

Effect of Single Sex Schools on Major Choice

Fabián Duarte, Universidad de Chile
Valentina Paredes, Universidad de Chile

PRELIMINARY DRAFT – PLEASE DO NOT CITE OR CIRCULATE
WITHOUT AUTHOR’S PERMISSION

Abstract

The gender gap has been a widely discussed topic, both in the economic literature and by public opinion. For Chile, although the number of women enrolled in the first year of higher education has exceeded the number of men enrolled since 2009, the average monthly income for salaried women is 20% less than for salaried men. One factor that explains part of the gender gap in wages is occupational segregation. In particular, Chile suffers from an underrepresentation of women in Science, Technology, Engineering, and Math (STEM) college majors, which are associated to higher wages. In this paper, we study how single-sex schools affect the choice of a STEM major. Using an instrumental variable approach, where we use the variation in the supply of single-sex schools as an instrument for the type of school, we find that single sex schools result in higher test scores for both girls and boys (0.8 and 1 standard deviation respectively), and a higher probability of choosing a STEM major for girls, of approximately 4 percentage points.

Introduction

The gender wage gap has been a widely discussed topic both in the economic literature and by public opinion. For Chile, although the number of women enrolled in the first year of higher education has exceeded the number of men enrolled since 2009 (National Education Council), the average monthly income for salaried women is 20% less than for salaried men (Diaz, 2015). The same phenomenon can be observed for developed countries (see O’Neill, 2003).

One factor that explains part of the gender gap in wages is occupational segregation¹: about one third of the gender gap in log wages in Chile is explained by differences in occupation. In particular, Chile suffers from an underrepresentation of women in Science, Technology, Engineering, and Math (STEM) college majors, which are associated to higher wages. Thus, studying the factors that explain occupational segregation is relevant for the design of public policies that seek to reduce wage gaps between men and women.

¹ Lewis (1996) and Goldin (2014) show that occupations can explain 1/3 of the gap. However, Goldin (2014), emphasizes that most of the gap is within occupations instead of between occupations.

The previous literature has found that school environment can have an impact on gender identity and therefore may have an effect on career choices (Maccoby, 1990, 1998, Lee y Marks, 1990, Dasgupta y Asgari, 2004, Paredes, 2014). In particular, one important element of the school environment is the gender composition of the classroom. Both Maccoby (1990, 1998) and Lee and Marks (1990) find that women in coed schools hold more traditional views of gender roles than women in single-sex schools. Bertrand (2011) notes that teenage girls in mixed environments reinforce traditional gender identities to the extent that they compete with other women to capture the attention of men. Therefore, coeducational schools may have a positive effect on the percentage of prevalently female careers in the student's application. Moreover, Maccoby (1990, 1998) suggests that pressure of women to be surrounded by men is greater than the pressure of men to be surrounded by women, so a minor or not significant effect is expected for men in single sex schools.

The previous literature has found mixed effects of single sex schools on STEM outcomes. Park, Behrman and Choi (2012) study the effect of single-sex schools on students' STEM outcomes for Korea, where the assignment to schools is random. They find that all-boys schools are positively related to STEM outcomes, but only a positive effect of all-girls schools on mathematics scores. Jackson (2012) studies the effect of single-sex schools in Trinidad and Tobago and finds no effect of single-sex schools on students' achievement and a negative effect on the probability of taking a science course for females. Eisenkopf, Hessami, Fischbacher and Ursprung (2015) find that single-sex schools improve the performance of female students in mathematics in Switzerland.

In this study, we investigate the effect of single-sex schools on college major choice for the case of Chile. Specifically, we study if single-sex schools increase the probability of following a STEM major for boys and girls. To identify a causal effect, we use an instrumental variable approach, where we use variations in the supply of single-sex schools as an instrument for the type of school, to estimate the effect of single sex schools on career choice.

Although the methodology is not as clean as the previous studies, we add two elements that improve the existing literature. In the first place, we use administrative records for all student in high school in Chile, improving the analysis by having different control variables. This is totally different from Park, Behrman and Choi (2012), which only use the capital city and Eisenkopf, Hessami, Fischbacher and Ursprung (2015) that use a sample of 808 students. Finally, we take advantage of the college system in Chile that allows students to rank several majors in the enrollment process. This feature will be crucial in disentangle student preferences from the availability of majors.

The educational gender gap in Chile

Although women have exceeded the number of men enrolled in higher education since 2009, there is still a significant gender gap in student achievement during high school

and in the university selection test (PSU). Using test scores from the PSU databases from 2005 to 2016, we observe a large gender gap in math test scores, of approximately 0.28 standard deviations. Moreover, although the gender gap in math test scores have decreased over time, in 2015 the gap was still significant.

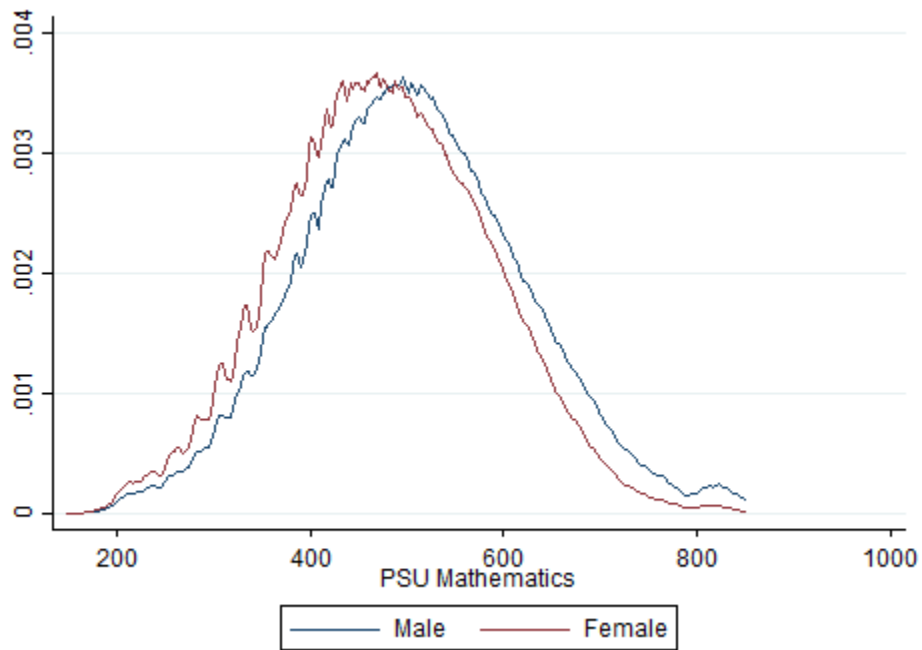


Figure 1: Distribution of Math PSU test scores

Table 1: Distribution of Math and Language PSU test scores

		Male Students	Female Students	All Students
Language	Mean	489.23	486.37	487.71
	Standard Deviation	113.42	109.17	111.19
	Observations	919,089	1,039,028	1,958,117
Math	Mean	506.54	478.45	491.65
	Standard Deviation	114.67	108.14	112.13
	Observations	913,504	1,031,694	1,945,198

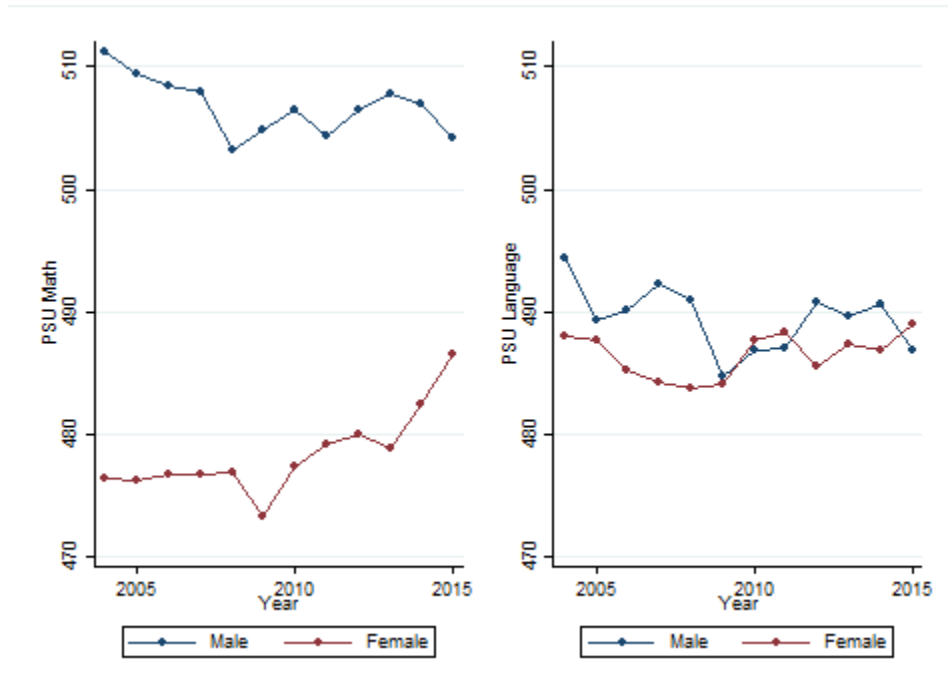


Figure 2: Gender Gap in Math and Language PSU test scores

This gender gap also shows in the probability of enrolling in a STEM major. Between 2005 and 2016, the probability of enrolling in a STEM major was 40% for male students and only 20% for female students.

Table 2: Probability of choosing a STEM major

Student Gender	Probability of STEM		Num Obs.
	Mean	Std. Dev.	
Male	0.40	0.49	191,72
Female	0.20	0.40	177,311
Total	0.31	0.46	369,031

Finally, the data doesn't show a gender gap in favor of women for language test scores. Table 1 shows that the average language scores is three points higher for male students.

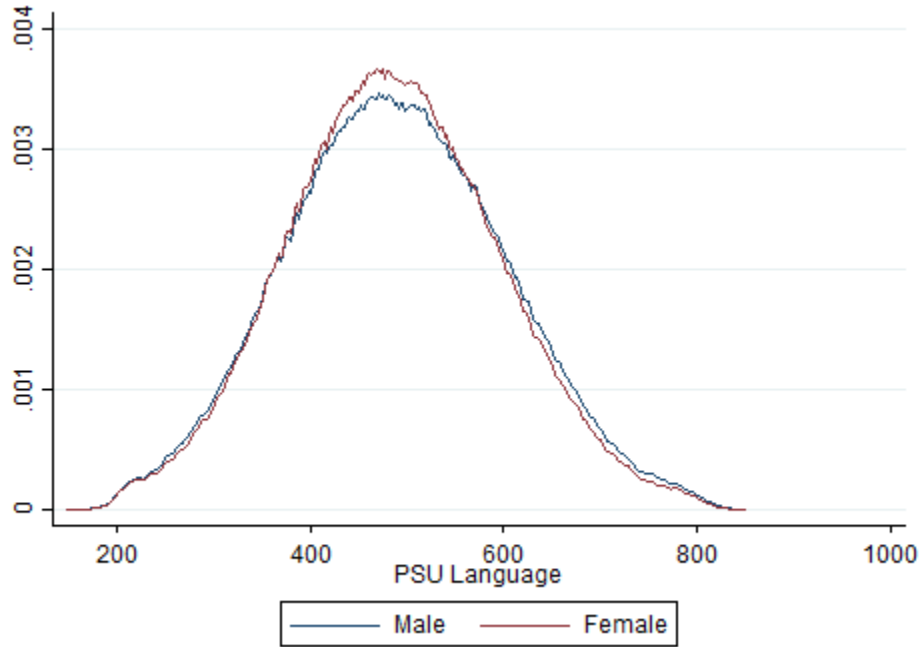


Figure 3: Distribution of Language PSU test scores

Econometric framework and data

The main identification challenge when studying the effect of single-sex school on student outcomes is that there are unobserved characteristics that affect both the school choice and, in this case, major choice. To address this source of endogeneity, we use an instrumental variable approach, where we use variations in the supply of single-sex schools within counties over time² as an instrument for the type of school, to estimate the effect of single sex schools on career choice. In particular, we estimate the following model:

$$\begin{aligned} \Pr(STEM)_{ict} &= \alpha + Coeducational_{ict} + X_{ict}\psi + \gamma_c + \delta_t + \varepsilon_{ict} \\ Coeducational_{ict} &= \alpha' + \pi PropCoeducational_{ct} + X_{ict}\psi' + \gamma'_c + \delta'_t + \nu_{ict} \end{aligned}$$

Where i denotes the student, c denotes the county and t denotes time. $\Pr(STEM)$ is a dummy variable that takes the value of 1 when the student chooses a STEM major, $Coeducational$ is

² This is important because in general families do not move from one county to another county frequently. In sum, the time dimension of the instrument reinforce the validity of the instrument.

a dummy variable that takes the value of 1 for coeducational schools, PropCoeducational is the proportion of coeducational schools in the county in that year, γ_c is a county fixed effect and δ_t is a year fixed effect. Finally X , is a series of sociodemographic controls.

To observe major choice and student test scores, we use the university selection test (PSU) database for years 2005 to year 2016. The PSU database contains a language and math test score, 10 majors/institutions to which the student applied, the major and institution where the student is enrolled, information about the high school the student attended, and socioeconomic information about the student’s family. In addition, we use the REND databases from the Ministry of Education to identify single-sex and coeducational schools, and to construct the percentage of coeducational schools in the county for each year.

Identification in our model comes from the fact that within each county, there are students who are exposed to different supplies of single-sex schools. Two main concerns regarding the validity of our instrumental variables are the fact that the geographic location of school may not be random, and that the residential location may not be exogenous.

The assumption that housing location is fundamentally an exogenous decision has been widely used in the literature that models schools choice (Chumacero, Gomez and Paredes, 2011, Nielson, 2013, among others). As Nielson (2013) argues, “the link between residential location and school choice is less important as it does not determine the school or choice set”. To explore whether these claims are empirically supported, we use data from the Ministry of Education (MINEDUC) for years 2004-2015. The data shows that the probability of changing school county is 8%, while the probability of changing county of residence is 5%. Moreover, the correlation between a change in school county and county of residence is only 0.22.

A more important threat to validity is that the geographic location of schools is not random. However, this is not a problem unless openings of single sex schools were correlated with omitted factors that also increased the probability of following a STEM major. In this case, our estimates could overestimate the effect of single sex schools on STEM outcomes. To test if this is the case, we regress number of single sex schools in the county in year t on the percentage of students who enrolled in a STEM major in year $t-1$. We also control for county and year fixed effects. Table 3 shows that the mean enrollment in STEM majors does not affect the number of single-sex schools.

Table 3: Enrollment in STEM majors does not affect number of single-sex schools

VARIABLES	(1) Only girls schools	(2) Coed schools	(3) Only girls schools	(4) Coed schools
Mean enrollment in STEM majors	0.003	-0.121		
Mean female enrollment in STEM majors	-0.037	-0.190	-0.001	-0.037
			-0.032	-0.165

Observations	3,434	3,434	3,376	3,376
R-squared	0.019	0.201	0.019	0.205
Number of cod_com_rbd	327	327	325	325

Notes: Standard errors are presented in parentheses. All regressions include country and year fixed effects

To use the variation in the proportion of coeducational schools within a county over time as an instrument, we first need sufficient variation. The average proportion of coeducational schools over the whole sample is 0.90, with an overall standard deviation of 0.10. The within standard deviation is larger than the between standard deviation, with values of 0.079 and 0.065 respectively.

Table 4 shows that the effect of the percentage of coeducational schools in the county in that year has a positive and strong effect on the probability of choosing a coeducational school. Columns (2) and (3) include county fixed effects and Column (3) includes year fixed effects. The F test is well above 10 in all regressions, indicating that our instrument is strong. Table 4 also shows that there is sufficient variation in the proportion of coeducational schools in each county over time and that the results is stable when we add different fixed effects.

Table 4: Effect of proportion of coed schools on probability of coed schools

	(1)	(2)	(3)
Proportion of coed schools	1.3228 (0.0387)	1.4849 (0.0445)	1.4906 (0.0462)
County fixed effects	No	yes	yes
Year fixed effect	No	no	yes

The proportion of coeducational schools increased between 2004 and 2015. However, this increase was not constant in all counties. From the 347 counties included in this study, 19% exhibit a positive linear trend in the proportion of coeducational schools; 4% show a negative linear trend and 77% show no significant linear trend³.

³ We regress the proportion of coeducational schools in each county against a linear time trend and compute the proportion of counties where the linear trend was positive and significant, negative and significant, and not statistically significant.

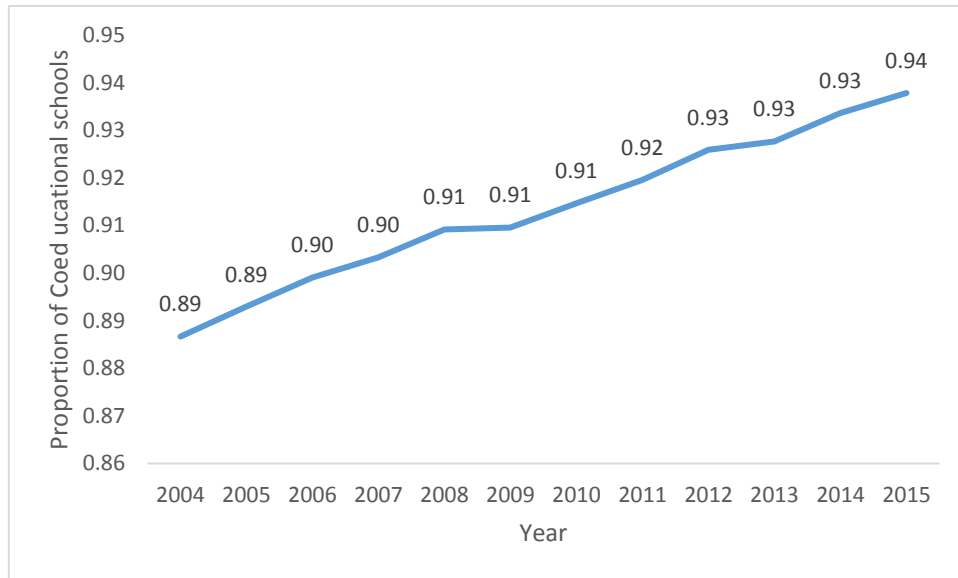


Figure 4: Proportion of Coeducational schools by year

Because the variation in our instrument comes from closures and openings of schools, the next Table shows the number of schools opened and closed each year, by type of school.

Table 5: Opening and Closures of Schools by year

	Openings		Closures	
	Coeducational	Single-Sex	Coeducational	Single-Sex
2004	94	5	19	0
2005	56	2	23	2
2006	41	1	30	0
2007	36	0	25	3
2008	49	1	14	0
2009	37	0	20	3
2010	54	0	26	4
2011	53	1	20	3
2012	62	1	46	2
2013	48	1	34	2
2014	32	0	24	6
2015	25	1	-	-

Table 6 shows the number and percentage of single-sex and coeducational schools. On average, 12% of students in our data set attended a single-sex school, with 10% of female students and 14% of male students attending single-sex schools. The percentage of students attending single sex schools is similar for public, private and voucher schools.

Table 6: Number and Percentage of Students by Type of School

Type of School	Frequency	Percentage
Single Sex	240,998	12.12
Coeducational	1,746,689	87.88
Total	1,987,687	100

Table 7: Number and Percentage of Students by Type of School and Gender

	Single Sex	Coeducational	Total
Male	93,582 <i>10.08</i>	834,796 <i>89.92</i>	928,378 <i>100</i>
Female	147,416 <i>13.92</i>	911,893 <i>86.08</i>	1,059,309 <i>100</i>
Total	240,998 <i>12.12</i>	1,746,689 <i>87.88</i>	1,987,687 <i>100</i>

Notes: Percentages are shown in italics

Table 8: Number and Percentage of Students by Type of School and School Administration

Type of School	Single Sex	Coeducational	Total
Municipal	87,502 <i>12.16</i>	632,085 <i>87.84</i>	719,587 <i>100</i>
Voucher	109,198 <i>11.24</i>	862,559 <i>88.76</i>	971,757 <i>100</i>
Private	27,481 <i>13.36</i>	178,265 <i>86.64</i>	205,746 <i>100</i>

Notes: Percentages are shown in italics

Results

Table 9 and 10 show the results of the effect of coeducational schools on the probability of choosing a STEM major. We run separate regressions for boys and girls. Column (1) presents estimates using OLS, Column (2) presents the results of the reduced form, and Column (3) uses our instrumental variable approach. All regressions control for county and time fixed effects. The results in Table 9 show that effect of coeducational schools is negative and significant for girls: attending a coeducational school lowers the probability of following a STEM major in 3 percentage points. On the other hand, the coeducational school has a positive effect for boys (Table 10).

Table 9: Effect of coeducational school on STEM: Female Students

Variables	Dependent Variable: Probability of enrolling in STEM major		
	OLS	Reduced form	Instrumental Variables
Coeducational school	-0.0095 (0.0067)		-0.0369*** (0.0091)
Proportion of coeducational schools		-0.0639*** (0.0168)	
Mother's education	-0.0001 (0.0004)	-0.0001 (0.0005)	-0.0001 (0.0004)
Father's education	0.00255*** (0.0004)	0.00251*** (0.0004)	0.00256*** (0.0004)
Income	-1.09e-08*** (0.0000)	-1.09e-08*** (0.0000)	-1.10e-08*** (0.0000)
Mother is head of household	0.00774*** (0.0026)	0.00763*** (0.0027)	0.00810*** (0.0027)
Mother is householder	0.0019 (0.0025)	0.0019 (0.0028)	0.0019 (0.0025)
Observations	139,343	139,343	139,343
R-squared	0.017	0.017	0.017

Table 10: Effect of Coeducational Schools on STEM: Male students

Variables	Dependent Variable: Probability of enrolling in STEM major		
	OLS	Reduced form	Instrumental Variables
Coeducational school	0.0376*** (0.0096)		0.0210** (0.0090)
Proportion of coeducational schools		0.0394* (0.0212)	
Mother's education	0.000914* (0.0005)	0.0008 (0.0005)	0.000859* (0.0005)
Father's education	0.00311*** (0.0005)	0.00306*** (0.0005)	0.00308*** (0.0004)
Income	-1.11e-08*** (0.0000)	-1.12e-08*** (0.0000)	-1.12e-08*** (0.0000)
Mother is head of household	-0.0048 (0.0032)	-0.0044 (0.0034)	-0.0046 (0.0032)
Mother is householder	0.0112*** (0.0029)	0.0112*** (0.0035)	0.0112*** (0.0029)
Observations	149,315	149,315	149,315
R-squared	0.034	0.033	0.034

Tables 11 and 12 explore differences in the effect of coeducational schools by type of administration using our instrumental variable approach. For this, we run separate regressions for public, voucher and private schools. For female students, we observe a negative effect of coeducational schools for both public and voucher schools. We find no significant effect for female students in coeducational private schools. For male students, the effect is negative for public schools and positive for private schools.

Table 11: Effect of coeducational school on STEM by type of school: Female Students

Variables	Dependent Variable: Probability of enrolling in STEM major		
	Public School	Voucher School	Private School
Coeducational school	-0.0263* (0.0143)	-0.0399** (0.0179)	0.0153 (0.0732)
Mother's education	-0.0006 (0.0007)	-0.0002 (0.0006)	-0.00216** (0.0011)
Father's education	0.00293*** (0.0006)	0.00184*** (0.0005)	0.0000 (0.0011)
Income	0.0000 (0.0000)	0.0000 (0.0000)	-1.74e-08*** (0.0000)
Mother is head of household	0.0024 (0.0051)	0.00885** (0.0038)	0.0102* (0.0062)
Mother is householder	0.0017 (0.0048)	-0.0009 (0.0036)	0.0137*** (0.0052)
Observations	38,656	71,792	26,830
R-squared	0.024	0.012	0.043

Table 12: Effect of coeducational school on STEM by type of school: Male Students

Variables	Dependent Variable: Probability of enrolling in STEM major		
	Public School	Voucher School	Private School
Coeducational school	-0.0391** (0.0183)	0.0262 (0.0180)	0.137*** (0.0315)
Mother's education	0.0004 (0.0008)	0.00136** (0.0007)	0.00491*** (0.0012)
Father's education	0.00198** (0.0008)	0.00302*** (0.0006)	-0.0013 (0.0013)
Income	-1.64e-08** (0.0000)	1.16e-08*** (0.0000)	-2.98e-08*** (0.0000)

Mother is head of household	-0.0042 (0.0060)	-0.0033 (0.0045)	-0.0160** (0.0071)
Mother is householder	-0.0024 (0.0057)	0.0177*** (0.0042)	0.0161*** (0.0059)
Observations	40,806	74,531	30,789
R-squared	0.026	0.020	0.096

Because many single-sex schools in Chile are catholic schools, the effect found above might be related to catholic schools and not the gender composition of schools. Tables 13 and 14 run separate regressions for catholic and non-Catholic schools. For females, the effect is negative for both types of schools, and the effect is greater for catholic schools. For boys, the effect is only significant for catholic schools. Therefore, it is not clear if there is an effect of the gender composition of the classroom for boys.

Table 13: Effect of coeducational school on STEM by type of school: Female Students

Variables	Dependent Variable: Probability of enrolling in STEM major	
	Non	
	Catholic School	Catholic School
Coeducational school	-0.0267** (0.0122)	-0.0506** (0.0206)
Mother's education	-0.0008 (0.0005)	0.0007 (0.0006)
Father's education	0.00287*** (0.0005)	0.00205*** (0.0006)
Income	-8.77e- 09*** (0.0000)	-1.13e- 08*** (0.0000)
Mother is head of household	0.00776** (0.0035)	0.00777* (0.0041)
Mother is householder	0.0018 (0.0033)	0.0027 (0.0037)
Observations	79,676	59,009
R-squared	0.018	0.024

Table 14: Effect of coeducational school on STEM by type of school: Male Students

Variables	Dependent Variable: Probability of enrolling in STEM major	
	Non Catholic School	Catholic School
Coeducational school	0.0100 (0.0134)	0.0487*** (0.0159)
Mother's education	0.0006 (0.0006)	0.0012 (0.0008)
Father's education	0.00329*** (0.0006)	0.00239*** (0.0007)
Income	-1.00e- 08*** (0.0000)	-1.09e- 08*** (0.0000)
Mother is head of household	-0.0032 (0.0041)	-0.00903* (0.0050)
Mother is householder	0.00890** (0.0038)	0.0154*** (0.0045)
Observations	87,958	60,432
R-squared	0.028	0.051

In Table 9 and 10 we used the major where the student is enrolled as our dependent variable. Because the major in which the student is enrolled in depends on preferences and on test scores, the effect of coeducational schools found above may be attributed to preferences but also to availability. To further explore the effect of type of school on STEM choice, we use all the preferences listed by the student (the first 10 preferences are recorded in the PSU databases). Although the preferences listed by the student may also depend on the student's test scores, they should be closer to real preferences than the major that the student is enrolled in. Figure 4 shows the coefficient associated to coeducational schools using preference 1 to 10 as our dependent variable. Our results show that the effect is always negative and significant for girls.

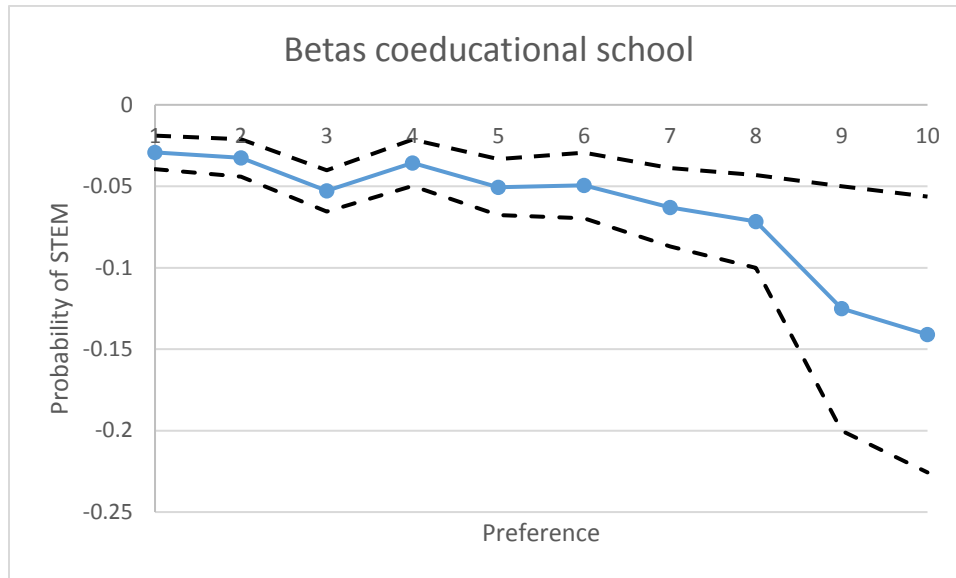


Figure 5: Effect of coeducational schools on STEM: Female students

In addition to having an effect on the probability of following a STEM major, coeducational schools can also have an effect on student achievement, as found in the previous literature. To measure student achievement, we use the math and language PSU score. Tables 15 to 18 show the effect of coeducational schools on PSU scores. As in Tables 9 and 10, Column (1) presents estimates using OLS, Column (2) presents the results of the reduced form, and Column (3) uses our instrumental variable approach. We run separate regression for girls (Table 15 and 16) and boys (Table 17 and 18) and for language and math.

Table 15: Effect of coeducational school on PSU scores: Female Students

Variables	Dependent Variable: Language PSU score		
	OLS	Reduced form	Instrumental Variables
Coeducational school	-21.84*** (6.1150)		-88.67*** (0.9610)
Proportion of coeducational schools		-132.3*** (6.8650)	
Mother's education	4.672*** (0.1140)	4.578*** (0.0630)	4.499*** (0.0376)
Father's education	3.765*** (0.1070)	3.683*** (0.0685)	3.713*** (0.0352)
Income	2.64e-05***	2.65e-05***	2.57e-05***

	(0.0000)	(0.0000)	(0.0000)
Mother is head of household	3.689*** (0.3210)	3.551*** (0.3170)	4.124*** (0.2690)
Mother is householder	-2.793*** (0.3200)	-2.538*** (0.3690)	-2.812*** (0.2520)
Observations	750,710	750,710	750,710
R-squared	0.287	0.291	0.244

Table 16: Effect of coeducational school on PSU scores: Female Students

Variables	Dependent Variable: Math PSU score		
	OLS	Reduced form	Instrumental Variables
Coeducational school	-25.22*** (6.3450)		-90.11*** (0.9440)
Proportion of coeducational schools		-134.4*** (6.6940)	
Mother's education	4.159*** (0.1150)	4.072*** (0.0726)	3.992*** (0.0370)
Father's education	3.386*** (0.1110)	3.305*** (0.0762)	3.336*** (0.0346)
Income	3.07e-05*** (0.0000)	3.08e-05*** (0.0000)	2.99e-05*** (0.0000)
Mother is head of household	3.073*** (0.3310)	2.907*** (0.3870)	3.493*** (0.2650)
Mother is householder	-0.4390 (0.3180)	-0.1800 (0.3760)	-0.462* (0.2480)
Observations	746,565	746,565	746,565
R-squared	0.305	0.308	0.264

Our results show that coeducational schools have a negative effect for both girls and boys. For girls, the effect is approximately 0.8 standard deviations for both math and language. For boys, the effect is of 1 standard deviation. The result is in line with part of the literature, showing that single-sex-school are much better for both boys and girls. However,

it is surprising that the effect is similar for both boys and girls, which cannot explain the huge difference in the probability of applying to a STEM career.

Table 17: Effect of coeducational school on PSU scores: Male Students

Variables	Dependent Variable: Languaje PSU score		
	OLS	Reduced form	Instrumental Variables
Coeducational school	-53.49*** (10.8900)		-111.8*** (0.9990)
Proportion of coeducational schools		-168.2*** (9.2830)	
Mother's education	4.156*** (0.1290)	4.170*** (0.0782)	3.895*** (0.0427)
Father's education	3.787*** (0.1240)	3.763*** (0.0751)	3.643*** (0.0396)
Income	2.38e-05*** (0.0000)	2.43e-05*** (0.0000)	2.28e-05*** (0.0000)
Mother is head of household	5.909*** (0.3460)	5.522*** (0.3350)	6.287*** (0.3010)
Mother is householder	-1.980*** (0.3560)	-1.613*** (0.3260)	-2.121*** (0.2740)
Observations	645,853	645,853	645,853
R-squared	0.275	0.270	0.251

Table 18: Effect of coeducational school on PSU scores: Male Students

Variables	Dependent Variable: Math PSU score		
	OLS	Reduced form	Instrumental Variables
Coeducational school	-55.82*** (11.0900)		-113.1*** (0.9910)
Proportion of coeducational schools		-170.5*** (9.9820)	
Mother's education	3.736***	3.758***	3.479***

	(0.1330)	(0.0790)	(0.0425)
Father's education	3.593***	3.573***	3.451***
	(0.1340)	(0.0868)	(0.0394)
	2.97e-	3.03e-	
Income	05***	05***	2.88e-05***
	(0.0000)	(0.0000)	(0.0000)
Mother is head of household	5.983***	5.577***	6.355***
	(0.3690)	(0.4450)	(0.2990)
Mother is householder	0.875**	1.249***	0.736***
	(0.3760)	(0.3850)	(0.2720)
Observations	642,813	642,813	642,813
R-squared	0.301	0.294	0.279

Conclusions

In this paper, we studied how single-sex schools affect the choice of a STEM major and student achievement. Our results show that single sex schools result in higher test scores for both girls and boys (0.8 and 1 standard deviation respectively). We also find that women attending coeducational schools have a lower probability of enrolling in a STEM major, of approximately 4 percentage points.

The negative effect of coeducational schools on the probability of following a STEM major is in line with the literature that finds that teenage girls in mixed environments reinforce traditional gender identities.

One interesting finding of our study is that, although coeducational schools lower the probability of following a STEM major for girls, the effect of coeducational schools on the math PSU score is not significantly different from the effect on the language PSU score. Because STEM majors are related to math more than language, we find that coeducational schools do not have an impact on the relative ability for STEM, that is, the ratio between the math PSU score and the language PSU score. Moreover, we find similar effects of coeducational schools on PSU scores for both boys and girls, even though the effect on the probability of following a STEM major is negative for girls and positive for boys. Therefore, the mechanism through which coeducational schools have an impact on STEM majors is probably not only through PSU scores.

Finally, even though coeducational schools have a negative effect on student achievement, and may also contribute to exacerbate the occupational gender gap by decreasing the probability of enrolling on a STEM major for girls, coeducational school may have positive effect on other dimesions.

References

- [1] Bertrand, M. (2011). New Perspectives on Gender. *Handbook of Labor Economics, Volume 4B*, 4(11), 1543–1590.
- [2] Chumacero, R. A., Gómez, D., & Paredes, R. D. (2011). I would walk 500 miles (if it paid): Vouchers and school choice in Chile. *Economics of Education Review*, 30(5), 1103-1114.
- [3] Dasgupta, N., & Asgari, S. (2004). Seeing is believing: Exposure to counterstereotypic women leaders and its effect on the malleability of automatic gender stereotyping. *Journal of Experimental Social Psychology*, 40(5), 642–658.
- [4] Díaz, E. (2015). La desigualdad salarial entre hombres y mujeres. Alcances y limitaciones de la Ley N° 20.348 para avanzar en justicia de género. Cuaderno de Investigación 55, Departamento de Estudios de la Dirección del Trabajo.
- [5] Eisenkopf, G., Hessami, Z., Fischbacher, U., & Ursprung, H. W. (2015). Academic performance and single-sex schooling: Evidence from a natural experiment in Switzerland. *Journal of Economic Behavior & Organization*, 115, 123-143.
- [6] Goldin, C. (2014). A Grand Gender Convergence: Its Last Chapter. *American Economic Review*, 104(4), 1091–1119.
- [7] Jackson, C. K. (2012). Single-sex schools, student achievement, and course selection: Evidence from rule-based student assignments in Trinidad and Tobago. *Journal of Public Economics*, 96(1), 173-187.
- [8] Lee, V. E., & Marks, H. M. (1990). Sustained effects of the single-sex secondary school experience on attitudes, behaviors, and values in college. *Journal of Educational Psychology*, 81, 578-592.
- [9] Lewis, G. B. (1996). Gender integration of occupations in the federal civil service: Extent and effects on male-female earnings. *Industrial and Labor Relations Review*, 49(3), 472–483.
- [10] Maccoby, E. E. (1990). Gender and relationships. A developmental account. *The American Psychologist*, 45(4), 513–520.
- [11] Maccoby, E. E. (1998). *The two sexes: Growing up apart, coming together*. Harvard University Press, Cambridge, MA.
- [12] O’Neill, J. (2003). The Gender Gap in Wages, circa 2000. *The American Economic Review*, 93(2), 309–314.
- [13] Paredes, V. (2014). A teacher like me or a student like me? Role model versus teacher bias effect. *Economics of Education Review*, 39, 38–49.
- [14] Park, H., Behrman, J. R., & Choi, J. (2013). Causal effects of single-sex schools on college entrance exams and college attendance: Random assignment in Seoul high schools. *Demography*, 50(2), 447-469.