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BACKGROUNDER

PUBLIC SERVICES

School Choice and the Benefits of Competition:

Evidence from Ontario

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In this issue...

Is there competition between publicly funded Catholic and public schools for students in Ontario? And, if so, does competition improve education quality?

The Study in Brief

The authors examine whether competition between schools can improve student performance since administrators have to improve the quality of education to attract families and students. They note that in four provinces (Ontario, Manitoba, Saskatchewan and Alberta), Catholic parents have the choice of sending their children to two publicly funded systems. The first system contains secular schools (public schools). Any student may attend a local secular school. The second system contains Catholic schools (separate schools) and is open only to children of Catholic families, although some non-Catholics are occasionally admitted. The two systems are run independently and receive equal government funding per student. The key constraint on school choice is that only children with Catholic backgrounds can readily choose between public and separate schools.

When Catholic families are willing to move between public and separate schools this creates incentives for both public and separate school systems to improve in order to attract more students. Poor-performing schools will attract fewer students and, therefore, will receive less funding from the province. This threat of losing resources should provide administrators with an incentive to provide a higher-quality education.

To examine these questions, the authors focus on elementary schools in the English public and separate school systems in Ontario. First, they establish that opening a new school in one system draws students away from schools in the competing system. There is indeed competition between the two systems, but what is the effect? To test this, they look at improvements in student performance on provincial tests between grade 3 and 6. They find the occurrence and size of improvements are greatest in areas with the greatest degree of competition – neigbourhoods where a large share of the population is Catholic (able to choose) and a large share of the housing stock is new. They conclude that greater competition does lead to an increase in test-score improvements for both Catholic and public school students.

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Canadian parents want a high-quality education for their children. Yet, many Canadians are dissatisfied with the public school system; for example, recent provincial surveys show more than 30 percent of parents are unsatisfied with the education their children have received in public schools.[1]

How can public schools improve? Basic economic intuition and research suggests that one way to improve quality is by limiting the monopoly-power schools have traditionally held through having well-defined catchments areas. These provide families with little or no choice in the assigned school. The argument follows that if parents are provided with greater choice, schools will react by providing a higher level of service. This choice could take many forms: for example, through giving parents greater access to other public schools or through the use of vouchers or tax credits that subsidize the cost of private schooling.

Past research on whether school choice improves student outcomes is not conclusive.[2] Moreover, little work has been done to explore this issue using Canadian data. Yet, Canada is a good venue for studying whether having choice results in stronger student performance. Schools are a provincial responsibility and in four provinces (Ontario, Manitoba, Saskatchewan and Alberta), Catholic parents have the choice of sending their children to two publicly funded systems.[3] The first system contains secular schools (public schools). Any student may attend a local secular school. The second system contains Catholic schools (separate schools) and is open only to children of Catholic families, although some non-Catholics are occasionally admitted. The two systems are run independently and receive equal government funding per student. The key constraint on school choice is that only children with Catholic backgrounds can readily choose between public and separate schools – particularly at the elementary level. When Catholic families are willing to move between public and separate schools this creates incentives for both public and separate school systems to improve in order to attract more students. Poor-performing schools will attract fewer students and, therefore, will receive less funding from the province. This threat of losing resources should provide administrators with an incentive to provide a higher-quality education.

We study elementary schools in the English public and separate school systems in Ontario and determine that (i) there is evidence of a willingness of parents to shift between school systems and (ii) this results in test-score improvements for students in areas where schools face stronger competition.

Catholic and Public Schools in Ontario: A Conceptual Framework

Two parallel publicly funded school systems have co-existed in Ontario since 1841, and since 1998 the Ontario government has provided full public funding of schools in both systems on a per-student basis. Today, Ontario public schools are secular and are legally required to accept all students, whereas separate schools restrict enrolment to the children of Catholic families.[4] The province is partitioned into overlapping grids of public and separate school boards with 31 English-speaking public school

The authors thank the many reviewers of this paper as well as our research assistants in the Public Economics Data Analysis Laboratory. This paper is based on our research of the effect of school competition in Ontario.

1 Alberta. Alberta Education. Performance Measurement and Reporting Branch. "Satisfaction with education in Alberta survey, 2006/2007: Summary Report." http://www.education.alberta.ca/media/600587/summaryreport2007.pdf

British Columbia Public Schools Satisfacation Survey 2002/03 – 2006/07 http://www.bced.gov.bc.ca/reports/pdfs/sat_survey/2007/prov.pdf

2 See Hess (2008)for a review of the evidence of school choice programs in the US.

3 Quebec and British Columbia offer partial funding to independent schools.

4 Most limit enrolment to baptized Catholics, or the children of a baptized Catholic.

boards (with an average enrolment of 44,000) and 29 English- speaking separate school boards (with an average enrolment of 18,000).[5]

In Card, Dooley, and Payne (2008), we illustrate the willingness of parents to move between systems. The ability to move is one-sided insofar as only Catholic students can freely switch. The willingness to move depends primarily on family values, the distance to alternative schools, and the quality of schools. For the systems to compete with each other, there only needs to be some Catholic families that are willing to switch to a public school. If there is a willingness to switch, will school administrators have an incentive to compete for these students? Assuming that schools receive the bulk of their funding based on enrolment, increasing (decreasing) enrolments will help (hurt) their ability to provide a quality education.

In Ontario, we do not have detailed information on an individual student's movement through his/her schooling career; thus we cannot observe directly whether students move or whether they would be willing to move if a school is not providing a quality education. Instead, we use information on school openings and closings to study student movement. Within a given system, a school opens or closes based on current and expected future enrolment in the area. The decision will be based primarily on the needs of that system, not on the needs of the other school system. Thus, to study a willingness to move across systems, we study the effect of an opening or closing of a school in one system (e.g., public) on the enrolment patterns of nearby schools in the other system (e.g., separate). Areas with new housing growth will also be accompanied by new schools. Parents moving into these areas may be more willing to switch schools and school systems than parents in areas that have schools with longstanding reputations.

Card, Dooley, and Payne (2008) explain why we can look to a school opening or closing to understand why separate and public schools should compete for students. Non-Catholic families must attend the local public school and so the potential effects stem from the ability of a Catholic family to send a child to a public or separate school. Catholic families choose a school based on the strength of their preferences for a Catholic versus a secular education, the quality of the schools in their neighborhood, and the distance from their homes to schools in the two systems. School openings or closings in a neighborhood change the relative distance to a Catholic versus a secular school. This change could result in a change in enrolment patterns across the two schools among Catholic families.

Can we expect schools to vary their effort based on enrolment patterns? Assuming that schools receive their funding based on enrolments, a public school's resources will be based on its enrolment of non-Catholic and Catholic students. A separate school's resources will be based on its enrolment of Catholic students. Teachers and their unions have an incentive to attract more children to their system as that increases teacher employment and promotes job security. Thus, both schools should be expected to compete for Catholic students on the basis of educational quality.[6]

Enrolment Responses to Nearby Openings and Closings

First, we identify newly opened and recently closed English-language elementary schools in Ontario between 1990 and 2004 using detailed school enrolment data.[7] There were 252 openings and 212 closings in the public system and 169 openings and 102 closings in the separate school system with about 60 percent of the openings and 70 percent of the closings occurring after a major reorganization

5 There were also 23 authorities that operated schools in remote rural areas, and a handful of French-language school boards. About 5 percent of students attend private schools that receive no public funding. We ignore these schools throughout this paper.

6 Class sizes have been shown to have little effect on student outcomes beyond grade 1 (Guillemette 2005) and we do not expect larger class sizes to have an effect on student performance.

7 We have also corrected for the following special circumstances: schools that open and close very quickly, schools paired with other schools and schools that gradually open and close or reduce the size of grades.

of school boards in 1998. The majority of newly opened schools are in the growing suburbs around Toronto, while most closed schools tend to be in central-city neighborhoods of Toronto and in more remote rural areas. We link the location of schools to the local census data that provide information about neighborhood demographics, such as the share of the population that is Catholic.

Next, we define the set of non-rural schools that were potentially affected by a nearby opening or closing event. We establish a radius around a school that represents the distance a typical student from nearby elementary schools would travel from home to the school.[8] We define a school as being affected if it lies within the radius of a nearby opening or closing. For both systems, approximately 63 percent of non-rural schools are affected by a nearby opening and 53 percent by a nearby closing. Affected schools in the competing system tend to be slightly closer to the opening/closing school than affected schools in the same system, suggesting that an opening or closing has the potential to induce at least some students to move between the rival systems. On average, a school opening affects 2.6 nearby schools, whereas a closing affects 3.6 nearby schools.

Third, we estimate the effect of nearby openings and closings on total student enrolment in nearby public and separate schools under four scenarios: public openings, separate openings, public closings, and separate closings. We use the percentage change in enrolment at a school from grades 1-5 in the previous year to grades 2-6 in the current year.[9] A typical public school in our sample has about 50 students per grade while separate schools have 44 students per grade, on average. We also control for other school and neighborhood effects.[10]

Our analysis suggests neighboring schools within the same system experience a decrease (increase) in enrolments when there is an opening (closing). But do neighboring schools in the *alternative* system experience a change in enrolment? School enrolments do not change significantly when there is a school closing in the alternative system, from which we infer that school closures have no substantial effect on school choice. An opening, however, results in a sizable decrease in enrolment at nearby schools affiliated with the alternative board. This effect is most dramatic when there is an opening in a neighborhood that has more new houses and/or has a high proportion of Catholic families.

To illustrate our results, we have identified two types of neighborhoods. The first is a neighborhood with a low share of new housing (5 percent) and a low share of Catholic families (30 percent). The second is a neighborhood with a high share of new housing (50 percent) and a high share of Catholic families (70 percent). For these two types of neighborhoods, we illustrate the effects of a school opening or closing in Table 1.

EFFECTS WHEN A CATHOLIC SCHOOL OPENS OR CLOSES: The top panel illustrates the effect on enrolment at public and Catholic schools from the opening or closing of a Catholic school. The left column shows how that event affects a nearby Catholic school and the second column shows the effect on nearby public schools.

In neighborhoods with less new housing and a low share of Catholics, there is little effect on enrolment in a neighbouring public school when a Catholic school opens (-0.4 percent) or closes (-0.7 percent). For an average grade enrolment of 50 students, this is equivalent to the school losing one-half of a student.

8 The radius is smaller in densely populated areas (typically 1-2 kilometers), and wider in suburban areas. We obtained information for one year on the postal codes of all students attending each elementary school in the province. We use centroids of the postal codes for the schools and the homes to compute "typical" travel distances. We then used satellite images and printed maps to add schools that are on the border of the radius and to eliminate schools that were separated from the newly opened or closed school by a major travel barrier – such as a major highway.

9 Our school level database includes enrolment by grade for each school, as well as the enrolment of ungraded students in special education and other programs.

10 The other controls include school and year fixed effects, an indicator for being paired with another school for administrative purposes, the share of enrolled students in the FSA attending public French and private schools, total population in the FSA and shares of population ages 5-9 and 10-14, the fraction of FSA residents who are Catholic, the fraction who are immigrants, fractions of FSA residents of East Asian, South Asian, and Northern, Southern, and Eastern European ancestry, the fraction of population with a university degree, the fraction with no high-school degree, the fraction of single-headed families, the fraction of families with two or three children, and the fraction of adults with a home language other than English.

Table 1: The Effect of School Openings and Closings on Total Elementary Enrollment

Catholic School Opens/Closes	Percentage Change in Enrolment in Catholic Schools	Percentage Change in Enrolment in Public Schools
Catholic school opens in low-Catholic areas (30% Catholic) and old housing area (5% new)	-9.2*	-0.4*
Catholic school opens in high-Catholic areas (70% Catholic) and new housing area (50% new)	-9.7*	-9.6*
Catholic school closes nearby	5.3*	-0.7
Public School Opens/Closes	**Percentage Change in Enrolment in Catholic Schools**	**Percentage Change in Enrolment in Public Schools**
Public school opens in low-Catholic areas (30 % Catholic) and old housing area (5% new)	-0.2*	-3.5*
Public school opens in high-Catholic areas (70% Catholic) and new-housing area (50% new)	-3.9*	-9.3*
Public school closes nearby	0.3	4.3*

* Indicates that result is statistically significant from zero at 95 percent confidence.
Sources: Ministry of Education, EQAO, Statistics Canada.

In neighborhoods with a high population growth and high share of Catholics, when a new Catholic school opens neighbouring public school enrolments decline approximately 9.6 percent, nearly as much as the decline in nearby Catholic schools. For an average grade enrolment of 50 students, this is equivalent to the school losing between 4 and 5 students.

EFFECTS WHEN A PUBLIC SCHOOL OPENS OR CLOSES: The bottom panel illustrates the effect on enrolment at nearby schools from the opening or closing of a public school. Closures have little impact on cross-enrolment in a neighbouring Catholic school. The left column shows the effects on nearby Catholic schools and the right column the effects on nearby public schools.

In neighborhoods with a small population influx and low share of Catholics, a public school opening has little effect on enrolments. On average, a Catholic school would observe 0.2 percent decline in enrolment.

However, in neighborhoods with a high population growth and high share of Catholics, Catholic school enrolments decline 3.9 percent when a new public school opens nearby. What explains the different reactions to public school openings and closings by Catholic families? Parents may prefer to switch between systems when they have recently moved to a neighborhood. Openings are concentrated in areas with many new residents, whereas closings are concentrated in urban neighborhoods with fewer recent arrivals. Parents are clearly willing to switch between the two systems, more so in areas with incoming populations and in areas with a high share of Catholic families.

Table 2: Summary Test Scores, Grades 3 and 6, 1998-2005

	Public Schools		Catholic Schools	
	Grade 3	Grade 6	Grade 3	Grade 6
Number of test scores	323,508	340,259	164,502	172,409
Average reading score	2.52	2.68	2.52	2.7
Average math score	2.73	2.71	2.68	2.68
Average writing score	2.66	2.67	2.69	2.71

Sources: Ministry of Education, EQAO, Statistics Canada.

Impacts of Competing School Systems on Student Achievement

The final step in our analysis is to measure the effects of the local competitive environment on student achievement. We use standardized tests administered in reading, mathematics, and writing each spring to students in grades 3 and 6 from 1998 to 2005.We track a series of five cohorts, starting with students in 3rd grade in 1997/98 – who were in grade 6 in 2000/01 – and ending with those in grade 3 in 2001/02 – in grade 6 in 2004/05. We have data for roughly 325,000 public school students and 165,000 separate school students.[11] The test sample includes a limited number of characteristics of individual test takers for which we control, most importantly, gender and whether or not a student is classified as "special needs" or "gifted." We do not know whether or not a student is Catholic. We use individual test scores for grades 3 and 6 students as our measure of success in the tables below, but these scores cannot be linked for specific students across these grades. Hence, we must infer the effects of competition from the test scores of grade cohorts for each school.

Summary statistics of the test scores by grade and test type are presented in Table 2. Test results are reported on a scale of 1-4 with 4 representing the top score. The mean test score is typically around 2.6.

Our empirical analysis relates the degree of competition between systems to the academic achievement of students, measured using standardized tests written by students in the 3rd and 6th grades. The average test score is influenced by many possible factors, and the influence of each specific factor is determined using regression analysis. Our proxy measure of competition is the fraction of Catholic families in the area multiplied by the share of the housing stock built in the neighborhood between 1991 and 2001.[12]

11 We eliminate schools where many students arrived or left between grades 3 and 6 and when less than 15 students take the test in either grades 3 or 6, leaving 65-70 percent of public school students and 85-96 percent of Catholic school students drawn from approximately 9,000 school-cohort groups from 2,000 different schools.

12 The test score of a student depends on the degree of competition between school systems (C*G) and characteristics of the school (X), the student (Z) and the local area (W). Multiplying the share of Catholics by the share of new housing is known as an interaction effect, where the effects are seen

$T = b_1X + b_2Z + b_3W + b_4(C*G) + e$

Each term b relates the effect of each variable on the test scores and the term e is the variation in test scores not explained by the other factors. The regression estimation controls for cohort and school specific difference, the share of students without a test score, the share students that are special needs. We include other student, neighborhood and school value-added indicator variables. For further details see Card, Dooley and Payne (2008).

Table 3: The Effect of Competition on Growth of Grade 6 Reading, Math and Writing Test Scores from Grade 3 to Grade 6

30 percent Catholic Area, 5 percent New Housing	Reading Test Scores*	Math Test Scores*	Writing Test Scores*
Public and Catholic school test scores	0.2%	0.4%	0.2%
70 percent Catholic Area, 50 percent New Housing			
Public and Catholic school test scores	5.5%	9.2%	4.5%

* Indicates that result is statistically significant from zero at 95 percent confidence.
Sources: Ministry of Education, EQAO, Statistics Canada.

We assume that the group of students at the school for grade 6 took the achievement test at that same school in grade 3.[13] Instead of using the absolute level of test scores, we measure student performance by how much the cohort of students improved between grade 3 and grade 6, meaning that if students at Catholic schools do better anyway than students in public schools (or vice-versa) we can still draw unbiased conclusions from how much students in both systems improved.[14] In essence, we are using the grade 3 test score to control for underlying abilities and differences in neighborhood compositions. Our test assesses if student test-score growth is higher in areas with greater competition.

To illustrate the potential effects of competition on grade 6 test-score improvement, we again use two types of neighborhoods: 1) those with little new housing (5 percent), and low Catholic (30 percent) composition; and 2) those with a high share of new housing (50 percent), and high Catholic (70 percent) composition. Table 3 illustrates the effect of competition on individual test-score improvement as a percentage of average test scores for these two types of neighborhoods.

The top panel of Table 3 illustrates the results for the old housing/low Catholic neighborhood and the bottom panel illustrates the results for the high growth/high Catholic neighborhood. Enhancement in scores varies based on school type; the gain in test-score growth at public schools is approximately one-and-one-half the gain in test-score growth at separate schools.

In the low growth/low Catholic neighborhoods, increases in grade 6 test scores over grade 3 test scores are modest, ranging from approximately 0.2 to 0.4 percent. However, there is a larger effect on the gain in grade 6 test scores in the schools located in neighborhoods where there is the greatest potential competition; that is, the new housing, high-Catholic neighborhoods. Students in these neighborhoods have reading, writing and math test-score improvements ranging from approximately 4 to 9 percent. These results are significantly higher than those in areas with little competition, which saw test-score improvement of less than 0.5 percent in all tests.

The results suggest that if *all* families – rather than just Catholic families – could exercise choice between school systems, the incentives for public school administrators to improve quality would be stronger yet, with potentially significant impacts on student outcomes.

13 This study assumes that the average abilities of the leavers and joiners at a given school between grade 3 and 6 are equal.

14 Altonji, Elder, and Taber (2005) find that the local fraction of Catholic children has some direct effect on the level of student achievement, potentially leading to a biased conclusion if we use just the level of the raw test scores.

For reading scores, a one percentage point increase in the share of students that are Catholic or a one percentage point increase in the share of new housing increases test scores by 0.18 percent for public schools and 0.13 percent for students at Catholic schools.[15] For mathematics a one percentage point increase in new housing or Catholic population share increases test scores by 0.27 percent at public schools and 0.19 percent for Catholic schools. For writing, the same changes increase test scores by 0.10 percent in public schools and 0.12 percent in Catholic schools. Notice that the effect of competition is slightly larger on public schools than Catholic schools.

The analysis of the test scores suggests that the competitive effects of having two school systems modestly improves test scores.[16] It is worth emphasizing that our test scores analysis has a couple of important limitations. First, we are only measuring gains over three years, or one-quarter of the time that most students spend in school, suggesting that the benefits of competition would be greater if applied at all grades. Second, it is possible that in more competitive markets teachers and principals spend more time and effort preparing for standardized tests, and less on other aspects of learning. Third, as we exclude French-language boards we may not be capturing another possible source of competition across English and French language systems.

Conclusions

What lessons can be drawn from the evidence of competing school boards in Ontario? Other provinces that do not fully fund Catholic schools (the Maritime Provinces, Quebec and British Columbia) may want to consider whether there are ways to encourage a willingness to move between schools operated by different systems. For example, providing per-student funding to the Catholic school system equivalent to that provided the public school system would encourage a similar competition for students as was observed with the Ontario data.

School choice does have an effect on student performance. For children and families to receive the benefits of school choice, fully private schools are not a necessary condition. For school choice to benefit students as its proponents suggest, there has to be both a willingness by students to move between school systems in response to quality differences and an incentive for school administrators to improve their schools to attract students. School choice can exist within a fully publicly funded and operated school system.

15 In an interaction model – where the effect of one variable is multiplied by the other, and in this case the share of new housing is multiplied by the percentage of population that is Catholic – the two variables have the same effect when changed by the same unit.

16 Lehrer (2005) suggests that children from families with no religious affiliation may have lower rates of achievement growth than families with religious ties. We find that controlling for this effect does lead to a reduction in the size of the coefficient of the competition effect on test scores, but our study's results are still statistically significant when we include this effect.

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