Socio-Economic Segregation Between Schools in Canada

By Anna Katyn Chmielewski and Sachin Maharaj

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Abstract

Canada's level of socio-economic segregation or sorting between schools—the extent to which students of different socio-economic status (SES) attend different schools—is low by international standards. However, this overall level may mask inter-provincial differences in segregation. Provinces have strikingly different school choice policies, which may affect segregation levels. We estimate segregation in each province using seven cycles of the Programme for International Student Assessment (PISA 2000-2018). We find that segregation is highest in Quebec and lowest in the Maritimes provinces. Correlational and decomposition analyses suggest high segregation in Quebec may be driven by private school enrolment.

Keywords: segregation, sorting, socio-economic inequalities, school choice, Canadian provinces, PISA

Acknowledgements

This research benefited from excellent research assistance from Erica Cheng, Mabruk Kabir and Alice Romo. The project was funded by a SSHRC Insight Development Grant to Anna Katyn Chmielewski and by the University of Toronto's Research Initiative on Education + Skills.

We thank the Council of Ministers of Education, Canada (CMEC) and the provincial ministries/departments of education for access to provincial identifiers for PISA. All other variables were publicly available online from the Organization of Economic Cooperation and Development (OECD). All analyses were conducted by the authors, who assume responsibility for the use and interpretation of the data, and do not reflect the views of CMEC, the provincial or territorial ministries/departments of education, or the OECD.

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RIES is a subsidiary of the FutureSkills Research Lab at the University of Toronto.
When referencing this report, please cite as: Chmielewski, A. K. & Maharaj, S. (2022). *Socio-Economic segregation between schools in Canada.* FutureSkills Research Lab. http://futureskillscanada.com

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Introduction

Socio-economic segregation or sorting between schools—that is, the extent to which students of different socio-economic status (SES) attend different schools—is pervasive across Canada, although segregation levels tend to be less extreme than those seen in many other countries (OECD, 2019). Scholars, policy-makers and journalists argue that socio-economic segregation undermines the principles of equity, inclusion and diversity (Conseil supérieur de l'éducation, 2016; Kamanzi, 2019; Outhit, 2018; Yoon, 2017). Moreover, research across Canada and a range of international settings shows that school SES composition is associated with many important outcomes, including graduation rates, post-secondary attendance and test scores (Friesen & Krauth, 2007; McEwan, 2003; Palardy, 2013; Perry & McConney, 2013; Rumberger & Palardy, 2005; Willms, 2010). The likely causes of these associations are disparities in resources, such as school climate, curricular rigour, parental involvement, and money from private fundraising (Willms, 2010; Winton & Milani, 2017; Yoon et al., 2020). Thus, SES segregation between schools may not only threaten social cohesion but also reduce social mobility via unequal childhood experiences.

Yet the overall level of segregation in Canada may mask differences across provinces. These differences could arise not only due to provincial differences in levels of residential segregation but also due to the striking variety of school choice policies across provinces (Lubienski & Yoon, 2017). Five provinces publicly fund some private schools, three publicly fund Catholic schools, and four have open enrolment policies. However, to date, there is little evidence on how these policy differences may affect inter-provincial differences in segregation. Additionally, there is very little national or provincial evidence on how segregation may be changing over time in Canada, though international research shows that segregation is increasing in several other countries, including the United States, Chile, and Sweden (Lindbom, 2010; Owens et al., 2016; Valenzuela et al., 2014).

We conduct the first large-scale investigation of inter-provincial differences in SES segregation between schools in Canada, addressing two objectives: 1) describing levels of segregation by province, and 2) examining the possible causes of provincial differences. We draw on data from seven cycles of the Programme for International Student Assessment (PISA), spanning the years from 2000 to 2018 across the 10 provinces.[1]

We examine possible explanations for inter-provincial differences in segregation using correlations between segregation levels and provincial policy variables, as well as decomposition analysis.

1 Territories were not included in PISA.

Causes of segregation

Since school attendance in Canada is largely determined by residential catchment area, neighbourhood segregation is an important determinant of SES segregation between schools. Neighbourhood income segregation varies widely across large Canadian cities, with higher levels in Toronto, Winnipeg and Montreal, and lower levels in Edmonton, Vancouver and Halifax (Chen et al., 2012; Walks, 2013). Neighbourhood segregation is partly due to "Tiebout choice," meaning families choose where to live based on local services and amenities, including public schools themselves (Hoxby, 2000; Tiebout, 1956; Urquiola, 2005). One-third of Canadian families report exercising this implicit form of school choice by choosing a neighbourhood near desirable schools (Davies & Aurini, 2011).

However, neighbourhood segregation is not the only potential source of school segregation. Growing levels of school choice across Canada have weakened the link between residential location and schooling options, with an additional one third of families choosing a school other than a "standard" public school (Davies & Aurini, 2011). Some economists have argued that school choice allows families to select the best schools and creates competition among schools, thus improving efficiency (Chubb & Moe, 1990; Friedman, 1955).

But empirical research in education, economics, and sociology shows that school choice can increase school segregation (Bohlmark & Lindahl, 2007; Byun et al., 2012; Hsieh & Urquiola, 2006; Ladd & Fiske, 2001; Söderström & Uusitalo, 2010; Valenzuela et al., 2014). This is for three main reasons:

First, low-SES families face barriers to exercising school choice, including tuition costs (for private schools), as well as information, proximity and the know-how to navigate complex choice systems (Bell, 2009; Burgess et al., 2015; Denice & Gross, 2016; Friesen et al., 2012; Hastings et al., 2009; Waslander et al., 2010; Yoon & Lubienski, 2017).

Second, schools have an incentive to "cream skim" by admitting higher-achieving, easier-to-educate students via admissions requirements such as entrance exams, which may constitute further barriers for low-SES students (Epple et al., 2017).

Finally, high-SES families may prefer not only school academic quality but also an advantaged socio-economic composition (Abdulkadiroğlu et al., 2020; Burgess et al., 2015; Holme, 2002; Rothstein, 2006; Rowe & Lubienski, 2017; Willms & Echols, 1992; Yoon et al., 2018).

Provincial differences in school choice policies

A striking variety of school choice policies exist across Canadian provinces, including independent private schools, publicly funded private schools, publicly funded Catholic schools, charter schools, open enrolment, and specialized magnet programs. Additionally, all provinces and territories have public minority language school systems (Anglophone schools in Quebec and Francophone schools elsewhere), though these do not represent the typical definition of school choice since only members of the relevant language minority have the option to enrol.

Although the overall rate of private schooling in Canada is relatively low by international standards, at approximately 8 percent of total secondary enrolment (UNESCO, 2020), private school enrolment has increased in 9 of 10 provinces since 2000 (Bosetti et al., 2017). Additionally, the rates of private school enrolment vary widely across provinces, ranging from over 20 percent of secondary enrolment in Quebec to less than two percent in New Brunswick, Newfoundland and Labrador, and Prince Edward Island (Statistics Canada, 2020b, 2020d). The provinces with the highest private school enrolment tend to be among the five that provide public subsidies to private schools: Quebec, British Columbia, Alberta, Manitoba and Saskatchewan (Allison et al., 2017). Research at both the national level and in the province of Quebec shows that higher-SES families are more likely to enrol their children in private schools (Conseil supérieur de l'éducation, 2016; Davies & Aurini, 2011; Statistics Canada, 2001).

Despite the low rate of private schooling in Canada, three provinces also operate what is "effectively a voucher program" by fully publicly funding Catholic schools (Card et al., 2010, p. 151). Relatively large shares of students attend publicly funded Catholic schools in all three provinces: Alberta (24%), Ontario (30%) and Saskatchewan (23%) (Government of Alberta, 2020; Ontario Ministry of Education, 2020; R. Warnock, personal communication, June 3, 2020). Data from Ontario indicate that Catholic parents have higher earnings and education than non-Catholic parents, and likewise students in Catholic schools come from higher-income and more educated neighbourhoods compared to their counterparts in secular public schools (Card et al., 2010; Davies, 2013). Charter (publicly-funded, privately-run) schools exist only in the province of Alberta and in very small numbers (Mindzak, 2015).

Perhaps the most prevalent type of school choice in Canada are what is known variously as "open enrolment", "optional attendance" or "cross-boundary enrolment" policies, which allow students to attend schools outside their assigned catchment areas, space permitting. While only the provinces of British Columbia and Manitoba have province-wide open boundary policies (inter-district choice), and only Alberta and Quebec have policies mandating intra-district choice (Allison, 2015; Allison et al., 2017), in practice, intra-district choice is also common in many urban school boards across Canada (Leonard, 2015). Research from Yoon and colleagues shows that, in both Vancouver and Toronto, students from more advantaged neighbourhoods are more likely to opt into the most in-demand schools (Yoon et al., 2018; Yoon, Marmureanu, et al., 2020).

However, research drawing on province-wide data from BC suggests that while the open boundaries policy slightly increased school segregation by achievement, it had little effect on segregation by ethnicity or home language (Friesen et al., 2011). And evidence on intra-district open enrolment in the Greater Toronto Area finds that while higher-achieving students are more likely to opt out of their assigned school, greater availability of school choice does not lead to higher segregation by achievement (Leonard, 2015).

Despite limited evidence on the effects of open enrolment on segregation, we might still expect these forms of choice to increase segregation, based on the large body of research on specialized curricula or programs, such as International Baccalaureate, French immersion and gifted, which often drive public school choices in urban school boards (Kamanzi, 2019; Parekh & Gaztambide-Fernández, 2017; Resnik, 2020; Yoon, Marmureanu, et al., 2020). While purportedly available to all students, specialized programs tend to enrol students who can pass admissions requirements and who have greater access to information and transportation (Parekh & Gaztambide-Fernández, 2017; Yoon et al., 2018; Yoon, Marmureanu, et al., 2020). Research from the Toronto District School Board shows that high-income and White students are overrepresented in specialized programs (Parekh, 2013; Sinay, 2010). The specialized program that has received the most research attention is French immersion. Nationally-representative evidence from the National Longitudinal Survey of Children and Youth shows that children in French immersion are more likely to be from higher-income families and have parents with university degrees (Worswick, 2003). In New Brunswick, students from low-SES backgrounds and those with special needs are underrepresented in French immersion (Willms, 2008). And in the Toronto District School Board, French immersion programs enrol disproportionately few racialized students, English language learners, students whose parents have less than a university education, and students with special education needs (Sinay et al., 2018). Although French immersion and other specialized programs are generally within-school programs, we also expect them to be associated with higher levels of between-school segregation, since students from higher-SES backgrounds are more likely to opt out of their local schools in order to attend schools with specialized programs (Yoon et al., 2018; Yoon, Marmureanu, et al., 2020).

Design

Research questions and empirical approach

Our study produces the first descriptive evidence on inter-provincial differences in SES segregation between schools. We define segregation as a province-level measure capturing how unevenly distributed students of different SES are across schools within the province.

We ask two research questions:

1. How does the level of segregation differ across provinces?
2. Can inter-provincial differences in segregation be explained by education policy and/or contextual factors?

In attempting to explain provincial differences (Question #2), we take two empirical approaches. First, we examine cross-sectional correlations between provincial segregation levels and explanatory variables at a single point in time (n = 10). We view these snapshot correlations as a weaker causal test because, for example, a positive correlation between segregation and private school enrolment could mean that private schooling causes segregation or that both are driven by an underlying common cause. Second, we decompose segregation into components that occur between versus within groups of schools (e.g., public/private, Francophone/Anglophone). We prefer decomposition over cross-sectional correlations because decomposition allows us to observe whether segregation breaks down descriptively between groups of schools as expected. For example, if private schooling causes segregation, we would expect to see segregation between public and private schools.

In addition, we explored using multilevel panel models to predict segregation in a given province-year from time-varying provincial covariates, thus controlling for unobserved provincial characteristics. However, changes in segregation over time are so small that there was little meaningful variation in the outcome, making these models less useful for explaining segregation levels.

Data

In this study, we draw on data from all 7 cycles of the Programme for International Student Assessment (PISA 2000, 2003, 2006, 2009, 2012, 2015 and 2018). PISA is an international assessment conducted by the Organization for Economic Co-operation and Development (OECD) that tests 15-year-old students in reading, math, and science in approximately 70 countries. Canada sampled over 20 thousand students in every cycle of PISA in order to enable reliable estimates from all 10 provinces (territories were not included in PISA). Sample sizes by province and year are available in **Appendix Table A1**.

All assessments use two-stage probability samples of students within schools and include representative samples of both Anglophone and Francophone public school sectors,[2] as well as private schools. Reserve schools were not included in PISA. PISA data include survey weights, which we incorporate into our segregation calculations, as described in the Methods section. Since PISA uses an age-based rather than a grade-based sample, students may be in a variety of grades, ranging from grade 7 to grade 12. In practice, in 2018, 87.7% of the sample is in grade 10, 9.7% is in grade 9 and 2.6% is in another grade.[3] We calculate segregation for each province in each study-year. This yields 70 observations (province-years) in the sample.

Student-level variable

Socio-economic status (SES). We use as our measure of SES the OECD-created Index of Social and Cultural Status (ESCS), which combines highest parental educational attainment, highest parental occupational attainment, and an inventory of household possessions. All components of the index are student reported.[4] The index has a mean of 0 and standard deviation of 1 across all OECD countries but has a mean greater than 0 in all Canadian provinces.[5] When calculating segregation, we convert the index into province-year-specific percentiles, described further in the methods section.[6] The approximately 3% of students with missing SES are dropped from the analysis.

2 Francophone schools were not included in the Newfoundland and Labrador sample. This is unlikely to affect results substantially, as Newfoundland and Labrador has the lowest enrolment rate in minority official language schools of any province, with only 36 students (0.2%) enrolled in Francophone high schools in 2017-18 (Statistics Canada, 2020c).

3 The share of students in grade 10 varies somewhat across provinces and is particularly low in Quebec (65% in 2018), as noted by Haeck and Lefebvre (2021). However, our segregation results do not change substantially if we drop students outside grade 10 from the analysis. After dropping these students, segregation in Quebec decreases slightly, but Quebec is still approximately tied with Manitoba for the highest provincial segregation level.

4 The fact that SES variables are student reported introduces measurement error into the index (Chmielewski, 2019; Jerrim & Micklewright, 2014). This causes segregation to be underestimated due to attenuation bias. However, we can think of no reason to expect the reliability of Canadian students' reports of SES variables would differ across provinces or over time.

5 For PISA 2000-2012, we use ESCS rescaled by the OECD for consistency with the PISA 2015 ESCS index. After 2015, the OECD no longer releases rescaled ESCS. In their view, ESCS indices are comparable across years if ESCS is standardized within year (as we do) – i.e., different ESCS indices rank students similarly (OECD, 2021).

6 Thus, our usage of the ESCS index avoids Haeck and Lefebvre's (2021) criticism of ESCS that the average levels of the index in each Canadian province fluctuate markedly over time. Our results are unaffected by this fluctuation since we use within-province percentile rankings for all analyses. Our results remain broadly similar if we instead use the occupational status index HISEI recommended by Haeck and Lefebvre's (2021). However, we prefer ESCS because it includes parental education and household possessions as a proxy for wealth, which we consider important dimensions of SES.

School-level variables for decomposition analysis

Language Sector. An indicator for whether a school belongs to the Anglophone or Francophone language sector, derived from PISA stratum information.

Sector. An indicator for whether a school is public or is a privately-managed school (regardless of funding source), derived from the PISA principal questionnaire. We include publicly-subsidized private schools in the private category.

Admissions – Special Program. An indicator of whether or not a school offers a special program, derived from a PISA principal questionnaire item on whether interest in a special program is "always" or "sometimes" considered in admission decisions.

Community Size Category. The category of community in which the school is located: (1) A village, hamlet or rural area (fewer than 3,000 people), (2) A small town (3,000 to about 15,000 people), (3) A town (15,000 to about 100,000 people), (4) A city (100,000 to about 1,000,000 people), (5) A large city (with over 1,000,000 people). Derived from the PISA principal questionnaire.

The approximately 4-6% of observations with missing school-level variables are dropped from the decomposition analysis.

Province-level variables for correlation analysis

Private Enrolment. The proportion of students enrolled in privately-managed schools, computed by province-year from the school-level PISA variable described above.

Catholic Enrolment. The proportion of secondary school students enrolled in publicly-funded Catholic schools by province-year from provincial ministry statistics (Government of Alberta, 2020; Ontario Ministry of Education, 2020; R. Warnock, personal communication, June 3, 2020).

French Immersion Enrolment. Ideally, we would have liked to measure enrolment in a variety of specialized programs, including International Baccalaureate, gifted programs, etc. Unfortunately, French immersion was the only program for which we could obtain comprehensive data across all 10 provinces. We measure French immersion enrolment as the proportion of secondary school students enrolled in French immersion programs as a share of total public school enrolment, by province-year (Statistics Canada, 2020c, 2020b).

As data on province-wide residential income segregation is not available, we examined two proxy measures. Neighbourhood segregation has been shown to be driven in part by income inequality (Hulchanski, 2010; Reardon & Bischoff, 2011; Walks, 2013; Watson, 2009). Residential segregation may also be driven by urbanization, as cities tend to be more economically segregated than rural areas, and cities with larger populations tend to have higher levels of neighbourhood income segregation (Chen et al., 2012; Walks, 2013).

Income Inequality. Gini coefficient, measuring inequality in the distribution of adjusted after-tax income (on a scale from 0 representing minimum inequality to 1 representing maximum inequality), by province-year (Statistics Canada, 2020a).

Urban Population. The proportion of the population living in large, medium or small population centres (i.e., not living in rural areas), by province-year, from Census data (Statistics Canada, 2019). We interpolate values for non-Census years.

We also include two variables for the shares of the youth population identifying as visible minorities and as Indigenous. Canadian cities with the highest concentrations of visible minority groups or of Indigenous people tend to have higher levels of residential segregation of these respective populations (Balakrishnan et al., 2005; Balakrishnan & Jurdi, 2007). Indigenous people, recent immigrants and certain visible minority groups tend to be concentrated in the lowest income neighbourhoods (Walks & Bourne, 2006). Thus, we expect provinces with larger youth visible minority or Indigenous populations may have higher residential SES segregation and thus higher SES segregation between schools.

Youth Visible Minority Population. The proportion of the population ages 15-24 identifying as visible minorities, by province-year, from Census and National Household Survey data (Statistics Canada, 2017b). We interpolate values for non-Census years.

Youth Indigenous Population. The proportion of the population ages 15-24 identifying as First Nations, Metis or Inuit, by province-year, from Census data (Statistics Canada, 2017a). We interpolate values for non-Census years.

Methods

We estimate segregation using the rank-order variance ratio index (R^R) (Reardon, 2011), a measure of how unevenly distributed students of different SES are across schools. Like most other segregation measures,[7] the rank-order variance ratio index is scaled from 0 to 1. Zero represents no segregation, where the SES distribution of every school exactly matches the SES distribution of the overall student population, and 1 represents complete segregation, where every school enrols only students of the same SES.

The rank-order variance ratio index is an extension of the two-group variance ratio index (R) (James & Taeuber, 1985) to the case of segregation by a continuous or ordinally-scaled variable. We first convert the continuous SES index into province-year-specific percentiles (weighted by survey weights), and then divide students in each province-year into 15 equal categories, defined by 14 evenly spaced percentile thresholds at the 6.6th percentile, 13.3th percentile, etc. Then we follow the steps below, outlined in Reardon (2011). For each threshold, we estimate the segregation of all students with SES above that threshold from all students with SES below that threshold, using the two-group variance ratio index *R*.

The *R* index relies on comparing the variation in SES group membership of each school to the variation in group membership in the total population. Variation is measured by the interaction index (*I*), defined as

$$I = \pi(1 - \pi) \tag{1}$$

where π is the proportion of students in one SES group, and 1-π is the proportion of students in the other SES group. The two-group variance ratio index *R* is then defined as 1 minus the weighted average ratio of within-school SES variation to total SES variation, weighted by school size, that is

$$R = 1 - \sum_{j=1}^{J} \frac{t_j I_j}{TI} \tag{2}$$

where *T* is the total population size, t_j is the number of students in school *j, I* is the interaction index measuring SES variation in the total population, and I_j is the interaction index measuring SES variation in school *j.* We weight *I* by student survey weights and weight t_j/T by the total survey weight in each school. The rank-order variance ratio index is defined as the average segregation across a theoretically infinite number of percentile thresholds over the interval (0, 1) (weighted by *I*, which is maximized when *p* = 0.5, meaning segregation in the middle of the SES distribution receives more weight):

7 We choose to use the variance ratio index rather than a more common segregation measure such as the dissimilarity index because the variance ratio index satisfies the principle of transfers (James & Taeuber, 1985), has the property of additive organizational decomposability (Reardon & Firebaugh, 2002), can be calculated for rank-ordered variables (Reardon, 2011) and has established methods to adjust for finite sample bias arising from using sample-based data (Reardon et al., 2018).

$$R^R = \frac{\int_0^1 I(p)R(p)dp}{\int_0^1 I(p)dp} \quad (3)$$

where *R(p)* is the segregation of students above the *p*th percentile of SES from students below the *p*th percentile of SES, and *I(p)* is the corresponding interaction index. We estimate the function *R(p)* by plotting our estimates of *R* at each of our 14 category thresholds against their percentiles and fitting a fourth-order polynomial function through the points.

Since we have a sample of only 20-30 students in each school, our estimate of I_j in Equation 2 is biased downward due to finite sample bias, causing segregation estimates to be biased upward. We adjust for this bias using methods developed by Reardon et al. (2018).[8]

The variance ratio index can be interpreted as the proportion of total variation in SES that occurs between schools versus within schools (i.e., is "explained by" schools). Thus, it is analogous to the R^2 statistic from a regression predicting student SES based on which school they attend.

In addition to computing R^R for each province-year, we also use our fitted polynomial function *R(p)* to estimate the segregation of low-SES students *R(20)*, i.e., the segregation of students below the 20th percentile of SES from students above the 20th percentile; and the segregation of high-SES students *R(80)*, i.e., the segregation of students above the 80*th* percentile of SES from students below the 80*th* percentile.

The variance ratio index has the property of organizational decomposability, meaning we can compute the share of segregation occurring between groups of schools, such as public and private schools or Anglophone and Francophone schools, and the share of segregation occurring among schools within the same group. We compute the segregation between groups of schools using the same methods as above, where in Equation 2, instead of indexing schools, *j* indexes groups of schools. The proportion of segregation occurring between groups of schools is the ratio of segregation between groups of schools to the total segregation between schools.

8 Our estimate of I in the denominator of Equation 2 is also biased downward in province-years with small total sample sizes, but there is no established method to correct for this bias. Therefore, our segregation estimates are biased downward, but we believe this bias is negligible in most province-years, as total sample sizes are generally adequate (see Appendix Table A1).

Results

Figure 1 illustrates the estimation of the rank-order variance ratio index for two provinces, Quebec (QC) and New Brunswick (NB), using PISA 2018 data. The SES distributions of the two provinces differ, but we divide students within each province into 15 equal categories based on province-specific percentiles of SES, creating 14 thresholds between categories. The 14 points for each province on the graph represent our estimates of segregation (measured by the two-group variance ratio index *R*) of all students with SES above each category threshold from all students below the threshold. For example, the leftmost point for Quebec shows that the estimated segregation of the lowest-SES students below the 6.6th percentile of SES from students above the 6.6th percentile is 0.082. The leftmost point for New Brunswick shows that the estimated segregation of students below the 6.6th percentile of SES from students above the 6.6th percentile is only 0.039. The curves fitted through the points are fourth order polynomial functions approximating the function *R(p)* in Equation 3. Our estimate of the rank-order variance ratio index R^R for each province is a weighted average of segregation values over all percentile values between 0 and 1. We estimate R^R = 0.129 for Quebec and R^R = 0.054 for New Brunswick.

We also estimate the segregation of low-SES students *R(20)*, i.e., the segregation of students below the 20th percentile of SES from those above the 20th percentile, is 0.106 in Quebec and 0.049 in New Brunswick. The segregation of high-SES students *R(80),* i.e., the segregation of students above the 80th percentile of SES from those below the 80th percentile, is 0.122 in Quebec and 0.052 in New Brunswick. Therefore, the difference between Quebec and New Brunswick in segregation of high-SES students is even more pronounced than the difference in the segregation of low-SES students. This can be seen in the graph by the larger gap between the curves at higher SES percentiles than at lower SES percentiles. The fitted curves have an inverted U shape because segregation estimates are highest when we calculate the segregation of students above approximately the median SES from students below the median. (Note this does not mean middle-SES students are highly segregated from low- and high-SES students. Recall that every segregation estimate is computed by splitting the sample into all students with SES above that threshold and all students with SES below that threshold.)

Figure 1.

Estimated socio-economic segregation between schools, PISA 2018

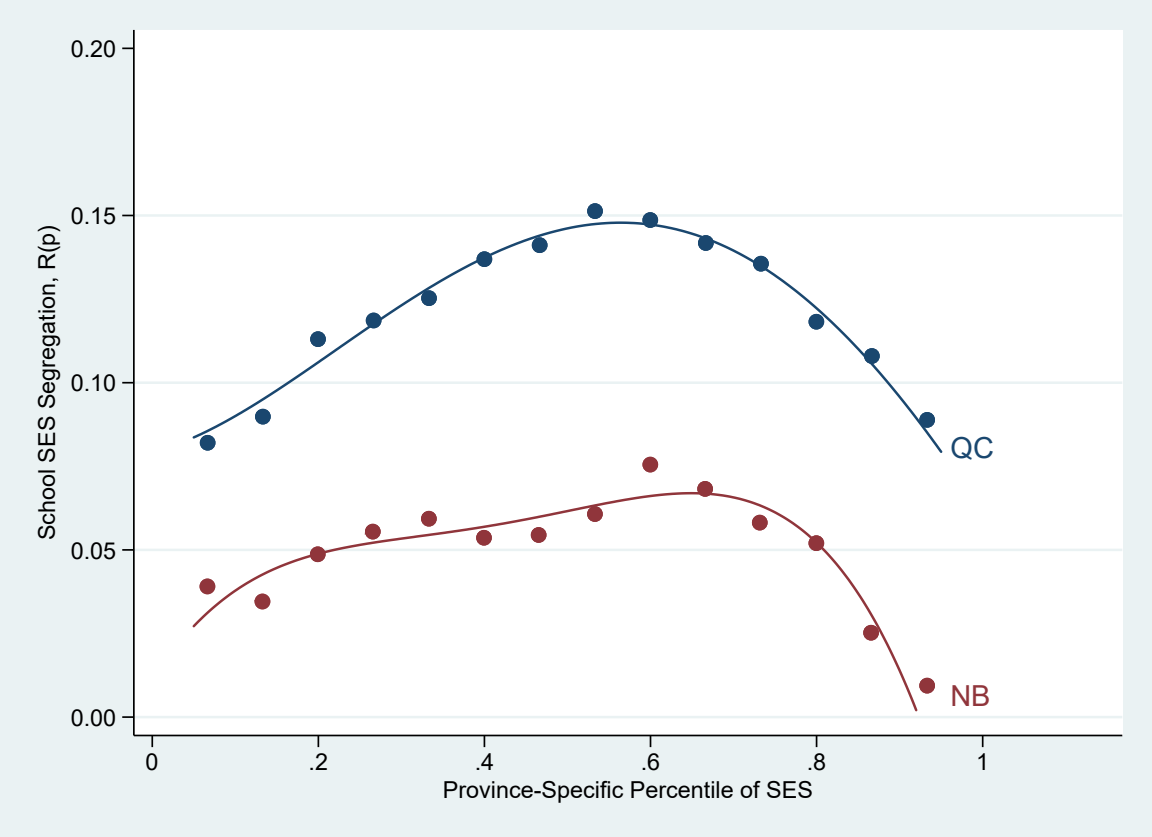


Figure 2 shows our estimates of overall segregation (R^R) for all 10 provinces (in mid-grey), as well as our estimate of segregation for Canada on the whole (in dark grey) and for 26 other selected countries that participated in PISA (in light grey). For all provinces and countries, we average segregation estimates across the three most recent cycles of PISA (2012, 2015 and 2018) to smooth slight year-to-year variations in PISA samples and yield a more robust ranking. In this graph, we can see that, although *R* theoretically ranges from 0 to 1, in practice, values over 0.3 are rarely observed. Differences of about 0.05 on the segregation index are considered practically significant, as they represent the difference between countries like Canada and the United States. Overall, Canada's level of segregation is low by international standards at 0.110. The countries with the highest levels of segregation tend to be middle-income countries (few very low-income countries participate in PISA), such as Chile, Mexico, Lebanon and Indonesia.

Although segregation in all provinces is quite low by international standards, there is wide variation across provinces. Quebec has the highest level of segregation in Canada, with a level similar to medium-segregation countries such as England, Japan and South Korea. Manitoba is the second highest, with a medium-low segregation level by international standards, similar to New Zealand and Ireland. The lowest segregation is in the Maritimes provinces, with levels similar to the least segregated country, Norway. Alberta is also quite low, with a segregation level similar to Finland.

The provinces in the middle of the Canadian segregation ranking have low-to-medium levels by international standards, similar to Sweden and Scotland: these are Saskatchewan, Ontario, British Columbia and Newfoundland and Labrador. With the third-highest segregation in Canada, Newfoundland and Labrador is quite different from the other Atlantic provinces. Note that the level of segregation in Canada on the whole is not simply the weighted average of provincial segregation levels because there is also segregation between higher-SES and lower-SES provinces (see **Appendix Figure A1**).

Figure 2.

SES segregation between schools, selected countries, and provinces (averaged over PISA 2012-2018)

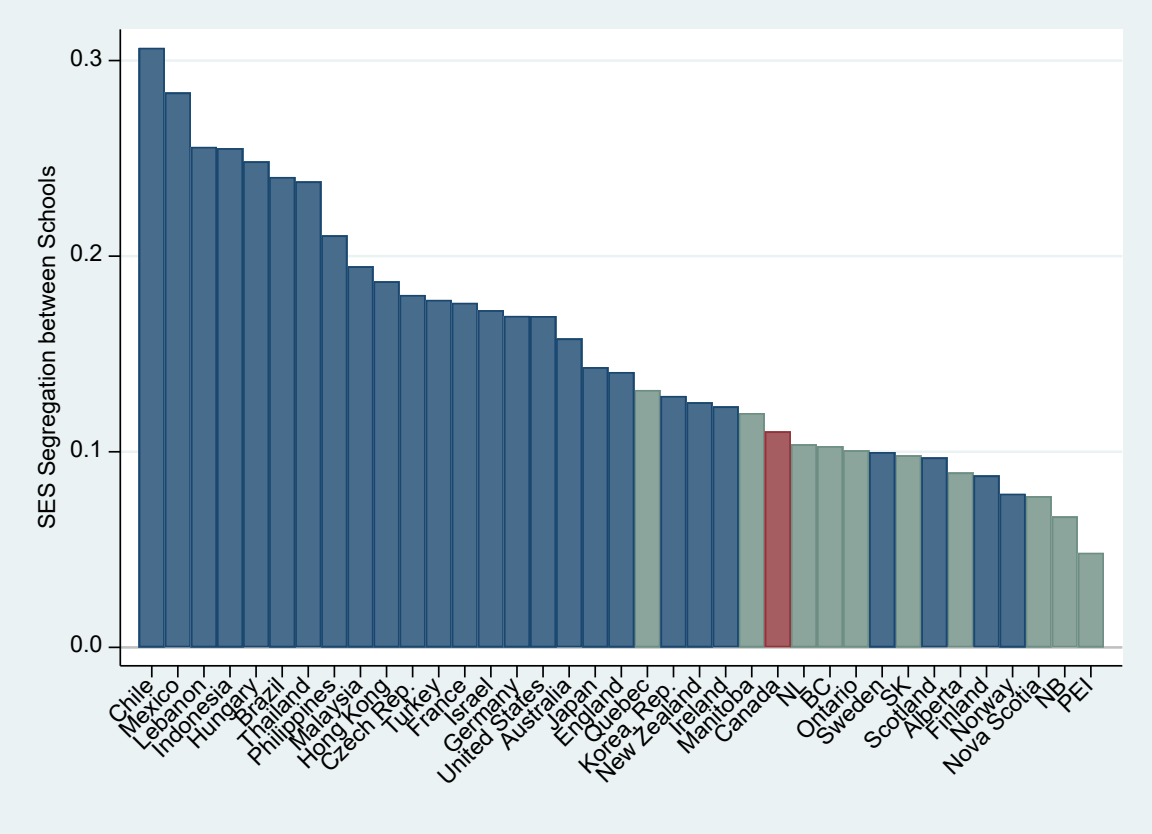
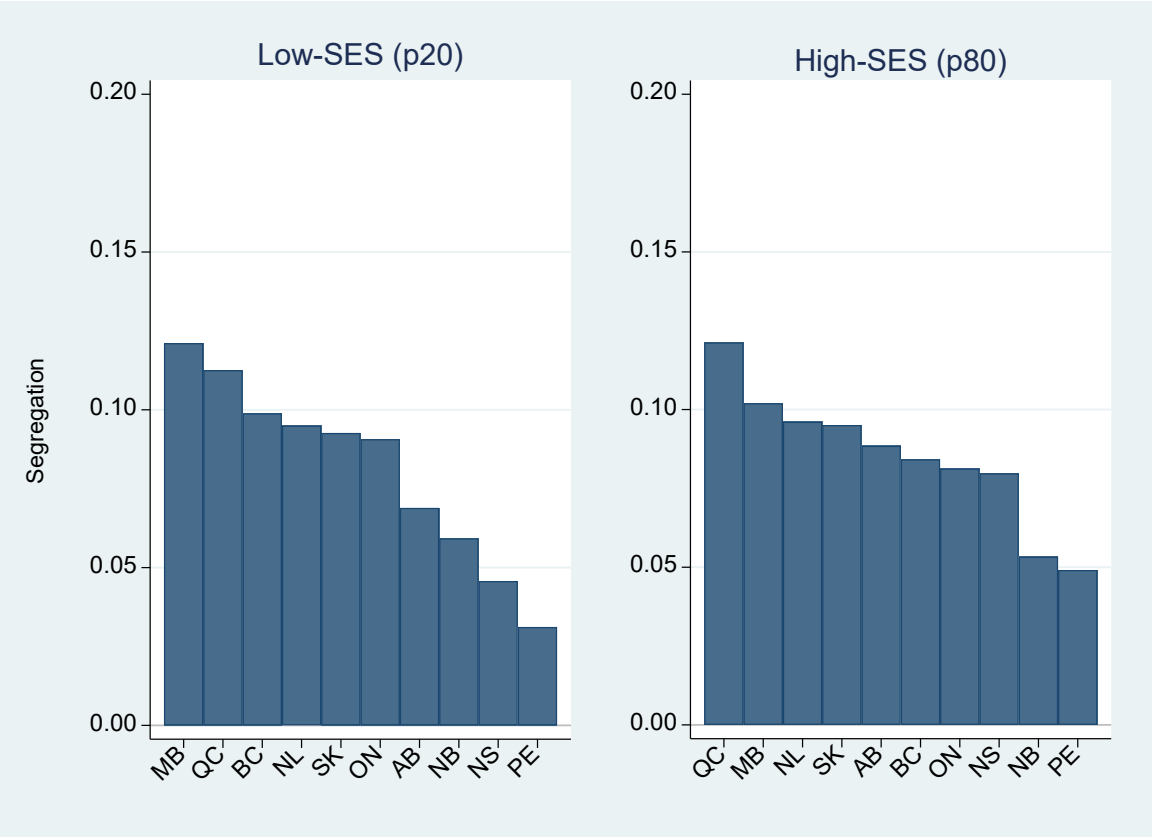


Figure 3 shows our estimates of the segregation of low-SES and high-SES students from their peers. The ranking of provinces is similar to that for overall segregation seen in **Figure 2**, with a couple of exceptions. Low-SES students are particularly highly segregated in Manitoba and British Columbia. Alberta and Nova Scotia have substantially higher segregation of their high-SES students compared to their low-SES and overall segregation estimates.

Figure 3.

Estimated segregation of low-SES and high-SES students (averaged over PISA 2012-2018)



Our first analysis to attempt to explain these provincial differences is cross-sectional correlations between segregation estimates and provincial explanatory variables. Results are displayed in **Table 1**. As hypothesized, private school enrolment is highly correlated with segregation (r = 0.67) and is more strongly correlated with segregation of high-SES students than low-SES students. **Figure 4** displays this relationship. It is mostly driven by high segregation in Quebec, which has the highest enrolment in private schools, as well as low segregation in the Maritimes provinces, which have the lowest enrolment in private schools. Enrolment in publicly funded Catholic schools has close to zero correlation with segregation. This is not surprising, as the three provinces with publicly funded Catholic schools (Alberta, Ontario and Saskatchewan) have medium levels of segregation within Canada. Unexpectedly, French immersion enrolment is strongly *negatively* correlated with segregation. This relationship is driven by the Maritimes provinces, which have the highest enrolment in French immersion programs. Based on the correlation alone, we are not confident this relationship is causal. As seen previously, the Atlantic provinces have the lowest private school enrolment. Previous research has observed that "French immersion is virtually the only school choice available in the four low-income Atlantic provinces" (Holmes, 2008, p. 200). It should also be kept in mind that French immersion is generally a within-school program. In this analysis, we cannot measure any segregation that French immersion programs may create between classrooms within schools, only between schools. We discuss this finding further in the discussion section.

As expected, our two proxies for residential SES segregation, income inequality and urbanization, are associated with higher segregation. Larger populations of visible minority and of Indigenous youth are both associated with somewhat higher segregation. These variables are only moderately associated with high-SES segregation, but they are somewhat more strongly associated with segregation of low-SES students.

Table 1.

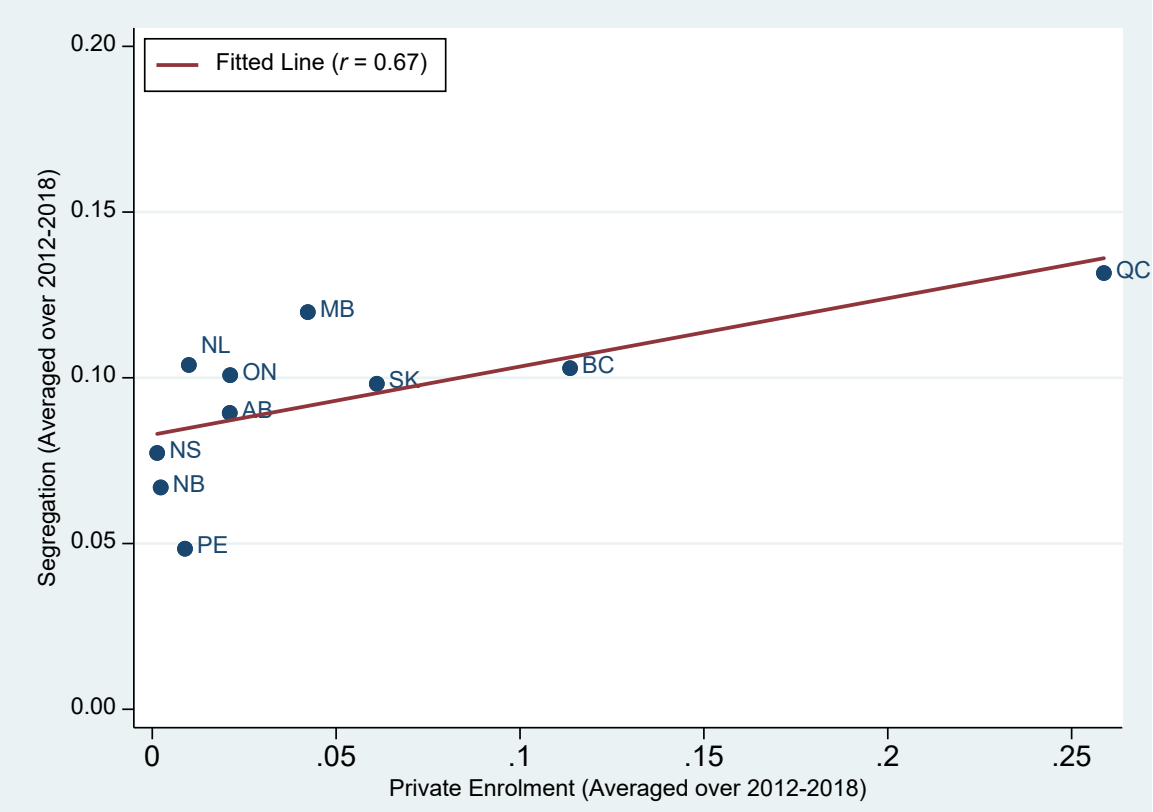
Correlations between provincial variables and overall segregation; segregation of low-SES students; and segregation of high-SES students

	Segregation			
	Overall	**Low SES**	**High SES**	**N**
Private enrolment (proportion)	0.67	0.56	0.67	10
Catholic enrolment (proportion)	0.07	0.07	0.08	10
French immersion enrolment (proportion)	-0.76	-0.62	-0.82	10
Income inequality (Gini, 0-1)	0.51	0.50	0.43	10
Urban population (proportion)	0.71	0.66	0.61	10
Visible minority population (proportion)	0.40	0.41	0.24	10
Indigenous population (proportion)	0.35	0.48	0.38	10

Note: All values averaged over 2012-2018

Figure 4.

SES segregation between schools, by private enrolment (averaged over 2012-2018)



Our second explanatory analysis decomposes segregation within and between groups of schools. Results are displayed in **Table 2**. The first column shows the proportion of total segregation accounted for by segregation between school sectors (public versus private). The proportion tends to be higher in provinces with higher private school enrolment, such as Quebec, British Columbia, Manitoba, and Saskatchewan. The share of segregation explained by school sector is particularly high in Quebec at 48%. However, it should be noted that in all provinces, the majority of segregation occurs among schools in the same sector (i.e., among different public schools and among different private schools). The second column shows the proportion of segregation occurring between schools with and without special programs. This proportion is very low in all provinces; however, the only four provinces with non-negligible proportions (ranging from 0.05 to 0.07) are the four Atlantic provinces. These are the four provinces with the highest rates of French immersion enrolment and could indicate that the negative correlation seen in **Table 1** is not causal. In fact, the decomposition results suggest that segregation levels in these four provinces might be slightly lower in the absence of special programs. However, this is still not causal evidence, as schools with special programs may have other characteristics that cause segregation. For example, urban schools are more likely to offer special programs. The third column shows the proportion of segregation occurring between the Anglophone and Francophone school sectors. This proportion is very low in all provinces.

The fourth column shows the proportion of segregation occurring between the six different community categories, defined by the population size of the community where the school is located. This proportion is moderately high in all provinces, but it is particularly high in the Atlantic provinces, especially Newfoundland and Labrador (51%). This suggests urban/suburban/rural inequalities account for a large share of segregation in these provinces. The results for community categories are illustrated in **Figure 5**. The total height of the bar represents the total level of segregation in each province (these values differ slightly from those seen in **Figures 2** and **4** because they exclude schools where the community category variable is missing). The dark grey portion of the bar represents the share of segregation accounted for by differences between community categories. The light grey portion of the bar represents the share of segregation occurring between schools within the same community category. The decomposition results for sectors are illustrated in **Appendix Figure A2**.

Table 2.

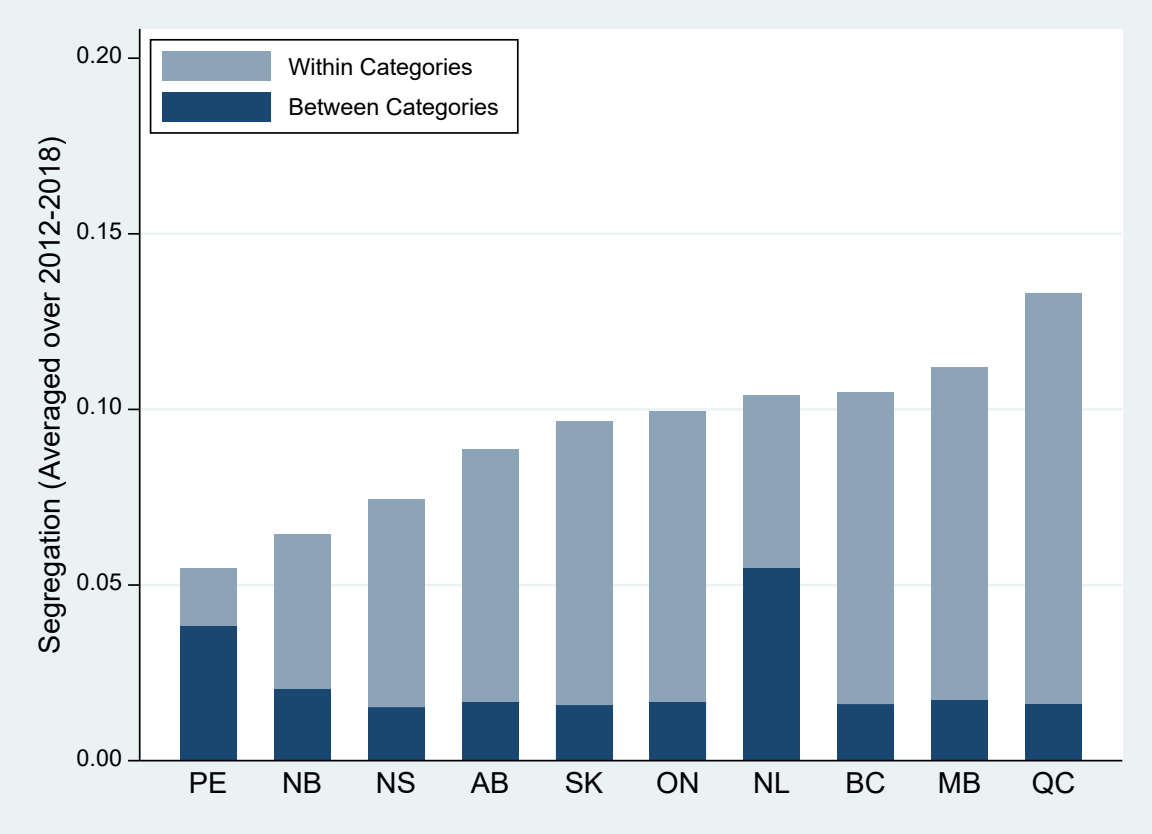
Decomposition of segregation between and within school types

	Proportion of Segregation Occurring Between Groups of Schools			
	Sectors *(Private/Public)*	**Admission Types** *(Special Programs Yes/No)*	**Language Sectors** *(English/French)*	**Community Size Category**
Quebec	0.48	0.01	0.01	0.12
Manitoba	0.11	0.01	0.01	0.16
Newfoundland & Labrador	0.05	0.06	0*	0.51
British Columbia	0.16	0.01	0.00	0.16
Ontario	0.06	0.00	0.00	0.16
Saskatchewan	0.09	0.02	0.00	0.17
Alberta	0.10	0.01	0.00	0.19
Nova Scotia	0.01	0.06	0.00	0.21
New Brunswick	0.01	0.05	0.01	0.30
Prince Edward Island	0.05	0.07	0.01	0.07

Francophone schools were not included in the Newfoundland and Labrador sample. See Footnote 2.
Note: All values averaged over 2012-2018. Provinces sorted from highest to lowest overall level of segregation.

Figure 5.

SES segregation between and within community size categories



Our final analysis describes trends in segregation over time in each province and uses panel models to explain changes in segregation from changes in provincial covariates. **Figure 6** illustrates trends in segregation in each province between 2000 and 2018. The levels of segregation change slightly from year to year, likely due to random sampling variation. However, in most provinces, there is no discernible upward or downward trend in segregation. The two exceptions are New Brunswick and Prince Edward Island, where segregation has substantially decreased over this 18-year period. While from a policy standpoint, it is encouraging that no provinces have seen large increases in segregation, from an analytical standpoint, the lack of any large changes in segregation means that our panel models will not produce very useful results. We report these results in **Appendix Table A2** and recommend interpreting them with caution, as they are predicting changes in segregation that are in most cases too small to be practically significant.

Exhibit 6.

Estimated trends in SES segregation between schools, PISA 2000-2018

Discussion

This article provides the first descriptive evidence on Canadian inter-provincial differences in SES segregation between schools. We observe different levels of segregation across provinces, differences that are substantial when benchmarked against other OECD jurisdictions. For example, the level of segregation in the province of Quebec is comparable to that found in medium-segregation countries such as the United States and England. In contrast, the provinces of Nova Scotia, New Brunswick, and Prince Edward Island have levels of segregation comparable to the lowest-segregation countries like Finland and Norway. Our provincial segregation estimates have a modest positive correlation with Haeck and Lefebvre's (2021) estimates of provincial SES achievement gaps in PISA, consistent with the idea that school segregation may be related to inequality in students' academic outcomes.[9]

As hypothesized, our findings provide evidence for the roles of both educational policy and residential segregation in contributing to SES segregation between schools. Regarding educational policy, provinces with higher levels of segregation like Quebec and Manitoba have open boundaries policies and provide public subsidies to private schools. By contrast, lower segregation jurisdictions like Nova Scotia, New Brunswick, and Prince Edward Island are the Canadian provinces with the lowest levels of school choice (Allison, 2015; Holmes, 2008). These findings are consistent with international comparative research showing that countries with greater marketization of school choice—and particularly with higher private school enrolments—tend to have higher levels of segregation between schools (Alegre & Ferrer, 2010).

Regarding residential segregation, we found strong correlations between provincial segregation levels and our two proxies: provincial income inequality and urbanization. Our decomposition analysis also supports the role of residential segregation in shaping segregation, as we found that the least urbanized provinces—the four Atlantic provinces—had the highest share of total segregation explained by segregation between different community size categories. In highly urbanized provinces, a great deal of segregation occurs among urban schools, while in less urbanized provinces, relatively little segregation occurs among urban schools or among rural schools. We found weak-to-moderate associations between segregation and the share of the youth population with visible minority or Indigenous identities, which suggests residential ethnic segregation and/or racially-motivated school choice decisions may partly contribute to SES segregation in more diverse provinces.

The most surprising finding was that French immersion enrolment appears to be associated with lower segregation. This finding is largely driven by the Maritimes provinces of Nova Scotia, New Brunswick, and Prince Edward Island, which have the lowest levels of segregation and among the highest rates of enrolment in French immersion programs.

9 The correlation between our provincial segregation rankings and Haeck and Lefebvre's (2021) SES achievement gap rankings would be somewhat stronger if we used parental occupational status (HISEI) instead of ESCS as our measure of SES. However, we prefer the ESCS index for substantive reasons (see footnote 6). The correlation between our results and those of Haeck and Lefebvre is not strongly affected by different decisions about dropping students outside of grade 10.

However, we believe this relationship may not be causal. Although French immersion was the only special program of choice for which we were able to obtain data, it is possible that other provinces have higher enrolments in other specialized programs such as International Baccalaureate or gifted programs. Aside from French immersion, Atlantic provinces have few other choice options available (Holmes, 2008). In a policy environment of low choice, it is perhaps not surprising that we see higher enrolments in French immersion. Additionally, the Atlantic provinces tend to have the lowest levels of income inequality and urbanization. Since French immersion is mostly provided as a within-school program, our between-school segregation estimates may not fully capture the segregating effect of the program.

We considered that French immersion may explain less between-school segregation in the Atlantic provinces if French immersion is a near-universal policy, offered in almost all high schools. However, while it is true that French immersion is offered in a very high proportion of high schools in the three Maritimes provinces, and a moderately high proportion of high schools in Newfoundland and Labrador, it is still far from universal. Of all public high schools in the Anglophone system, French immersion is offered in approximately 70% of New Brunswick schools, 70% of Prince Edward Island schools, 76% of Halifax schools[10] and 17% of Newfoundland and Labrador schools (Department of Education, 2018; Department of Education and Lifelong Learning, 2020; Halifax Regional Centre for Education, 2020; NL English School District, 2020). This leaves 20 to 30% of high schools in the three Maritimes provinces and over 80% of high schools in Newfoundland and Labrador—often rural high schools—without French immersion, which provides ample opportunities for between-school segregation. Additionally, our decomposition analysis revealed that the Atlantic provinces are the only ones in Canada where a non-trivial share of total segregation was explained by segregation between schools with and without special programs. Therefore, it is plausible that in the absence of French immersion programs, segregation in these provinces would be even lower.

Overall, we believe our findings suggest that segregation is related to different factors in different provinces. The decomposition portion of our analysis particularly supports this idea. In Newfoundland and Labrador and Prince Edward Island, most of the segregation that exists is between schools located in urban and rural areas. This is consistent with a longstanding concern with rural–urban educational disparities in the case of Newfoundland and Labrador (Mulcahy, 2007). In Quebec, a large portion of segregation is between public and private schools. We also see substantial proportions of segregation between public and private schools in the other provinces that provide public subsidies for private school enrolment: British Columbia, Manitoba, Alberta, and Saskatchewan. The importance of different factors in different provinces is consistent with economics research arguing that different forms of school choice may act as substitutes, with private enrolment, public school choice and even within-school streaming all satisfying "parental demand for sorting" (Urquiola, 2005, p. 1322). Likewise, it is consistent with research from a range of fields showing that high-SES families appear to prefer schools with an advantaged SES composition, independent of more direct measures of school quality (Abdulkadiroğlu et al., 2020; Burgess et al., 2015; Holme, 2002; Rothstein, 2006; Rowe & Lubienski, 2017; Willms & Echols, 1992; Yoon et al., 2018).

10 We were unable to find French immersion offerings for the entire province of Nova Scotia.

Thus, we may expect these families to seek advantages for their children within whatever institutional structures are available in their jurisdiction. In the Atlantic provinces, that option is French immersion programs. In Quebec and British Columbia, it is publicly subsidized private schools. In provinces or boards with open boundaries, it may be schools with alternative or specialized programs. And in provinces with less school choice, it may involve Tiebout choice, i.e., moving into the catchment of a desirable local school, which may drive residential segregation (Davies & Aurini, 2011). The latter two factors were not possible to measure in our analyses.

Our findings present a difficult trade-off for policy-makers at the provincial and school district levels, as school choice policies may contribute to segregation and drive inequality in students' educational experiences and outcomes. Yet school districts across the country often perceive choice programs as necessary to retain affluent families within the public system and within their own district, and fear they risk losing those families to either private schools or other school districts that provide the alternatives they seek (Baluja, 2012; Gee, 2017; Hammer & Baluja, 2012; Kamanzi, 2019; Vancouver School Board, 2012).

Our analyses have important limitations. First, none of our explanatory analyses allows causal inference. Our multilevel panel analysis would have provided the strongest test since it controls for unobserved time-invariant provincial characteristics, but low year-to-year variability in the segregation outcome gives the results less practical significance. Second, we did not have information on school locations within provinces. This means our segregation estimates conflate segregation between different cities within provinces and segregation within cities. An ideal analysis would measure segregation within cities. Conceptually, both residential and school segregation occur within commuting areas since families are constrained by work locations when they decide where to live and where to send their children to school. A final limitation is that we did not have comprehensive information on all the socio-demographic characteristics by which students may be segregated. Our SES measure includes parental education, parental occupation, and an inventory of home possessions, but does not include a measure of household income, which is likely an important dimension of segregation between schools. Additionally, the components of the SES index were student-reported and thus have lower reliability than parent-reported measures would. Our PISA dataset did not have information on student ethno-racial or Indigenous identity, which have been shown to be important factors in previous Canadian segregation research. Future research should address these issues by continuing a robust tradition of using administrative data from provinces or school boards, which allows researchers to examine segregation within cities, and which may include better information on student socio-demographics. However, we recommend that future research use high-quality, unbiased, decomposable segregation measures like those we have used here to produce the most reliable evidence on school segregation.

Despite these limitations, we believe our inter-provincial comparison of segregation—the first of its kind—provides important descriptive evidence on varying levels of segregation in Canadian provinces. These results are an important starting point in suggesting some potential drivers of school segregation, and setting the stage for future, more fine-grained research on this important phenomenon that has serious consequences for students' educational success.

References

Abdulkadiroğlu, A., Pathak, P. A., Schellenberg, J., & Walters, C. R. (2020). Do parents value school effectiveness? *American Economic Review, 110*(5), 1502–1539.

Alegre, M. À., & Ferrer, G. (2010). School regimes and education equity: Some insights based on PISA 2006. *British Educational Research Journal, 36*(3), 433–461.

Allison, D. J. (2015). School Choice in Canada: Diversity Along the Wild–Domesticated Continuum. *Journal of School Choice, 9*(2), 282–309. https://doi.org/10.1080/15582159.2015.1029412

Allison, D. J., Pelt, D. N. V., Hasan, S., & Bosetti, L. (2017). Private Schools in Canada and the USA: Contrasts and Commonalities. *Journal of Applied Business and Economics, 19*(12), 68–84.

Balakrishnan, T., & Jurdi, R. (2007). *Spatial residential patterns of Aboriginals and their socioeconomic integration in selected Canadian cities* (No. 100; pp. 263–274). Aboriginal Policy Research Consortium International.

Balakrishnan, T., Maxim, P., & Jurdi, R. (2005). Residential segregation and socio-economic integration of visible minorities in Canada. *Migration Letters, 2,* 126–144.

Baluja, T. (2012, February 1). Boutique schools: Elitist or early learning opportunities? T*he Globe and Mail,* A11.

Bell, C. A. (2009). All choices created equal? The role of choice sets in the selection of schools. *Peabody Journal of Education, 84*(2), 191–208.

Bohlmark, A., & Lindahl, M. (2007). *The impact of school choice on pupil achievement, segregation and costs: Swedish evidence.*

Bosetti, L., Van Pelt, D., & Allison, D. (2017). The changing landscape of school choice in Canada: From pluralism to parental preference? *Education Policy Analysis Archives, 25*, 38.

Burgess, S., Greaves, E., Vignoles, A., & Wilson, D. (2015). What parents want: School preferences and school choice. *The Economic Journal, 125*(587), 1262–1289.

Byun, S., Kim, K., & Park, H. (2012). School choice and educational inequality in South Korea. *Journal of School Choice, 6*(2), 158–183.

Card, D., Dooley, M. D., & Payne, A. A. (2010). School competition and efficiency with publicly funded Catholic schools. *American Economic Journal: Applied Economics, 2*(4), 150–176.

Chen, W.-H., Myles, J., & Picot, G. (2012). Why have poorer neighbourhoods stagnated economically while the richer have flourished? Neighbourhood income inequality in Canadian cities. *Urban Studies, 49*(4), 877–896.

Chmielewski, A. K. (2019). The Global Increase in the Socioeconomic Achievement Gap, 1964 to 2015. *American Sociological Review, 84*(3), 517–544. https://doi.org/10.1177/0003122419847165

Chubb, J. E., & Moe, T. M. (1990). *Politics, markets, and America's schools.* Brookings Institution Press.

Conseil supérieur de l'éducation. (2016). *Report on the state and needs of education 2014-2016: Steering the course back to equity in education*. Government of Quebec.

Davies, S. (2013). Are there Catholic school effects in Ontario, Canada? *European Sociological Review, 29*(4), 871–883.

Davies, S., & Aurini, J. (2011). Exploring School Choice in Canada: Who Chooses What and Why? *Canadian Public Policy, 37*(4), 459–477.

Denice, P., & Gross, B. (2016). Choice, preferences, and constraints: Evidence from public school applications in Denver. *Sociology of Education, 89*(4), 300–320.

Department of Education. (2018). *Summary Statistics 2017-2018* (p. 83).

Department of Education and Lifelong Learning. (2020). *Public schools*. https://www.princeedwardisland.ca/en/information/education-and-lifelong-learning/public-schools

Epple, D., Romano, R. E., & Urquiola, M. (2017). School vouchers: A survey of the economics literature. *Journal of Economic Literature, 55*(2), 441–492.

Friedman, M. (1955). *The role of government in education.* Rutgers University Press.

Friesen, J., Harris, B., & Woodcock, S. (2011). *Does Open Enrolment Increase Sorting?* 46.

Friesen, J., Javdani, M., Smith, J., & Woodcock, S. (2012). How do school 'report cards' affect school choice decisions? *Canadian Journal of Economics/Revue Canadienne d'économique, 45*(2), 784–807. https://doi.org/10.1111/j.1540-5982.2012.01709.x

Friesen, J., & Krauth, B. (2007). Sorting and inequality in Canadian schools. *Journal of Public Economics, 91*(11), 2185–2212. https://doi.org/10.1016/j.jpubeco.2007.03.003

Gee, M. (2017, October 24). Don't kill academic excellence in the name of equity. *The Globe and Mail,* A11.

Government of Alberta. (2020, May 28). *Protecting choice in education, Protéger le choix des Albertains et Albertaines en matière d'éducation.* https://www.alberta.ca/news.aspx

Haeck, C., & Lefebvre, P. (2021). Trends in Cognitive Skill Inequalities by Socio-Economic Status across *Canada. Canadian Public Policy, 47*(1), 88–116.

Halifax Regional Centre for Education. (2020). *Late French immersion.* https://www.hrce.ca/about-hrce/school-administration/registration/french-programs/late

Hammer, K., & Baluja, T. (2012, January 17). Specialized schools spark new debate about fairness. *The Globe and Mail,* A10.

Hastings, J., Kane, T. J., & Staiger, D. O. (2009). *Heterogeneous preferences and the efficacy of public school choice.* NBER Working Paper, 2145, 1–46.

Holme, J. J. (2002). Buying homes, buying schools: School choice and the social construction of school quality. *Harvard Educational Review, 72*(2), 177–206.

Holmes, M. (2008). An Update on School Choice in Canada. *Journal of School Choice, 2*(2), 199–205. https://doi.org/10.1080/15582150802138229

Hoxby, C. M. (2000). Does competition among public schools benefit students and taxpayers? *American Economic Review, 90*(5), 1209–1238.

Hsieh, C.-T., & Urquiola, M. (2006). The effects of generalized school choice on achievement and stratification: Evidence from Chile's voucher program. *Journal of Public Economics, 90*(8–9), 1477–1503. https://doi.org/10.1016/j.jpubeco.2005.11.002

Hulchanski, J. D. (2010). *The three cities within Toronto.* Toronto: Neighbourhood Change Community University Research Alliance, St. Christopher house & Cities Centre.

James, D. R., & Taeuber, K. E. (1985). Measures of segregation. *Sociological Methodology, 15*, 1–32.

Jerrim, J., & Micklewright, J. (2014). Socio-economic Gradients in Children's Cognitive Skills: Are Cross-Country Comparisons Robust to Who Reports Family Background? *European Sociological Review,* jcu072.

Kamanzi, P. C. (2019). School Market in Quebec and the Reproduction of Social Inequalities in Higher Education. *Social Inclusion, 7*(1), 18–27. https://doi.org/10.17645/si.v7i1.1613

Ladd, H. F., & Fiske, E. B. (2001). The uneven playing field of school choice: Evidence from New Zealand. *Journal of Policy Analysis and Management,* 20(Winter), 43–63.

Leonard, P. S. J. (2015). Choice of Ontario high schools and student sorting by ability. *Applied Economics, 47*(49), 5282–5302.

Lindbom, A. (2010). School choice in Sweden: Effects on student performance, school costs, and segregation. *Scandinavian Journal of Educational Research, 54*(6), 615–630.

Lubienski, C., & Yoon, E.-S. (2017). Introduction to the special issue: Studying school choice in Canada. *Education Policy Analysis Archives, 25,* 37.

McEwan, P. J. (2003). Peer effects on student achievement: Evidence from Chile. *Economics of Education Review, 22*(2), 131–141.

Mindzak, M. (2015). What Happened to Charter Schools in Canada? *Equity & Excellence in Education, 48*(1), 105–117. https://doi.org/10.1080/10665684.2015.991162

Mulcahy, D. M. (2007). Current Issues in Rural Education in Newfoundland and Labrador. *Education in Rural Australia, 17*(1), 17–39.

NL English School District. (2020). *District French immersion school directory*. https://www.nlesd.ca/schools/fischooldirectory.jsp

OECD. (2019). P*ISA 2018 Results: Where all students can succeed.* Volume II. OECD Publishing, Paris.

OECD. (2021). *PISA 2018 Technical report.* OECD Publishing.

Ontario Ministry of Education. (2020). *Education facts, 2019-2020.* Government of Ontario. http://www.edu.gov.on.ca/eng/educationfacts.html

Outhit, J. (2018, May 26). How French immersion has created a two-tier education system. *Waterloo Region Record*, A1.

Owens, A., Reardon, S. F., & Jencks, C. (2016). Income segregation between schools and school districts. A*merican Educational Research Journal, 53*(4), 1159–1197.

Palardy, G. J. (2013). High School Socioeconomic Segregation and Student Attainment. *American Educational Research Journal, 50*(4), 714–754. https://doi.org/10.3102/0002831213481240

Parekh, G. (2013). *Structured pathways: An exploration of programs of study, school-wide and in-school programs, as well as promotion and transference across secondary schools in the Toronto District School Board* (13/14-03). Research and Information Services, Toronto District School Board.

Parekh, G., & Gaztambide-Fernández, R. (2017). The more things change: Durable inequalities and new forms of segregation in Canadian public schools. In *Second International Handbook of Urban Education* (pp. 809–831). Springer.

Perry, L. B., & McConney, A. (2013). School socioeconomic status and student outcomes in reading and mathematics: A comparison of Australia and Canada. *Australian Journal of Education, 57*(2), 124–140.

Reardon, S. F. (2011). *Measures of income segregation.* Unpublished Working Paper. Stanford Center for Education Policy Analysis.

Reardon, S. F., & Bischoff, K. (2011). Income inequality and income segregation. *American Journal of Sociology, 116*(4), 1092–1153.

Reardon, S. F., Bischoff, K., Owens, A., & Townsend, J. B. (2018). Has income segregation really increased? Bias and bias correction in sample-based segregation estimates. *Demography, 55*(6), 2129–2160.

Reardon, S. F., & Firebaugh, G. (2002). Measures of multigroup segregation. *Sociological Methodology, 32*(1), 33–67.

Resnik, J. (2020). All against all competition: The incorporation of the International Baccalaureate in public high schools in Canada. *Journal of Education Policy, 35*(3), 315–336.

Rothstein, J. M. (2006). Good principals or good peers? Parental valuation of school characteristics, Tiebout equilibrium, and the incentive effects of competition among jurisdictions. *American Economic Review, 96*(4), 1333–1350.

Rowe, E. E., & Lubienski, C. (2017). Shopping for schools or shopping for peers: Public schools and catchment area segregation. *Journal of Education Policy, 32*(3), 340–356.

Rumberger, R. W., & Palardy, G. J. (2005). Does segregation still matter? The impact of student composition on academic achievement in high school. *The Teachers College Record, 107*(9), 1999–2045.

Sinay, E. (2010). *Programs of choice in the TDSB: Characteristics of students in French immersion, alternative schools, and other specialized schools and programs* (No. 09-10–13). Organizational Development Department, Research and Information Services, Toronto District School Board.

Sinay, E., Presley, A., Armson, S., Tam, G., Ryan, T., Burchell, D., & Barron, C. (2018). T*oronto District School Board French as a second language program review: Developmental evaluation* (18/19-03). Toronto District School Board.

Söderström, M., & Uusitalo, R. (2010). School choice and segregation: Evidence from an admission reform. *The Scandinavian Journal of Economics, 112*(1), 55–76.

Statistics Canada. (2001). T*he Daily—Trends in the use of private education. Statistics Canada.* https://www150.statcan.gc.ca/n1/daily-quotidien/010704/dq010704b-eng.htm

Statistics Canada. (2017a). *Aboriginal Peoples highlight tables, 2016 Census*, Catalogue no. 98-402-X2016009. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/abo-aut/Table.cfm?Lang=Eng&T=101&S=99&O=A

Statistics Canada. (2017b). *Immigration and ethnocultural diversity highlight tables, 2016 Census*, Catalogue no. 98-402-X2016007 Ottawa. http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/abo-aut/index-eng.cfm

Statistics Canada. (2019). *Table 17-10-0122-01 Census indicator profile, based on the 2016 Census short-form questionnaire, Canada, provinces and territories, and health regions (2017 boundaries)*. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710012201

Statistics Canada. (2020a). *Table 11-10-0134-01 Gini coefficients of adjusted market, total and after-tax income.* https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1110013401

Statistics Canada. (2020b). *Table 37-10-0007-01 Number of students in regular programs for youth, public elementary and secondary schools, by grade and sex.* https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3710000701

Statistics Canada. (2020c). *Table 37-10-0009-01 Number of students in official languages programs, public elementary and secondary schools, by program type, grade and sex.* https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3710000901

Statistics Canada. (2020d, October 15). *Table 37-10-0173-01 Number of students in regular programs for youth, private or independent elementary and secondary schools, by grade and sex.* https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3710017301

Tiebout, C. M. (1956). A pure theory of local expenditures. Journal of Political Economy, 64(5), 416–424.

UNESCO. (2020). *School enrollment, secondary, private (% of total secondary).* UNESCO Institute for Statistics. Retrieved from: http://data.worldbank.org/indicator.

Urquiola, M. (2005). Does school choice lead to sorting? Evidence from Tiebout variation. *American Economic Review, 95*(4), 1310–1326.

Valenzuela, J. P., Bellei, C., & Ríos, D. D. L. (2014). Socioeconomic school segregation in a market-oriented educational system. The case of Chile. *Journal of Education Policy, 29*(2), 217–241. https://doi.org/10.1080/02680939.2013.806995

Vancouver School Board. (2012). *Vancouver School Board sectoral review: Our schools, our programs, our future*. Vancouver School Board.

Walks, R. A. (2013). *Income inequality and polarization in Canada's cities: An examination and new form of measurement.* Research Paper, 227.

Walks, R. A., & Bourne, L. S. (2006). Ghettos in Canada's cities? Racial segregation, ethnic enclaves and poverty concentration in Canadian urban areas. *The Canadian Geographer/Le Géographe Canadien, 50*(3), 273–297.

Warnock, R. (2020, June 3). *K-12 enrolment numbers—1992 to 2019* [Personal communication].

Waslander, S., Pater, C., & Weide, M. van der. (2010). *Markets in Education: An Analytical Review of Empirical Research on Market Mechanisms in Education.* https://doi.org/10.1787/5km4pskmkr27-en

Watson, T. (2009). Inequality and the measurement of residential segregation by income in American neighborhoods. R*eview of Income and Wealth,* 55(3), 820–844.

Willms, J. D. (2008). *The case for universal French instruction. Policy Options.* https://policyoptions.irpp.org/magazines/quebec-1608-2008/the-case-for-universal-french-instruction/

Willms, J. D. (2010). School composition and contextual effects on student outcomes. *The Teachers College Record, 112*(4), 3–4.

Willms, J. D., & Echols, F. (1992). Alert and inert clients: The Scottish experience of parental choice of schools. *Economics of Education Review, 11*(4), 339–350.

Winton, S., & Milani, M. (2017). Policy advocacy, inequity, and school fees and fundraising in Ontario, Canada. *Education Policy Analysis Archives, 25,* 40.

Worswick, C. (2003). S*chool program choice and streaming: Evidence from French immersion programs.*

Yoon, E.-S. (2017). Neoliberalizing race? Diverse youths' lived experiences of race in school choice. *Research in Education, 97*(1), 76–94. https://doi.org/10.1177/0034523717718309

Yoon, E.-S., & Lubienski, C. (2017). How Do Marginalized Families Engage in School Choice in Inequitable Urban Landscapes? A Critical Geographic Approach. Education Policy Analysis Archives, 25(42), n42.

Yoon, E.-S., Lubienski, C., & Lee, J. (2018). The geography of school choice in a city with growing inequality: The case of Vancouver. *Journal of Education Policy, 33*(2), 279–298.

Yoon, E.-S., Marmureanu, C., & Brown, R. S. (2020). School choice and the polarization of public schools in a global city: A Bourdieusian GIS approach. *Peabody Journal of Education, 95*(3), 229–247. https://doi.org/10.1080/0161956X.2020.1776071

Yoon, E.-S., Young, J., & Livingston, E. (2020). From bake sales to million-dollar school fundraising campaigns: The new inequity. *Journal of Educational Administration and History, 52*(1), 25–38. https://doi.org/10.1080/00220620.2019.1685473

Appendix

Table A1.

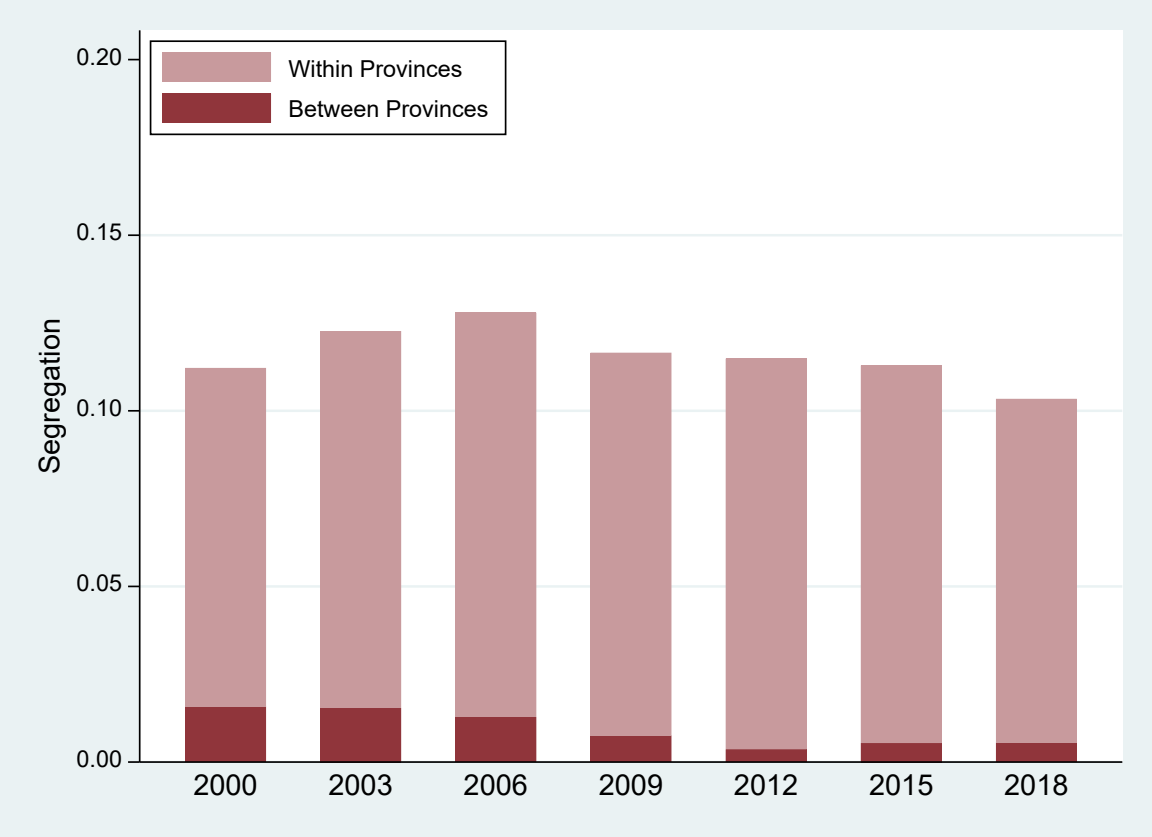
PISA sample sizes by province and year

	Alberta		British Columbia		Manitoba		New Brunswick		W and Labrador	
Year	Students	Schools	Students	Schools	Students	Schools	Students	Schools	Students	Schools
2000	2742	120	3037	123	2599	106	2963	67	2281	99
2003	2458	117	2966	123	2798	122	3781	76	2317	110
2006	1990	88	1885	73	1993	84	2444	67	1739	75
2009	2581	112	2367	101	1965	85	1927	58	1412	63
2012	2088	99	1816	81	2079	88	1784	58	1312	56
2015	2133	92	1953	79	1928	85	1555	54	1203	50
2018	2199	86	2268	85	2353	96	1555	53	1124	47

	Nova Scotia		Ontario		Prince Edward Island		Quebec		Saskatchewan	
Year	Students	Schools	Students	Schools	Students	Schools	Students	Schools	Students	Schools
2000	2930	111	4290	182	1632	27	4497	165	2716	117
2003	2871	117	3369	149	1653	26	3377	133	2363	114
2006	2113	86	3051	130	1574	26	3999	182	1858	85
2009	1648	70	4151	171	1443	25	3716	194	1997	99
2012	1374	61	3699	151	1292	26	4166	178	1934	87
2015	1439	55	4223	143	392	18	2915	95	2317	88
2018	1511	58	4491	146	327	16	4616	144	2209	90

Figure A1.

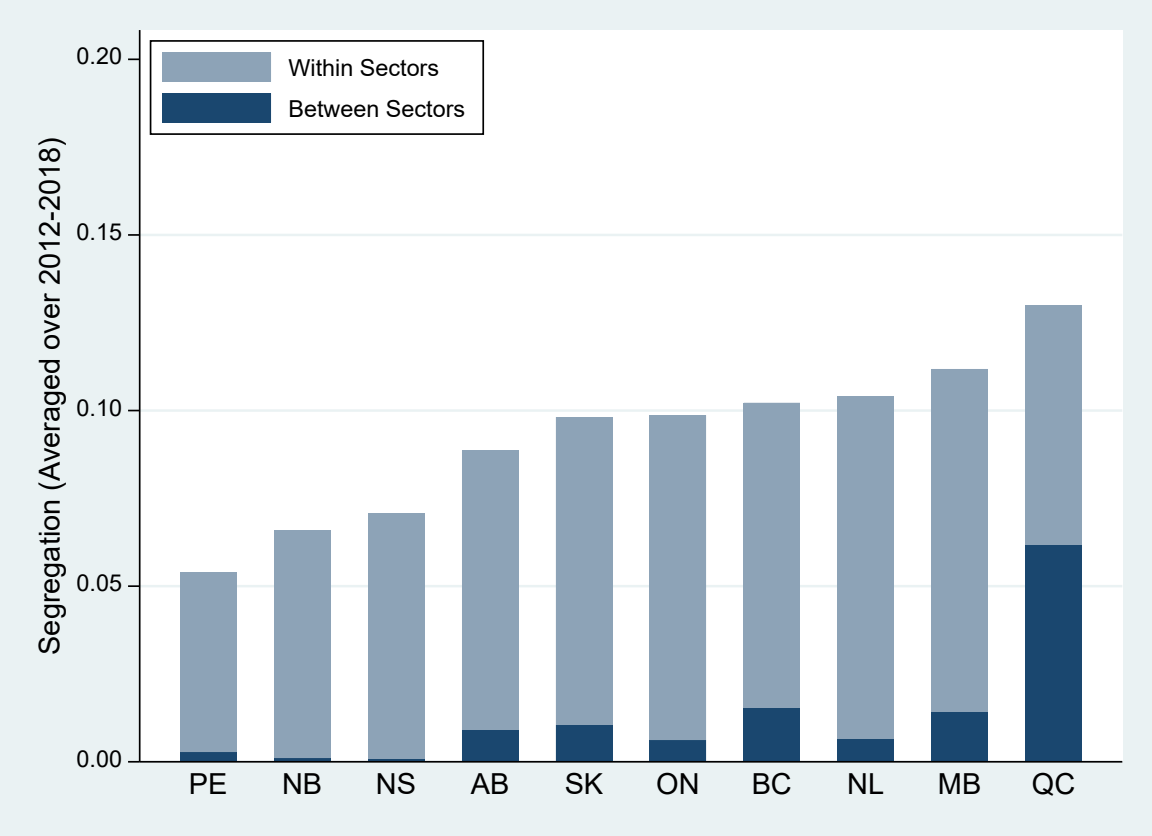
Decomposition of total Canadian SES segregation between and within provinces



Notes: Decomposition of total Canadian segregation between and within provinces in each year. The total height of each bar represents the total level of SES segregation across all schools in Canada. The share of segregation accounted for by between-province segregation decreased from about 14% in 2000 to about 5% in 2018. This decrease corresponds to increasing average SES in the Atlantic provinces and Quebec, relative to higher-SES provinces. The different distributions of SES in different provinces, as well as the changing distribution of SES within provinces over time, illustrates the importance of calculating segregation based on province-year-specific SES percentile distributions, since we consider SES a positional good. However, all our results are robust if we calculate segregation based on the Canada-wide SES percentile distribution.

Figure A2.

Decomposition of SES segregation between and within school sectors



*Notes: Decomposition of total SES segregation between and within school sectors (public and private) in each province. The total height of each bar represents the total level of segregation in each province (these values differ slightly from those seen in **Figures 2** and **4** because they exclude schools where the sector variable is missing). The dark grey portion of the bar represents the share of segregation accounted for by differences between the public and private school sectors. The light grey portion of the bar represents the share of segregation occurring between schools within sectors.*

Table A2.

Multilevel panel models predicting overall segregation, segregation of low-SES students, and segregation of high-SES students, PISA 2000–

	Segregation		
	Overall	**Low-SES**	**High-SES**
Private enrolment (proportion)	0.14 +	0.26 **	0.08
	(0.08)	(0.09)	(0.09)
French immersion enrolment (proportion)	-0.44 **	-0.45 *	-0.25
	(0.16)	(0.20)	(0.20)
Income inequality (Gini, 0-1)	0.38	0.14	0.30
	(0.27)	(0.32)	(0.32)
Visible minority population (proportion)	-0.04	-0.14	-0.20 +
	(0.09)	(0.11)	(0.11)
Indigenous population (proportion)	0.27	0.40	0.24
	(0.27)	(0.33)	(0.33)
School size (logged)	0.09 **	0.07 *	0.14 ***
	(0.03)	(0.04)	(0.04)
Intercept	0.10 ***	0.08 ***	0.09 ***
	(0.01)	(0.01)	(0.01)
Provincial mean covariates	yes	yes	yes
Within-province residual variance	0.00023	0.00034	0.00034
Between-province residual variance	0.00034	0.00030	0.00023
N (Observations)	70	70	70
N (Provinces)	10	10	10

+ p < 0.1. * p < 0.05. ** p < 0.01. *** p < 0.001. Notes: Models predict segregation in a given province-year from time-varying provincial covariates. We mean-centre covariates within provinces, meaning our models control for unobserved provincial characteristics and predict *changes* in segregation from *changes* in explanatory variables. We estimate segregation R_{ki} in province *k* in year *i* as $R_{ki} = \alpha + (\boldsymbol{X}_{ki} - \overline{\boldsymbol{X}}_k)\mathbf{B} + \overline{\boldsymbol{X}}_k\boldsymbol{\Gamma} + u_k + \varepsilon_{ki}$, where α is an intercept, $\boldsymbol{X}_{ki}$ is a vector of provincial covariates in year *i*, $\overline{\boldsymbol{X}}_k$ is the average of vector $\boldsymbol{X}_{ki}$ within province *k*, u_k is a province-level random effect, and ε_{ki} is a province-year-level error. The parameters of interest are the vector of coefficients $\mathbf{B}$ describing the association between changes in provincial covariates and changes in segregation. School size is the mean school enrolment by province-year, derived from the total number of students enrolled in each school, as reported in the PISA principal questionnaire. All other covariates are as described under the 'Province-level variables' subheading in the Data section. Although several coefficients in the models are statistically significant, we recommend interpreting these results with caution, as they are predicting changes in segregation that are in most cases too small to be practically significant.