



Immigrant student performance in Math: Does it matter where you come from?



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ABSTRACT

The performance gap in math of immigrant students is investigated using PISA 2012. The gap with respect to non-immigrant schoolmates is first measured. The hypotheses that first (second) generation students coming from (whose parents come from) countries with a higher performance in math fare better than their immigrant peers coming from lower-ranked countries are then tested on a sample of about 13,000 immigrant students. The estimated average immigrant-native score gap in math amounts to -12 points. The results show that immigrant students coming from higher-ranked origin countries have a significantly lower score gap, and are thus relatively less disadvantaged. For example, coming from a country in the top quintile for math and having attended school there for one year improves the absolute score gap by more than 33 points, the highest coefficient among the variables that reduce the gap, such as parental education and socio-economic status.

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1. Introduction

The integration of immigrant students is becoming a central concern in many countries. It is widely recognized that the chances of social and economic integration would be increased if immigrant children were guaranteed equal education opportunities. Research on student school achievement provides evidence of a widespread performance gap between immigrant and native students that varies considerably across countries. The underperformance of immigrant students may be due to a multiplicity of factors, such as socio-economic differences (Ammermueller, 2007, Rangvid 2007), linguistic barriers (Akresh & Akresh, 2011), ethnicity and its transmission to children through parental influence (Gang & Zimmermann, 2000), age of arrival in the country of immigration

(Böhlmark, 2008; Van Ours & Veenman, 2006), educational institutions (Schneeweis, 2011), excessive concentration in schools (Cortes, 2006) and educational tracking (Lüdemann & Schwerdt, 2013).

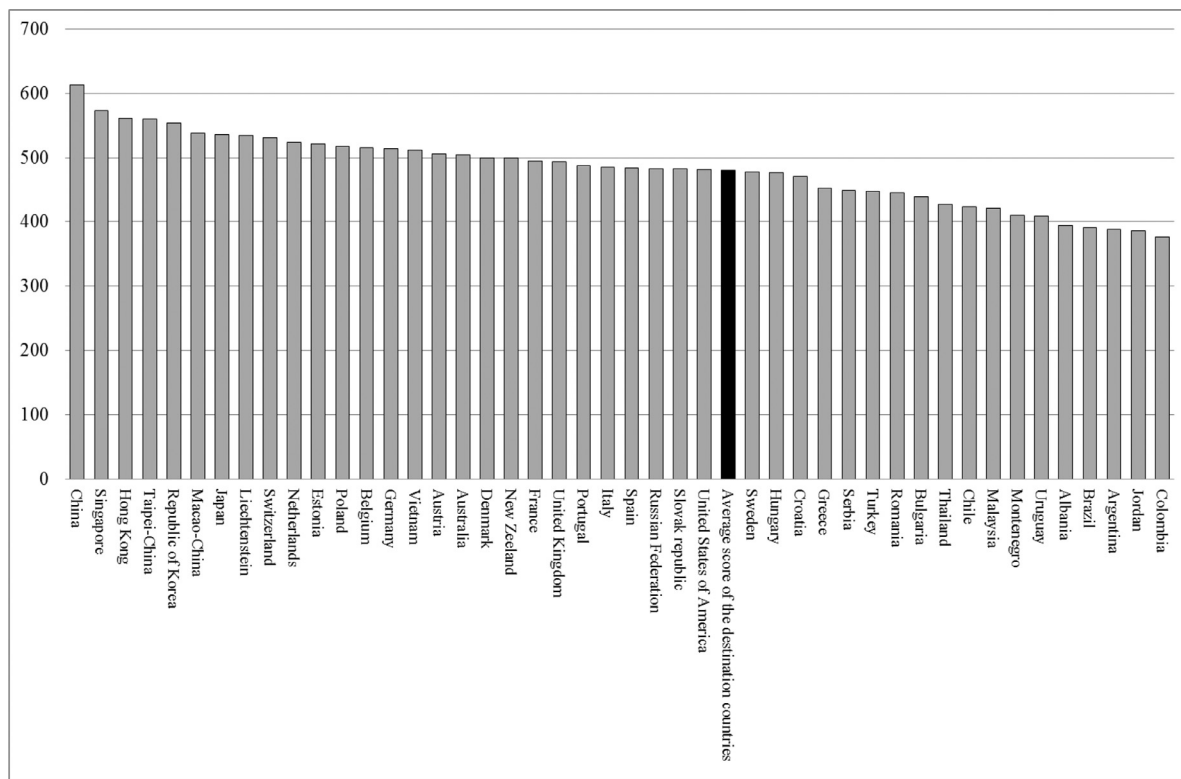
In parallel, growing attention is being paid to performance in math. The focus on math is motivated by the belief that mathematical skills are crucial for employment, productivity and earnings (Hanushek & Kimko, 2000), as well as for social mobility (Martins & Veiga, 2010). The estimated effect of student performance in math on economic growth, however, remains an open debate (Ramirez, Luo, Schofer, & Meyer, 2006). As far as performance gaps are concerned, the generalized evidence of gender score gaps in math in favor of males has stimulated research on assessing the relative importance of biological and cultural explanations (Guiso, Monte, Sapienza, & Zingales, 2008; Reilly, 2012; Stoet & Geary, 2013; Weber, Skirbekk, Freund, & Herlitz, 2014).

The focus of this paper is unique as it looks at the importance of origin countries performance in math on the score gap between immigrant and native students. Our

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Source: Our elaboration on PISA 2012.

Graph 1. Math scores of the countries of origin of immigrant students vs. average score of the countries of destination.

research assumption is that barriers to learning math in the host country are lower than those to learning other subjects that require more language skills. If math is a more portable skill than others, the disadvantage of immigrant students with respect to natives would be reduced, especially when the former come from countries that are highly ranked for math. In other words, immigrant students may take advantage of a performance in math of their origin countries which is higher than, or equivalent to, that of the countries of destination. This advantage may come indirectly from family influence, if they are second-generation immigrants. For first-generation immigrants, the advantage may come directly from schooling in the country of origin, if they had some schooling there, and indirectly from family influence. Parental influence would always be there, and may increase the advantage of immigrant students if their parents come from highly performing countries for math.

Using PISA 2012, we first measure the performance gap of immigrant students in math with respect to their native schoolmates, and then investigate whether the disadvantage is reduced when they come from highly-ranked countries for math performance.

Two pieces of evidence have motivated this research. The first is the well-documented fact that immigrant students experience severe difficulties in subjects that are, to a large extent, linked to language skills. As emerges from both the PISA 2000 and PISA 2009 surveys, in some countries the estimated disadvantage in reading skills of im-

migrants is of about one school year (around 40 points) compared to natives (OECD, 2012a). In the entire 2012 PISA sample, the immigrant-native score gap for math is on average -6.26 points, while in reading it amounts to -9.68 points.¹ This descriptive evidence supports the supposition that mathematical skills are indeed more portable than language skills. The second relevant piece of evidence is that the average performance in math of the countries of origin is often better than that of the countries of destination. Graph 1 shows that, in the PISA sample, the average score in math of a large number of countries of origin (gray bars) is higher than the overall average score in math of the countries of destination of immigrant students (black bar).

Our estimates show that performance in math of the countries of origin contributes to reducing both first- and second-generation students' immigrant-native score gap in absolute value, particularly of students that have attended school in highly-ranked countries. This result holds true when controlling for student characteristics, household socio-economic status, language spoken at home, school fixed effects, and level of economic development of the country of origin.

A limitation of our analysis is related to the unobserved heterogeneity implicit in the use of PISA data. In particular, the main sources of this heterogeneity are the

¹ Our calculation on PISA 2012 using the OECD definition of first- and second-generation immigrants.

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