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Impact of female peer composition on gender norm perceptions and skills formation in secondary school

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Abstract: This paper examines peer effects on students' gender norm perceptions and skills formation. I use a Uruguayan nationally representative survey of 9th grade students and exploit the quasi-random variation in the proportion of female peers across classes within schools for causal identification. Results show that a higher exposure to female peers in the class leads to more progressive gender norms. Furthermore, these effects in gender perceptions are driven mostly by male students. Female students are also impacted by peers' sex composition and significantly reduce the time devoted to domestic work and improve mathematics scores when exposed to more female peers. No effects on language were found for either sex. Thus, exposure to female peers operates not only by reducing traditional gender perceptions but also by changing actual behaviour regarding housework and academic performance of female students. My results suggest that short peer interactions in secondary school contexts may have substantial effects on reducing gender stereotypes and change gendered behaviours among students.

Key words: peer effects, gender norms, gender inequalities, developing countries

JEL classification: I24, I25, J16

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Note: As the research is part of the author's PhD thesis, the author will hold copyright to facilitate its publication.

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1 Introduction

The analysis of the importance of gender norms on labour market outcomes has received a great deal of academic attention. Gender norms refers to the rules of conduct for women and men. They comprehend behavioural expectations according to gender as well as relationships between genders (Seguino 2007). As such, they reside in the individuality but reflect the cultural and social contexts (Alesina et al. 2013; Pearse and Connell 2016). By shaping preferences and influencing skills formation, norms may become an obstacle to girls' educational achievements and future economic outcomes (Fortin 2005; Bertrand 2020). In fact, while pioneer theoretical frameworks based on human capital factors explain a decreasing portion of gender gaps (Goldin 2014; Blau and Kahn 2017), emerging literature points to gender norms and stereotypes that could lead to persistent gender inequality (Bertrand 2020). Yet, how gender norm perceptions are formed and what drives their changes over time are still open questions.

The norms formation process involves many actors that vary along the life cycle. While family is key in the initial stages (Bisin and Verdier 2001), school and peers become increasingly important with age (Alan et al. 2018). Peer gender composition might affect perceptions on gender norms by at least two channels. It could affect social attitudes and behaviours between groups because of diversity in class composition.[1] It could also affect the interaction between teachers and students, promoting the transmission of gender views from teachers to students.[2]

This paper aims to fill this gap by investigating how school contexts can shape perceptions on gender norms. I rely on a unique Uruguayan nationally representative survey that includes information from six questions eliciting views on gender norms for 9th grade students (around 15 years of age) to analyse the effects of peers' gender composition on students' gender norm perceptions. For causal identification, I exploit the variation in the percentage of female peers across classes within schools. Admission to public secondary school is based mainly on geographic criteria. When opting for a private secondary school, students and their families can choose the school without external restrictions. Nevertheless, in both types of centres, the assignment of students to classrooms is made by the heads of the school, and they seek to preserve homogeneity between groups. Classes are rearranged every year (i.e. peers also change every year). Based on simulations of random assignment of students to classes and balancing tests of students' predetermined characteristics, I argue that classes within schools are formed as good as random. I also show there is enough variability in the proportion of female peers across classes within schools.

My results show that a higher exposure to female peers in the class has robust statistically significant effects leading to more progressive gender perceptions. The analysis of the separate statements shows interesting heterogeneities. While female peers positively affect gender norm perceptions on domestic work, politics, care work, and employment, the effects are negative but less significant for gender equality in wages and equality in practicing sports. Furthermore, these effects are driven mostly by male students. The analysis of other heterogeneous effects shows that peer effects are stronger for students with previous grade repetition, in the lower 40 per cent of the socio-economic context, and living outside the capital city. I further show that having a higher proportion of female peers affects the actual behaviour of female students by reducing time devoted to domestic work and improving mathematics performance with no such effects for male students.

[1] Rao (2019) finds that a higher exposure to poor peers increases pro-social and egalitarian attitudes and decreases discriminatory attitudes of rich students against poor ones.

[2] Alan et al. (2018) find that teachers with traditional gender views negatively affect female performance in math and verbal tests with no effect on boys. Carlana (2019) also finds that exposure to math teachers with stronger gender stereotypes increases the gender gap in math performance to the detriment of girls.

This paper contributes to two strands of the literature. First, it contributes to the peer effects literature. Since the seminal work of Coleman in 1966, researchers have made great progress in understanding the educational production function. In recent decades, peer effects analysis has become more relevant. Evidence for developed countries is well established (Epple and Romano 2011; Sacerdote 2011; Paloyo 2020), but literature on peer effects in developing contexts is scarcer.[3] This is mainly because of stringent data requirements to apply credible causal identification empirical strategies. The data used in this study is unique by providing data on more than one classroom within each school and including all students in a classroom.[4] This sample design allows exploit of a quasi-random variation within school. Additionally, even for developed countries, literature addressing gendered impacts is still scarce (Hoxby 2000; Lavy and Schlosser 2011; Gong et al. 2021). Finally, while peer effects on skills formation have been widely studied (Angrist and Lang 2004; Ammermueller and Pischke 2009; Lavy and Schlosser 2011; Brenøe and Zölitz 2020), little is known about the transmission of gender norms within school contexts. I contribute to this literature by analysing the gender effects of sex composition on gender norms in a developing country. This paper provides evidence on the importance of peers in the formation process of gender norm perceptions in secondary school contexts. My contribution also came from an atypical setting where students are reassigned each year to a different class. Therefore, peer exposure is intense but relatively shorter compared to previous studies. In fact, my results show that even short peer interactions (one year) contribute to reduce gender stereotypes in secondary school contexts.

Second, this paper contributes to the literature on gender norms. While the effects of gender norms on economic outcomes has been widely studied (Vella 1994; Fortin 2005, 2015; Bertrand 2020), literature on the formation process of gender norm perceptions is still scarce. There is evidence on the family intergenerational transmission of gender norms (Bisin and Verdier 2001; Fernández 2011; Farré and Vella 2013) and the transmission of beliefs from teachers to students (Alan et al. 2018). To the best of my knowledge, Garcia-Brazales (2021) is the only related work analysing the school peer effects on gender norms for the Vietnamese case. While the author analyses the long-term effects of peers on gender attitudes, in this paper I explore the contemporaneous effects. Also, this paper will shed light on these aspects from an interesting setting: Uruguay is characterized by progressive views compared to other developing countries, yet gender norms that restrict women's and girls' opportunities are still widespread.[5] Providing evidence from a developing country is highly important to build over the idea that gender attitudes depend on cultural norms and not just on economic underdevelopment (Jayachandran 2015).

Last, the study of gender inequalities in school contexts is important from a policy perspective for two main reasons. On one hand, there is a justice argument related to equality of opportunities among genders. On the other hand, there is an efficiency argument (Bertrand 2020). Gendered impacts during school can have negative long-term effects at the individual level by affecting educational outcomes, career choices, and labour outcomes (Sahoo and Klasen 2018). They can also have effects at the social level by misallocating talents that will affect economic growth (Hsieh et al. 2019). The evidence provided in this study shows that policy interventions aimed at secondary school contexts may have substantial effects on reducing gender stereotypes among teenagers. This builds over previous evidence showing that policy can impact cultural norms and gender attitudes (Bau 2021; Field et al. 2021; Dhar et al. 2022).

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[3] See Izaguirre and Di Capua (2020) for many countries in Latin America, McEwan (2003) for Chile, and de Melo (2014) and Balsa et al. (2018) for Uruguay.

[4] For instance, PISA surveys only provide information for a sample of students within a classroom, thus challenging the identification of peer effects.

[5] There is 52 per cent agreement with the statement that 'a woman should work only if her partner does not earn enough' (Berniell et al. 2021).

The remainder of the paper is organized as follows. Section 2 describes the institutional setting of secondary schools in Uruguay and the data used in the paper. Section 3 introduces the methodology and provides evidence on the validity of the identification strategy. Section 4 presents the empirical results of peer effects on gender norm perceptions, the heterogeneous analysis, and evidence on the robustness of the main results. Section 5 shows the peer effects on other outcomes such as time devoted to domestic work and cognitive skills. Finally, Section 6 concludes.

2 Institutional context and data

2.1 Uruguayan educational system

Mandatory basic education in Uruguay includes 14 years of formal schooling. This consists of two years of pre-school, six years of primary school, and another six years of secondary school. Typically, at 12 years of age students enter secondary education consisting of six levels (7th to 12th grade). Students can choose between attending regular or technical secondary schools.

Admission to public secondary school is based mainly on geographic criteria. Students and their families have some influence on the choice of the school within a limited range of options according to the area of residence. When opting for a private secondary school, students and their families can choose the school without external restrictions. Nevertheless, in both types of centres, the assignment of students to classrooms is made by the heads of the school. This process is done every year, and, in general, classrooms are formed so that they are balanced in the number of students per group, sex composition, and educational background. That is, classes are rearranged every year and the assignment is not random but seeks to preserve homogeneity between groups.[6] According to INEEd (2019), there is a maximum limit of 28 students per classroom in lower secondary education.

Typically, students are assigned to classes at the beginning of the school year (March) and share all curricular activities and the same room throughout the year. Thus, the interaction between classmates is more intense than with the rest of the students in the school. On the other hand, the reassignment of groups every year implies a shorter interaction with the peer group compared to other contexts.

In this paper, I study the contemporaneous effects of sex composition among students in the third year of secondary school (9th grade).

2.2 Data and sample selection

The analysis is based on Aristas's survey conducted by the *Instituto Nacional de Evaluación Educativa* (INEEd) of Uruguay.[7] The survey allows for a multidimensional evaluation of the educational system collecting information on students', families', and teachers' characteristics, students' opinions, and performance on standardized cognitive tests and socio-emotional skills.

The survey is representative of 9th grade secondary students attending urban schools. Information was collected in 2018 though a three-stage stratified sampling design. First, schools were randomly selected. Then, classes within sampled schools were randomly selected. Finally, all students within the selected

[6] A similar process of class formation is identified by Ammermueller and Pischke (2009) in 94 per cent of the schools in their sample of European primary schools.

[7] The database is publicly available through this link.

classes were included in the sample and interviewed.[8] The sampling design provides information on all students within the same class, and, for more than 80 per cent of schools, information from more than one class. This is crucial for the empirical strategy used in this paper.

The original sample consists of 8,845 students. For this study, I restrict the sample to students from public and private regular secondary schools, with non-missing information in the analysed variables, in classes with more than 12 students, and in schools with two or more classes.[9] The estimation sample consists of 136 schools, 274 classes, and 5,337 students, of which 2,547 are men and 2,790 women.

2.3 Main variables and descriptives

I begin with a brief overview of the main characteristics of the students in our estimation sample. Table 1 provides a summary by sex of the student.[10] Female students are younger, less likely to be the only child, live with both parents or grandparents, and more likely to come from households within the lower 40 per cent of the socio-economic level.[11] They have less experience in previous grade repetition. The main independent variable is the percentage of female peers. It is constructed as the leave-one-out distribution of female peers in the class—that is, excluding the student himself (herself). The percentage of female peers is calculated in the original sample (i.e. before excluding cases) to account for the actual sex composition in the class.[12] The share of females is 52 per cent for men and 51 per cent for women, with a standard deviation of 0.10 and 0.09, respectively. This is similar to the proportion of females among total students (51.7 per cent).

Table 1: Descriptive statistics by sex

	Males		**Females**	
	Mean	SD	Mean	SD
Student characteristics				
Age	14.90	1.49	14.78	1.12
Only child	0.25	0.44	0.23	0.42
Live w/ both parents	0.69	0.46	0.68	0.47
Live w/ grandparents	0.18	0.38	0.15	0.35
40% lower SE	0.33	0.47	0.39	0.49
Age above median	0.16	0.37	0.12	0.32
Previous repetition	0.26	0.44	0.20	0.40
Main independent variable				
Share female	0.52	0.10	0.51	0.09
Observations	2,547		2,790	

Note: the table shows the mean and the standard deviation of student characteristics and main independent variable for both male and female students. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes.

Source: author's elaboration based on Aristas's survey, INEEd.

[8] The sampling frame is made up of 523 schools and 48,372 students. This includes all public and private urban schools in the country with at least one 9th grade student.

[9] I exclude students in technical schools (23.1 per cent), without information on age (4.7 per cent), in classes in which the number of students is lower than the first percentile of the number of students per class distribution (0.6 per cent), without information on control variables (6.7 per cent), and in schools with only one classroom (4.5 per cent).

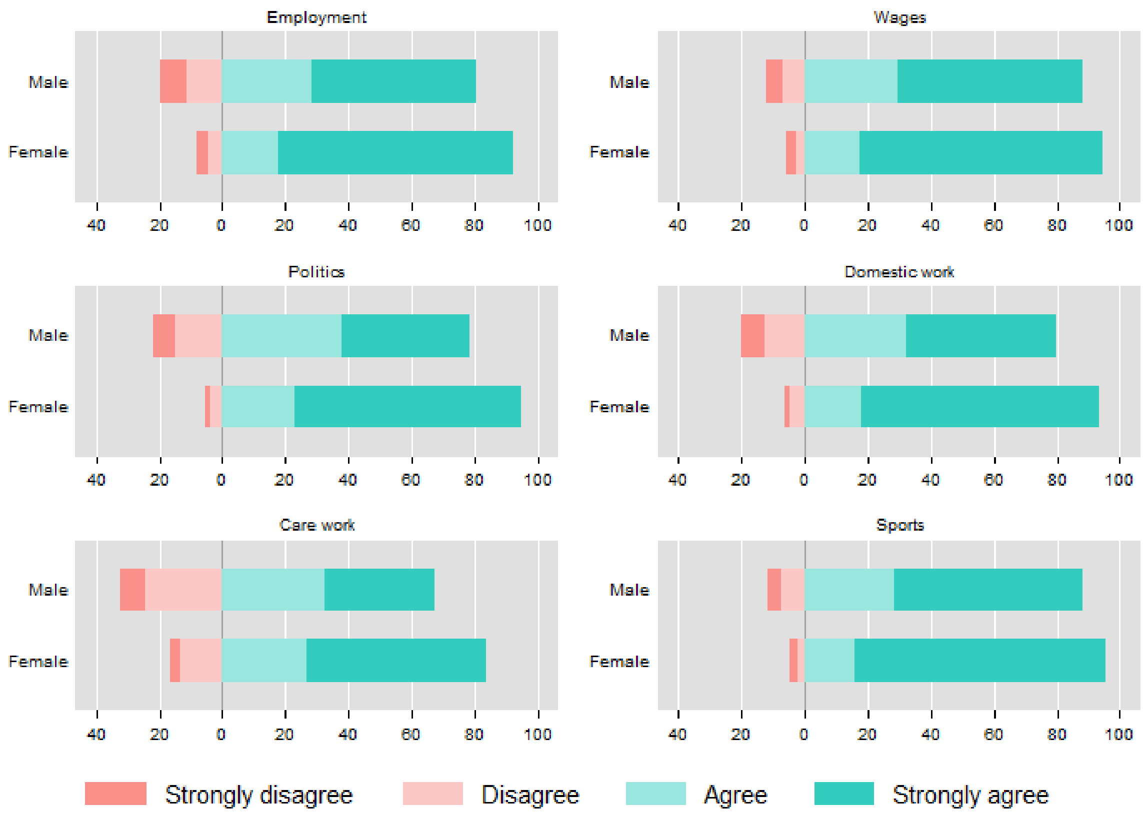
[10] All estimations are computed using survey weights calculated by INEEd.

[11] The household wealth index provided by INEEd that considers information on household composition, health attention, dwelling characteristics, and comfort; parents' educational level; lecture habits in the family; educational expectation; and parental supervision, among others.

[12] The same procedure was followed for the other peer variables.

The main outcome variables are the students' views on gender norms. I take advantage of novel information collected in the survey. Students are asked about the level of agreement with six statements: (i) 'Women shouldn't work' (Employment); (ii) 'Men and women should earn the same if doing the same job' (Wages); (iii) 'Men are better in politics than women' (Politics); (iv) 'Women should do the housework' (Domestic work); (v) 'Women are the primary caregivers' (Care work); and (vi) 'Men and women can practice the same sports' (Sports). Answer options vary from 1 (strongly disagree) to 4 (strongly agree). Responses to questions i, iii, iv, and v were inverted so that higher values always represent more progressive perceptions. Figure 1 shows the distribution of responses on gender norms for each of the six statements by students' sex. The statements with a higher level of agreement (i.e. more progressive perceptions) among both males and females are the ones related to Sports and Wages, with 91.9 per cent and 91.2 per cent of students that agree or strongly agree. There is great variation by student gender, and females hold more progressive opinions compared to males for all the analysed statements.

Figure 1: Students' views on gender norms, by sex



Note: the figure shows the responses to questions on views of gender norms by students' sex. Higher levels of agreement represent more progressive perceptions. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes.
Source: author's illustration based on Aristas's survey, INEEd.

Finally, I compute a global index on gender norms by aggregating the information of all the statements above. Following Kling et al. (2007), I first standardize each of the six components, then compute the average, and finally standardize the global index. Outcomes are standardized by sex to have a mean of 0 and a standard deviation of 1 for female and male students separately. Thus, higher values of the gender norms index represent more progressive perceptions.

3 Empirical strategy

3.1 Model

To analyse gender peer effects, I implement the widely used linear-in means model through the following equation:

$$y_{ics} = \alpha + \beta_1 ShareFem_{(-i)cs} + \beta_2 X_{ics} + \beta_3 \overline{X}_{(-i)cs} + \lambda_s + \varepsilon_{ics} \tag{1}$$

where y_{ics} is the outcome variable for student i in classroom c and school s. $ShareFem_{(-i)cs}$ measures the leave-one-out proportion of female peers in the class, without considering student i. Thus, coefficient β_1 indicates the average effects of exposure to female peers. X_{ics} is a vector of student control variables, including own gender, age, household composition, and socio-economic level, and previous grade repetition as a measure of observable previous academic achievements. $\overline{X}_{(-i)cs}$ is the vector of peer control variables considering the same individual characteristics but measured as the leave-one-out proportions. λ_s are school-level fixed effects to control for unobserved characteristics of school quality and to deal with potential sorting of students into schools. ε_{ics} are standard errors clustered at the class level to allow for correlation of outcomes between students in the same class.

The empirical strategy exploits the quasi-random variation in the percentage of female peers across classrooms within the school for the identification of causal effects.[13]

3.2 Validity of the identification strategy

The main identification assumption is that, conditional on all individual and peer controls, $ShareFem_{ics}$ is uncorrelated with ε_{ics}.

One of the main challenges to identify peer effects is self-selection of students to schools. If students are self-selected to schools because of unobserved factors, then estimates would be biased. Potential selection bias can be minimized by the novel sampling design of Aristas's surveys by introducing fixed effects at the school level. Therefore, identification comes from the variation in the share of female peers between classes within school.

Self-selection of students to classes may be a potential issue. As explained in the previous section, students in Uruguay are not assigned to classes through a completely random process.[14] School authorities are in charge of this process and generally try to reach a certain balance. To verify if students are assigned to classrooms following an as-good-as-random process, I conduct two complementary analyses. First, as in Lavy and Schlosser (2011), I randomly simulate the assignment of students to classes. For each school, I randomly generate the students' gender using a binomial distribution function with p equal to the share of females in the school. Then I estimate the standard deviation of the proportion of female peers among classes within the school. I do the same for all the students' control variables and repeat the process 1,000 times to obtain an empirical 90 per cent confidence interval for each school and each variable. Then the actual standard deviation for each student characteristic across classes within schools was compared to the empirical distribution generated by the random process. Table A1 in the Appendix shows the results of this test. For the main variable—proportion of female peers—I find that

[13] Previous studies also rely on school fixed effects for causal identification. See McEwan (2003) for Chile, Vigdor and Nechyba (2008) for North Carolina, and Ammermueller and Pischke (2009) for six European countries (France, Germany, Iceland, the Netherlands, Norway, and Sweden).

[14] A challenge also faced by previous studies (Ammermueller and Pischke 2009).

90.4 per cent of the schools have a standard deviation that fell within the empirical confidence interval.[15] Also for all the other variables simulated, this percentage is at least 88 per cent of the schools, which is close to expectations.

Second, I conduct a balance test of student characteristics to check if classes with varying proportions of female peers are similar in terms of other observed characteristics. I regressed students' predetermined characteristics over the proportion of female peers and school fixed effects.[16] Table A2 in the Appendix shows the results of this test. While for 3 out of 10 variables the coefficients are significant, magnitudes are low, and there is no evidence on systematic bias on class formation. The results of both exercises show that the assignment of students to classes is as good as random, ruling out the potential self-selection problems. This is consistent with previous evidence for the Uruguayan case (Balsa et al. 2018). Anyway, the predetermined characteristics are included as controls in all the regression analyses.

Causal identification is possible because of the quasi-random assignment of students and the inherent variability in the conformation of multiple small classes (Ammermueller and Pischke 2009). Table A3 in the Appendix shows the mean, standard deviation, and range for the proportion and number of female peers by sex. Male students have on average 51.6 per cent of female peers in the class (12 students), with a standard deviation of 9.6 per cent (3.3 students). The residual deviation after including school fixed effects and controls is reduced by half and reaches 5.5 per cent (1.3 students). Results for female students are similar. Alternatively, Figure A1 in the Appendix also provides evidence of enough variation in the proportion of female peers among classes within schools. The residual deviation in the proportion of female peers (after including school fixed effects and other controls) is high and similar to previous studies (Gong et al. 2021; Brenøe and Zölitz 2020).

Finally, another potential bias could arise from the fact that the surveys were conducted at the end of the school year. If dropout is correlated with the proportion of female peers, then the peer effect would be biased. At 15 years of age, 10 per cent of young people are outside the educational system (INEEd 2019). However, according to data from the 2018 National Household Survey, school attendance does not vary significantly between March and October among young people who passed 8th grade regardless of the student's sex.

4 Peer effects on gender norms

In this section, the main results are presented. I start by showing the effects of peer sex composition on gender norms and evidence on heterogeneous effects by sex and other students' predetermined characteristics. Then I analyse the sensitivity of the results to different specifications or to methodological decisions through different robustness checks.

4.1 Baseline results

Table 2 reports peer effects estimates for each statement on gender norms perception as well as the global index. Coefficients are the result of regressing each outcome variable on the share of female peers in the class, student and peer controls, and school fixed effects. The parameter associated to peer effects is positive and statistically significant for the gender norms index, indicating that a higher exposure to female peers leads to more progressive gender-related opinions. A 10 percentage point (pp)

[15] This gauge is similar to Lavy and Schlosser (2011), who find that 89 per cent of the schools had a standard deviation that fell within the empirical 90 per cent confidence interval.

[16] For own gender regression, I also include the share of females in the school to control for the inherently negative relationship between the share of female peers and own gender for women students (Guryan et al. 2009).

increase in the proportion of female peers increases the students' gender norms index by 3.84 per cent of a standard deviation. The peer effects for the different statements are in general positive. The only exceptions are opinions regarding equality in wages and sports. As shown in Figure 1, those items have the highest levels of agreement with non-traditional norms. The economic significance of the effects varies depending on the analysed dimension. A 10 pp increase in the proportion of female peers in the class raises students' progressive opinion regarding domestic work by 7.23 per cent of a standard deviation and regarding equality in employment by 4.70 per cent of a standard deviation. Results are consistent with Garcia-Brazales (2021) for the Vietnamese case. The separate effects are of greater magnitude compared to the global index. Nevertheless, results on the contemporaneous effects of sex composition on gender norms perceptions are important considering that peer interaction is intense but somewhat short as students are reassigned each year to a different class. Previous studies show that peer effects on educational outcomes are influential when interactions last for more than a year (Patacchini et al. 2017). My results show that even short peer interactions (i.e. only one year with same class peers) contribute to reduce gender stereotypes in secondary school contexts.

Table 2: Effects of the proportion of female peers on gender norms

	Gender norms	Employment	Wages	Politics	Domestic work	Care work	Sports
Share female	0.384*	0.470**	-0.495*	0.542***	0.723***	0.478**	-0.139
	(0.23)	(0.22)	(0.30)	(0.19)	(0.21)	(0.24)	(0.24)
Obs.	5,337	5,337	5,337	5,337	5,337	5,337	5,337
R-squared	0.110	0.083	0.062	0.070	0.087	0.073	0.061

Note: the table shows the results of regressing each outcome variable on the share of female peers in the group, student and peer characteristic controls, and school fixed effects. Robust standard errors are clustered at the class level and reported in parentheses. *** significant at the 1% level, ** 5% level, and * 10% level. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes.

Source: author's elaboration based on Aristas's survey, INEEd.

Table 3 reports the estimates of peer effects on gender norms separately for male (panel A) and female (panel B) students. While for both sexes coefficients are positive, results indicate that the significant peer effects on gender norms are driven mostly by male students. This is important as male students are characterized by more traditional gender norms compared to female. While still positive, effects on the global index on gender norms are not statistically significant for either sex.

Table 3: Effects of the proportion of female peers on gender norms, by students' sex

	Gender norms	Employment	Wages	Politics	Domestic work	Care work	Sports
Panel A: Male students							
Share female	0.405	0.648**	-0.828**	0.907***	0.846***	0.770**	-0.677**
	(0.32)	(0.29)	(0.41)	(0.27)	(0.27)	(0.33)	(0.30)
Obs.	2,547	2,547	2,547	2,547	2,547	2,547	2,547
R-squared	0.136	0.106	0.099	0.117	0.122	0.093	0.102
Panel B: Female students							
Share female	0.259	0.326	-0.337	0.139	0.634**	0.186	0.116
	(0.32)	(0.30)	(0.33)	(0.27)	(0.32)	(0.34)	(0.31)
Obs.	2,790	2,790	2,790	2,790	2,790	2,790	2,790
R-squared	0.158	0.120	0.088	0.097	0.124	0.125	0.094

Note: the table shows the results of regressing each outcome variable on the share of female peers in the group, student and peer characteristic controls, and school fixed effects separately by student's own gender. Robust standard errors are clustered at the class level and reported in parentheses. *** significant at the 1% level, ** 5% level, and * 10% level. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes.

Source: author's elaboration based on Aristas's survey, INEEd.

4.2 Heterogeneous peer effects

Finally, I explore potential heterogeneous peer effects on gender norms accounting for differential effects by repetition in previous grades, socio-economic level, student's mother's education, and geographical region. Table 4 shows the results of regressing the gender norms index for each sub-group separately. While peer effects are positive for students regardless of previous repetition and socio-economic level, estimates are only significant for repeaters and those in the lower 40 per cent of the socio-economic context. Peer effects are negative for students whose mother reached tertiary educational level and reside in the capital city (Montevideo), although not significant. On the contrary, I find positive and significant peer effects for students living outside the capital city. Thus, the analysis of other heterogeneous effects suggest that the peer effects are driven by individuals with previous grade repetition, in the lower 40 per cent of the socio-economic context, and living outside the capital city.

Table 4: Heterogeneous effects of the proportion of female peers on gender norms

	Repeater		**40% lower SE**		**Mother tertiary**		**Capital city**	
	Yes	No	Yes	No	Yes	No	Yes	No
Share female	1.211**	0.388	0.995***	0.031	-0.046	0.422	-0.475	0.560**
	(0.51)	(0.24)	(0.38)	(0.27)	(0.50)	(0.28)	(0.38)	(0.27)
Observations	1,021	4,316	1,772	3,565	1,258	3,451	1,371	3,966
R^2	0.206	0.101	0.162	0.110	0.178	0.127	0.121	0.123

Note: the table shows the results of regressing the gender norms index on the share of female peers in the group, student and peer characteristic controls, and school fixed effects separately by students' predetermined characteristics. Robust standard errors are clustered at the class level and reported in parentheses. *** significant at the 1% level, ** 5% level, and * 10% level. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes. SE = socio-economic.

Source: author's elaboration based on Aristas's survey, INEEd.

4.3 Robustness checks

This subsection presents evidence of some alternative estimations to provide robustness to the main results. All estimations are reported in the Appendix.

Teacher and class controls. I re-estimate the results including a different set of control variables that will act as class fixed effects. Note that these are not considered in the main specifications as that would reduce the estimation sample due to missing variables. First, I include mathematics teacher's characteristics—gender, age, title, and tenure—as control variables. Results in Table A4 provide evidence on the robustness of the main results, indicating they are not driven by omitted variables or teacher's effects. Nevertheless, the effect on the global index of gender norms loses statistical significance with this alternative specification. Second, I include a dummy variable indicating whether the student attends classes in the morning or not. This robustness check is motivated on anecdotal evidence suggesting that high school students attending morning groups have different educational outcomes compared to total students. Again, results in Table A5 show the main result holds robust to different specifications.

Sample attrition. In the final sample of analysis, there are observations with missing values in outcome and control variables. First, to test whether the results are biased because of non-random distribution of missing values in the outcome variable, I regress a dummy indicating missing value on student's own gender, the share of female peers, and school fixed effects. In all the regressions, the coefficient associated to the share of female peers is statistically insignificant (Table A6). Then, to test whether the results are biased because of missing values in the control variables, I re-estimate the main specification replacing the missing values by the median of each variable and including a dummy indicating missing value in the control variable. The main result holds with this alternative treatment of missing values (Table A7).

Probability of random assignment. I further test if the results hold when estimating the main specification for a different sub-sample of schools according to the probability of random assignment of students to classes.[17] Based on the results of the simulation test (Table A1), I re-estimate the peer effects on gender norms index for those schools with a greater probability of as-good-as-random assignment of students to classes. I only consider schools with 9 out of 10 predetermined students' characteristics randomly distributed among classes. Results are similar, although the effect on the global gender norms index is not statistically significant (Table A8).

Sub-samples of schools. To test whether the results are driven by some schools in the sample, I re-estimate the main specification 9,180 times by randomly dropping two schools at a time (C_2^{136}). If quasi-random composition of classes holds in our main sample of analysis, then results are expected to be robust using multiple different sub-samples. Results for the main outcome variable—gender norms index—show that the distribution of coefficients associated with the share of female peers is concentrated around the baseline estimate (Figure A2).

5 Further outcomes

To explore possible consequences and mechanisms behind the main results, in this section I show the gender peer effects on time devoted to domestic chores and cognitive skills formation.

Regarding behaviours towards domestic work, students self-report the frequency on which they help with the following chores at home: (i) Cooking for the family; (ii) Washing clothes; (iii) House cleaning; and (iv) Caring for siblings or other family members. Responses vary from 1 (never) to 4 (almost every day). I estimate the effects on each component and also on an index of domestic work constructed as explained before. Students' academic performance is measured by standardized test scores in mathematics and language. The test was part of the survey and was designed, distributed, supervised, and qualified by the INEEd team. Thus, the score is unlikely to be influenced by potential teacher's bias. These outcomes were also standardized separately by student's sex.

First, I take advantage of questions on the frequency on which a student helps with housework and estimate the peer effects on actual behaviours separately for male (panel A) and female (panel B) students. Table 5 shows that for male students there are no significant peer effects. On the contrary, female students significantly reduce the frequency on which they perform care chores in the household as well as the overall index on domestic work behaviour. A 10 pp increase in the proportion of female peers decreases time devoted in domestic work by 4.99 per cent of a standard deviation for female students. Thus, exposure to female peers operates not only by reducing traditional gender perceptions but also by changing actual behaviour regarding domestic work.

[17] This exercise follows the methodological approach proposed by Vigdor and Nechyba (2008).

Table 5: Effects of the proportion of female peers on gendered behaviours, by students' sex

	Cooking	Clothing	Cleaning	Caring	Index
Panel A: Male students					
Share female	-0.182	0.204	-0.074	0.154	0.035
	(0.25)	(0.29)	(0.25)	(0.25)	(0.27)
Obs.	2,538	2,538	2,538	2,538	2,538
R-squared	0.093	0.102	0.094	0.132	0.114
Panel B: Female students					
Share female	-0.436	-0.111	-0.301	-0.601*	-0.499*
	(0.27)	(0.25)	(0.29)	(0.31)	(0.28)
Obs.	2,782	2,782	2,782	2,782	2,782
R-squared	0.095	0.133	0.146	0.143	0.161

Note: the table shows the results of regressing each outcome variable on the share of female peers in the group, student and peer characteristic controls, and school fixed effects separately by student's own gender. Robust standard errors are clustered at the class level and reported in parentheses. *** significant at the 1% level, ** 5% level, and * 10% level. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes.

Source: author's elaboration based on Aristas's survey, INEEd.

Finally, I analyse the effects of exposure to female peers on cognitive skills. Table 6 reports the results of analysing peer effects on the performance in mathematics and language standardized tests. I find positive and statistically significant peer effects on mathematics scores for female students with no effects on language scores for either sex. A 10 pp increase in the proportion of female peers increases the mathematics score by 4.60 per cent of a standard deviation for female students. Previous evidence on these topics is not conclusive. While some studies find positive effects of female composition on academic performance by both males and females (Hoxby 2000; Lavy and Schlosser 2011), or even stronger effects for males (Gong et al. 2021), results of this study are in line with those arguing that there is no strong relationship between male students' attitudes and other economic outcomes (Vella 1994). Moreover, positive effects for female students are evident only in mathematics, thus improving academic performance in a field where female students have relatively worse results.[18]

Table 6: Effects of the proportion of female peers on cognitive skills, by sex

	Male		**Female**	
	Mathematics	Language	Mathematics	Language
Share female	0.194	-0.098	0.460*	0.064
	(0.33)	(0.29)	(0.27)	(0.40)
Obs.	2,416	2,381	2,640	2,571
R-squared	0.310	0.226	0.321	0.285
Mean	0.00	-0.00	0.00	0.00

Note: the table shows the results of regressing each outcome variable on the share of female peers in the group, student and peer characteristic controls, and school fixed effects separately by student's own gender. Robust standard errors are clustered at the class level and reported in parentheses. *** significant at the 1% level, ** 5% level, and * 10% level. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes.

Source: author's elaboration based on Aristas's survey, INEEd.

[18] Even though gender gaps in mathematics scores are negligible according to Aristas's data, females are relatively better in language and males in mathematics.

6 Conclusions

This paper uses a Uruguayan nationally representative survey to investigate how gender composition in lower secondary school affects students' perceptions on gender norms. My results show that a higher exposure to female peers in the class leads to more progressive gender norms.The analysis of the separate statements shows interesting heterogeneities. Female peers positively affect gender norm perceptions regarding women's role in paid work, role in domestic and care work, and performance in politics. On the contrary, peer effect is negative but less significant for gender equality in wages and equality in practicing sports. Furthermore, these effects are driven mostly by male students who are characterized by more traditional gender norms compared to female. The analysis of other heterogeneous effects showed interesting results. Evidence suggests that the effects of peer sex composition are driven by individuals with previous grade repetition, in the lower 40 per cent of the socio-economic context, and living outside the capital city.

Additionally, taking advantage of questions on time devoted to domestic work, I further show that female students significantly reduce the frequency on which they perform housework when exposed to more female peers in the classroom. Peer effects are also evident for female students by increasing mathematics scores. No significant effects were found for male students on either of the outcomes. Thus, exposure to female peers operates not only by reducing traditional gender perceptions but also by changing actual behaviour: first, by reducing domestic work assumed by female students, and second, by improving academic performance in a field where female students have relatively worse results compared to male.

In summary, this study provides evidence on the importance of peers in the formation process of gender norms. Adolescence provides a window of opportunity for the implementation of policy interventions aimed at affecting gender attitudes towards a more egalitarian society. My results suggest that diversity in class sex composition increases gender-egalitarian attitudes. Moreover, even short interactions—one year—in secondary school contexts may have substantial effects on reducing gender stereotyped perceptions and behaviours among students.

References

Alan, S., Ertac, S., and Mumcu, I. (2018). 'Gender Stereotypes in the Classroom and Effects on Achievement'. *The Review of Economics and Statistics*, 100(5): 876–90. https://doi.org/10.1162/rest_a_00756

Alesina, A., Giuliano, P., and Nunn, N. (2013). 'On the Origins of Gender Roles: Women and the Plough'. *Quarterly Journal of Economics*, 128(2): 469–530. https://doi.org/10.1093/qje/qjt005

Ammermueller, A., and Pischke, J. (2009). 'Peer Effects in European Primary Schools: Evidence from the Progress in International Reading Literacy Study'. *Journal of Labor Economics*, 27(3): 315–48. https://doi.org/10.1086/603650

Angrist, J. D., and Lang, K. (2004). 'Does School Integration Generate Peer Effects? Evidence from Boston's Metco Program'. *American Economic Review*, 94(5): 1613–34. https://doi.org/10.1257/0002828043052169

Balsa, A., Gandelman, N., and Roldán, F. (2018). 'Peer and Parental Influence in Academic Performance and Alcohol Use'. *Labour Economics*, 55(-): 41–55. https://doi.org/10.1016/j.labeco.2018.08.010

Bau, N. (2021). 'Can Policy Change Culture? Government Pension Plans and Traditional Kinship Practices'. *American Economic Review*, 111(6): 1880–917. https://doi.org/10.1257/aer.20190098

Berniell, I., Berniell, L., de la Mata, D., Edo, M., and Marchionni, M. (2021). 'Motherhood and Flexible Jobs: Evidence from Latin American Countries'. WIDER Working Paper 2021/33. Helsinki: UNU-WIDER. https://doi.org/10.35188/UNU-WIDER/2021/971-6

Bertrand, M. (2020). 'Gender in the Twenty-First Century'. *AEA Papers and Proceedings*, 110(-): 1–24. https://doi.org/10.1257/pandp.20201126

Bisin, A., and Verdier, T. (2001). 'The Economics of Cultural Transmission and the Dynamics of Preferences'.

Journal of Economic Theory, 97(2): 298–319. https://doi.org/10.1006/jeth.2000.2678

Blau, F. D., and Kahn, L. M. (2017). 'The Gender Wage Gap: Extent, Trends, and Explanations'. *Journal of Economic Literature*, 55(3): 789–865. https://doi.org/10.1257/jel.20160995

Brenøe, A. A., and Zölitz, U. (2020). 'Exposure to More Female Peers Widens the Gender Gap in STEM Participation'. *Journal of Labor Economics*, 38(4): 1009–54. https://doi.org/10.1086/706646

Carlana, M. (2019, 03). 'Implicit Stereotypes: Evidence from Teachers' Gender Bias'. *The Quarterly Journal of Economics*, 134(3): 1163–224. https://doi.org/10.1093/qje/qjz008

de Melo, G. (2014). 'Peer Effects Identified Through Social Networks: Evidence from Uruguayan Schools'. N° 2014-05. Mexico City: Banco de México. https://doi.org/10.36095/banxico/di.2014.05

Dhar, D., Jain, T., and Jayachandran, S. (2022). 'Reshaping Adolescents' Gender Attitudes: Evidence from a School-Based Experiment in India'. *American Economic Review*, 112(3): 899–927. https://doi.org/10.1257/aer.20201112

Epple, D., and Romano, R. E. (2011). 'Chapter 20 - Peer Effects in Education: A Survey of the Theory and Evidence'. In J. Benhabib, A. Bisin, and M. O. Jackson (eds), *Handbook of Social Economics* (Vol. 1, pp. 1053–163). Amsterdam: North-Holland. https://doi.org/10.1016/B978-0-444-53707-2.00003-7

Farré, L., and Vella, F. (2013). 'The Intergenerational Transmission of Gender Role Attitudes and its Implications for Female Labour Force Participation'. *Economica*, 80(318): 219–47. https://doi.org/10.1111/ecca.12008

Fernández, R. (2011). 'Does Culture Matter?' In A. North-Holland (ed.), *Handbook of Social Economics* (Vol. 1, p. 481—510). https://doi.org/10.1016/B978-0-444-53187-2.00011-5

Field, E., Pande, R., Rigol, N., Schaner, S., and Troyer Moore, C. (2021). 'On Her Own Account: How Strengthening Women's Financial Control Impacts Labor Supply and Gender Norms'. *American Economic Review*, 111(7): 2342–75. https://doi.org/10.1257/aer.20200705

Fortin, N. M. (2005). 'Gender Role Attitudes and the Labour-Market Outcomes of Women Across OECD Countries'. *Oxford Review of Economic Policy*, 21(3): 416–38. https://doi.org/10.1093/oxrep/gri024

Fortin, N. M. (2015). 'Gender Role Attitudes and Women's Labor Market Participation: Opting-Out, AIDS, and the Persistent Appeal of Housewifery'. *Annals of Economics and Statistics*,(117/118): 379–401. https://doi.org/10.15609/annaeconstat2009.117-118.379

Garcia-Brazales, J. (2021). *Changing Gender Attitudes: The Long-Run Effects of Early Exposure to Female Classmates.* https://doi.org/10.2139/ssrn.3818754

Goldin, C. (2014). 'A Grand Gender Convergence: Its Last Chapter'. *American Economic Review*, 104(4): 1091–119. https://doi.org/10.1257/aer.104.4.1091

Gong, J., Lu, Y., and Song, H. (2021). 'Gender Peer Effects on Students Academic and Noncognitive Outcomes: Evidence and Mechanisms'. *Journal of Human Resources*, 56(3): 686–710. https://doi.org/10.3368/jhr.56.3.0918-9736R2

Guryan, J., Kroft, K., and Notowidigdo, M. J. (2009). 'Peer Effects in the Workplace: Evidence from Random Groupings in Professional Golf Tournaments'. *American Economic Journal: Applied Economics*, 1(4): 34–68. https://doi.org/10.1257/app.1.4.34

Hoxby, C. (2000). 'Peer Effects in the Classroom: Learning from Gender and Race Variation'. Working Paper No. 7867. Cambridge, MA: National Bureau of Economic Research. https://doi.org/10.3386/w7867

Hsieh, C.-T., Hurst, E., Jones, C. I., and Klenow, P. J. (2019). 'The Allocation of Talent and U.S. Economic Growth'. *Econometrica*, 87(5): 1439–74. https://doi.org/10.3982/ECTA11427

INEEd. (2019). *Informe sobre el estado de la educación en uruguay 2017-2018.* Montevideo: Author.

Izaguirre, A., and Di Capua, L. (2020). 'Exploring Peer Effects in Education in Latin America and the Caribbean'. *Research in Economics*, 74(1): 73–86. https://doi.org/10.1016/j.rie.2020.02.001

Jayachandran, S. (2015). 'The Roots of Gender Inequality in Developing Countries'. *Annual Review of Economics*, 7(1): 63–88. https://doi.org/10.1146/annurev-economics-080614-115404

Kling, J. R., Liebman, J. B., and Katz, L. F. (2007). 'Experimental Analysis of Neighborhood Effects'. *Econometrica*, 75(1): 83–119. https://doi.org/10.1111/j.1468-0262.2007.00733.x

Lavy, V., and Schlosser, A. (2011). 'Mechanisms and Impacts of Gender Peer Effects at School'. *American Economic Journal: Applied Economics*, 3(2): 1–33. https://doi.org/10.1257/app.3.2.1

McEwan, P. J. (2003). 'Peer effects on student achievement: Evidence from chile'. *Economics of Education Review*, 22(2): 131-141. https://doi.org/10.1016/S0272-7757(02)00005-5

Paloyo, A. R. (2020). 'Peer Effects in Education: Recent Empirical Evidence'. In Academic Press (ed.), *The Economics of Education* (pp. 291–305). https://doi.org/10.1016/B978-0-12-815391-8.00021-5

Patacchini, E., Rainone, E., and Zenou, Y. (2017). 'Heterogeneous Peer Effects in Education'. *Journal of Economic Behavior & Organization*, 134(-): 190–227. https://doi.org/10.1016/j.jebo.2016.10.020

Pearse, R., and Connell, R. (2016). 'Gender Norms and the Economy: Insights from Social Research'. *Feminist Economics*, 22(1): 30–53. https://doi.org/10.1080/13545701.2015.1078485

Rao, G. (2019). 'Familiarity Does Not Breed Contempt: Generosity, Discrimination, and Diversity in Delhi Schools'. *American Economic Review*, 109(3): 774–809. https://doi.org/10.1257/aer.20180044

Sacerdote, B. (2011). 'Chapter 4 - Peer Effects in Education: How Might They Work, How Big Are They and How Much Do We Know Thus Far?' In E. A. Hanushek, S. Machin, and L. Woessmann (eds), *Handbook of the Economics of Education* (Vol. 3, pp. 249–77). Elsevier. https://doi.org/10.1016/B978-0-444-53429-3.00004-1

Sahoo, S., and Klasen, S. (2018). 'Gender Segregation in Education and its Implications for Labour Market Outcomes: Evidence from India'. IZA Discussion Papers No. 11660. Bonn, Germany: Institute of Labor Economics (IZA). https://doi.org/10.2139/ssrn.3217476

Seguino, S. (2007). 'PlusÇa Change? Evidence on Global Trends in Gender Norms and Stereotypes'. *Feminist Economics*, 13(2): 1–28. https://doi.org/10.1080/13545700601184880

Vella, F. (1994). 'Gender Roles and Human Capital Investment: The Relationship Between Traditional Attitudes and Female Labour Market Performance'. *Economica*, 61(242): 191–211. https://doi.org/10.2307/2554957

Vigdor, J., and Nechyba, T. (2008). 'Causal Inference When Assignment May Have Been Random: Peer Effects in North Carolina Elementary Schools'. Unpublished. Available at: https://www.aeaweb.org/conference/2009/meetingpapers.php

Appendix

Table A1: Identification validity: random simulation of class assignment

	Proportion
Female	0.9044118
Age above median	0.9338235
Only child	0.9338235
Live w/ both parents	0.9191176
Live w/ grandparents	0.9191176
40% lower SE	0.9411765
Previous repetition	0.8897059
Early attendance (< 3)	0.875
Mother tertiary	0.8897059
Father tertiary	0.9705882

Note: the table shows the results of random simulations of students' assignment to classes. For each school, classes were randomly drawn respecting the schools' actual number of students and the number of students with the respective characteristic (e.g., female). Then the standard deviation of the proportion of peers with the respective characteristic among classes within the school is computed. This exercise is repeated 1,000 times to compute the empirical 90 per cent confidence interval. The table reports the proportion of schools with observed standard deviation within the confidence interval for each predetermined characteristic. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes. SE = socio-economic.

Source: author's elaboration based on Aristas's survey, INEEd.

Table A2: Identification validity: balancing tests

	Coef	SE
Female	0.006	0.020
Age above median	0.149**	0.073
Only child	0.078	0.079
Live w/ both parents	-0.061	0.083
Live w/ grandparents	0.137	0.085
40% lower socio-economic context	-0.063	0.097
Previous repetition	0.292**	0.116
Early attendance (<3)	0.051	0.086
Mother tertiary	0.034	0.078
Father tertiary	0.127*	0.072

Note: the table shows the results of separate regression for each corresponding predetermined characteristic on the share of female peers in the group and school fixed effects. For female dummy, the regression also controls for the share of female peers in the school. Robust standard errors are clustered at the class level. *** significant at the 1% level, ** 5% level, and * 10% level. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes. SE = socio-economic.

Source: author's elaboration based on Aristas's survey, INEEd.

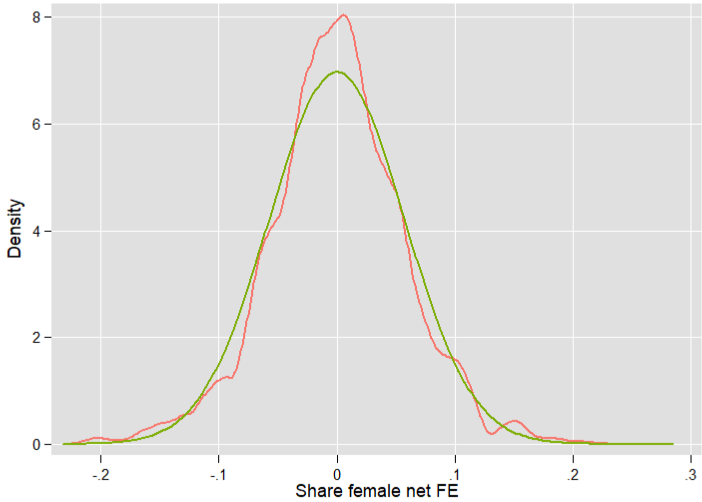
Table A3: Identification validity: variation in percentage and number of female peers

	Male				Female			
	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.
Share female	0.516	0.096	0.231	0.818	0.506	0.094	0.154	0.773
Share female net FE	0.016	0.055	-0.181	0.266	-0.015	0.055	-0.214	0.206
Num. female	11.993	3.253	3.000	23.000	11.792	3.351	2.000	22.000
Num. female net FE	0.361	1.275	-5.062	6.145	-0.339	1.263	-5.970	5.145

Note: the table shows summary statistics for the share and number of female peers before and after removing school fixed effects. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes. SD = standard deviation, FE = fixed effects.

Source: author's elaboration based on Aristas's survey, INEEd.

Figure A1: Identification validity: distribution of the percentage of female peers



Note: the figure shows the distribution of residuals from a regression of the share of female peers on student and peer controls and school fixed effects. The normal distribution is also plotted. R2=0.6381. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes.

Source: author's elaboration based on Aristas's survey, INEEd.

Table A4: Robustness check: teacher controls

	Gender norms	Employment	Wages	Politics	Domestic work	Care work	Sports
Share female	0.339	0.597**	-0.665**	0.548***	0.786***	0.633**	-0.504**
	(0.24)	(0.25)	(0.32)	(0.21)	(0.22)	(0.25)	(0.24)
Obs.	4,833	4,833	4,833	4,833	4,833	4,833	4,833
R-squared	0.114	0.087	0.067	0.073	0.090	0.078	0.063

Note: the table shows the results of regressing each outcome variable on the share of female peers in the group, student and peer characteristic controls, mathematics teacher's controls, and school fixed effects. Robust standard errors are clustered at the class level and reported in parentheses. *** significant at the 1% level, ** 5% level, and * 10% level. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes.

Source: author's elaboration based on Aristas's survey, INEEd.

Table A5: Robustness check: morning control

	Gender norms	Employment	Wages	Politics	Domestic work	Care work	Sports
Share female	0.444**	0.540**	-0.468	0.595***	0.756***	0.534**	-0.130
	(0.21)	(0.22)	(0.31)	(0.18)	(0.20)	(0.24)	(0.24)
Obs.	5,337	5,337	5,337	5,337	5,337	5,337	5,337
R-squared	0.111	0.083	0.062	0.070	0.087	0.074	0.061

Note: the table shows the results of regressing each outcome variable on the share of female peers in the group, student and peer characteristic controls, morning hour control, and school fixed effects. Robust standard errors are clustered at the class level and reported in parentheses. *** significant at the 1% level, ** 5% level, and * 10% level. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes.

Source: author's elaboration based on Aristas's survey, INEEd.

Table A6: Robustness check: sample attrition

	Gender norms	Time domestic work	Mathematics	Language
Share female	0.067	0.053	0.001	0.066
	(0.07)	(0.07)	(0.07)	(0.06)
Observations	5,909	5,909	5,909	5,909
R^2	0.061	0.061	0.056	0.064

Note: the table shows the results of regressing a dummy variable indicating a missing value in the outcome variable on student gender, the share of female peers in the group, and school fixed effects. Robust standard errors are clustered at the class level and reported in parentheses. *** significant at the 1% level, ** 5% level, and * 10% level.

Source: author's elaboration based on Aristas's survey, INEEd.

Table A7: Robustness check: missing control variables treatment

	Gender norms
Share female	0.379*
	(0.23)
Observations	5,342
R^2	0.113

Note: the table shows the results of regressing each outcome variable on the share of female peers in the group, student and peer characteristic controls (imputed when missing), school fixed effects, and dummy variables indicating a missing value in the control variables. Robust standard errors are clustered at the class level and reported in parentheses. *** significant at the 1% level, ** 5% level, and * 10% level.

Source: author's elaboration based on Aristas's survey, INEEd.

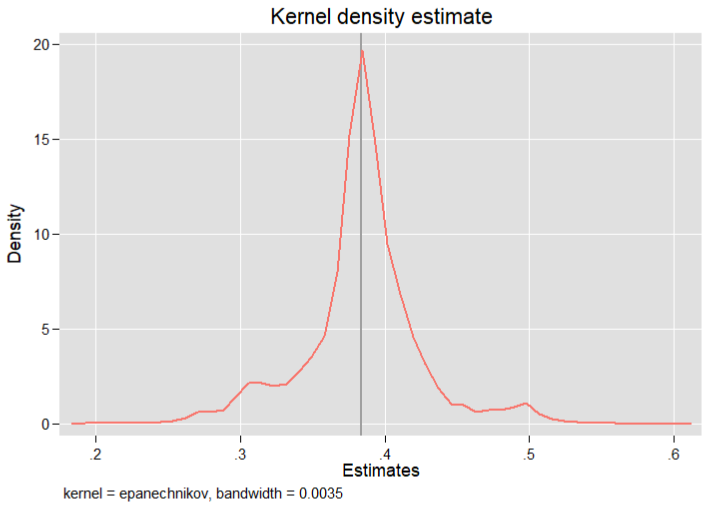
Table A8: Robustness check: further test to randomization

	Gender norms	Employment	Wages	Politics	Domestic work	Care work	Sports
Share female	0.359	0.550*	-0.657*	0.545**	0.669***	0.708**	-0.338
	(0.28)	(0.31)	(0.36)	(0.23)	(0.25)	(0.28)	(0.26)
Obs.	4,223	4,223	4,223	4,223	4,223	4,223	4,223
R-squared	0.119	0.083	0.069	0.070	0.093	0.080	0.065

Note: the table shows the results of regressing the gender norm index on the share of female peers in the group, student and peer characteristic controls, and school fixed effects for the sub-sample of schools with a greater probability of random assignment of students to classes. Robust standard errors are clustered at the class level reported in parentheses. *** significant at the 1% level, ** 5% level, and * 10% level.

Source: author's elaboration based on Aristas's survey, INEEd.

Figure A2: Robustness check: distribution of estimates after randomly dropping schools



Note: the figure shows the distribution of the coefficient associated to the share of female peers from 9,180 regressions that each time randomly drop two schools from the main sample. Regression of the gender norm index on the share of female peers in the group, student and peer characteristic controls, and school fixed effects. The sample includes students from public and private regular secondary schools, with non-missing information in analysed variables, in classes with more than 12 students, and in schools with two or more classes.

Source: author's elaboration based on Aristas's survey, INEEd.