be studied with more sophisticated analyses in due course, in particular taking into account any "compositional" differences in the origin countries from which the migrant students come. As will be seen in the next section, migrants from countries who also speak the test language tend to have flatter age-at-arrival profiles (softer late-arrival penalties) than do migrants who come from different linguistic backgrounds. A large late-arrival penalty may therefore simply reflect a large inflow of migrants who need to learn a new language in the destination country. Nevertheless, the overall observed differences do provide an overview of the main patterns in the data as well as a yardstick against which to check for important deviations. (Figure 4.1 presents the "gross" differences before controlling for parents' socio-economic background. Table B4.4 in Annex B shows the "net" results after controls, i.e. only contrasting students with similar socio-economic background. As with van Ours and Veenman's study, the controls generally have little effect on the size of the late-arrival penalties.)

In Figure 4.1 the performance of the early arrivers is set to zero, and the performance of the mid- and late-arrivers is compared with that of the early arrivers. In general, the figure shows there is a late arrival penalty, albeit of varying size, in almost all of the developed Western countries. The OECD average late-arrival penalty is about 20 score points, roughly equivalent to about a half a year of schooling. Furthermore, in most countries the mid-arrivers are rather closer to the early arrivers than to the late arrivers. This suggests that the effect of age at arrival on test scores is not a linear one but becomes progressively larger the later the age at which the student migrates. This implies that a curvilinear characterisation of the age-at-arrival/performance profile is more appropriate than a linear one. More detailed analysis (Heath and Kilpi-Jakonen, 2012) indicates that there is no specific "critical" age for arrival but that later arrivals are increasingly vulnerable.

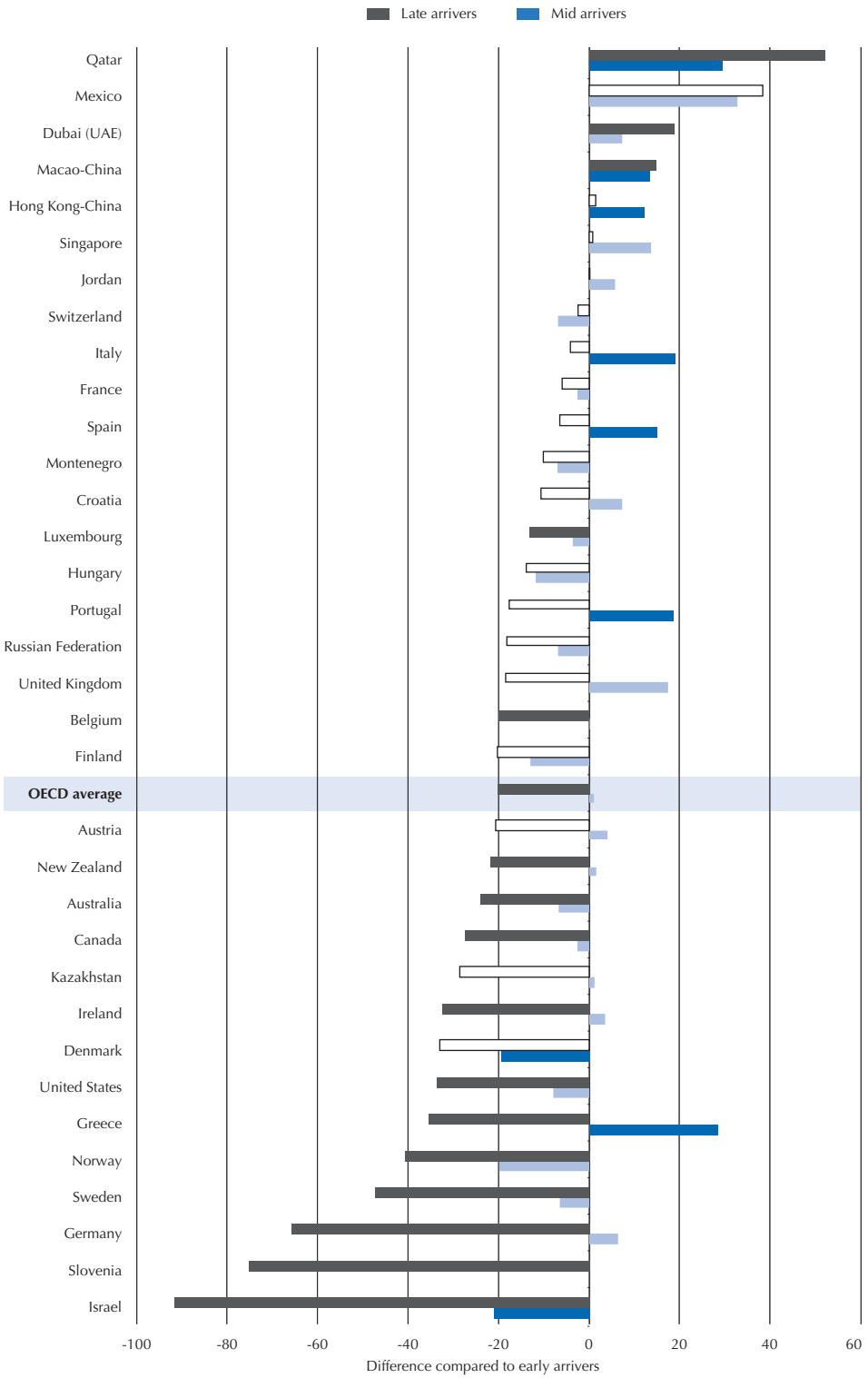
In contrast to this dominant pattern of a late-arrival penalty, in some partner countries and economies such as Macao-China, late arrivers actually perform better than the early arrivers. This may well reflect particular features of the migrant flows to these countries. As will be shown later, a late-arrival "premium" rather than a penalty can occur when children migrate at an older age, having spent a larger part of their educational career in a country with higher educational standards or speaking the same language.

Even the early arrivers may perform less well than non-immigrant students in the country of assessment. The absence of a late-arrival penalty therefore does not mean that all is well for immigrant students. This will become more clear when comparing the results of Figure 4.1 with those of Figure 4.2, which compares the test scores of the early arrivers with those of the non-immigrant students. Figure 4.2 also compares the early-arrivers' test scores with the scores of second-generation students.

As in Figure 4.1, the performance of early arrivers is set to zero and the performance of non-immigrant students and of the second-generation are compared with this baseline. There is again considerable cross-national variation, but non-immigrant students outperform both the early arrivers and the second-generation students in many countries, sometimes by considerable margins. (As Table B4.4 in Annex B shows, the net differences between the immigrant and non-immigrant students after controls tend to be somewhat smaller than the gross differences shown in Figure 4.2, but in most cases the differences remain quite substantial and statistically significant.) Figure 4.2 also suggests that the scores of second-generation students tend to be rather close to those of the early-arrivers; in some countries the second-generation do rather better, while in others they score somewhat worse, but the overall average for OECD countries is virtually identical for early-arrivers and second-generation students.

▪ Figure 4.1 ▪

Estimated difference in PISA reading scores of late and mid arrivers compared to early arrivers



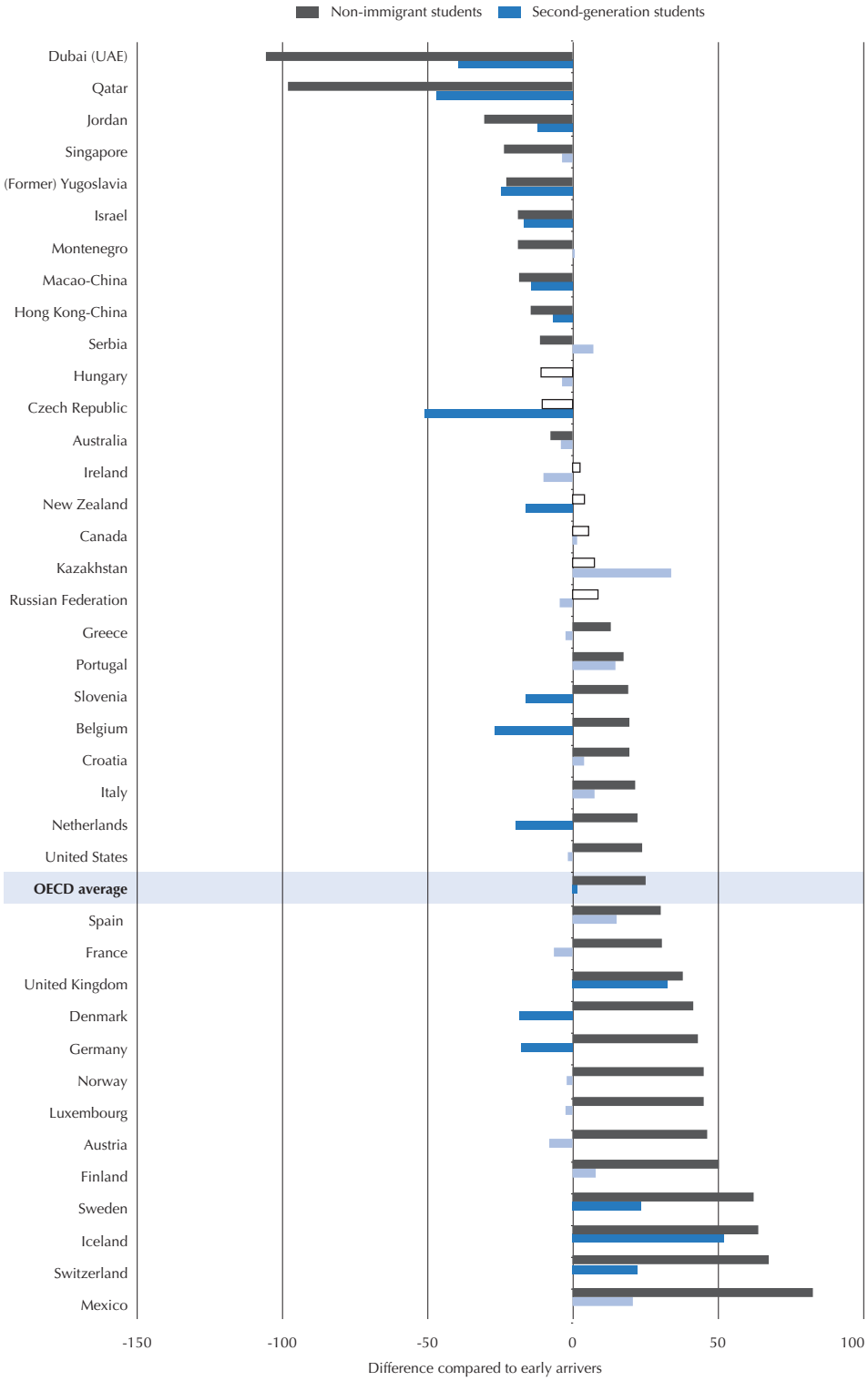
Note: See notes for Table B4.3; only differences for groups larger than 40 shown; lighter shades indicate non-significant differences. Early arrivers refers to first-generation students who arrived at or above age 5, mid arrivers refers to those who arrived at ages 6-11 and late arrivers refers to those who arrived at ages 12 and above.

Countries are ranked in ascending order of the score point difference between early arrivers and late arrivers.

Source: Table B4.3; PISA pooled data 2003, 2006, 2009; Heath and Kilpi-Jakonen (2012).

▪ Figure 4.2 ▪

Estimated difference in PISA reading scores of non-immigrant and second-generation students compared to early arrivers



Note: See notes for Table 4.3; only differences for groups larger than 40 shown; lighter shades indicate non-significant differences.

Countries are ranked in ascending order of the score point difference between early arrivers from first-generation and non-immigrant students.

Source: Table B4.3; PISA pooled data 2003, 2006, 2009; Heath and Kilpi-Jakonen (2012).

LANGUAGE AND THE LATE-ARRIVAL PENALTY

Previous research has often found differences between origin groups in the extent to which later age at arrival depresses test performance, although the results vary across countries of residence. For example, in Israel (Cahan, et al., 2001) found that children arriving from western Europe had a much steeper age-at-arrival/performance profile, with a heavier age-of-arrival penalty, than children arriving from North Africa and western Asia. In contrast, in Sweden (Böhlmark, 2008), found that children arriving from western Europe suffered very little in the way of a late age-at-arrival penalty whereas there was a steep profile for those arriving from Asia. One reason for these differences is almost certainly, as Böhlmark suggests, the possession of destination-country specific skills, most notably language (although other factors such as the educational levels typically achieved in the country of origin may also be relevant as will be seen in the next section).

Age-at-arrival profiles have quite different characters and explanations from overall performance levels. Thus children from East Asia and India generally perform very well in performance tests, and appear to do so whatever the country they have migrated to. In contrast, their age-at-arrival profiles are likely to vary according to the particular country which they have migrated to. For example, mainland Chinese migrating to Hong Kong-China, where Chinese is the language of instruction in schools, might be expected to have a flatter profile than those migrating to Australia, where they will be taught in English and might hence experience a steeper learning curve. In other words, it is the congruence or lack of congruence between the language of the home and that of the school that is likely to affect the age-at-arrival/test score profile.

In practice it is not straightforward to investigate the differences in profiles of specific migrant groups in different countries of destination, as there are relatively few origin groups found in several different destination countries. There is also a selection problem: migrants often move to countries which are culturally and linguistically more similar, for example Britons tending to migrate to Australia or New Zealand, both English-speaking countries and hence ones where the age-at-arrival profiles of Britons are expected to be fairly flat.

However, Chinese students are found in reasonable numbers in the PISA samples in Australia, Hong Kong-China, Macao-China and New Zealand. The expectation is that Chinese migrating to Hong Kong-China and Macao-China will have relatively flat age-at-arrival profiles, since they have moved to countries with similar cultures and language of instruction in schools, whereas Chinese migrating to English-speaking Australia and New Zealand will have much steeper age-at-arrival profiles. It is important to recognise that this does not mean that Chinese or Asians in general have heavier penalties than Britons and other western Europeans: the expectation is that the penalty will vary from one destination country to another. Some western European groups migrating to countries where there is a different language of instruction in school (e.g. Germans migrating to Belgium) might therefore also be expected to have quite heavy age-at-arrival penalty.

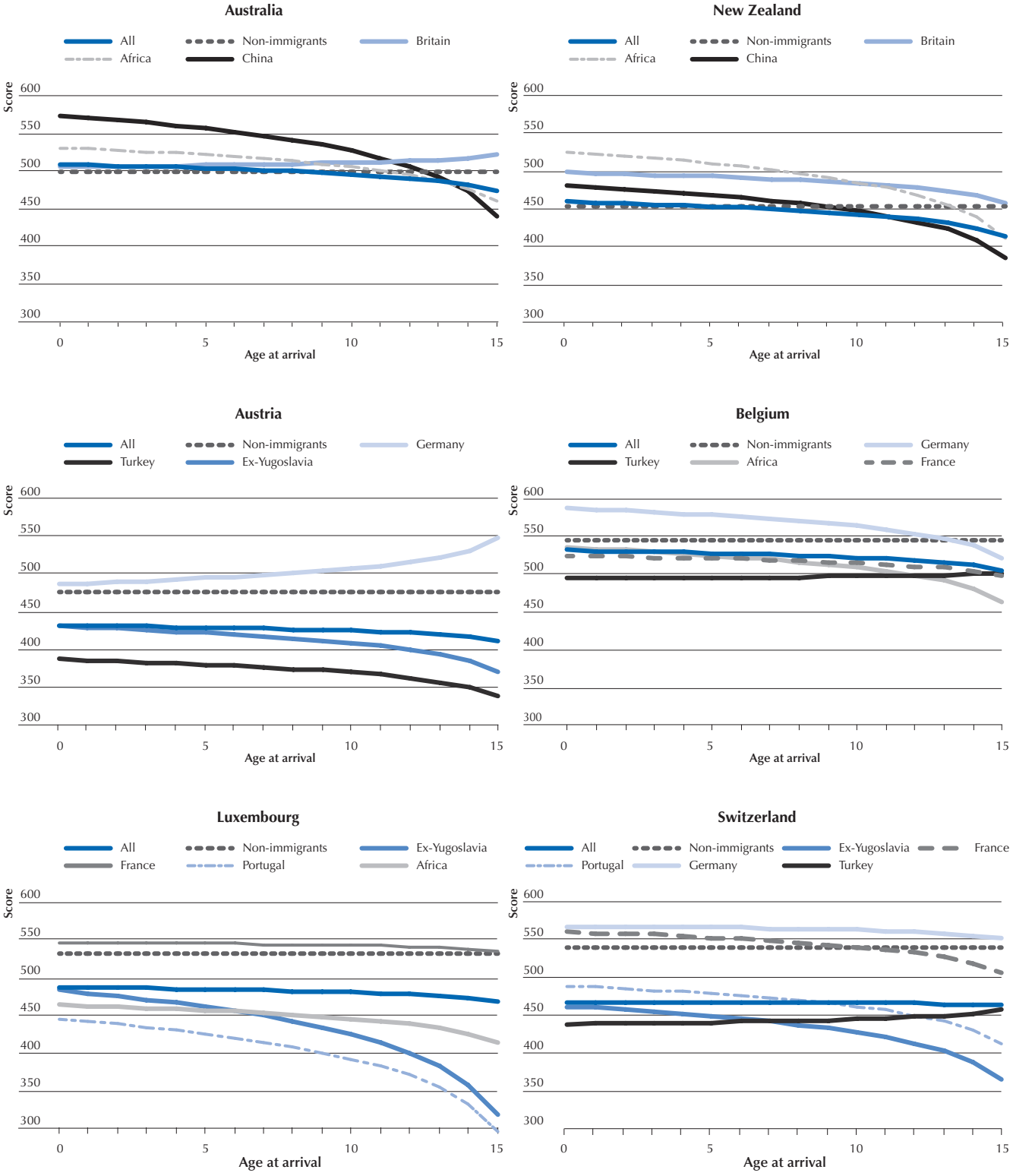
In Tables B4.1a and B4.1b age-at-arrival profiles are shown for selected origin groups.[4] The tables show the late-arrival penalty for that origin group in the particular country of destination. The larger the reported coefficient in the table, the steeper the profile; that is the greater the late-arrival penalty. Negative coefficients indicate that a later age at arrival is associated with better, not worse, test scores which, as will be seen in the next section is a theoretically important possibility. (The models also include controls for PISA year, gender and students' school year/grade. Interactions are fitted and reported only for those cases where at least 40 respondents from a given origin country were sampled in the country of destination.)

While standard errors for the coefficients reported in Tables B4.1a and B4.1b are generally rather large (because of the small sample sizes), the overall pattern is nonetheless quite striking and in line with expectations. Thus the age-at-arrival profile is indeed much steeper for Chinese in Australia and New Zealand than it is in Hong Kong-China or Macao-China. The profile for Germans migrating to Belgium is much steeper than for Germans moving to Austria or Switzerland (where it is assumed that many will have moved to German-speaking parts of Switzerland). The profile for young people from the former USSR is much steeper in Israel, Finland and Germany than it is in Russia. And the profile for young people from the former Yugoslavia is much steeper in Luxembourg, Germany and Switzerland than it is in Serbo-Croat speaking Croatia or Serbia. In contrast the profiles for Britons or French, who typically migrate to other Anglophone or Francophone countries respectively, are uniform and fairly flat.

Tables B4.1a and B4.1b also show the overall coefficient for young migrants in each destination country in the final column, and it is informative to compare this with the coefficients for the individual origin groups within a given country. Consider Germany for example, which Figure 4.1 indicated was one of the countries with the largest late-arrival penalty. Overall, Germany does indeed exhibit a large age-at-arrival coefficient of 36.0 score points. However, the main immigrant groups to Germany with sufficient numbers in the sample for detailed analysis are all ones from linguistically-dissimilar countries, namely from Turkey, the former-USSR and the former Yugoslavia. Conversely Australia, which overall displays a much smaller age-at-arrival coefficient of 12.9 score points, also exhibits a large coefficient of 48.5 score points (as large as the biggest coefficient in Germany) for the linguistically-dissimilar migrants from China. The small overall Australian coefficient can almost certainly be explained by its large number of migrants from linguistically-similar Britain with their small coefficient of minus 5.7 score points. In other words, the overall differences in the magnitude of the late-arrival penalties observed in Figure 4.1 almost certainly owe a great deal to the composition of the immigrant flows, specifically whether the immigrants come from linguistically-similar or dissimilar origin countries.

▪ Figure 4.3 ▪

Relationship between PISA reading score and age at arrival in selected destination countries by immigrant origin



Note: All estimates control for PISA year (2009 as reference), gender (male as reference) and student's grade (10th as reference)

Source: PISA pooled data 2003, 2006, 2009; Heath and Kilpi-Jakonen (2012).

To illustrate the patterns, the curves are plotted for a selection of countries. Thus in the top panel of Figure 4.3 the age-at-arrival curves are shown for Australia. Here one can see that the non-immigrant group is high-performing, that there is a flat curve for arrivals from Britain, and a steep curve for arrivals from Africa and even more so from China. Especially notable is the fact that the early arrivals from China clearly outperform non-immigrant students, whereas the late arrivals score substantially lower.

New Zealand, in the next panel, tells a rather similar story with steeper curves for migrants from Africa and China, and with early arrivals outperforming non-immigrant students and late arrivals faring worse.

In Austria the late-arrival premium for migrants from Germany is apparent, and the late-arrival penalties for migrants from the former Yugoslavia and from Turkey. However, this figure also brings out the important point that the rather flat curves for the latter two groups do not tell a positive story about these migrants. Instead, what is observed is that even the early arrivals from the former Yugoslavia and from Turkey have much lower scores than non-immigrant students at age 15. In contrast, in Belgium, immigrant students from Turkey do not appear to suffer a late-arrival penalty, performing at much the same level as non-immigrant students throughout (although one should be careful about drawing any strong conclusions from this finding as it is based on a sample of only 61 migrants from Turkey).

In Luxembourg and Switzerland late-arrival penalties and lower scores are observed for minorities coming from linguistically-dissimilar countries. In contrast the curves are much flatter for migrants from France to Luxembourg, and for migrants from Germany to Switzerland, and the scores for the migrants are comparable to those of non-immigrant students. Switzerland, despite the absence of a late-arrival penalty overall, displays major late-arrival penalties for the late arrivers from Portugal and the former Yugoslavia.

To be sure, there are some anomalies in Tables B4.1a and B4.1b (and Figure 4.3), such as the profile of migrants from Turkey in Belgium, some of which may be due to sampling error given the small sample sizes involved. A more formal test of the hypothesis that late-arrival penalties are larger when the young people come from linguistically-dissimilar countries was therefore conducted. The PISA datasets record whether the young people were tested in the same language as they speak at home. This measure can be used to test statistically the informal observations based on the coefficients displayed in Table B4.1. The result is to confirm a significant difference in the age-at-arrival coefficients for those who do and do not speak the test language at home.[5]

The measure of language spoken at home, however, provides only limited information. The measure gives the current language spoken at home, which may not always be the same as the language spoken on arrival. Thus many early arrivers (and their families) may have shifted, partly or completely, from speaking their origin-country language in their early years in the new country to speaking the destination-country language by the time of the test.[6]

While the need to learn a new language is clearly important in explaining the late-arrival penalty, it is likely not the whole story. Even among those who speak the test language or who come from linguistically-similar origin countries, there is still a modest-sized late-arrival penalty.

One possible reason for this is that migrants moving from a country with lower educational standards to one with higher standards will have more ground to make up for and thus will be particularly penalised if they arrive late (having spent a larger proportion of their academic career in the country with lower standards and thus being even further behind). There is a further possibility as well: some young people might be moving from a high-achieving to a low-achieving country. In this case one might expect that late age-at-arrival might be beneficial since the young people will have spent more time in the educational system of the country of origin. In other words, the usual pattern of a penalty for late arrival might be reversed with a premium for late arrivals. And indeed there were some hints of this in Table B4.1a, for example, where migrants from higher-achieving Germany (mean score in PISA 2009 of 497) had a late-arrival premium in lower-achieving Austria (mean score of 470) as shown by the negative coefficient.

AGE OF ARRIVAL PENALTIES AND LANGUAGE SPOKEN AT HOME: A COMBINED ANALYSIS

To isolate the role played by language and late-arrival penalties, this section presents the results of an analysis that considers how all of these factors interact for a subsample of countries sharing common characteristics. Box 4.1 provides the technical details on the analysis.

The first column of results in Table B4.2 shows the coefficients estimated from a model which includes age at arrival, destination country, and type of origin country as the predictors. Four types of origin countries are distinguished,[7] namely: *i)* Linguistically-similar Western countries (the reference category); *ii)* Linguistically-dissimilar Western countries; *iii)* Linguistically-similar non-Western countries; and *iv)* Linguistically-dissimilar non-Western countries.

As is evident, in the first model there are significant late-arrival penalties for migration from linguistically-dissimilar countries (both Western and non-Western) and for nine countries of residence (relative to the reference country of Australia). Since age at arrival is coded as the natural logarithm of years spent in the destination country, the estimates for countries of origin and destination

effectively tell us about the reading scores of young people who arrived in the destination country at ages 15 and 16 (which are combined in the coding of age at arrival). That is, late arrivals from a linguistically-dissimilar non-Western country are estimated to score on average 51 score points less than late-arrivals from a linguistically-similar Western country; and late arrivals in Finland are estimated to score on average 67 score points more than late arrivals in Australia, while late arrivals in Italy on average score 51 score points worse than those in Australia.

Box 4.1 **Analysing the role of language and late-arrival penalties**

In order to assess the relative importance of these different processes, and to determine what country differences remain after taking these processes into account, a multivariate analysis of the dataset was undertaken. The dependent variable is, as before, the reading test scores of the young migrants. Only young migrants are included in the analysis (excluding second-generation and non-immigrant students) in order to focus on the effects of late arrival. (The total sample size for these analyses is therefore 11 299 young migrants.) Furthermore, the analyses are restricted to destination countries which are relatively developed, and which generally have high overall scores on the reading test and on the Human Development Index, in order to sidestep the differing patterns to be found in the less-developed destinations (and which would have involved more complex interaction terms). Migrants with an unreported country of origin are also excluded as they cannot be classified into the categories used in this analysis (described below). All the included countries are given equal weight in the analyses, the results of which are shown in Table B4.2.

The positive sign of the age-at-arrival coefficient reflects the effect of additional years of residence on the reading score. For example, for students with 15 years of residence, that is, who arrived in the destination country when they were less than one year of age, the reading score is estimated to be higher by about 50 score points than students who arrived when they were 15.[8] Fifty score points can thus be interpreted as the late-arrival penalty for those arriving at age 15.

The second model introduces interactions between age-at-arrival and type of origin country. This in effect allows the late-arrival penalty to differ according to the type of country from which the migrants came. And the estimated coefficients indicate that late-arrival penalties are significantly greater for migrants coming from linguistically-dissimilar non-Western countries than they are for migrants coming from linguistically-similar Western countries.

Perhaps the most helpful way to interpret these interaction terms is to add them to the "main effect" of age at arrival, thus showing us what the effect of age at arrival is for migrants from a particular type of origin. Thus, for migrants moving from one Western country to another, linguistically-similar Western country, the age-at-arrival coefficient is a statistically-significant 7.6 score points, so that the reading score improves with years of residence. Thus even these migrants experience a late-arrival penalty, possibly because of the difficulties of adjustment to a new educational system (or to unmeasured heterogeneity within our Western category, for example with respect to educational standards).

For migrants arriving from linguistically-similar non-Western countries the age-at-arrival coefficient is effectively the same at 3.4 score points (7.6 – 4.2), while for those arriving from linguistically-dissimilar Western countries it is rather larger at 15.1 score points (7.6 + 7.5). Finally, for those arriving from linguistically-dissimilar non-western countries it is significantly larger at 29.3 (7.6 + 21.7). It is this latter group of migrants, then, who have both to learn a new language and to make the transition from a non-Western to a Western educational environment, who experience much the largest late-arrival penalties.

In the third model, interactions between age at arrival and destination country are introduced. These interactions indicate whether the relationship between age at arrival and test scores is steeper in some countries than in the reference country of Australia. In effect, then, these reveal whether late-arrival penalties are greater in some countries than in others. (Note that this is importantly different from the meaning of the main effects of country, which simply indicates how the test scores of late arrivals in a particular country differ from those of late arrivals in Australia.) Only two of the interactions are statistically significant, those for Israel and for Switzerland – two countries which were seen in Figure 4.1 to be quite distinctive, Israel having the largest late-arrival penalty and Switzerland having the smallest.

In the fourth model, both sets of interactions are included, but the story remains essentially the same: migrants from linguistically-dissimilar non-Western countries experience much larger late-arrival penalties than do those from other origins. Once one controls for these differences in the composition of the migrant flow and the distinctive penalties which this particular group of migrants from linguistically-dissimilar non-Western countries experience, the remaining differences between Western destination countries in their late-arrival penalties prove to be statistically non-significant (apart from Israel and Switzerland).

Given the absence of statistically-significant interaction terms, one should be careful about drawing any conclusions as to whether particular countries provide more effective institutional arrangements for integrating late arrivals in the school system. Even in the cases of Israel and Switzerland, one needs to be circumspect since their distinctive age-at-arrival/test score profiles may be due to unmeasured heterogeneity in their migrant flows; this is particularly likely to be the case in Israel where the migrant flows are rather different from those going to any other destination, but as was seen in Figure 4.3, late arrivals in Switzerland from the former Yugoslavia (many of whom were from Kosovo) experience large late-arrival penalties.

SUMMARY AND CONCLUSIONS

After considering various factors that could affect the performance of immigrant children, including their age at arrival, gender, the language of the assessment and the educational standards both in the country of origin and in the host country, the analysis identifies an especially vulnerable group composed of students who arrived when they were of lower secondary-school age from less-developed countries where the home language is different from the test language in the destination country. These students have to both quickly acquire knowledge of the test language and catch up with the higher levels of attainment achieved by their peers in the destination country, all while coping with all the problems of adjusting to a new educational and social environment.

To be sure, test performance at age 15 is not in itself a critical issue, provided that poor performance at this stage does not have major implications for young people's future school careers. However, in most countries there are major decisions to be made at age 16 regarding which track to follow in upper secondary schooling, or whether to continue with schooling at all. Relatively poor reading performance at this stage may therefore have important implications for subsequent schooling. This suggests that, in addition to language instruction, additional help to mitigate the adverse consequences of arriving when older should be offered. This might take the form of further language instruction and flexible arrangements so that those students who arrive when they are older can delay the transition to upper secondary education. Flexible arrangements of this kind might be particularly important if linguistic problems are not the only obstacles facing young migrants. In other words, while language instruction is clearly of greatest importance, it may not be the only path to greater success in school. As the analyses in Table B4.2 shows, it is the combination of coming from a linguistically-dissimilar and less-developed country that is particularly disadvantageous for those who arrive when they are older. Coming from a linguistically-dissimilar but highly developed country does not appear to pose the same risks. Different social and educational contexts will probably require different solutions to these problems.

The results also point to a dilemma in migration policy that is rarely explicitly acknowledged. Most countries require that immigrants have adequate lodgings and income before family reunification is allowed. Although such requirements are well-intentioned, they sometimes result in delaying family reunification and thus increasing the disadvantages to immigrant children, especially if they are older, in terms of poorer reading outcomes and possibly in poorer labour market outcomes later on. Thus, a legitimate concern about the welfare of immigrant children and families may translate into the possibility, if not always the certainty, of poorer educational and integration outcomes following their arrival in destination countries.

Notes

1. This chapter is based on a working paper produced by Anthony Heath and Eilina Kilpi-Jakonen. For more detailed analyses and technical issues see Heath and Kilpi-Jakonen (2012).
2. The results for Qatar were not included in this table.
3. For this analysis, only groups with more than 40 observations are considered. Note however that this database combines the data from PISA 2003, PISA 2006 and PISA 2009.
4. The table shows the main effect added to the interaction effect. Technically, for each country test scores were regressed on the natural logarithm of years since arrival (that is, the number of years spent in the destination country by the time of the test), fitting both main effects for years since arrival and interaction effects, allowing the coefficients to vary across origin groups. After experimenting with alternative functional forms, the most parsimonious and tractable form seems to be to take the natural logarithm of the number of years spent in the destination country at the time of the test. The logarithmic transformation takes account of the fact that age-at-arrival differences are relatively small during the earlier years and that the differences gradually increase thereafter. It also provides a significantly better fit to the data than a simple linear model A quadratic function provides an even better fit to the data since it better captures the lower test scores of those who arrived in the first year of life. However, a quadratic function does not lend itself easily to modelling interaction terms, which are a key feature of the analysis, and the more parsimonious logarithmic transformation is therefore preferred.
5. The coefficient for those who speak the test language at home is 5.1 with a standard error of 2.0 and the interaction for those who do not speak the test language at home is 9.6 with a standard error of 2.5 (p=0.0002).

6. This is likely to bias the results of the statistical test although possibly the bias might lead one to underestimate the difference. Thus the early arrivers can be divided into three groups: those who speak the test language at home throughout their lives, those who speak a non-test language when they migrate but switch to the test language by age 15 and those who speak a non-test language throughout their lives. If the test scores of these three groups are assumed to go from highest to lowest in the order that they are listed here, then when the age-of-arrival effect of current test language speakers is examined, it will include a slightly worse-performing group of those who did not speak the test language on arrival, whereas the non-test group is missing the better-performing students (in comparison). If those who switched language do not differ in progress from those who have always spoken the test language and these two groups perform throughout at a higher level than those who speak a non-test language, then the age-at-arrival effect is correct for the test speakers but is dampened for the non-test speakers. But this does depend on what is assumed about the test scores and progress of these three groups (which unfortunately cannot be checked with the currently available data).

7. Linguistic similarity is assumed when countries have the same majority language. In cases where it is not clear whether immigrants are likely to speak the majority language, the language spoken at home was taken as the language of the immigrant student's country of birth. For example South Africans in Australia and New Zealand (the only two countries where they are identified separately) are classified as coming from a linguistically similar country when they speak the test language at home and from a linguistically different country when they do not. The same applies to immigrant students from Oceania. Italians are always regarded as being linguistically different, except for those in Switzerland who speak the test language at home. By the term "western" here is meant "developed" ; by this classification, Korea, for example, is western.

8. The estimated coefficient 18.5 score points times the natural logarithm of 15 years of age, which equals 50.

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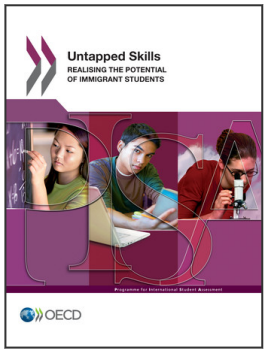

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