ASSESSMENT MATTERS!

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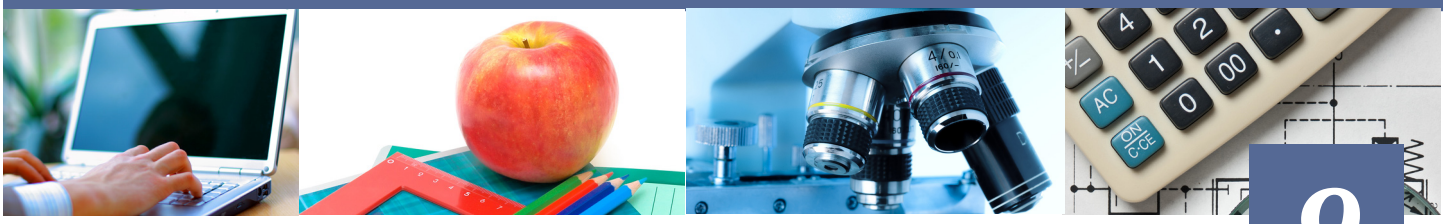

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IMMIGRANTS IN CANADA: DOES SOCIOECONOMIC BACKGROUND MATTER?

Success in education can be defined as a combination of high levels of achievement and high levels of equity in educational outcomes. Equity is important, as it is desirable to have all students succeed regardless of their socioeconomic background; therefore, the influence of such factors as socioeconomic status (SES) on educational outcomes should be negligible. According to the Programme for International Student Assessment (PISA), socioeconomic status is associated with performance at three levels (OECD, 2013):

- The system level, at which higher socioeconomic status involves greater spending on education;
- The school level, at which higher socioeconomic status relates to a safer environment and the availability of educational resource, such as libraries, laboratories, and computers;
- The individual level, at which higher socioeconomic status is reflected in the superior occupational status of the parents, often accompanied by more home possessions, more positive parental attitudes toward learning, and deeper involvement in their child's education.

This issue of *Assessment Matters!* focuses on the influence of socioeconomic background on the PISA 2012 outcomes for mathematics and investigates how this influence differs between immigrant and non-immigrant students in Canada. This topic is of particular relevance in Canada, given our high immigration levels and the often low socioeconomic status — at least initially — within this population.

Over one in four Canadian teenagers has an immigrant background

Across OECD countries, 11 per cent of 15-year-old students assessed by PISA in 2012 were found to have an immigrant background. As a multilingual and multicultural country, Canada stands out for having around 30 per cent of its student population made up of immigrants, which is well above the OECD average (OECD, 2013). Integrating immigrant students into schools remains a key indicator for the efficacy of any educational policy and, given the diversity of immigrant populations in Canada, is not always an easy task.

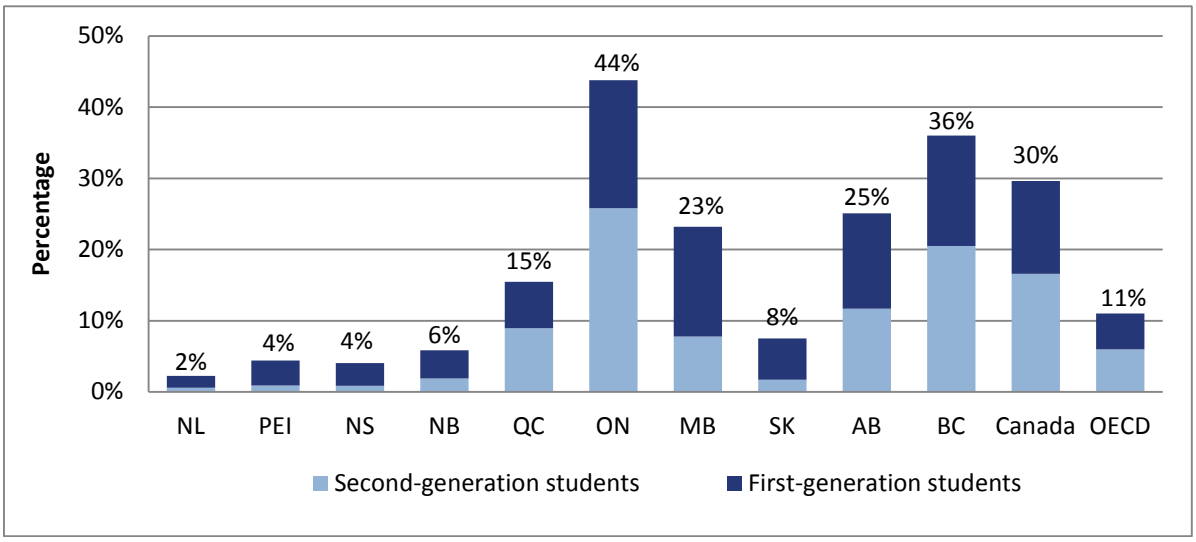
In PISA 2012, students were sorted into three categories, corresponding to the following definitions:

- Non-immigrant: students who have at least one parent who was born in the country in which the assessment was administered;

- First-generation immigrant: students who are foreign-born and have foreign-born parents;
- Second-generation immigrant: students who are born in the country in which the assessment was administered but have foreign-born parents.

Immigrants are usually separated into first- and second-generation in order to gain a perspective on intergenerational assimilation among immigrants. Chart 1 shows the proportion of students in each category, by province.

CHART 1 Proportion of first- and second-generation immigrants within the 15-year-old student body, by province



There is a performance gap between immigrant and non-immigrant students in some Canadian provinces

Table 1 below shows the average mathematics scores and the differences in scores for OECD and Canada.[1] While immigrant students perform significantly worse that their non-immigrant peers at the OECD level, no such gap is observed for Canada overall. There are, however, some significant differences across Canadian jurisdictions, with immigrant students scoring either below or above non-immigrants, depending on the province. Thus, first-generation immigrant students perform significantly worse than their non-immigrant peers in Quebec and the combined jurisdictions of Manitoba and Saskatchewan, but significantly better than their non-immigrant peers in British Columbia and the Atlantic jurisdictions. Second-generation immigrant students show significantly lower mathematics scores than their non-immigrant peers in Quebec. Elsewhere in Canada, the differences in performance between second-generation and non-immigrant students are not significant.

[1] Due to the low number of immigrants in some jurisdictions, data from some provinces had to be combined. Thus, New Brunswick, Newfoundland and Labrador, Nova Scotia, and Prince Edward Island were joined to form the Atlantic region. For the same reason, Manitoba and Saskatchewan were also combined.

Table 1 **Average mathematics scores and differences by immigrant group**

	Non-immigrant students		First-generation immigrant students		Second-generation immigrant students		First-generation minus non-immigrant students		Second-generation minus non-immigrant students	
	Mean math score	S.E.	Mean math score	S.E.	Mean math score	S.E.	Score difference	S.E.	Score difference	S.E.
Atlantic region	498	2.1	531	9.4	513	20.1	**33**	9.8	15	20.4
Quebec	544	3.2	509	8.4	509	8.0	**-35**	8.1	**-35**	8.2
Ontario	515	4.2	531	8.9	510	6.5	15	9.5	-5	7.0
Manitoba & Saskatchewan	505	2.4	483	6.4	500	10.6	**-22**	7.1	-5	10.8
Alberta	521	4.7	524	8.1	527	8.3	3	8.0	7	8.2
British Columbia	521	4.4	549	7.5	522	7.3	**28**	7.6	1	7.7
Canada[2]	522	1.8	528	5.2	514	4.5	6	5.4	-8	4.7
OECD[2]	500	0.5	453	1.6	469	2.0	**-45***	1.6	**-31**	2.0

Results in bold indicate a statistical difference between the immigrant groups. A negative difference means that the results for non-immigrant students are higher.
*Does not equal 453 minus 500 due to rounding and the fact that certain countries were dropped due to having low amount of immigrants.

Source: 2012 Programme for International Student Assessment (PISA)

Second-generation immigrant students have the lowest socioeconomic status in Canada

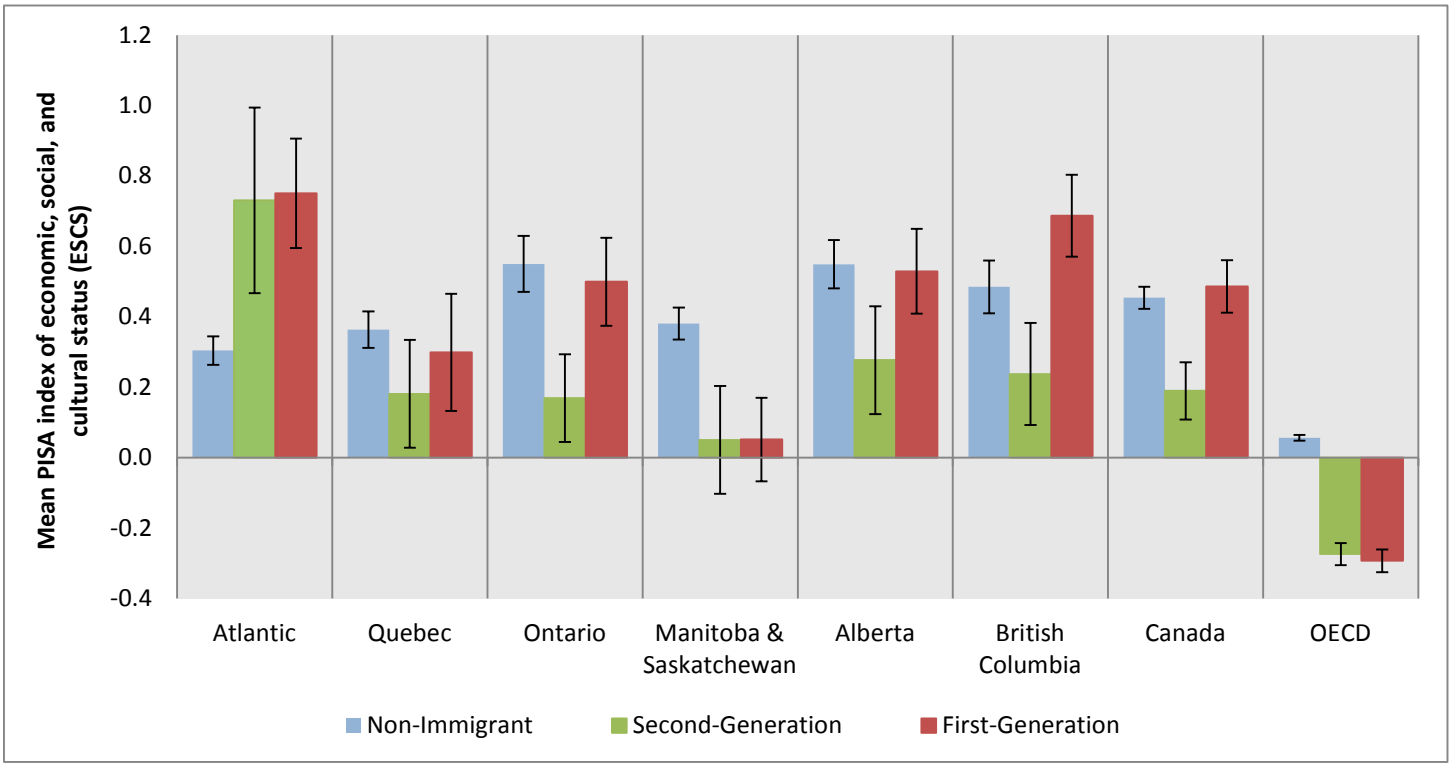
PISA measures students' socioeconomic status using the PISA index of economic, social, and cultural status (ESCS). The index is based on the following indicators: parental education and occupation, the number and type of home possessions, and the educational resources available at home (OECD, 2013).[3] The index has been standardized to have a mean of 0 for the population of students in OECD countries, with a standard deviation of 1.

Across OECD countries, first- and second-generation immigrant students have similar socioeconomic status, but both groups are worse off than non-immigrants (see Chart 2). In Canada, first-generation immigrant and non-immigrant students have similar socioeconomic status, while second-generation immigrant students are worse off than the other two groups. It should be noted, however, that all three groups are above the OECD average. Several variations are found at the provincial level, as shown in Table 2 below. The Atlantic provinces stand out for having first-generation immigrant students with a higher socioeconomic status than that of any group in Canada overall; in these provinces, both immigrant groups are better off than the non-immigrant population.

[2] Value for OECD and Canada overall in Charts 1 and 2 and Tables 1 and 2 are derived from the second volume of the International PISA 2012 report (OECD, 2013: Table II.3.6a in Annex B1).

[3] While wealth is usually used to calculate socioeconomic status, no direct measure of wealth is available in PISA. Instead, the number and type of home possessions are used as a proxy measure.

CHART 2 **Socioeconomic status by immigrant group**



While it may seem strange that, in Canada, first-generation immigrant students enjoy a higher socioeconomic status than second-generation immigrant students, there are two interrelated factors to take into consideration. The first factor is PISA's method of calculating socioeconomic status, which has a strong focus on parental education and educational resources in the home instead of parental income level. The second factor is immigration policy in Canada, where, in the 1990s, the immigration selection process was altered to increase the importance of education as an admission criterion (Ferrer et al., 2012; Green et al., 1999). The combination of these two factors can potentially explain the socioeconomic gaps between first- and second-generation immigrant students.

Taking socioeconomic status into account changes the performance gaps in some provinces

Changes in performance gaps in mathematics shown in Table 2 suggest that it is important to take socioeconomic status into account. Thus, while significant differences between immigrant students and non-immigrants across OECD countries still existed after controlling for socioeconomic status, the performance gaps narrowed by over 10 points. In Canada overall, the differences between immigrant and non-immigrant students are still not significant, but several changes occurred at the provincial level. More precisely, accounting for socioeconomic status produced significant changes in the following provinces:

- Manitoba and Saskatchewan — in this combined jurisdiction, the difference between first-generation and non-immigrant students narrowed to become non-significant ;
- Alberta — in this province, the difference between second-generation and non-immigrant students narrowed to become non-significant;
- Ontario — in this province, the performance gap between first-generation and non-immigrant students grew and became statistically significant.

It is also important to note that the performance of first- and second-generation immigrant students in Quebec was significantly lower than that of their non-immigrant peers, regardless of socioeconomic status.

Table 2 **Mathematics score differences between immigrant and non-immigrant students after accounting for socioeconomic status**

	First-generation minus non-immigrant students		Second-generation minus non-immigrant students	
	Score difference	S.E.	Score difference	S.E.
Atlantic region	**20**	9.6	3	19.8
Quebec	**-32**	7.4	**-28**	7.3
Ontario	**18**	8.2	7	6.4
Manitoba & Saskatchewan	-12	6.5	6	10.8
Alberta	4	6.8	**16**	7.1
British Columbia	**23**	7.2	8	7.6
Canada	5	4.7	0	4.3
OECD	**-29**	1.4	**-18**	1.9

Results in bold indicate a statistical difference between the immigrant groups. A negative difference means that the results for non-immigrant students are higher.

Source: 2012 Programme for International Student Assessment (PISA)

The influence of socioeconomic status on mathematics performance varies according to immigrant status

One way to evaluate equity in achievement is by measuring the extent to which the differences in performance are explained by disparities in students' socioeconomic status. Across all OECD countries, about 15 per cent of the differences in mathematics performance can be explained by socioeconomic background. Breaking that down by immigrant groups, the numbers are about 13 per cent, 9 per cent, and 14 per cent for first-, second-generation immigrants, and non-immigrants, respectively. In a perfectly equitable education system, the percentage would be zero, which would indicate that the interaction between immigrant status and socioeconomic status does not influence academic outcomes.

In Canada overall, socioeconomic status is responsible for about 16 per cent, 6 per cent, and 9 per cent of the differences in mathematics performance for first-, second-generation immigrant, and non-immigrant students, respectively (see Table 3). Thus, socioeconomic status has a greater influence on first-generation immigrant students than on the other two groups. This means that it is more difficult for first-generation immigrant students with lower socioeconomic status to be high-performing than it is for disadvantaged students from the other two groups.

At the provincial level, over 10 per cent of the differences in mathematics performance can be explained by socioeconomic status for:

- first-generation immigrant students in Ontario, Alberta, and the combined jurisdiction of Manitoba and Saskatchewan; and
- non-immigrant students in Quebec and the combined jurisdiction of Manitoba and Saskatchewan.

First-generation immigrant students in Ontario and Alberta stand out for having over 18 per cent of the differences in their mathematics performance explained by socioeconomic status. For second-generation immigrant students, no more than 10 per cent of the differences in mathematics performance were explained by socioeconomic status in any province.

TABLE 3 **Proportions of variation in mathematics performance explained by disparities in students' socioeconomic status**

	First-generation immigrant students	Second-generation immigrant students	Non-immigrant students	Overall
Atlantic region	6.7%	9.8%	9.5%	9.8%
Quebec	9.4%	5.0%	12.5%	11.6%
Ontario	18.1%	6.6%	9.2%	9.6%
Manitoba & Saskatchewan	13.2%	6.6%	10.5%	10.8%
Alberta	18.5%	6.1%	8.4%	8.9%
British Columbia	3.8%	3.8%	9.1%	7.1%
Canada	15.5%	6.0%	9.4%	9.4%
OECD	13.1%	9.1%	14.0%	14.8%

This table presents the proportion of the variation explained by students' socioeconomic background (R^2 x 100%). Countries with fewer than 30 immigrant students or fewer than five schools with valid data for the different immigrant sub-groups were not included in the calculation of the OECD average. These include Chile, Iceland, Japan, Korea, Poland, and Slovakia for second-generation immigrant results and Estonia, Hungary, Japan, Korea, Poland, Slovakia, and Turkey for first-generation immigrant results.

Source: 2012 Programme for International Student Assessment (PISA)

In Canada, improvement in socioeconomic status impacts first-generation immigrant students the most

Another measure of equity used by PISA is the score-point difference in performance associated with improvements in socioeconomic status. Chart 3 shows the changes in mathematics scores due to a one-unit increase in the PISA index of economic, social and cultural status (ESCS).[4] Across OECD countries, and in Canada overall, an increase in socioeconomic status substantially improves performance of both immigrant and non-immigrant students: mathematics scores improve by over 20 points. In OECD countries, the biggest change in performance was found among non-immigrant students, while in Canada, the biggest change was found among first-generation immigrant students. At the provincial level, the strongest effect of socioeconomic status appeared in Ontario and Alberta, where a one-unit change in ESCS improved the mathematics score of first-generation immigrant students by over 40 points.

[4] Since ESCS has a mean of 0 and a standard deviation of 1, a one-unit change in ESCS is relatively large.

CHART 3 **Changes in mathematics scores due to a one-unit increase in ESCS**

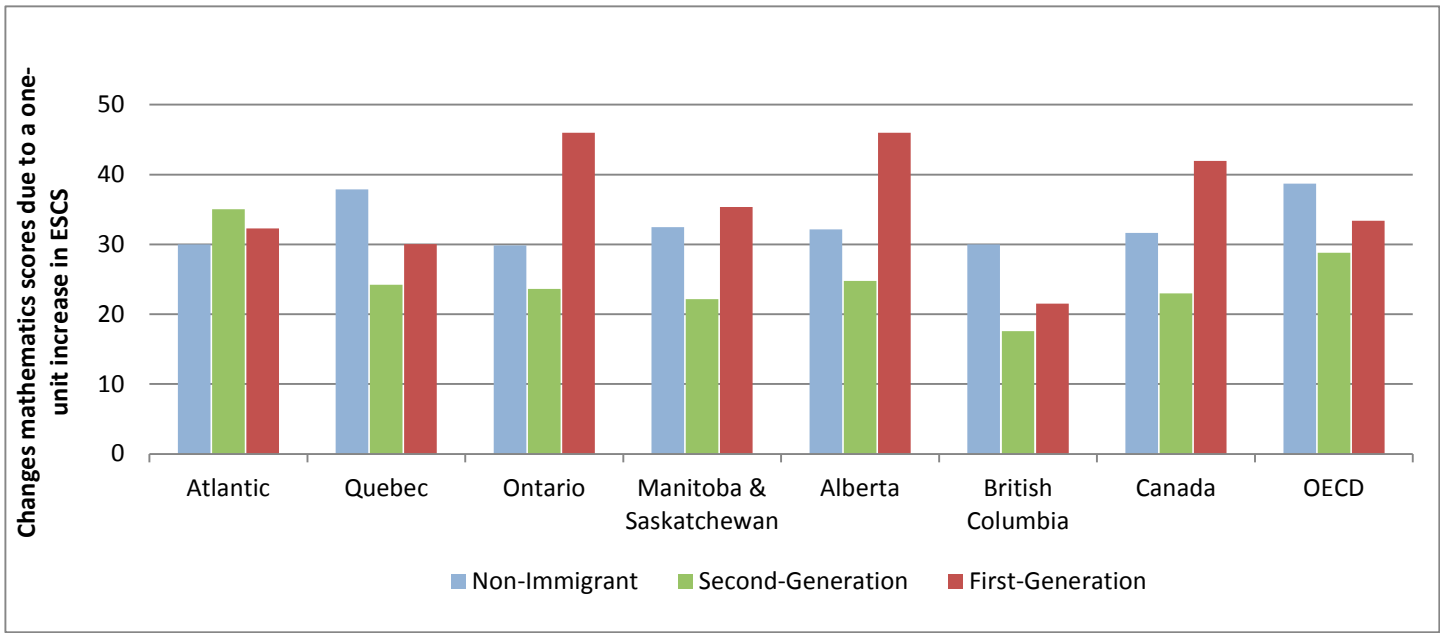


Table 4 compares the impact of an increase in socioeconomic status on performance between immigrant and non-immigrant students. A positive difference in Table 4 means that a one-unit change in socioeconomic status will cause a bigger change in the mathematics scores of immigrant students than of non-immigrant students. Across OECD countries, the differences are negative and significant, meaning that immigrant students across OECD countries are less impacted by socioeconomic status than non-immigrant students are. In Canada overall, the difference is positive and significant for first-generation immigrant students, but negative and significant for second-generation immigrant students. This implies that, in Canada, first-generation immigrant students are more impacted by socioeconomic status than non-immigrant students are, while second-generation immigrant students are less impacted. The strong impact of the ESCS increase on first-generation immigrant students in Canada largely comes from Ontario and Alberta.

TABLE 4 **Differences in the changes in mathematics scores due to a one-unit increase in ESCS between immigrant and non-immigrant students**

	First-generation immigrant students minus non-immigrant students		Second-generation immigrant students minus non-immigrant students	
	Difference	S.E. of difference	Difference	S.E. of difference
Atlantic region	2.3	11.9	5.1	18.2
Quebec	-7.8	6.7	-13.6	8.7
Ontario	**16.2**	6.9	-6.2	4.9
Manitoba & Saskatchewan	2.9	6.8	-10.3	9.3
Alberta	**13.8**	6.9	-7.4	7.7
British Columbia	-8.5	8.1	-12.4	7.0
Canada	**10.3**	3.7	**-8.7**	3.0
OECD	**-4.4**	1.5	**-9.4**	1.8

Results in bold indicate a statistical difference between the immigrant groups. A negative value means that the immigrant students are less impacted by socioeconomic status than non-immigrant students are. Countries with fewer than 30 immigrant students or fewer than five schools with valid data for the different immigrant sub-groups were not included in the calculation of the OECD average. These include Chile, Iceland, Japan, Korea, Poland, and Slovakia for second-generation immigrant results and Estonia, Hungary, Japan, Korea, Poland, Slovakia, and Turkey for first-generation immigrant results.

Source: 2012 Programme for International Student Assessment (PISA)

Summary and Conclusion

Consistent with results presented in other OECD publications, immigrant students in Canada perform at the same level as non-immigrant students in mathematics. However, at the provincial level, there are some striking differences. After accounting for socioeconomic status, the performance of immigrant students in Quebec was significantly lower than that of their non-immigrant peers. The opposite is true for first-generation immigrant students in Ontario, British Columbia, and the Atlantic region, as well as for second-generation immigrant students in Alberta. From an equity perspective, these performance differences might be a cause for concern.

Using various statistical techniques, it has been determined that socioeconomic status has a greater influence on the mathematics performance of first-generation immigrant students than of non-immigrant students throughout Canada. This difference in influence is mainly due to the results from Ontario and Alberta, where the performance of first-generation immigrant students was more impacted by socioeconomic background. Since equity remains one of the most important goals in education, all provinces should strive to give all students, regardless of socioeconomic or immigrant background, the same chance to succeed.

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