Understanding the Gender Gap in University Participation: An Exploration of the Application Behaviour of Ontario High School Students

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for the Higher Education Quality Council of Ontario

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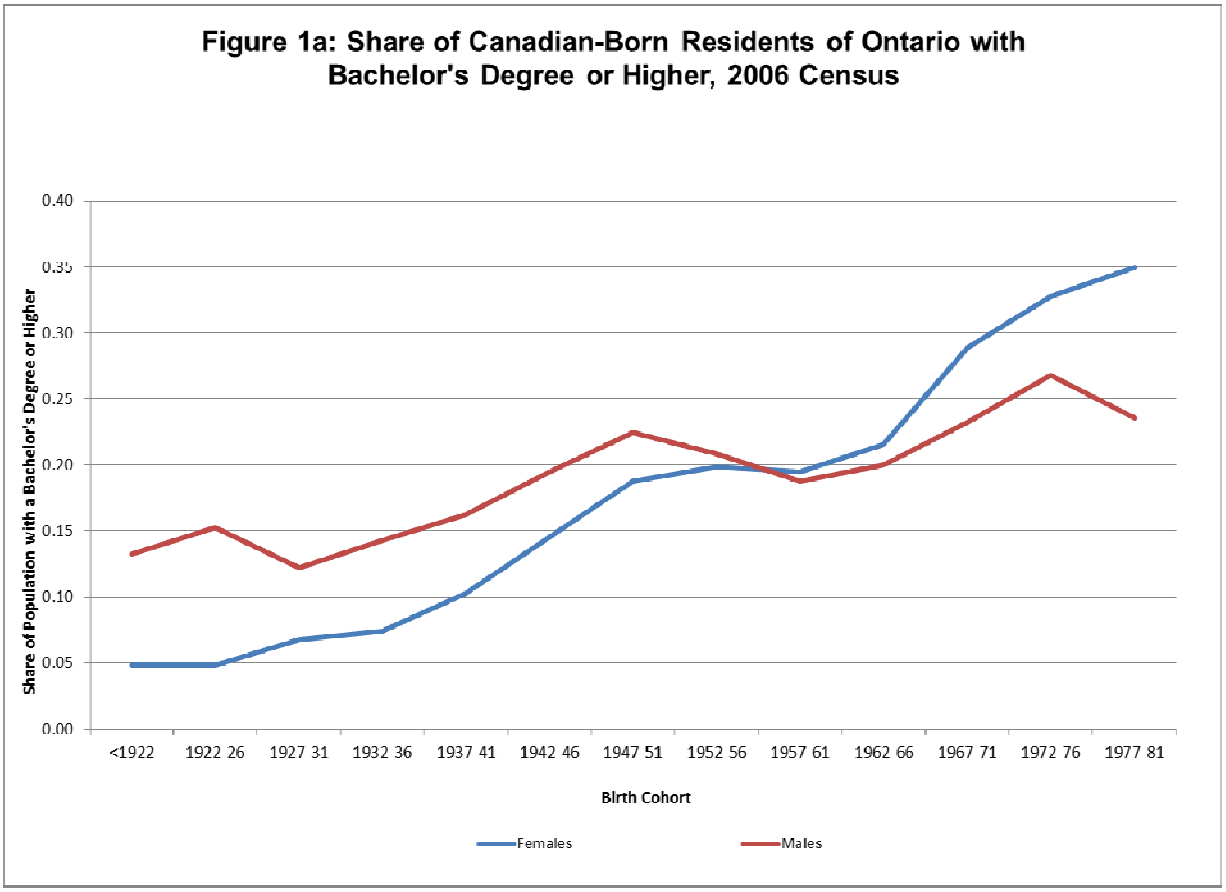
Introduction

Throughout most of the twentieth century, Canadian women were less likely to attend university than were Canadian men. Within the past three decades, however, the gender gap has reversed (Frenette and Zeman, 2007). In 1971 only one-third of 25 to 29 year-old university graduates were women. By 1991, the pool of recent university graduates was roughly 50 per cent women, and by 2006 women accounted for 60 per cent of recent graduates. A parallel increase in the number of women graduates has occurred in most other OECD countries, including the United States. Nevertheless, the current gender gap in Canada appears to be larger than in most other advanced countries.[1]

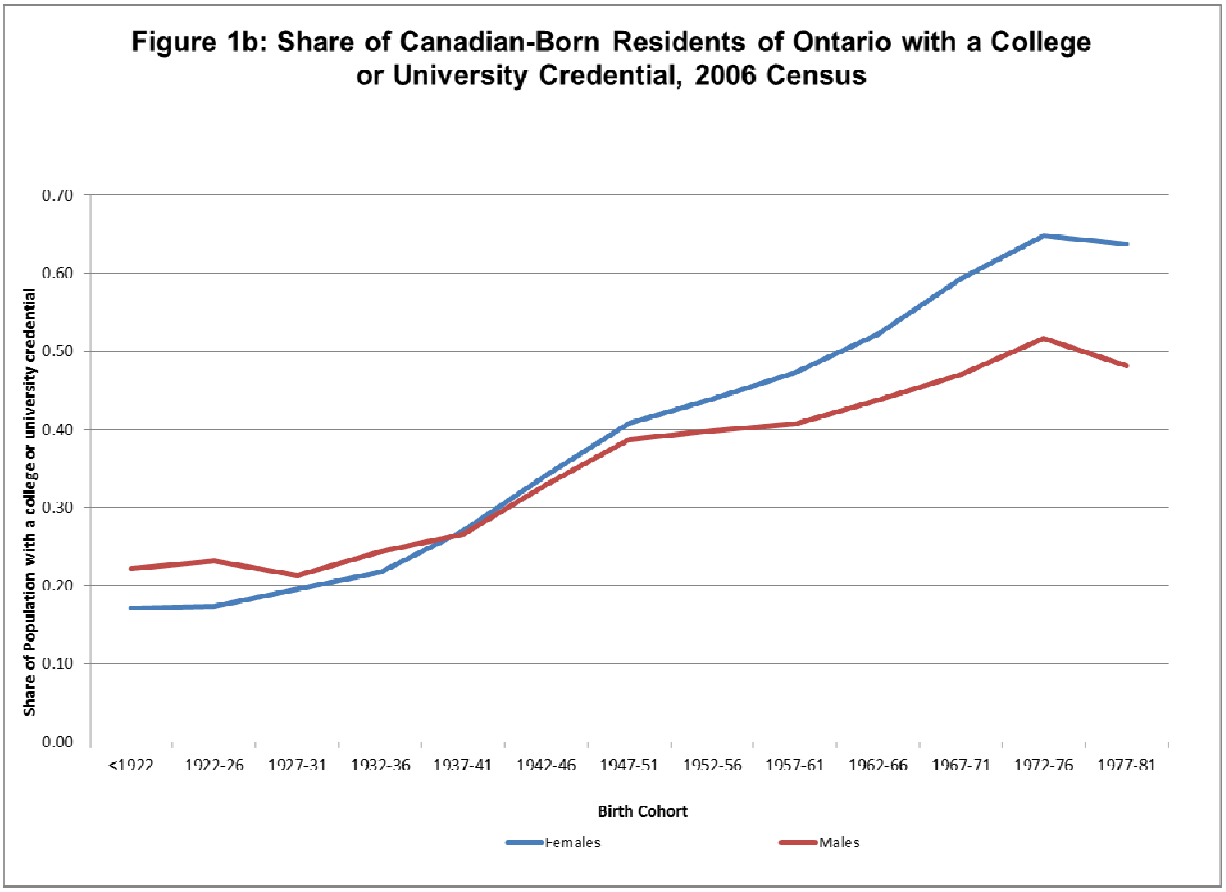
Trends in university participation in Ontario mirror those in Canada as a whole. Figure 1a shows the fractions of Canadian-born Ontario residents in different birth cohorts who, in the 2006 Census, reported having earned a bachelor's degree or higher.[2] The figure reveals two important facts that motivate our study. After the cohort of men born in the late 1940s, the fraction of men with a bachelor's degree or more has risen only modestly. For nearly 20 years, in fact, post-1940s cohorts of men had **lower** university completion rates than those of men born between 1947 and 1951, and the most recent cohort of young adults (born 1977-81) is only slightly ahead of that group. In contrast, women have made much progress, especially among recent cohorts. Ontario women born in the late 1970s, for example, have nearly double the university completion rate of women born 30 years earlier.

[1] A recent OECD publication (OECD, 2004) reports estimates of the fractions of men and women with at least some post-secondary education. As of 2001, 56 per cent of Canadian women and 45 per cent of Canadian men had at least some post-secondary education. The 11 point gap is among the largest of the major developed nations, and is substantially higher than the 6 point gap in the U.S., the 5 point gap in France, or the negligible gap in the U.K.

[2] Lemieux and Card (2001) present data from earlier Censuses that show the gender gaps in education for earlier cohorts.



While the focus of this report is on university attendance, it is important to note that the gap in the fractions of women and men with either a college or university credential is similarly widening. This increase is shown in Figure 1b, where we plot the fractions of Canadian-born Ontario residents with either a college or university credential by birth cohort and gender. Among men and women born in the late 1940s, roughly equal fractions had a postsecondary credential. Among the most recent cohorts there is a 16 percentage point gap, with women substantially ahead of men in both university and college completion.



The slow growth in university attendance by Canadian men poses a serious policy challenge. Technological change and rising international trade have led to an increasing relative demand for more highly educated workers, creating a "skill gap" in the Canadian labour market (Canadian Council on Learning, 2006; Boothby and Drewes, 2010). Assuming that these trends continue, the relatively low rate of university attendance among current cohorts of Canadian men will contribute to a widening gap between the needs of employers and the available skills of the male workforce for decades to come, threatening the long run earnings capacity of one half of the labour force.

In this report we summarize the insights into the causes of the gender gap in university attendance, which were derived from our analysis of a newly assembled database of Ontario university applicants. This database combines information from student applications submitted to Ontario University Application Centre (OUAC) with school-level data for publicly funded high schools in Ontario (including average test results on the Grade 9 mathematics tests administered by the Educational Quality Accountability Office, EQAO), and neighbourhood socio-economic characteristics obtained from the 1991-2006 Censuses. An important limitation of our database is the absence of ***student specific*** high school information for students who do not apply to university. Instead, we have to rely on school-level outcomes (e.g., school-wide

average test scores) as proxies for the corresponding student-level outcome. Despite this limitation we believe the available data shed a number of useful insights into the determinants of the gender gap in university applications among Ontario youth.

SUMMARY OF FINDINGS

Our analysis of the university application and high school characteristics data base points to six major conclusions.

1. University application rates of both women and men have increased over the past decade. Application rates of females rose from 41 per cent of the potential applicant pool in 1994 (based on students in Grade 10 in 1991) to 52 per cent of the potential pool in 2006 (based on Grade 10 students in 2004). Application rates of males rose from 32 per cent of the potential pool in 1994 to 39 per cent of the potential pool in 2006.

The rise in application rates, coupled with growth in the size of the high school cohort, means that total applications to Ontario universities increased by nearly 47 per cent. Among applicants, the share of females has risen slightly from 55 per cent to 56 per cent.

2. Among females who apply to university, just under 75 per cent register in an Ontario university in the following September. Among males, the registration rate is slightly lower (70 per cent). Despite fluctuations associated with the entry of the "double cohort" both rates were similar in 2006 to their corresponding levels in 1994.

The small rise in the fraction of female applicants coupled with relatively stable registration rates means that the fraction of females among new university registrants in Ontario universities increased slightly over the period, from 57 per cent to 58 per cent.

3. A school-by-school analysis reveals wide variation in the fraction of potential applicants who apply to university.

Separate schools have slightly higher application rates than public schools; schools in lower income areas with fewer university-educated adults, rural schools, and schools further from any university campus have lower application rates.

4. Nevertheless, the gender gap in university application rates is similar across high schools. Very few high schools in the entire province have equal application rates for men and women: in most cases the gap is close to 10 percentage points.

The gender gap is not limited to any particular type of school. Notably, the gender gap is similar at schools that serve high-income and low-income neighbourhoods.

5. Gender-specific application rates for cohorts of students at a given high school are higher in schools where more students scored in the upper half of the Grade 9 EQAO mathematics test.

The average gender gap in the Grade 9 EQAO test is relatively small, however, so this gap does not explain much of the gender gap in application rates.

More comprehensive measures of Grade 9 achievement may show a wider gender gap. The gender gap achievement may also rise between Grades 9 and 12. Available data do not allow us to address either possibility.

6. Application rates of men and women from a given high school are very strongly related to the fraction of students who take the academic versus applied mathematics test. Young women are somewhat more likely to take the academic test in Grade 9 than young men (73 per cent versus 68 per cent) explaining some of the gender gap in application rates.

This limited evidence suggests that high school course selection and student tracking may play an important role in explaining the gender gap in university applications.

Background

The Ontario Setting

During the 1990s and early 2000s, high school students applying to Ontario universities experienced a series of important policy changes.[3] At the provincial level, the direction of policy was influenced by the report of the Royal Commission on Learning (1994**),** which noted that 55 per cent of Ontario high school graduates were not entering college or university. In response, the Ministry of Education instituted a new high school curriculum, initiated programs to improve student counselling, and moved to shorten high school by eliminating the last year of high school, also known as the OAC year (see, e.g., Ontario Ministry of Education and Training, 1995)**.** The end of a five-year high school program for students going on to university had a dramatic effect in 2003, when two cohorts of high school students were both scheduled to proceed to university in the same year.

A second set of provincial policies focused on university tuition setting. In 1997, the province introduced policies to allow for a move towards deregulated tuition rates for bachelors and advanced degree programs in areas such as engineering, law, commerce, and medicine.[4] Tuition rate hikes resulting from this announcement started to take effect in the 1998 and 1999 academic school years.

During the same period, many universities initiated scholarship programs that provide substantial support (e.g., full tuition costs plus a stipend) to students with superior academic achievement during high school. The scholarship programs differ in the amount of funding, the

[3] In addition there were a number of changes during this period to the Ontario Student Assistance Program that also affected access to financial aid. For example, a major switch in the program was to require that all students qualifying for financial assistance first qualify for a student loan and, only secondarily, qualify for grants. A study of the effects of the student aid program on university participation, however, is outside of the scope of this report.
[4] In 2004 and 2005, the province instituted a tuition freeze, temporarily stemming tuition hikes universities might have imposed as result of the tuition deregulation policies introduced in the late 1990s.

required grade levels to qualify for the scholarships, and the year of adoption.[5] Since male and female students have different grades at the end of high school, and apply to a different mix of universities, these scholarship programs have potentially different effects on males and females.

Existing Research on the Gender Gap

A number of existing studies have documented and attempted to explain the widening gender gap in university attendance (and in post-secondary schooling attendance, more generally). In interpreting these studies it is important to keep in mind that the gender gap poses a difficult challenge for the "traditional" hypotheses that social scientists have used to explain why some children go on to higher education and some do not. The key family background factors that drive much of the observed variation in educational choices, including parental education, family income, and ethnic/immigration status, are (on average) the same for men and women.[6] Explanations for the gender gap must focus either on factors that are different for males and females, or on factors that have a differential impact on the schooling choices of females and males. Explanations for the change in the gender gap face an even more difficult challenge because many of the differences between males and females (e.g., the tendency for girls to score better on reading tests than boys) have persisted for decades.[7]

One recent Canadian study, by Frenette and Zeman (2007), uses nationally representative data from the Youth in Transition Survey (YITS) to examine gender differences in university enrolment at age 19. An advantage of YITS is that it includes self-reported information on school grades, as well as test results from the standardized tests used in the PISA program.[8] Frenette and Zeman find that young women have higher standardized reading scores and high school Grades than young men, and that together these differences can explain up to three-quarters of the 13-percentage point gender gap in university attendance in the YITS sample.[9] A limitation of the study is that it focuses on a single cohort of students (people who were 15 in December 1999). Thus it provides no insights into changes in the gender gap over time.

A second recent Canadian study, by Christofides, Hoy, and Yang (2010), examines the enrolment behaviour of young men and women age 18-24 interviewed in the Survey of Consumer Finances (1977-97) and the Survey of Labour and Income Dynamics (1998-2005). These data sets have no information on student grades or test scores. The sample is also restricted to children living with their parents – a potentially important limitation since only about

[5] See Dooley, Payne, and Robb (2008) for more detail on these scholarships. In addition, in 1998 the Canada Millennium Scholarship Foundation was created and in 2005 the Ontario Access Grant was introduced.
[6] Card (1999) shows that parental education alone explains at least 30 per cent of the variation in completed years of education.
[7] In the US, the National Assessment of Education Progress has been measuring math and reading achievement of children since the 1970s. The (small) gender gap in reading scores for 17 year olds (about 11 points higher for females, on a test with mean of 285 points) has been virtually constant, as has the small gap in math scores for 17 year olds (about 5-6 points higher for males on a test with a mean of 300 points).
[8] PISA is the Program for International Student Assessment – an OECD initiative. Students in YITS wrote the PISA tests at age 15.
[9] Frenette and Zeman only model the effect of reading scores: in math, the gender gap is generally smaller (or even reversed).

one-half of 24-year olds live with their parents in their early twenties (Card and Lemieux, 1999).[10] Christofides, Hoy, and Yang attribute much of the average gender gap in university attendance in their 29 year sample period to the differential returns to university education they estimate for women versus men. Most of the rise in the gender gap in their sample, however, is unexplained.[11]

Outside of Canada, studies of the gender gap in post-secondary education generally point to the same combination of factors – including potentially higher "returns" to obtaining a university degree for women than men, and superior high school achievement of young women – as drivers of the gender gap (see Buchmann, DiPrette and McDaniel (2008) for a recent review). For example, an influential study by Jacob (2002) uses the National Longitudinal Education Study (NELS, which has a design similar to YITS) to study the gender differential in college and university attendance. The gender gap in the NELS sample, which pertains to 1994, is rather modest (only +4 percentage points) and Jacob shows that most of this gap can be explained by differences in grades, hours of homework, and incidence of disciplinary problems in high school.

Relative to existing research our study has several advantages. A key advantage is that we have access to data for close to 100 per cent of Ontario students who attend university, over a 13 year sample period. This large sample size makes it possible to estimate more complex models, while taking account of the many unobservable factors – some of which are shared by students in the same high school, or region, or time period – that affect university attendance decisions.

Data Set Development

To explore the gender gap in university applications we rely on three key data sources: student level applications from the Ontario University Application Centre (OUAC); school level data from the Ministry of Education; and neighbourhood socio-economic characteristics obtained from the 1991, 1996, 2001, and 2006 Censuses from Statistics Canada. Detailed information on the transformation of these data into research data sets is available from the authors.

High School Application Rates

The OUAC data include applications by Ontario high school students who applied for full time admission during the period from fall of 1995 through 2008. Although data are available for students from privately as well as publicly funded schools, in our analysis we focus on students from publicly-funded regular high schools.[12] We classify these schools into four major types: English public, English separate (Catholic), French public, and French separate (Catholic). We also develop a number of other descriptors, including whether the school is "small" (enrolment in the bottom decile for its type); whether it is located in a rural region (based on the postal code of

[10] Living with parents and attending school are highly correlated, so Christofides, Hoy, and Yang's sample under-represents youth who have left school and moved out on their own.
[11] They include unrestricted trends in their models which show a much larger trend for women than men. These trends account for 80 per cent of the rise in the gender gap in university attendance in their sample period.
[12] We exclude night schools and special education schools.

the school); and the distance from the school to the nearest university and nearest college (also based on postal code).

We use the annual enrolment data from each school and counts of the number of university applicants in the OUAC data to construct an estimate of the "university application rate" for each high school (and for male and female students separately). In developing this estimate we faced two challenges. The first was to identify an appropriate denominator to reflect the potential pool of students that could apply to university. Ontario students must decide in Grade 9 and/or Grade 10 whether to pursue academically-oriented or applied courses in several subject areas (including mathematics). Those who do not enrol in academic-track courses may find it hard to complete the required prerequisite courses to be considered for university admission. Given this streaming system, one option might be to develop a denominator based on the number of students at a high school who are eligible to apply to university (e.g. looking at the courses they have already taken by Grade 12). Since our focus is on explaining differences in the fraction of students who apply to university, however, we believe it is important to take a broader view, incorporating course selection and dropout behaviour as part of the process that ultimately determines university admission and matriculation. Thus, we have defined the application rate of a cohort of students at a given high school as the ratio of the number of students who apply to university in a given year, divided by the number who were in Grade 10 two or three years earlier at the same school.[13]

A second and related challenge arises because the application records do not include information on how long a student was in high school, only their birth year and the high school they attended most recently. During our sample period, the OAC year was eliminated. In the transition period, some students applied to university after four years of high school and other students applied to university after five (or sometimes even six) years of high school. Even apart from the transition phase, students may spend an extra year in high school to finish advanced classes or for other reasons.

In previous reports we allocated a group of applicants in a given application year to high school cohorts based on an assessment of the average share of students that applied to university after four or five years. In preparing this report, however, we discovered that the age at application differs dramatically for males and females. Before the elimination of the OAC year, males tend to be between 19 and 20 years old at the time of application whereas females tend to be between 18 and 19 years old. Likewise, after the elimination of the OAC year, males tend to be older than females at the time of application.

Given the focus of this report is about the difference in application rates by gender, we developed an alternative allocation rule based on the year a student turned 15. Specifically, we assign a student to a Grade 10 cohort on the assumption that students enter Grade 10 in the same calendar year they turn 15. A downside to this approach is that students that repeat or

[13] A downside to using the Grade 10 enrolments for a cohort of applicants is that students may move into or out of a given high school between Grade 10 and the year of application. Our assumption is that there are relatively stable enrolments in the high school for a given cohort of students. Access to student level data would allow us to measure application rates at an individual level.

skip a year will be misallocated to a given cohort. Without more detail from the student's high school record, however, there is little that can be done to address this problem.

In the analysis that follows, we use the following measures for each high school:

- ***University Application Rate***: The number of applicants in a particular year divided by the corresponding Grade 10 enrolments in the high school (as explained above). We define the application rate by gender, and also define the high-school specific gender gap as the difference between the female and male application rates.

- ***Registration Rate:*** The number of university registrations reported (Ontario Universities only) for the Grade 10 cohort applicants divided by the number of applications for that cohort.

- ***Participation Rate:*** The number of university registrations reported (Ontario Universities only) for the Grade 10 cohort applicants divided by the corresponding Grade 10 enrolments.

- ***Application Rates by Program of Study***: We group applications based on the first choice program to which an applicant applies.[14] The programs have been grouped as follows: arts, science, commerce, and engineering. For this analysis we exclude "direct entry" programs such as education, journalism, and nursing. A listing of the programs within each group is provided in Appendix Table 1.

- ***Application Rates by Highly Qualified and Less Qualified Students***: We classify applicants into two groups based on their average high school grades in the courses that are used to calculate their standing for admission. Highly qualified applicants are those with an average of 80 or higher (on a 100 point scale); less qualified applicants are those with an average of less than 80. We divide the numbers in each group by the corresponding Grade 10 enrolments.

Neighbourhood Characteristics

We use the first three characters of each high school's postal code to identify the Forward Sortation Area (FSA) in which the high school is located.[15] We then matched Census tabulations at the FSA-level to the high school to capture the socio-economic characteristics of

[14] Applicants rank their choices of program and university and have 3 choices for one application fee. In recent years, additional choices could be purchased at the time of application. First, second and third choices could all be at the same university in different programs or in the same program at different universities.
[15] An FSA is the first three characters of the postal code (e.g. "M6S" of postal code "M6S 1H6"). These designations are defined by Canada Post and represent the postal facility from which mail delivery originates. In 2001 there were 510 FSAs in Ontario.

the families at each high school.[16] We matched the schools to the 1991, 1996, 2001, and 2006 Censuses. We then interpolated the data to give annual observations for each school in each year. All dollar amounts used were adjusted to a real value using 2002 as the base year.

Our Census-based neighbourhood characteristics are all based on indicators for whether the outcomes of interest (e.g., average household income) were in the top, middle, or bottom third of the overall population of Ontario FSA's that include a high school. We constructed indicators for the following measures:

- Average household income
- Share of the population that is under the age of 19
- Share of lone-parent families
- Share of the population that immigrated to Canada and arrived after 1981
- Share of the population that moved into the central metropolitan area in the past five years
- Share of the population aged 25 or older with a university degree or higher
- Share of the population whose stated religion is Catholic

Appendix Table 2 reports the cutoffs for the tercile groupings for each of the measures.

School-Level Test Scores

The final element in our combined school-level data set is based on outcomes of the Grade 9 mathematics test administered to all students in publicly funded high schools since 1998, by the Educational Quality Accountability Office (EQAO). As our data set includes multiple years prior to the introduction of the EQAO tests, we construct a school-specific average measure of Grade 9 achievement based on the average over the years for which we have data for the high school in question, and assign this time-invariant average to all cohorts of students from the high school. We also construct the average fraction of students who wrote the academic version of the EQAO mathematics test, as compared to the "applied" version. We use this fraction as a simple (and admittedly imperfect) indicator of the fraction of students in a high school who are taking academic versus non-academic courses in high school.

A limitation of the EQAO test data is that students in private schools are not required to take the test. For this reason we mainly focus on students from publically funded schools, though private high school students are included in some of our descriptive analyses.

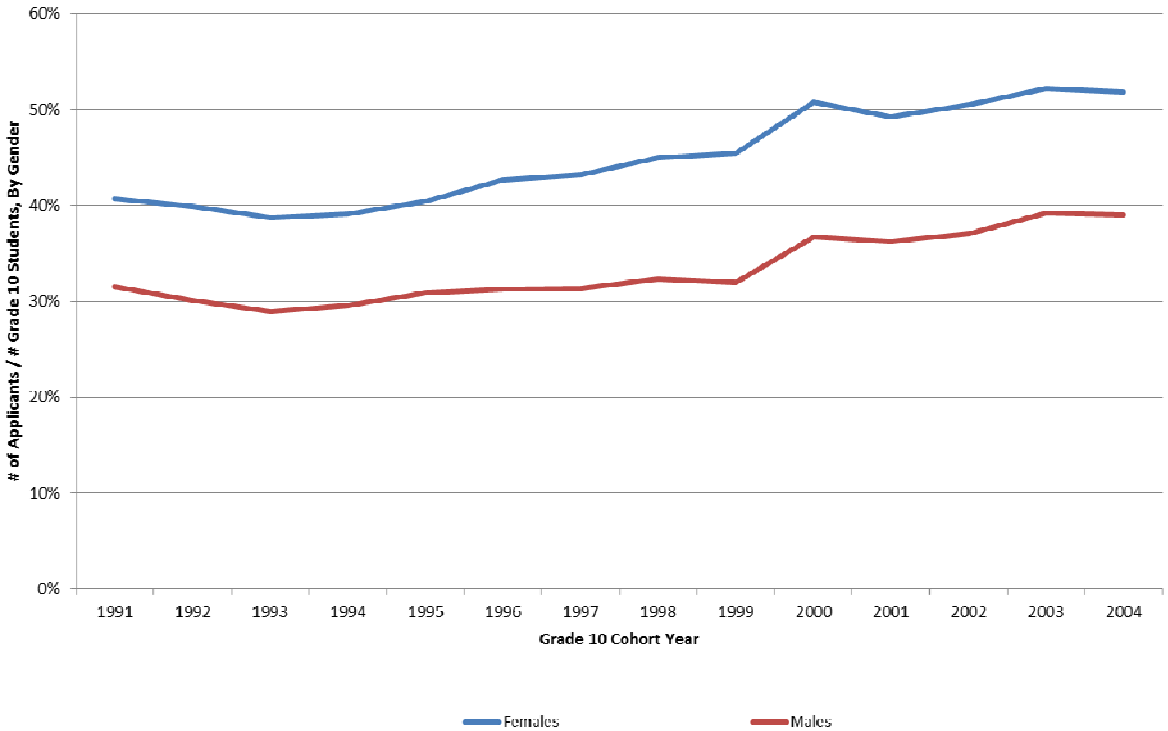
[16] A more detailed procedure based on Census enumeration area (EA) could be used if we had access to the postal codes for individual students. Since a typical high school will draw students from multiple EAs, we opted to use the FSA as the geographic area that was more likely to approximate a high school's catchment area.

Descriptive Analysis

Trends in Application, Registration, and Participation Rates

Figure 2 shows the fractions of young men and young women in Ontario high schools who applied to university over the past 15 years. We plot the rates for cohorts starting with students in Grade 10 in 1991 (application year 1994) and ending with those in Grade 10 in 2004 (application year 2006). At the beginning of the period there were about 68,000 females and 72,000 males enrolled in Grade 10 province-wide. Of these students, 41 per cent of females and 32 per cent of males applied to university three years later. Over the period, the size of the Grade 10 cohort increased by approximately 14 per cent for males and 15 per cent for females. The size of the applicant pool increased by approximately 32 per cent for males and 33 per cent for females. Thus, as a proportion of applicants, the ration of females to males stayed relatively constant over the period.

Figure 2: Estimated University Application Rates, by Cohort and Gender



The application rates of both groups drifted down slightly for the 1992-1994 cohorts, while the gender gap remained relatively constant at about 9-10 percentage points. Between the 1995 and 1996 cohorts the share of female students applying to university increased by about 2 percentage points (to just under 43 per cent) the male application rate remained relatively constant at 31 per cent.[17]

For the 1996 to 1999 cohorts there were increases in application rates of both females and males, though the gains were larger for women, leading to a widening of the gender gap to about 13 percentage points (45 per cent versus 32 per cent). Then both rates jumped dramatically for the 2000 cohort (by +4 percentage points), reflecting the impacts of the switch from a five-year to four-year high school curriculum as well as changes to the overall curriculum.[18] We note that this increase is *not* a mechanical reflection of the "double cohort" bump in total applications to universities. Rather, since our application rates are based on Grade 10 cohorts, the rise appears to reflect a true effect of the shortening of high school – perhaps because some fraction of students who would have never completed the OAC year decided to apply in Grade 12. Beyond the 2000 cohort, applicant rates have increased slightly for males and females. Thus, looking over the 1991 to 2004 period as a whole, application rates for women have risen by 11 percentage points (from 41 per cent to 52 per cent) while rates for men have risen by 7 percentage points (from 32 per cent to 39 per cent), leading to a 4 percentage point increase in the gender gap.

Figure 3 shows the estimated university registration rates of male and female university applicants. Note that this rate reflects a combination of the acceptance rate (i.e., the fraction of applicants who are offered admission to one or more of their choices) and the takeup rate (the fraction of accepted applicants who decide to attend university). Over our sample period the registration rate has varied for females but there was little average trend: the rate for the 1991 cohort was 74 per cent while the rate for the 2004 cohort was 75 per cent. Male students show similar fluctuations and a similar net rise over the period, from a 69 per cent rate for the 1991 cohort to a 70 per cent rate for the 2004 cohort.

A prominent feature of Figure 3 is the series of dips in registration rates for the 1996 and 2000 cohorts. The first dip occurred around the 1999 application year; the first year that tuition deregulation took effect. The second, larger, dip occurred around the 2002 application year, and was associated with the entrance of the double cohort. A further analysis (not shown) of the registration rates for students with a high school average of 80 or higher shows that these rates have been relatively constant over the period. Since all of these students were presumably accepted to at least one of their choices, the constancy of their registration rate suggests that takeup-rates of highly qualified applicants were very stable. The variation in overall registrations rates shown in Figure 3 is attributable to changes among lower-achieving

[17] The 1996 cohort of students would have been experiencing the changes in curriculum as well as the tuition deregulation policies.

[18] Under the 5 year curriculum students wanting to go onto university followed a stream that resulted in their qualifying for OAC level courses. Under the 4 year curriculum, students have more choice in certain courses where they can choose to take the course under an academic ("U" level course) or an academic/applied stream ("M" level course).

students, and may well be due to fluctuations in the fraction who are admitted to at least one of their choices. Interestingly, the gap in registration rates between men and women also appears to be due to the less-qualified group. Among applicants with averages of 80 or more registration rates of men and women are equal.

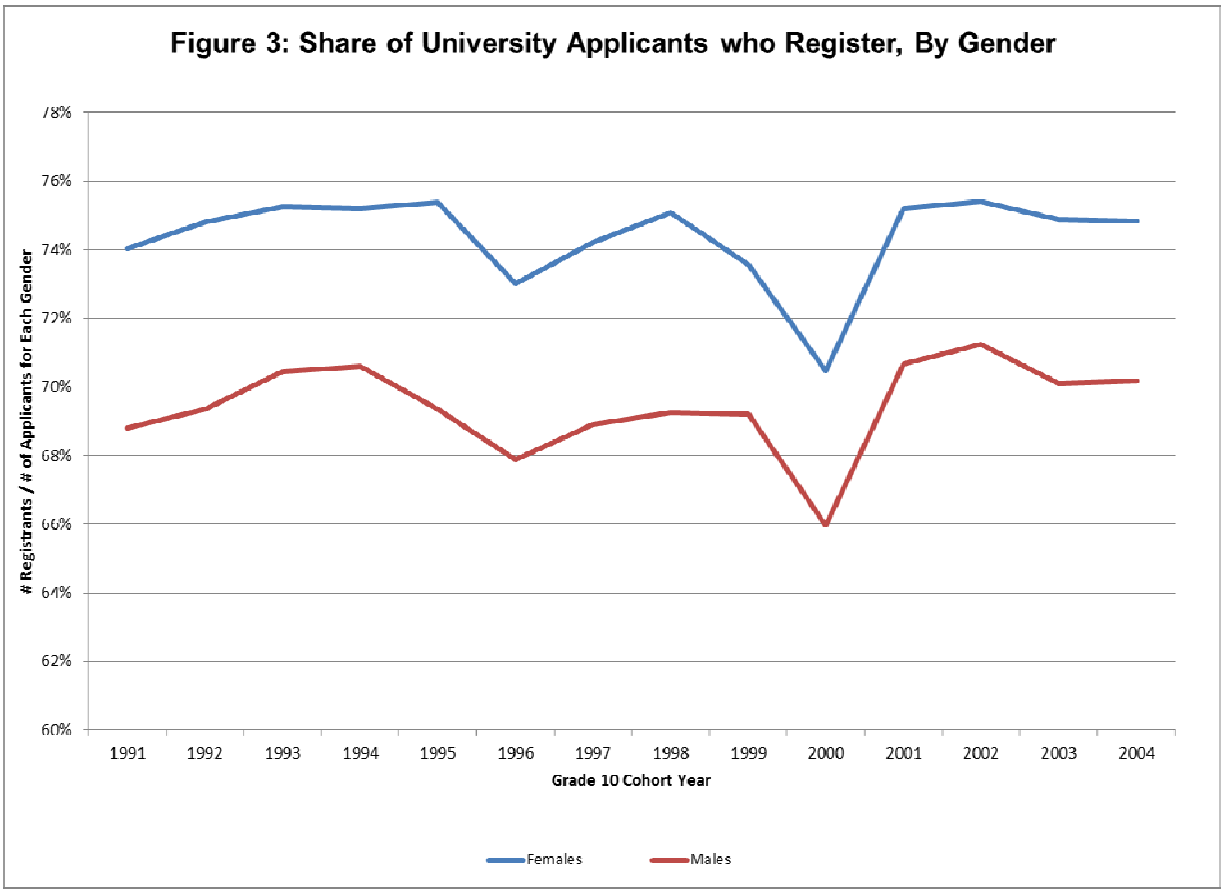
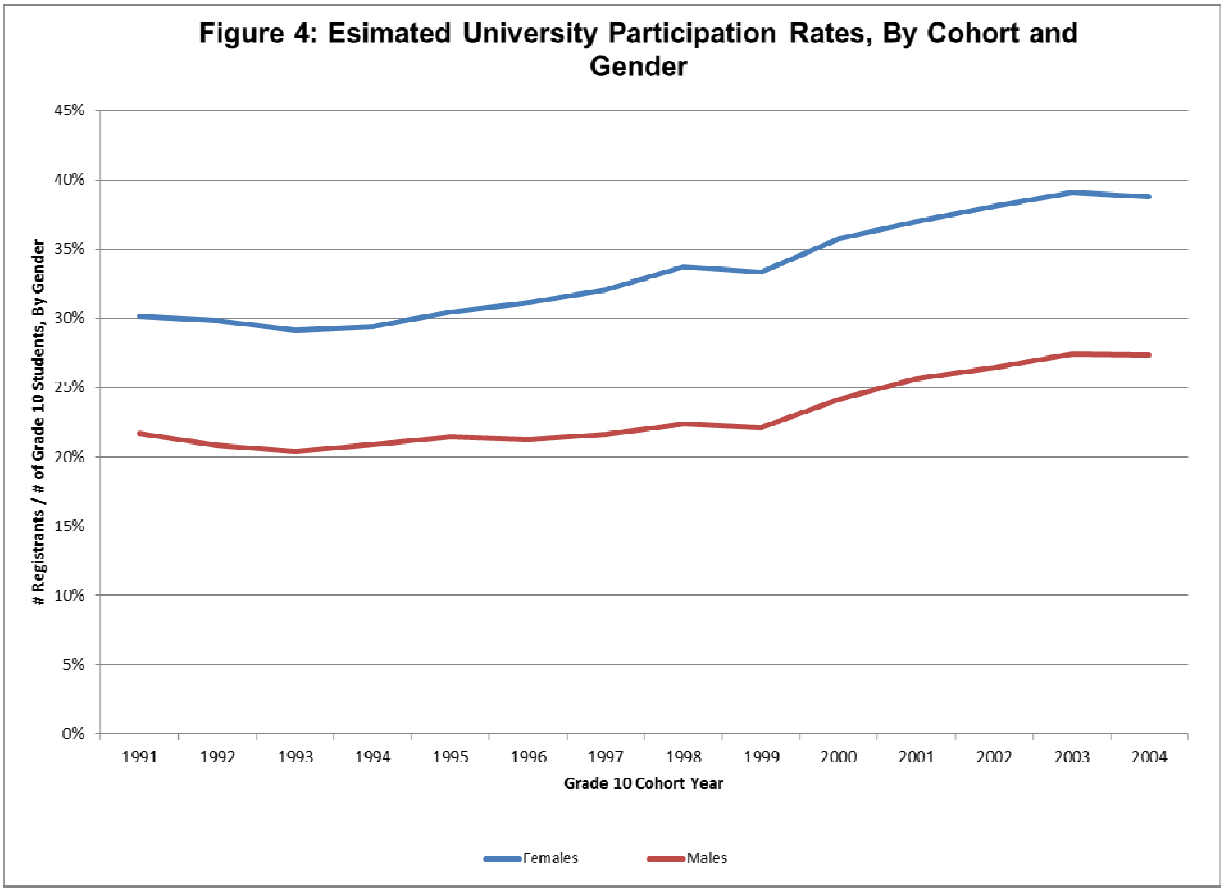
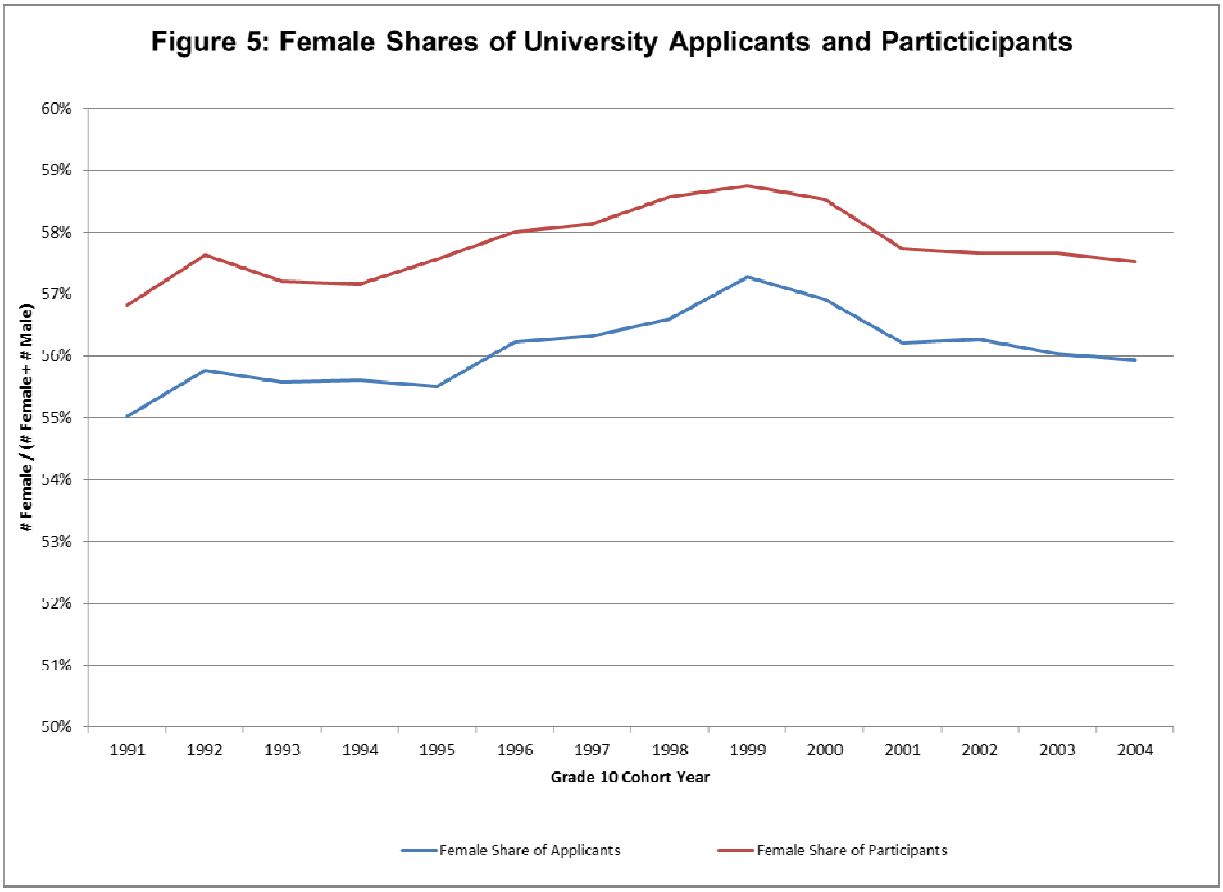


Figure 4 shows the combined effect of application, acceptance, and takeup behaviour in generating university participation rates of female and male students. Interestingly, the short-term movements in application and registration rates tend to offset each other, so the trends in participation rates are relatively smooth. Over our 15 year sample period the fraction of Grade 10 females who entered an Ontario university rose from 30 per cent to 39 per cent, while the fraction of Grade 10 males entering an Ontario university rose from 22 per cent to 27 per cent. Thus the (absolute) gender gap in university participation widened slightly (+4 percentage points).



The previous figures relate the application and registration rates within each gender. Figure 5 summarizes the net impacts of differential application rates and registration rates on the gender composition of the pools of applicants and registrants (and, thus, a different denominator). Overall, the female shares of both groups edged up slightly over the period (by approximately 1 per cent). By the mid-2000's about 58 per cent of all newly-registering Ontario university students were female.



Finally, Figures 6a and 6b show the programs of study that female and male applicants list as their "first choice" for the universities they apply to. Among female applicants preferences appear to be relatively stable: just over 45 per cent list arts programs as their first choice; another 23-25 per cent list science programs; roughly 10 per cent list commerce as their first choice; and 2-3 per cent list engineering. Preferences of male applicants are rather different, and also show somewhat more variability. Among male applicants, about 30 per cent list arts programs as their first choice, with some indication of a dip in the early 1990s. Interest in commerce programs appears to be steadily rising (from 15 per cent to 19 per cent of first choices) while interest in science programs is declining. Engineering is a first choice for 14-17 per cent of men (versus only 2-3 per cent of women) and shows an inverse-U shape, peaking in the mid to late 1990s. The sharp gender differences in preferences for course of study at university, and the absence of any trend for female students, are interesting in light of evidence that demand for different groups of graduates has been changing over the past two decades.[19]

[19] We used the 2006 Census, which collects field of study in broad categories, to examine gender differences in field of study for older university graduates in Ontario. Among 35-39 year old Canadian-born Ontario residents with a BA or higher, 66 per cent of women majored in arts, 19 per cent in sciences, 12 per cent in business and commerce, and 3 per cent in engineering, while the respective fractions for men are 47 per cent (arts) 20 per cent (science) 21 per cent (commerce) and 13 per cent (engineering). Similar distributions are present for 40-59 year olds.

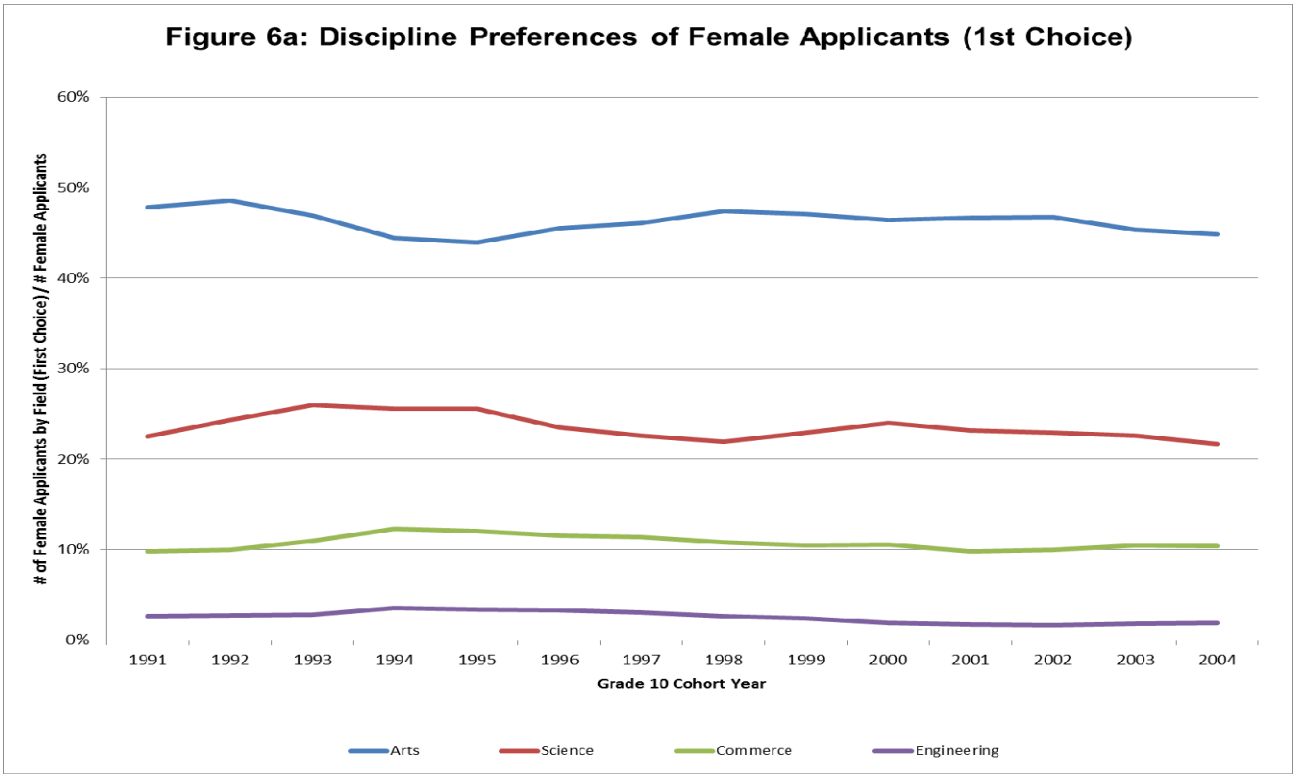


Figure 6a: Discipline Preferences of Female Applicants (1st Choice)
60%
50%
40%
30%
20%
10%
0%
# of Female Applicants by Field (First Choice) / # Female Applicants
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Grade 10 Cohort Year
Arts
Science
Commerce
Engineering

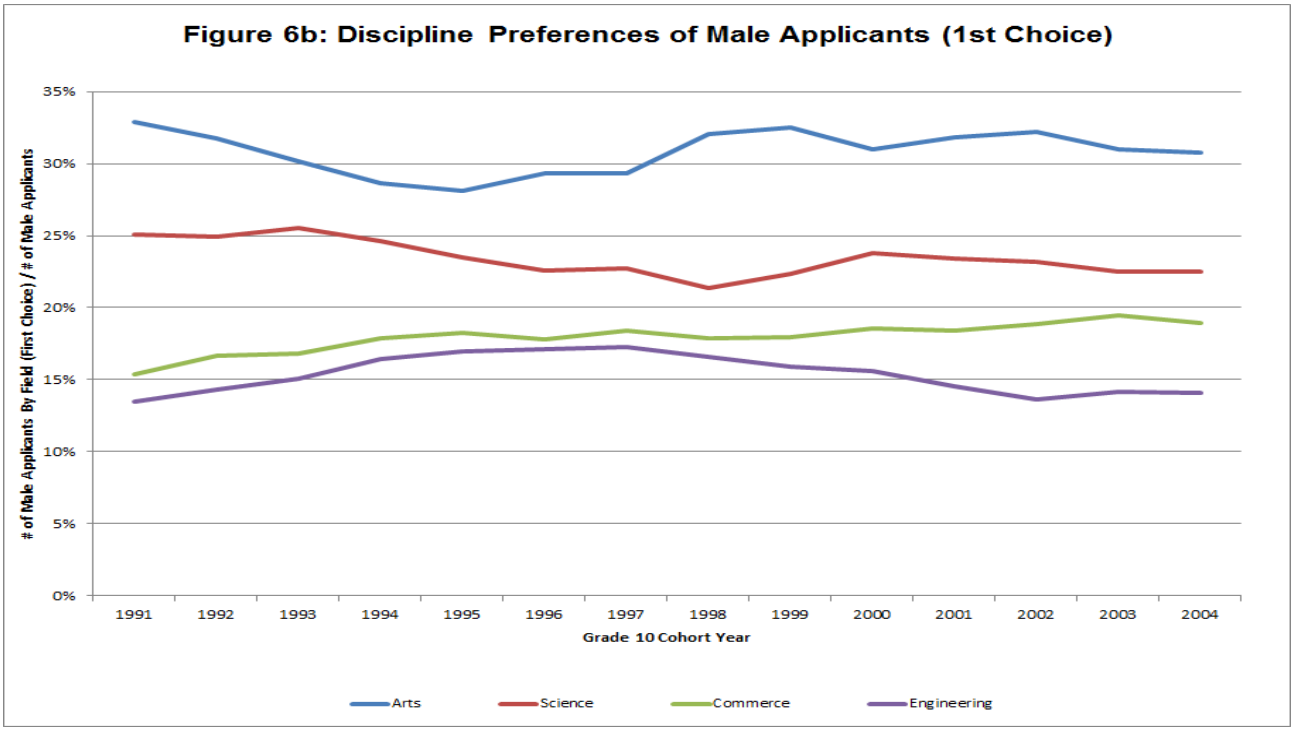


Figure 6b: Discipline Preferences of Male Applicants (1st Choice)
35%
30%
25%
20%
15%
10%
5%
0%
# of Male Applicants By Field (First Choice) / # of Male Applicants
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Grade 10 Cohort Year
Arts
Science
Commerce
Engineering

Variation in Application Rates Across High Schools

Given the persistent gender gap in province-wide application average rates, it is interesting to ask whether the differences in application behaviour are similar at all high schools, or whether there are some schools where the application rates of men and women are more similar. Average school-level application rates of male and female students by type of school are summarized in Table 1. (For simplicity in this table we exclude private high schools). Across the 698 publicly funded high schools in our data set the (unweighted) average application rate is 41 per cent for female students and 30 per cent for male students.[20] There is some variation in application rates by board type, with relatively higher rates for students at English-language separate schools, and slightly lower rates at the French-language schools.[21] Nevertheless, the gender gap in average application rates is between 10 and 14 per cent at all four board types. Moreover, as shown in the last column of the Table, the female application rate exceeds that of males in the same school by 5 per cent or more at 90 per cent of the schools at all four board types except the French Public Board.

Table 1: School-Level Average University Application Rates by School Board Type

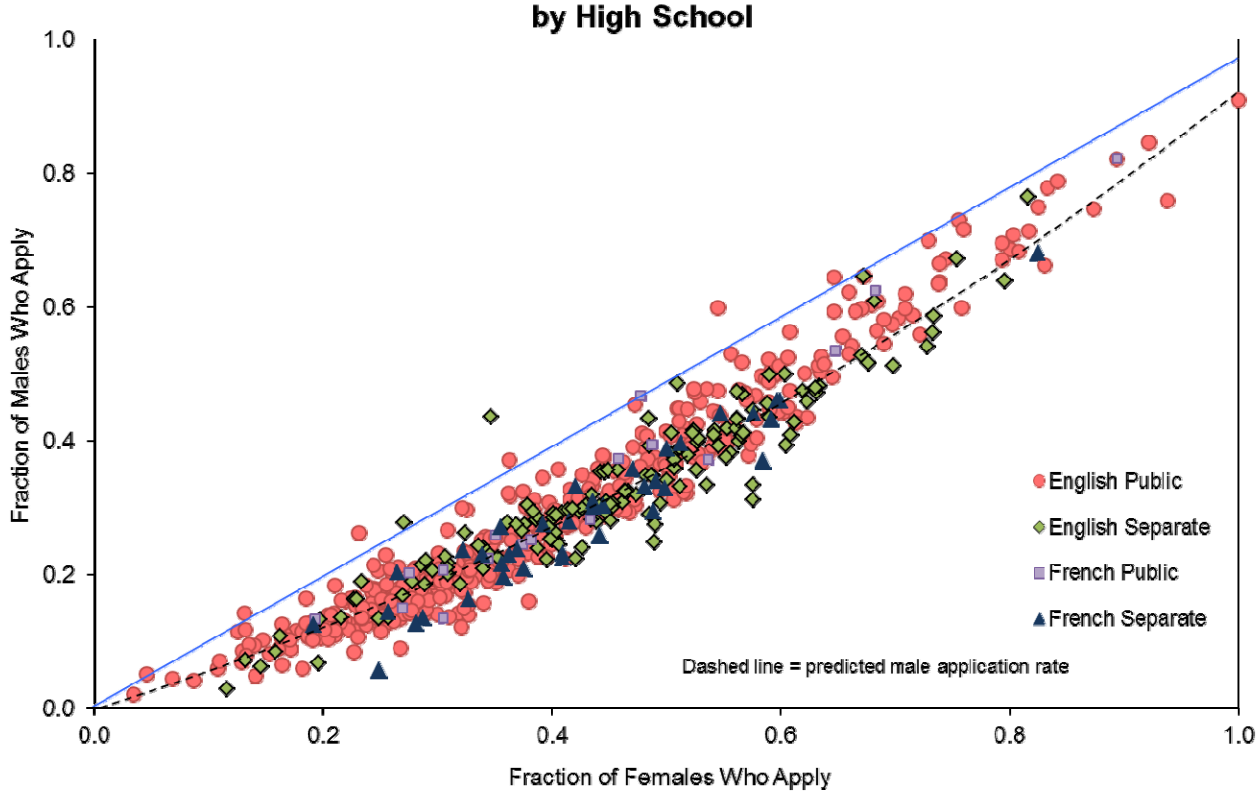
		School-Specific Application Rates by Gender:			
	Number of Schools	**Average Application Rate of Females**	**Average Application Rate of Males**	**Average Difference in Female-Male Rates**	**Percent of Schools with Female Rate > Male Rate + 5%**
All	698	40.9%	29.7%	11.3%	92.0%
English Public	479	39.5%	28.9%	10.6%	91.4%
English Separate	162	46.3%	33.7%	13.2%	92.6%
French Public	18	36.3%	26.5%	9.8%	88.9%
French Separate	39	38.5%	24.9%	13.7%	97.4%

Note: School-specific average application rates are enrolment-weighted averages across cohorts in grade 10 from 1991 to 2004. Averages across schools are unweighted.

[20] As we discuss below, smaller schools tend to have lower application rates so the unweighted average of application rates across schools is slightly lower than an enrollment-weighted average.
[21] Students of French language high schools may be more likely to apply to out-of-province universities (specifically to Quebec universities) than students of English-language schools.

A more complete picture of the variation in male and female application rates across high schools is presented in Figure 7, where we plot the average application rate of male students at a given high school against the corresponding rates for female students. We use different symbols for each of the four publicly funded school board types. For reference we also superimpose two lines. The first is a 45 degree line – if the application rates for males and females were identical in each school, all points would lie on this line. The second is a smooth fitted line, derived from a simple regression of the male application rate on a quadratic function of the female rate. (One can see clearly from the graph that the relationship is slightly "bowed", hence the choice of a quadratic prediction model).

Figure 7: University Application Rates of Males and Females, by High School



Two important observations emerge from the graph that reinforce the message contained in Table 1. First, across schools with a very wide range of female application rates (from under 10 per cent to 90 per cent or higher), male application rates of students from the same school are almost uniformly lower. The gender gap at a given school, which is just the vertical distance between the 45 degree line and the point representing a given high school, is typically around 10 per cent, but slightly smaller at schools with very low female application rates, and those with very high rates. Second, the range of variation across schools in application rates at the two largest sets of schools:-- English-speaking public schools and English-speaking separate schools -- is relatively similar.

School Level Test Score Outcomes

The Grade 9 EQAO mathematics test is graded in 4 levels, from 1 (lowest level of achievement) to 4 (highest). Two versions of the test are taken: an academic version for students taking academic track mathematics in high school; and an applied version for students taking applied track mathematics. Table 2 shows the distribution of test results for young men and women who took the two versions of the test between 1998 and 2005. Overall, about 73 per cent of female students and 68 per cent of male students took the academic version of the test. Among this group, average test outcomes for males are slightly better for males than females, with about 62-66 per cent of students scoring in the upper two levels (level 3 or 4). Among students taking the applied version of the test, test scores are lower (only 25-27 per cent scoring level 3 or 4), and slightly better for males than females.

Table 2: Grade 9 EQAO Mathematics Test Score Outcomes

	Academic Version of Test		Applied Version of Test	
	Females	**Males**	**Females**	**Males**
Fraction of Gender Group Writing this Version of Test	73.1%	68.3%	26.9%	31.7%
Test Score Distribution (%):				
Level 1 (lowest)	16.4%	15.2%	28.3%	26.6%
Level 2	21.8%	21.0%	46.4%	45.9%
Level 3	57.1%	58.9%	25.0%	27.1%
Level 4	4.7%	4.9%	0.3%	0.3%

Note: Test scores outcomes are for EQAO grade 9 mathematics tests in 2000-2003. Sample includes 247,335 valid test results for female students, and 251,755 test results for male students

Table 3 shows the distributions of school-specific test results by gender for schools operated by different school boards. For simplicity we classify test results at each school by the fraction of students with a test outcome of level 3 or level 4. Across all publicly funded high schools in the

province the average fraction of males with a level 3 or 4 test is slightly higher than the average fraction of females (52.7 per cent versus 52.6 per cent). Consistent with the near equality of test outcomes for males and females, females outscore males in 49.1 per cent of schools. The results for schools operated by the different boards are not too dissimilar, though males in the French public do slightly worse than their female counterparts, but young women score higher than young men in about 50 per cent of these schools. In the English separate schools, females outscore males in only 44.4 per cent of the schools.

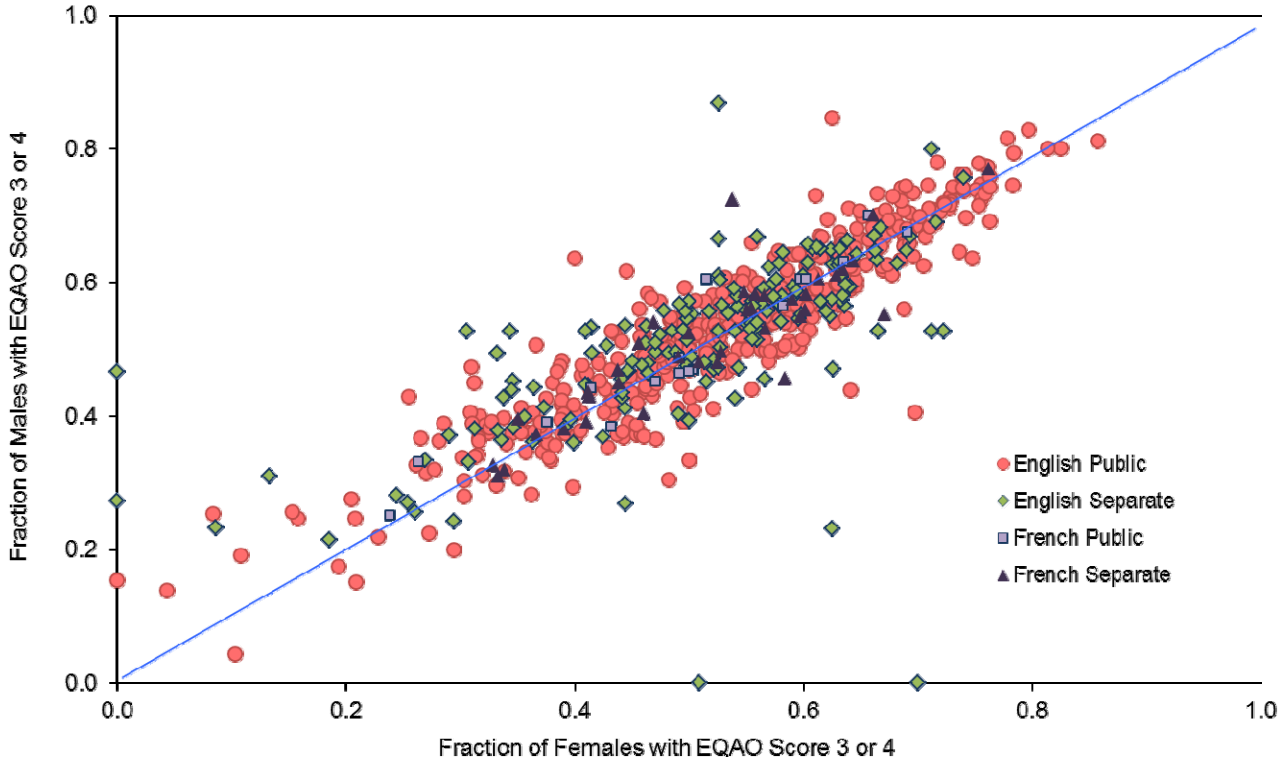
Table 3: School-Level Average Grade 9 Mathematics Test Outcomes by School Board Type

		Average Fraction of Test Takers in School with Level 3-4 Test Outcomes			
	Number of Schools	Females	Males	Difference: Female−Male	Percent of Schools with Female Rate > Male Rate
All	698	52.6%	52.7%	-0.2%	49.1%
English Public	479	53.1%	53.2%	-0.1%	50.5%
English Separate	162	50.7%	51.5%	-0.8%	44.4%
French Public	18	50.1%	48.1%	2.0%	50.0%
French Separate	39	55.2%	54.4%	0.8%	51.3%

Note: School-specific test score results are based on test results for grade 9 EQAO mathematics tests written in 1998-2004. Average fraction with level 3 or 4 results is unweighted average.

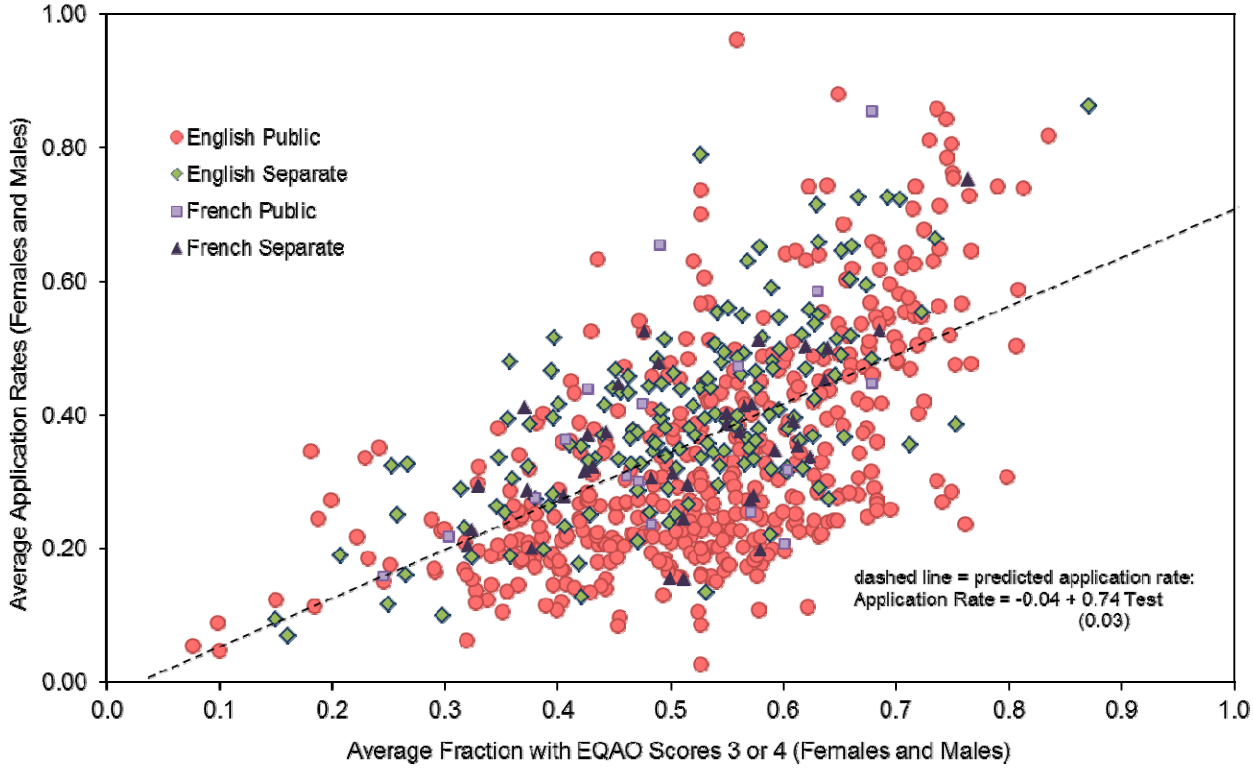
More information on the cross-school variation in test results for male and female students is illustrated in Figure 8, where we plot the fraction of male Grade 9 students who have EQAO math scores of 3 or 4 against the corresponding fraction for females. As suggested by the results in Table 3, most of the points in Figure 7 are clustered close to the 45 degree line. This is true at relatively low-performing schools (where under 40 per cent of students achieve a level 3 or 4 test score) and at high-performing schools (where over 60 per cent achieve a level 3 or 4 score). Although test scores very widely across schools, males and females in the same school tend to have very similar scores.

Figure 8: Fractions of Males and Females With Grade 9 EQAO Scores 3-4, by High School



As a final descriptive exercise we related average test scores on the Grade 9 EQAO mathematics test at a given high school to the university application rate of students at that school. Figure 9 shows the relationship for all students (male and female). Each point in the figure represents a publicly funded high school: the x-axis shows the average fraction of male and female students scoring 3 or 4 on the EQAO tests (from 1998 to 2005) while the y-axis shows the average fraction of male and female students who apply to university (over the period from 1994 to 2006). For reference we also show the predicted application rate, based on a simple linear regression model. As shown in the figure there is a very strong positive relationship between student test performance at a school and the university application rate. The slope of the predicted relationship suggests that raising the fraction of students scoring in the top 2 levels of the EQAO test by 10 percentage points would raise their application rate by about 7.5 percentage points. We suspect that the link between application rates and broader measures of achievement (for example, course grades in Grades 9-12) might even be stronger. Of course a causal interpretation of this relationship is difficult because students at schools with higher test scores typically have richer and better educated parents, and these students may be more likely to apply to university regardless of their Grade 9 test results.

Figure 9: Average Test Scores in Grade 9 Mathematics and Average University Application Rate, by High School



Multivariate Analysis

To what extent can observed data (such as Grade 9 test scores) help to explain the gender gap in applications rates at different high schools? In this section we report the results from a set of regression models that relate gender-specific application rates (and the difference in application rates of females versus males) to a variety of measured characteristics of each high school in each year for which we have data. We focus on three groups of measured characteristics: (a) characteristics of the school, such as school board type, rural versus urban location, enrolment, distance to nearest college and university campuses; (b) average Grade 9 mathematics test results for male and female students at the school (averaged over the period from 2000 to 2003); (c) neighbourhood characteristics, obtained from the 1991-2006 Censuses, and interpolated to inter-censal years. In addition, our model includes unrestricted year effects (or so-called "year dummies") that capture any changes in the dependent variable that are not accounted for by the other explanatory variables in the model. Importantly, these year effects account for any province-wide factors like tuition levels and changes in average economic conditions that affect the students in all schools equally.[22]

[22] In the regression analysis we cluster the standard errors at the FSA level given our highest level of aggregation is at the FSA level (Census measures).

Table 4a reports the coefficients (and estimated standard errors) of the school and student-level characteristics in the three models.[23] Beginning with the school characteristics, the first 3 rows show the differentials in application rates associated with English language separate schools, French language public schools, and French language separate schools, all measured relative to the English language public schools, which form the "base group" for our models. Controlling for other factors, female application rates at separate schools are about 2 percentage points higher than at public schools, whereas male application rates are about 0.6 percentage points higher. On net the gender gap is therefore higher at separate schools (about 2.2 percentage points higher) after adjusting for other factors. Interestingly, this is only a little smaller than the unadjusted difference in the gender gaps at public and separate schools (see Table 1). Male student application rates at the Francophone schools are also lower than at public high schools; again these adjusted differentials are not too different from the unadjusted differentials documented in Table 1.

Table 4a: Coefficients from Estimated Models for Application Rates of Female and Male Students, and Difference in Application Rates

Dependent Variable	Female Applicant Rate (1)	Male Applicant Rate (2)	Female - Male Applicant Rate (3)
School Characteristics:			
English Separate School	2.18	0.56	2.21
	(0.68)	(0.62)	(0.40)
Francophone Public School	-1.19	-2.30	0.92
	(2.17)	(1.94)	(1.17)
Francophone Separate School	-0.60	-2.94	2.38
	(1.09)	(1.03)	(0.75)
Located in Rural Area	-4.91	-5.50	0.88
	(1.06)	(1.07)	(0.50)
Low Enrollment School	-4.13	-0.81	-2.92
	(1.22)	(1.33)	(0.78)
Distance to Nearest University (in 100's of kms)	-0.01	0.00	-0.01
	(0.01)	(0.01)	(0.00)
Distance to Nearest College (in 100's of kms)	0.01	0.00	0.00
	(0.01)	(0.01)	(0.01)
Share of Academic Test Takers w/ High EQAO Score (level 3/4)	25.81	25.49	0.99
	(3.53)	(3.59)	(1.83)
Share of Applied Math Test Takers w/ High EQAO Score (level 3/4)	-1.01	0.33	-1.38
	(3.91)	(4.05)	(2.11)
Share of Academic Math Test Takers	61.17	60.37	2.76
	(3.73)	(3.57)	(1.96)

[23] The models are fit to slightly different samples: as a result, the coefficients for the gender gap model are not exactly equal to the differences in the corresponding coefficients from the female and male models.

Dependent Variable	Female Applicant Rate (1)	Male Applicant Rate (2)	Female - Male Applicant Rate (3)
School Characteristics:			
Missing EQAO Test Data	-0.63	-0.05	-1.04
	(3.60)	(3.35)	(1.37)
R-Squared	0.584	0.618	0.052
Additional Controls	Year & Census	Year & Census	Year & Census
Mean of Dependent Variable (Application Share)	41.66	30.26	11.46
Standard Deviation	(18.78)	(17.91)	(10.16)
Number of Observations	9,555	9,490	9,430

Notes: Table reports regression coefficients (and standard errors) from models fit to the estimated share of a cohort in a given high school who apply to university. See text for discussion of how application rates are constructed. Data are for cohorts of students who would have been in grade 10 in years from 1991 to 2004. All models include unrestricted year effects and neighbourhood census measures (reported in Table 4b).

The next set of coefficients in Table 4a show that schools in rural areas and smaller schools have lower application rates for both females and males. The effect of rural schools is similar for females and males, while the effect of small schools is larger in magnitude (more negative) for females. Measures of the distance to nearby colleges and universities appear to have no large or significant effect on university application rates.

Finally, we consider the impacts of having higher academic achievement at Grade 9 (as measured by the EQAO tests in math) on application rates of the cohort 3-4 years later. In the specification in Table 4a we distinguish between two groups of students: those taking academic-track math in Grade 9, and those taking applied-track math in Grade 9. We also control directly for the share of Grade 9 test-takers who are recorded as taking Grade 9 academic math. The latter has a very strong impact on application rates: the coefficient estimates imply that increasing the fraction of students in the academic track by 10 percentage points would raise university application rates by about 6 percentage points. This very large effect suggests that even measured crudely, early tracking has a powerful effect on application rates, though it should be noted that the effect may overstate the true "causal" effect of moving students to the academic track since this choice may be correlated with other factors (like parental education) that predict university application behaviour.

Another indication of the strength of tracking effects is that application rates of both gender groups are strongly influenced by the share of academic-track students with above average EQAO scores, but unaffected by the share of applied-track students with good scores. Given that the achievement of applied track students has virtually no effect on application rates, it appears that this group is very unlikely to "cross-over" and eventually apply to university[24]. By

[24] The Ministry of Education has made two adjustments to the math curriculum pathways: 1) creation in 2006 of a transfer course for students to move from applied Grade 9 to academic math in Grade 10 and 2) the 2007 curriculum enabled students to enter the college/university math from applied Grade 10 math. Continued follow-up of more recent cohorts will help determine it this has enabled students to "cross –over".

contrast, a rise in the achievement of academic track students leads to a significant rise in application rates. For example, increasing the fraction of academic track students who score 3 or 4 on the EQAO math test by 10 percentage points is associated with increases in the university application rates of females and males by 2.5 percentage points. Interestingly, the effects on male and female application rates are very similar.

We have also fit similar models where we relate the application rate of each gender group to the fractions of the same gender group who are in academic-track math, and the fractions of the gender group in each track with EQAO scores of 3 or 4. Coefficient estimates for the critical student test variables from these models are reported in Table 5. The coefficient estimates for the gender-specific models are not too different from those reported in Table 4a, though the effect of higher scores for the academic test takers is slightly attenuated for males, and there appears to be a small but significant effect of raising scores of the applied test takers. These results suggest that there may be a small amount of cross-over from the applied track to eventual enrolment in university for male students, but none for female students.

Table 5: Coefficients for Alternative Set of EQAO Measures

Dependent Variable	Female Applicant Rate	Male Applicant Rate	Female - Male Applicant Rate
Mean of Dependent Variable	0.427	0.319	0.109
Standard Deviation	(0.211)	(0.208)	(0.114)
	(1)	(1)	(1)
ShareAcademic Test Takers w/ High EQAO Score by Gender Type	24.77	19.33	4.61
	(3.17)	(3.19)	(2.10)
Share Applied Math Test Takers w/ High EQAO Score by Gender Type	0.75	5.00	-0.25
	(0.49)	(1.36)	(0.06)
Share of Academic Math Test Takers by Gender Type	53.72	55.72	14.53
	(3.93)	(4.21)	(2.83)
Missing EQAO Test Data	-3.75	-1.15	-1.84
	(3.04)	(3.02)	(1.29)

Note: all other controls remain the same. For each column the EQAO measures differ based on the dependent variable. For female applicant rate, the test score measures are for female only For male applicant rate, the test score measures are for male only. For the Female-Male applicant rate, the test scores reflect the difference in the measures (female - male)

Table 4b shows the coefficients for the neighbourhood-level variables from the specifications reported in Table 4a. Generally, these show the expected patterns. For example, schools in FSAs with a larger share of high income families, a larger share of university-educated adults, and a low share of single parent families have higher application rates of both females and males, while schools in FSAs with the opposite characteristics have lower application rates. In general the neighbourhood variables have similar effects on females and males, and so little net effect on the gender gap in application rates.

Table 4b: Estimated Coefficients from Models for Application Rates of Female and Male Students, and Difference in Application Rates

Dependent Variable	Female Applicant Rate	Male Applicant Rate	Female - Male Applicant Rate
	(1)	(2)	(3)
Census-Based Measures:			
Bottom Tercile of Income Grouping	-1.42	-0.52	-0.81
	(0.70)	(0.70)	(0.38)
Top Tercile of Income Grouping	2.43	1.28	1.11
	(0.98)	(0.96)	(0.47)
Top Tercile for Share of Population Under 19	-1.29	-1.48	0.15
	(0.76)	(0.68)	(0.33)
Bottom Tercile for Share of Population Under 19	-0.78	-0.19	-0.41
	(0.79)	(0.77)	(0.36)
Top Tercile for Share of Families with 1 Parent	-1.01	0.09	-0.66
	(0.78)	(0.73)	(0.44)
Bottom Tercile for Share of Families with 1 Parent	2.76	2.86	0.07
	(0.90)	(0.91)	(0.39)
Top Tercile for Population that Immigrated Post 1981	6.66	6.65	0.25
	(0.92)	(0.93)	(0.43)
Bottom Tercile for Population that Immigrated Post 1981	-2.44	-3.39	0.94
	(0.74)	(0.68)	(0.43)
Top Tercile for Population that has moved in last 5 years	0.06	-0.46	0.49
	(0.66)	(0.65)	(0.31)
Bottom Tercile for Population that has moved in last 5 years	1.77	1.99	-0.02
	(0.73)	(0.72)	(0.35)
Top Tercile for Population over 25 with University Degree	4.73	5.95	-1.16
	(1.11)	(1.04)	(0.47)
Bottom Tercile for Population over 25 with University Degree	-1.05	-1.30	0.48
	(0.72)	(0.65)	(0.42)

Dependent Variable	Female Applicant Rate	Male Applicant Rate	Female - Male Applicant Rate
Top Tercile for Population Catholic	0.88	0.22	0.58
	(0.81)	(0.76)	(0.40)
Bottom Tercile for Population Catholic	2.09	2.07	0.03
	(0.91)	(0.88)	(0.44)
Total Population	6.44	0.72	0.09
	(18.80)	(16.55)	(10.19)
Additional Controls	Year & School	Year & School	Year & School

Notes: Table reports regression coefficients (and standard errors) from models fit to the estimated share of a cohort in a given high school who apply to university. See text for discussion of how application rates are constructed. Data are for cohorts of students who would have been in grade 10 in years from 1991 to 2004. All models include unrestricted year effects as well as school level variables reported in Table 4a.

Finally, though we do not report the coefficient estimates, it is interesting to consider the estimated year effects from our models, and compare these estimates to year effects from models that exclude the other explanatory variables. This comparison allows us to easily summarize the fraction of the trend in application rates of females or males, or in the gender gap in application rates, that is explained by our model. Interestingly, we find that trends in the various school and neighbourhood measures we have collected explain some (around 20 per cent) of the upward trends in application rates of both females and males over our sample period, but virtually none of the trend in the gender gap.

Policy Discussion and Conclusion

Similar to analyses for Canada and other countries, we show there is a gender gap in post-secondary educational attainment in Ontario and that this gap has been increasing. In the early 1990s the gap in university application rates was approximately 9 per cent. Today, that gap has increased to approximately 13 per cent. Much of this gap is attributable to a faster growth in applications by females than by males. What explains this growth, however, is less clear.

Across the Ontario university system, during the 1990s and 2000s, the share of females relative to males enrolled in universities has increased more modestly, from approximately 57 per cent to 58 per cent. The preferences of females across academic disciplines (e.g. arts, science) as revealed through their applications have remained relatively consistent over time; the highest fraction of female applicants is in the area of arts. During this same period, there has been greater variation in the preferences of males across academic disciplines with an increasing interest in commerce and a declining interest in science.

Our high school level analysis provides several interesting findings. Overall, the school level and neighbourhood characteristics explain a small proportion of the widening of the gender gap in applications to university. The analysis, however, suggests that streaming and performance in Grade 9 is a significant factor in application rates and in explaining the gender gap. More investigation, with more detail data, is warranted on this point.

This report represents an initial exploration of the gender gap in post-secondary education participation in Ontario. With more detailed data at the high school level, a more elaborate investigation of the choices made by students and the potential causes of the gender gap in post-secondary education can be undertaken.

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Appendix

Appendix Table 1: Allocation of Disciplines Within Each Program Category

Art	Humanities
	Social Sciences
	Fine and Applied Arts
Science	Sciences
	Physical, Health Education and Recreation
Commerce	Commerce
	Management and Business Administration
Engineering	Engineering and Applied Sciences
Other	Agriculture
	Architecture
	Education
	Environmental Studies
	Forestry
	Household Science
	Journalism
	Landscape Architecture
	Music
	Nursing
	Optometry
	Pharmacy
	Rehabilitation Medicine
	Social Work
	Veterinary Medicine
	Other Administration
	Other Degrees
	Preliminary Year
	Mathematics

Appendix Table 2: Summary Statistics on School and Census Measures

var name	School Level Measures	Explanation of Measure	Mean	Standard Deviation	
private	Private School	=1 if Private School	0.08	(0.27)	
encath	English Separate (Catholic) School	=1 if English Separate School	0.22	(0.41)	
frpub	Francophone Public School	=1 if Francophone Public School	0.02	(0.15)	
frcath	Francophone Separate (Catholic) School	=1 if Francophone Separate School	0.05	(0.22)	
rural	Located in Rural Area	=1 if Postal Code of School is designated a rural area	0.30	(0.46)	
lowenr	Low Enrolment School	=1 if Total Enrolment is in bottom 10% based on school type	0.07	(0.25)	
uni_dist	Distance to Nearest University	Minimum distance (kms) to nearest university	37.09	(59.45)	
cg_dist	Distance to Nearest College	Minimum distance (kms) to nearest college	16.58	(25.44)	
eqaohi_all	Share Test Takers w/ High EQAO Score (level 3 or 4)	# Test Takers w/ score of 3 or 4 / # Test Takers	53.08	(12.16)	
eqaohi_ac	Share Academic Math Test Takers w/ High EQAO Score (level 3 or 4)	# Academic Level Test Takers with score of 3 or 4 / # of Academic Test Takers	0.63	(0.12)	
eqao_ac	Share of Academic Math Test Takers	# of Academic Level Test Takers / # of Total Test Takers	0.71	(0.11)	
eqao_mi	Missing EQAO Test Data	School has no EQAO test scores (all privates and some public)	0.10	(0.30)	

	Census Measures (333 Unique FSAs)	Explanation of Measure	Mean	Standard Deviation	Average Cut-off For Tercile
pop_tot	Total Population	Total population for the FSA divided by 1,000,000	0.03	(0.02)	
lowinc	Bottom Tercile of Income Grouping	=1 if Average Household Income for the FSA is in the bottom tercile of FSAs	0.34	(0.47)	$54,714
hiinc	Top Tercile of Income Grouping	=1 if Average Household Income for the FSA is in the top tercile of FSAs	0.30	(0.46)	$70,128

	Census Measures (333 Unique FSAs)	Explanation of Measure	Mean	Standard Deviation	Average Cut-off For Tercile
hi_p19	Top Tercile for Share of Population Under 19	=1 if share of population in the FSA aged 19 or younger is in the top tercile	0.36	(0.48)	28.07%
low_p19	Bottom Tercile for Share of Population Under 19	=1 if share of population in the FSA aged 19 or younger is in the bottom tercile	0.27	(0.44)	24.43%
hi_f1p	Top Tercile for Share of Families with 1 Parent	=1 if share of families in the FSA with only one parent present is in the top tercile	0.28	(0.45)	16.19%
low_f1p	Bottom Tercile for Share of Families with 1 Parent	=1 if share of families in the FSA with only one parent present is in the bottom tercile	0.40	(0.49)	11.96%
hi_i81p	Top Tercile for Population that Immigrated Post 1981	=1 if share of population that immigrated to Canada since 1981 is in top tercile	0.28	(0.45)	12.00%
low_i81p	Bottom Tercile for Population that Immigrated Post 1981	=1 if share of population that immigrated to Canada since 1981 is in bottom tercile	0.45	(0.50)	3.96%
hi_move	Top Tercile for Population that has moved in last 5 years	=1 if share of population that migrated into the CMA of the area is in the top tercile	0.32	(0.46)	22.08%
low_move	Bottom Tercile for Population that has moved in last 5 years	=1 if share of population that migrated into the CMA of the area is in the bottom tercile	0.32	(0.47)	16.85%
hi_uni	Top Tercile for Population over 25 with University Degree or Higher	=1 if share of adult population with a university degree or higher is in top tercile	0.30	(0.46)	23.83%
low_uni	Bottom Tercile for Population over 25 with University Degree or Higher	=1 if share of adult population with a university degree or higher is in bottom tercile	0.39	(0.49)	14.05%
hi_cath	Top Tercile for Population Catholic	=1 if share of population in 2001 that are Catholic is in the top tercile	0.34	(0.47)	39.11%
low_cath	Bottom Tercile for Population Catholic	=1 if share of population in 2001 that are Catholic is in the bottom tercile	0.37	(0.48)	28.40%
			0.08		

Note: The cut-off for the terciles were calculated separately for each year -- the range of cut-offs represents the average cut-off for the maximum for the bottom tercile and for the minimum for the top tercile