The Impact of School and Classroom Gender Composition on Educational Achievement

Online Appendix: Not for Publication

A Data Appendix

Our primary data source comes from the Korean Ministry of Education and contains National Assessment of Educational Achievement (NAEA) test scores for all ninth grade students. Students are tested in reading (Korean), math, English, science, and social studies. This data set also contains information from a survey that students complete regarding their time use and experiences in school. We also use a subset of data from the Korea Education Longitudinal Study (KELS). The KELS is an annual longitudinal survey of 6,908 students who were in grade 7 (the first year of middle school in Korea) in 2005. The KELS also contains survey data for the parents and teachers of sample members. We use data from the teacher survey in the 3rd wave (2007) because these teachers are the ones who teach students in grade 9 – the same grade as the students who took NAEA tests. Finally, we use school-level administrative data from the Korean Education and Research Information Service (KERIS), which contains information on bullying, student exits, and a limited set of school and teacher characteristics.

A.1 NAEA Tests

All South Korean students at grades 6, 9, and 11, participate in the NAEA in June of each year. The NAEA was introduced in 1998 and was initially administrated to a subset of schools based on sampling and then expanded to all schools from 2008. By law, summary statistics of a school's performance at the NAEA is publicly available at the school's website and that of the Ministry of Education. For each subject, we standardize students' score to have a mean of zero and standard deviation equal to one. We construct a measure of overall achievement by summing raw scores across all five subjects and standardizing to have a mean of zero and standard deviation equal to one.

A.2 NAEA Student Survey

Our measure of student effort is derived from survey questions which ask students to choose one of four options (strongly disagree, disagree, agree, or strongly agree) in response to a statement. For each survey question, we assign a value of 0 for students who strongly disagree, 1 for students who disagree, 2 for students who agree, and 3 for students who strongly agree. Students were classified as *coming to class prepared* based on their agreement with the statement "I bring textbooks, homework, and materials related to classes to school." Students were classified as being *focused on lectures* based on their agreement with the statement "I concentrate on what teachers say during classes." Students were classified as having *studied material in advance* based on their agreement with the statement "I study textbook materials in advance to get ready for school lectures." The extent to which students *reviewed after school* was based on their agreement with the statement "I study the lecture materials I learned during the day." Students who *asked questions during class* were those who agreed with the statement "I ask questions to teachers during the class or right after the class." *Active participants* were classified according to their agreement with the statement "I actively participate in classroom activities – e.g., science experiment, discussions, group activities." Our composite student effort index is constructed by summing students responses to each of the above six measures, standardized to have a mean of zero and standard deviation of one. Table A.1 displays the distribution of responses to each survey item by school type.

Measures of student time use are derived from survey questions which ask students to chose one of five categories of time use for the specified activity. We convert these categories into a continuous measure of time use: "0 hours" is coded as 0, "between 0 and 1 hour" is coded as 0.5 hours, "between 1 and 2 hours" is coded as 1.5 hours, "between 2 and 3 hours" is coded as 2.5 hours, and "3 or higher" is coded as 3.5 hours. Tables A.2 and A.3 display the distribution of student responses to these questions by school and class gender composition.

Our measures of classmate and teacher inputs come from survey questions where students choose one of four options (strongly disagree, disagree, agree, or strongly agree) in response to a statement. We classify a student as indicating that his/her *classmates study hard* if he or she strongly agrees or agrees with the statement "the students in my school study hard in general." A student is classified as indicating his/her high *teaching quality* if he/she strongly agrees with the statement "my teachers [homeroom and subject teachers] teach skillfully/with enthusiasm." Likewise, our alternative measures of student outcomes come from survey questions where students choose one of the same four options. A student is classified as *understanding lectures* if he/she strongly agrees with the statement "I can understand the textbook materials with classroom lectures (without additional help from cram school)." Finally, a student is considered to be *happy to go to school* if

he/she strongly agrees with the statement "I am happy to go to school." Table A.4 displays the distribution of student responses by survey question and school type.

Table A.1: Student Effort Index Components by School and Class Gender Composition

	A. Coed School		B. Single-sex school	
	(1) Coed classrooms	(2) Single-sex classrooms	(3) Boys only	(4) Girls only
A. Coming to class prepared				
strongly disagree	0.01	0.01	0.02	0.01
disagree	0.12	0.12	0.13	0.09
agree	0.59	0.60	0.55	0.66
strongly agree	0.27	0.27	0.31	0.25
Observations	127,361	7,702	23,045	19,822
B. Focused on lectures				
strongly disagree	0.02	0.02	0.03	0.02
disagree	0.25	0.27	0.26	0.21
agree	0.59	0.58	0.55	0.64
strongly agree	0.14	0.13	0.16	0.13
Observations	127,308	7,701	23,049	19,817
C. Study material in advance				
strongly disagree	0.21	0.20	0.22	0.19
disagree	0.56	0.57	0.54	0.59
agree	0.20	0.19	0.19	0.20
strongly agree	0.04	0.04	0.05	0.02
Observations	127,275	7,700	23,031	19,811
D. Review after school				
strongly disagree	0.15	0.14	0.17	0.12
disagree	0.47	0.48	0.47	0.48
agree	0.33	0.32	0.30	0.36
strongly agree	0.05	0.05	0.06	0.04
Observations	127,316	7,699	23,037	19,816
E. Ask questions in class				
strongly disagree	0.18	0.15	0.16	0.16
disagree	0.51	0.52	0.49	0.52
agree	0.26	0.28	0.29	0.28
strongly agree	0.05	0.05	0.07	0.04
Observations	127,266	7,700	23,029	19,806
F. Actively participate				
strongly disagree	0.06	0.05	0.07	0.04
disagree	0.27	0.27	0.27	0.25
agree	0.53	0.54	0.50	0.58
strongly agree	0.14	0.14	0.17	0.12
Observations	127,292	7,698	23,036	19,812

Notes: For sample, see Table 1 notes.

Table A.2: Student Time Use by School and Class Gender Composition: Academic Activities

	A. Coed School		B. Single-sex school	
	(1) Coed classes	(2) Single-sex classes	(3) All male	(4) All female
A. Homework				
0 hours	0.15	0.14	0.13	0.10
less than 1 hour	0.59	0.57	0.56	0.58
1-2 hours	0.22	0.25	0.25	0.27
2-3 hours	0.03	0.03	0.03	0.03
3 or more hours	0.02	0.02	0.03	0.01
Mean	0.74	0.78	0.83	0.82
Observations	127,168	7,688	23,025	19,807
B. Cram school				
0 hours	0.30	0.37	0.30	0.32
less than 1 hour	0.04	0.04	0.04	0.03
1-2 hours	0.13	0.12	0.12	0.13
2-3 hours	0.21	0.18	0.19	0.21
3 or more hours	0.33	0.30	0.36	0.30
Mean	1.89	1.69	1.92	1.80
Observations	127,120	7,692	23,009	19,786

*Note*s: For sample, see Table 1 notes.

Table A.3: Student Time Use by School and Class Gender Composition: Leisure Activities

	A. Coed School		B. Single-sex school	
	(1) Coed classrooms	(2) Single-sex classrooms	(3) Boys only	(4) Girls only
A. Watching TV				
0 hours	0.09	0.07	0.09	0.09
less than 1 hour	0.23	0.21	0.25	0.22
1-2 hours	0.37	0.38	0.38	0.36
2-3 hours	0.18	0.20	0.17	0.19
3 or more hours	0.13	0.15	0.11	0.15
Mean	1.57	1.69	1.50	1.64
Observations	127,060	7,681	23,002	19,794
B. Computer games				
0 hours	0.23	0.22	0.11	0.37
less than 1 hour	0.23	0.21	0.22	0.23
1-2 hours	0.29	0.30	0.35	0.23
2-3 hours	0.15	0.16	0.19	0.10
3 or more hours	0.10	0.11	0.13	0.07
Mean	1.28	1.34	1.55	0.94
Observations	127,021	7,678	22,991	19,786
C. With friends				
0 hours	0.08	0.08	0.08	0.09
less than 1 hour	0.28	0.27	0.28	0.32
1-2 hours	0.29	0.28	0.30	0.26
2-3 hours	0.16	0.16	0.15	0.14
3 or more hours	0.19	0.21	0.18	0.19
Mean	1.65	1.69	1.62	1.57
Observations	126,985	7,674	22,980	19,776

*Note*s: For sample, see Table 1 notes.

Table A.4: Alternative Outcomes and Teacher and Peer Inputs by School and Class Gender Composition

	A. Coed School		B. Single-sex school	
	(1) Coed classrooms	(2) Single-sex classrooms	(3) Boys only	(4) Girls only
A. Understand lectures				
strongly disagree	0.04	0.04	0.04	0.03
disagree	0.21	0.24	0.19	0.22
agree	0.60	0.59	0.58	0.63
strongly agree	0.15	0.14	0.19	0.12
Observations	127,235	7,700	23,025	19,811
B. Happy to go to school				
strongly disagree	0.05	0.05	0.06	0.04
disagree	0.17	0.18	0.19	0.17
agree	0.58	0.60	0.56	0.64
strongly agree	0.20	0.17	0.18	0.16
Observations	127,249	7,702	23,035	19,793
C. Classmates study hard				
strongly disagree	0.05	0.04	0.07	0.01
disagree	0.30	0.33	0.33	0.15
agree	0.55	0.55	0.51	0.70
strongly agree	0.10	0.08	0.10	0.14
Observations	127,299	7,698	23,038	19,811
D. Teaching quality				
strongly disagree	0.02	0.02	0.03	0.01
disagree	0.12	0.12	0.11	0.10
agree	0.72	0.72	0.66	0.76
strongly agree	0.13	0.14	0.19	0.13
Observations	127,305	7,705	23,050	19,812

Notes: For sample, see Table 1 notes.

A.3 KELS teacher survey

We also use data from the Korean Education Longitudinal Study (KELS). The KELS is a nationally representative panel of students who entered 7th grade in 2005. First, a nationally representative sample of schools was selected, and within each school, administrative and survey data was collected for 50 students, as well as their teachers and parents. We restrict our KELS sample to include teachers of KELS students attending schools in the Seoul region who taught tested subjects (math, Korean, English, science, or social studies) in 2007, when the original sample of students was in 9th grade.We identify single-sex schools based on gender composition of sampled students, but cannot identify coed schools with single-sex classes because the data do not contain school or district identifiers.

We use the KELS teacher survey data to construct an index of strict teaching methods, to measure the number and difficulty of homework assignments, and to measure teachers' perceptions of student behavior.

Our measure of strict teaching methods is derived from survey questions in which teachers are asked to rate the importance of a given teaching method using one of five options (not important, somewhat important, moderately important, important, or very important) and an additional question relating to school level policies around punishments towards students who violate the code of conduct. For each survey question relating to teaching methods, we assign a value of 0 to the response of "not important", 1 to "somewhat important", 2 to "moderately important, 3 to "important", and 4 to the response of "very important". These questions include the importance of "challenging students", "asking students questions in class", and "encouraging students to think on their own". The question relating to school discipline policies asks teachers about the extent to which teachers and administrators impose punishments on students for violating the school's code of conduct. Teachers can choose one of five responses: "not at all", which we code as 0, "infrequently" (coded as 1), "sometimes" (coded as 2), "generally yes" (coded as 3), and "always yes" (coded as 4). The index is equal to the sum of the teacher's responses across these four questions, standardized to have a mean of zero and standard deviation of one. Table A.5 displays the distribution of teachers' responses to these survey questions by school type.

Our measures of homework assignment difficulty comes from a question where teachers are asked how long they expect it to take their students to complete a given assignment. Teachers can choose one of five options: less than 30 minutes, 30 minutes to 1 hour, 1 to 1.5 hours, 1.5 to 2 hours, and 2 or more hours. We recode teachers' responses to represent the midpoint of the range represented by the response (e.g., less than 30 minutes = 15 minutes, 30 minutes to 1 hour = 45 minutes, etc.). Our measure of assignment frequency comes from teachers' responses to a series of survey questions asking teachers to report how often they assign specific types of assignments in a given month including extra practice problems, exercises from textbooks, readings from textbooks, short essays, individual projects, and group projects. Teachers can choose one of five options: "none", "once", "twice", "three times", or "four or more". Our measure of homework assignment frequency is equal to the sum of the frequency of each type of assignment. The distribution of assignment frequency by assignment type and school gender composition is displayed in Table A.6.

Finally, we use teachers' reports of student behavior problems to construct indices of minor and major behavior problems. For each type of specific behavior problem, teachers are asked to report the extent to which their students display this behavior, with possible answers including almost never, rarely, sometimes, often, and very often. Each question is recoded such that a response of "almost never" is set equal to 0, "rarely" to 1, "sometimes" to 2, "often" to 3, and "very often" to 4. To create the indices of minor and major behavior problems, teachers responses to each survey question are summed and then standardized to have a mean of zero and standard deviation equal to one. Tables A.7 and A.8 contain the specific behaviors that are used to construct each index, as well as the distribution of teacher responses by school gender composition.

Table A.5: Strict Teaching Methods Index Components by School Gender Composition

	A. Coed School	B. Single-sex school	
	(1) All	(2) All male	(3) All female
A. Challenge students			
not important	0	0	0
somewhat important	0.04	0	0
moderately important	0.33	0.14	0.36
important	0.54	0.62	0.58
very important	0.09	0.24	0.06
Observations	259	21	33
B. Ask students questions			
not important	0	0	0
somewhat important	0.01	0	0
moderately important	0.05	0.05	0.06
important	0.66	0.48	0.73
very important	0.28	0.48	0.21
Observations	261	21	33
C. Encourage students to think on their own			
not important	0	0	0
somewhat important	<0.01	0	0
moderately important	0.11	0.05	0.18
important	0.71	0.76	0.70
very important	0.18	0.19	0.12
Observations	261	21	33
D. Punishment for students violating code of conduct			
not at all	0.14	0.10	0.03
infrequently	0.20	0.14	0.12
sometimes	0.44	0.33	0.48
generally yes	0.19	0.43	0.33
always yes	0.03	0	0.03
Observations	254	21	33

Notes: Teachers of 9th grade students enrolled in a Seoul area school in 2007 that participated in the KELS survey.

Table A.6: Homework Assignment Categories by School Gender Composition

	A. Coed School	B. Single-sex school	
	(1) All	(2) All male	(3) All female
A. Extra practice problems			
none	0.58	0.57	0.79
once	0.20	0.14	0.12
twice	0.11	0.14	0.06
three times	0.03	0.10	0
4 or more	0.08	0.05	0.03
mean	0.84	0.90	0.36
Observations	260	21	33
B. Exercises from textbooks			
none	0.17	0.14	0.21
once	0.27	0.19	0.27
twice	0.21	0.14	0.30
three times	0.11	0.10	0.03
4 or more	0.23	0.43	0.18
mean	1.96	2.48	1.70
Observations	262	21	33
C. Textbook readings			
none	0.34	0.10	0.27
once	0.30	0.29	0.36
twice	0.12	0.38	0.15
three times	0.08	0.05	0.03
4 or more	0.17	0.19	0.18
mean	1.43	1.95	1.48
Observations	263	21	33
D. Short essays			
none	0.41	0.38	0.42
once	0.30	0.05	0.33
twice	0.13	0.24	0.12
three times	0.05	0.14	0.03
4 or more	0.11	0.19	0.09
mean	1.16	1.71	1.03
Observations	261	21	33
E. Individual projects			
none	0.52	0.48	0.58
once	0.41	0.48	0.39
twice	0.05	0.05	0.03
three times	0.01	0	0
4 or more	0.01	0	0
mean	0.58	0.57	0.45
Observations	260	21	33
F. Group projects			
none	0.66	0.57	0.52
once	0.31	0.38	0.45
twice	0.03	0.05	0.03
three times	0	0	0
4 or more	<0.01	0	0
mean	0.38	0.48	0.52
Observations	261	21	33

*Note*s: Teachers of 9th grade students enrolled in a Seoul area school in 2007 that participated in the KELS survey.

Table A.7: Minor Behavior Problem Categories by School Gender Composition

	A. Coed School	B. Single-sex school	
	(1) All	(2) All male	(3) All female
A. Late for school			
almost never	0.14	0.43	0.27
rarely	0.25	0.19	0.36
sometimes	0.21	0.29	0.12
often	0.23	0.10	0.21
very often	0.17	0	0.03
Observations	263	21	33
B. Absent from school			
almost never	0.32	0.71	0.64
rarely	0.26	0.24	0.24
sometimes	0.18	0.05	0.03
often	0.16	0	0.06
very often	0.08	0	0.03
Observations	263	21	33
C. Skip class			
almost never	0.40	0.86	0.73
rarely	0.30	0.10	0.15
sometimes	0.17	0.05	0.09
often	0.08	0	0.03
very often	0.05	0	0
Observations	263	21	33
D. Violate dress code			
almost never	0.06	0.33	0.12
rarely	0.23	0.38	0.39
sometimes	0.28	0.24	0.24
often	0.25	0.05	0.21
very often	0.19	0	0.03
Observations	263	21	33
E. Not pay attention in class			
almost never	0.13	0.19	0.24
rarely	0.20	0.48	0.30
sometimes	0.23	0.24	0.18
often	0.26	0.10	0.21
very often	0.18	0	0.06
Observations	263	21	33
F. Rude to teachers			
almost never	0.11	0.19	0.18
rarely	0.23	0.19	0.39
sometimes	0.21	0.43	0.15
often	0.25	0.14	0.21
very often	0.20	0.05	0.06
Observations	263	21	33
G. Cheat			
almost never	0.59	0.62	0.76
rarely	0.27	0.29	0.21
sometimes	0.13	0.05	0
often	0.02	0.05	0.03
very often	0	0	0
Observations	263	21	33
H. Challenge teachers' authority			
almost never	0.23	0.52	0.39
rarely	0.30	0.29	0.30
sometimes	0.23	0.19	0.21
often	0.18	0	0.09
very often	0.06	0	0.0
Observations	262	21	33

*Note*s: Teachers of 9th grade students enrolled in a Seoul area school in 2007 that participated in the KELS survey.

Table A.8: Major Behavior Problem Categories by School Gender Composition

	A. Coed School	B. Single-sex school	
	(1) All	(2) All male	(3) All female
A. Bully other students			
almost never	0.35	0.43	0.58
rarely	0.32	0.43	0.24
sometimes	0.25	0.10	0.09
often	0.06	0.05	0.09
very often	0.02	0	0
Observations	263	21	33
B. Damage school property			
almost never	0.30	0.33	0.64
rarely	0.30	0.48	0.24
sometimes	0.22	0.14	0.06
often	0.14	0.05	0.06
very often	0.04	0	0
Observations	263	21	33
C. Steal from students or teachers			
almost never	0.36	0.57	0.58
rarely	0.31	0.33	0.21
sometimes	0.21	0.05	0.15
often	0.08	0.05	0.06
very often	0.04	0	0
Observations	263	21	33
D. Threaten other students			
almost never	0.21	0.38	0.36
rarely	0.33	0.43	0.45
sometimes	0.28	0.14	0.12
often	0.14	0.05	0.06
very often	0.04	0	0
Observations	263	21	33
E. Physically attack other students			
almost never	0.32	0.62	0.73
rarely	0.31	0.19	0.21
sometimes	0.26	0.10	0.06
often	0.09	0.10	0
very often	0.02	0	0
Observations	262	21	33
F. Drink or take drugs			
almost never	0.22	0.19	0.67
rarely	0.31	0.48	0.21
sometimes	0.26	0.33	0.09
often	0.15	0	0.03
very often	0.06	0	0
Observations	262	21	33

*Note*s: Teachers of 9th grade students enrolled in a Seoul area school in 2007 that participated in the KELS survey.

B Additional Figures and Tables

Table B.1: The Impact of Single-Sex Schools and Classrooms on Achievement by Subject

	(1) Reading	(2) English	(3) Math	(4) Science	(5) Soc. Studies
Female ^{x}					
1[Single-sex school]	-0.005	-0.007	-0.001	-0.006	0.010
	[0.040]	[0.056]	[0.046]	[0.041]	[0.039]
1[Coed school, single-sex class]	-0.048	-0.108*	-0.028	-0.036	-0.064
	[0.051]	[0.065]	[0.053]	[0.043]	[0.048]
Male ^{x}					
1[Single-sex school]	0.148***	0.165***	0.164***	0.129***	0.138***
	[0.041]	[0.059]	[0.049]	[0.046]	[0.039]
1[Coed school, single-sex class]	-0.073*	-0.116**	-0.066	-0.088**	-0.069
	[0.040]	[0.051]	[0.043]	[0.039]	[0.042]
Test of equality (*p*- value):					
Male ^{x} SS school = Male ^{x} SS class	<0.001	<0.001	<0.001	<0.001	<0.001
Female ^{x} SS school = Female ^{x} SS class	0.472	0.160	0.673	0.601	0.214
Observations	178,829	178,829	178,829	178,829	178,829

*Note*s: See Table 1 notes for sample. Estimates represent the impact of assignment to the specified school and and classroom gender composition relative to a coed classroom. Each column represents a separate regression. Robust standard errors, clustered by school×cohort, in brackets; * p<0.10, ** p<0.05, *** p<0.01. All regressions include district×year×gender fixed effects and individual and school controls (fully interacted with gender). See Table 4 notes for individual and school controls. All test scores standardized to have a mean of zero and standard deviation equal to one.

Table B.2: The Impact of Cohort Gender Composition on Achievement

	(1) Combined	(2) Reading	(3) English	(4) Math	(5) Science	(6) Soc. Studies
Female ^{x}						
Fraction female in cohort	0.176	0.229	0.094	0.255*	0.184	0.023
	[0.169]	[0.179]	[0.140]	[0.145]	[0.171]	[0.174]
Male ^{x}						
Fraction female in cohort	0.330*	0.358**	0.356***	0.349**	0.280	0.131
	[0.169]	[0.180]	[0.135]	[0.141]	[0.177]	[0.173]
Observations	128,096	128,096	128,096	128,096	128,096	128,096

*Note*s: Sample limited to students attending coed schools with coed classrooms. Estimates represent the impact of increasing the fraction of female students in the cohort, relative to an even split between female and male students. Each column represents a separate regression. Robust standard errors, clustered at school by year level, in brackets; * p<0.10, ** p<0.05, *** p<0.01. All regressions include school fixed effects, district by gender fixed effects, year by gender fixed effects, living arrangement indicators (both biological parents, single mother, single father, grandparents, other relatives, or other adults) interacted with student gender, school controls (number of classes, average students per class, number of teachers, fraction of experienced teachers, fraction of teachers belonging to a union, fraction of teachers that are female, pupils per teacher, whether the school was founded by a private entity) interacted with student gender, and gender main effects. Combined achievement equals the sum of reading, English, math, science, and social studies test scores, standardized to have a mean of zero and standard deviation equal to one. All subject test scores are standardized to have a mean of zero and standard deviation equal to one.

Table B.3: Impacts of School and Classroom Gender Composition on Student Effort

	(1) Come to class prepared	(2) Focused on lectures	(3) Study material in advance	(4) Review after school	(5) Ask questions in class	(6) Actively participate
Female x						
1[Single-sex school]	-0.045***	0.009	-0.004	0.007	0.061**	0.031
	[0.015]	[0.019]	[0.017]	[0.021]	[0.025]	[0.019]
1[Coed school, single-sex class]	-0.022	-0.015	0.033	0.030	0.082***	0.051***
	[0.021]	[0.026]	[0.021]	[0.022]	[0.022]	[0.019]
1[Coed class] x Fraction female in class	-0.077**	0.014	-0.016	0.030	0.076	0.081*
	[0.038]	[0.042]	[0.041]	[0.047]	[0.056]	[0.044]
Test of equality (*p*- value):						
Female x SS school = Female x SS class	0.276	0.416	0.074	0.323	0.412	0.364
Female x SS school = Female x Coed class, 100% female	0.792	0.949	0.882	0.808	0.536	0.710
Female x SS class = Female x Coed class, 100% female	0.571	0.519	0.164	0.642	0.234	0.732
Male x						
1[Single-sex school]	0.105***	0.078***	0.034*	0.049**	0.093***	0.068***
	[0.016]	[0.019]	[0.018]	[0.020]	[0.022]	[0.020]
1[Coed school, single-sex class]	0.037**	0.015	0.013	0.024	0.077***	0.020
	[0.018]	[0.017]	[0.016]	[0.019]	[0.025]	[0.022]
1[Coed class] x Fraction female in class	-0.074	0.041	0.050	0.051	-0.004	0.002
	[0.050]	[0.052]	[0.054]	[0.062]	[0.069]	[0.057]
Test of equality (*p*- value):						
Male x SS school = Male x SS class	<0.001	0.001	0.268	0.248	0.538	0.036
Male x SS school = Male x Coed class, 100% male	0.011	0.001	0.053	0.031	0.019	0.042
Male x SS class = Male x Coed class, 100% male	<0.001	0.223	0.190	0.145	0.068	0.551
Dependent variable mean	3.13	2.85	2.07	2.28	2.20	2.76
Observations	177,930	177,875	177,817	177,868	177,801	177,838

*Note*s: For sample, see Table 1 notes. Estimates represent the impact of assignment to the specified school and and classroom gender composition relative to a coed classroom with equal number of female and male students. Each column represents a separate regression. Robust standard errors, clustered by school, in brackets; * p<0.10, ** p<0.05, *** p<0.01. For description of individual and school controls, see Table 4 notes.

Table B.4: Impacts of School and Classroom Gender Composition on Student Time Use

	(1) Hours spent on homework	(2) Hours spent in cram school	(3) Hours spent watching TV	(4) Hours spent computer games	(5) Hours spent with friends
Female [x]					
1[Single-sex school]	0.003	-0.031	0.009	0.039	-0.046
	[0.022]	[0.044]	[0.037]	[0.033]	[0.035]
1[Coed school, single-sex class]	-0.003	-0.055	0.081**	0.055	0.020
	[0.029]	[0.065]	[0.037]	[0.039]	[0.038]
1[Coed class] [x] Fraction female in class	0.008	0.134	-0.023	0.022	-0.138
	[0.055]	[0.133]	[0.098]	[0.086]	[0.101]
Test of equality (*p*- value):					
Female [x] SS school = Female [x] SS class	0.842	0.731	0.064	0.662	0.106
Female [x] SS school = Female [x] Coed class, 100% female	0.978	0.207	0.748	0.623	0.713
Female [x] SS class = Female [x] Coed class, 100% female	0.856	0.188	0.145	0.455	0.164
Male [x]					
1[Single-sex school]	0.063***	0.130***	-0.055*	-0.105***	-0.128***
	[0.024]	[0.040]	[0.032]	[0.040]	[0.029]
1[Coed school, single-sex class]	0.016	-0.097**	0.056*	0.029	-0.011
	[0.029]	[0.042]	[0.031]	[0.037]	[0.024]
1[Coed class] [x] Fraction female in class	-0.100	-0.015	0.023	0.013	0.121
	[0.076]	[0.116]	[0.081]	[0.097]	[0.084]
Test of equality (*p*- value):					
Male [x] SS school = Male [x] SS class	0.153	<0.001	0.002	0.001	<0.001
Male [x] SS school = Male [x] Coed class, 100% male	0.758	0.056	0.342	0.086	0.135
Male [x] SS class = Male [x] Coed class, 100% male	0.457	0.117	0.149	0.522	0.257
Dependent variable mean	0.77	1.88	1.58	1.28	1.64
Observations	177,688	177,607	177,537	177,476	177,415

*Note*s: For sample, see Table 1 notes. Estimates represent the impact of assignment to the specified school and and classroom gender composition relative to a coed classroom with equal number of female and male students. Each column represents a separate regression. Robust standard errors, clustered by school, in brackets; * p<0.10, ** p<0.05, *** p<0.01. For description of individual and school controls, see Table 4 notes. Time use measures represent hours per day spent on the specified activity.

Table B.5: Heterogeneity in the Impact of School and Classroom Gender Composition: Public versus Privately Founded Schools

	(1) Overall Achievement	(2) Student effort index	(3) Hours: academic	(4) Hours: leisure	(5) Teacher effort
Private	0.102	-0.006	0.104	-0.041	0.017
	[0.064]	[0.037]	[0.065]	[0.100]	[0.034]
x Female	-0.031	-0.025	-0.013	-0.045	0.024
	[0.054]	[0.040]	[0.071]	[0.119]	[0.018]
Female x **1**[Single-sex school]	-0.076	-0.010	-0.163**	0.229	0.040
	[0.088]	[0.061]	[0.076]	[0.169]	[0.048]
x Private	0.093	0.014	0.180*	-0.278	-0.057
	[0.100]	[0.069]	[0.101]	[0.198]	[0.052]
Female x **1**[Co-ed school, same sex class]	-0.002	0.127***	0.040	-0.056	0.010
	[0.059]	[0.042]	[0.096]	[0.126]	[0.027]
x Private	-0.093	-0.144**	-0.136	0.332*	-0.088**
	[0.107]	[0.061]	[0.148]	[0.187]	[0.043]
Male x **1**[Single-sex school]	0.139*	0.163***	0.198**	-0.238	-0.056
	[0.082]	[0.051]	[0.080]	[0.157]	[0.044]
x Private	0.042	-0.048	-0.015	-0.066	0.059
	[0.098]	[0.062]	[0.099]	[0.179]	[0.054]
Male x **1**[Co-ed school, same sex class]	-0.046	0.065*	-0.114*	0.006	-0.013
	[0.045]	[0.036]	[0.066]	[0.099]	[0.040]
x Private	-0.073	-0.025	0.050	0.123	0.044
	[0.089]	[0.061]	[0.097]	[0.154]	[0.060]
Observations	178,829	177,682	177,310	177,094	177,872

*Note*s: For sample, see Table 1 notes. Each column represents a separate regression. Robust standard errors, clustered by school, in brackets; * p<0.10, ** p<0.05, *** p<0.01. For description of individual and school controls, see Table 4 notes.

Table B.6: Heterogeneity in the Impact of School and Classroom Gender Composition: Schools Founded by Religious Organization

	(1) Overall achievement	(2) Student effort index	(3) Hours: academic	(4) Hours: leisure	(5) Teacher effort
Founded by religious organization	-0.276***	-0.070	-0.261**	0.400**	0.009
	[0.086]	[0.054]	[0.107]	[0.171]	[0.024]
x Female	0.093	0.051	0.073	-0.323*	0.023
	[0.092]	[0.071]	[0.102]	[0.195]	[0.029]
Female x **1**[Single-sex school]	-0.052	-0.005	-0.076	0.034	0.028
	[0.053]	[0.035]	[0.061]	[0.101]	[0.017]
x Founded by religious organization	0.283***	0.089	0.297**	-0.179	-0.039
	[0.086]	[0.064]	[0.119]	[0.218]	[0.027]
Female x **1**[Co-ed school, single-sex class]	-0.118**	0.074**	-0.120	0.177	-0.001
	[0.059]	[0.037]	[0.084]	[0.120]	[0.011]
x Founded by religious organization	0.304**	-0.056	0.345*	-0.135	-0.030
	[0.149]	[0.085]	[0.200]	[0.258]	[0.027]
Male x **1**[Single-sex school]	0.148***	0.140***	0.171***	-0.256***	0.001
	[0.055]	[0.036]	[0.054]	[0.098]	[0.013]
x Founded by religious organization	0.121	0.013	0.096	-0.126	0.002
	[0.090]	[0.058]	[0.109]	[0.184]	[0.028]
Male x **1**[Co-ed school, single-sex class]	-0.157***	0.023	-0.136***	0.142	-0.002
	[0.051]	[0.030]	[0.051]	[0.086]	[0.015]
x Founded by religious organization	0.384***	0.178**	0.315**	-0.407*	0.028
	[0.110]	[0.073]	[0.126]	[0.213]	[0.029]
Observations	178,829	177,277	177,310	177,094	177,872

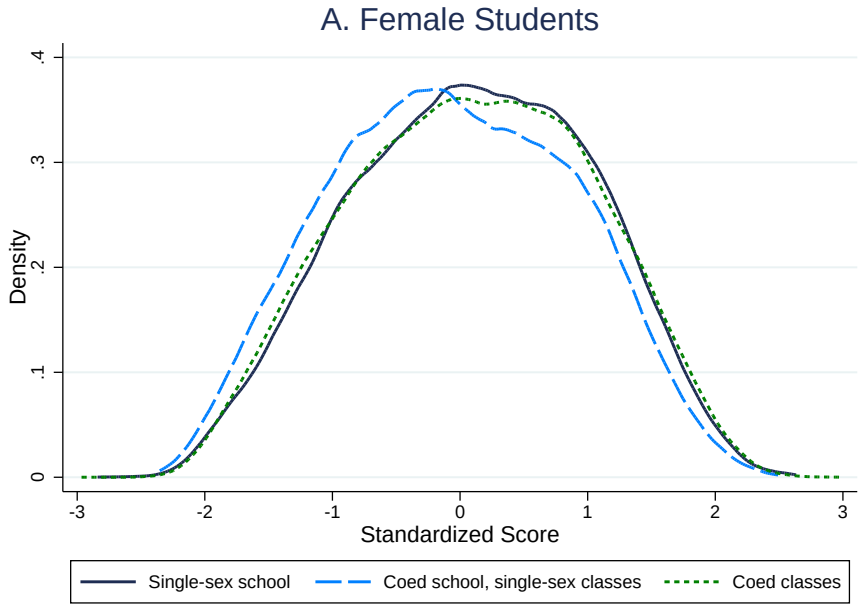
Notes: For sample, see Table 1 notes. Each column represents a separate regression. Robust standard errors, clustered by school, in brackets; * p<0.10, ** p<0.05, *** p<0.01. For description of individual and school controls, see Table 4 notes.

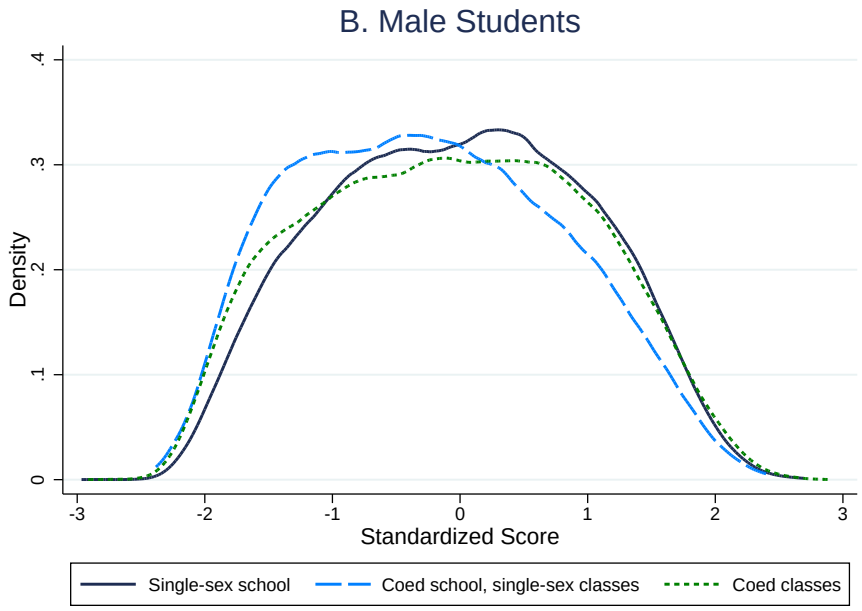
Table B.7: Heterogeneity in the Impact of School and Classroom Gender Composition by Teacher Gender

	(1) Overall Achievement	(2) Student effort index	(3) Hours: academic	(4) Hours: leisure	(5) Teacher effort
Fraction teachers female in school ($\mu = 0.5$)	0.447**	0.181	0.255	-0.189	0.020
	[0.185]	[0.116]	[0.189]	[0.302]	[0.082]
x Female	0.001	0.057	0.168	-0.356	0.031
	[0.150]	[0.116]	[0.195]	[0.309]	[0.044]
Female x **1**[Single-sex school]	0.031	0.047	0.027	-0.132	-0.019
	[0.062]	[0.035]	[0.087]	[0.111]	[0.030]
x Fraction teachers female in school	-0.214	-0.234	-0.387	1.030**	0.216*
	[0.274]	[0.160]	[0.370]	[0.484]	[0.123]
Female x **1**[Co-ed school, same sex class]	-0.037	0.023	-0.056	0.204*	-0.056*
	[0.073]	[0.039]	[0.095]	[0.119]	[0.030]
x Fraction teachers female in school	-0.153	0.243	0.067	-0.513	0.177
	[0.312]	[0.195]	[0.461]	[0.534]	[0.137]
Male x **1**[Single-sex school]	0.210***	0.142***	0.211***	-0.316***	-0.015
	[0.049]	[0.033]	[0.053]	[0.087]	[0.026]
x Fraction teachers female in school	-0.497**	-0.038	-0.160	0.451	-0.166*
	[0.206]	[0.131]	[0.225]	[0.383]	[0.095]
Male x **1**[Co-ed school, same sex class]	-0.049	0.058	0.002	0.071	0.005
	[0.069]	[0.045]	[0.063]	[0.105]	[0.043]
x Fraction teachers female in school	-0.138	0.032	-0.588*	-0.083	0.010
	[0.266]	[0.193]	[0.309]	[0.483]	[0.213]
Observations	178,829	177,277	177,310	177,094	177,872

Notes: For sample, see Table 1 notes. Each column represents a separate regression. Robust standard errors, clustered by school, in brackets; * p<0.10, ** p<0.05, *** p<0.01. Share teachers female denotes the fraction of teachers in a given school and year that are female, standardized such that zero indicates an equal share of male and female teachers. For description of individual and school controls, see Table 4 notes.

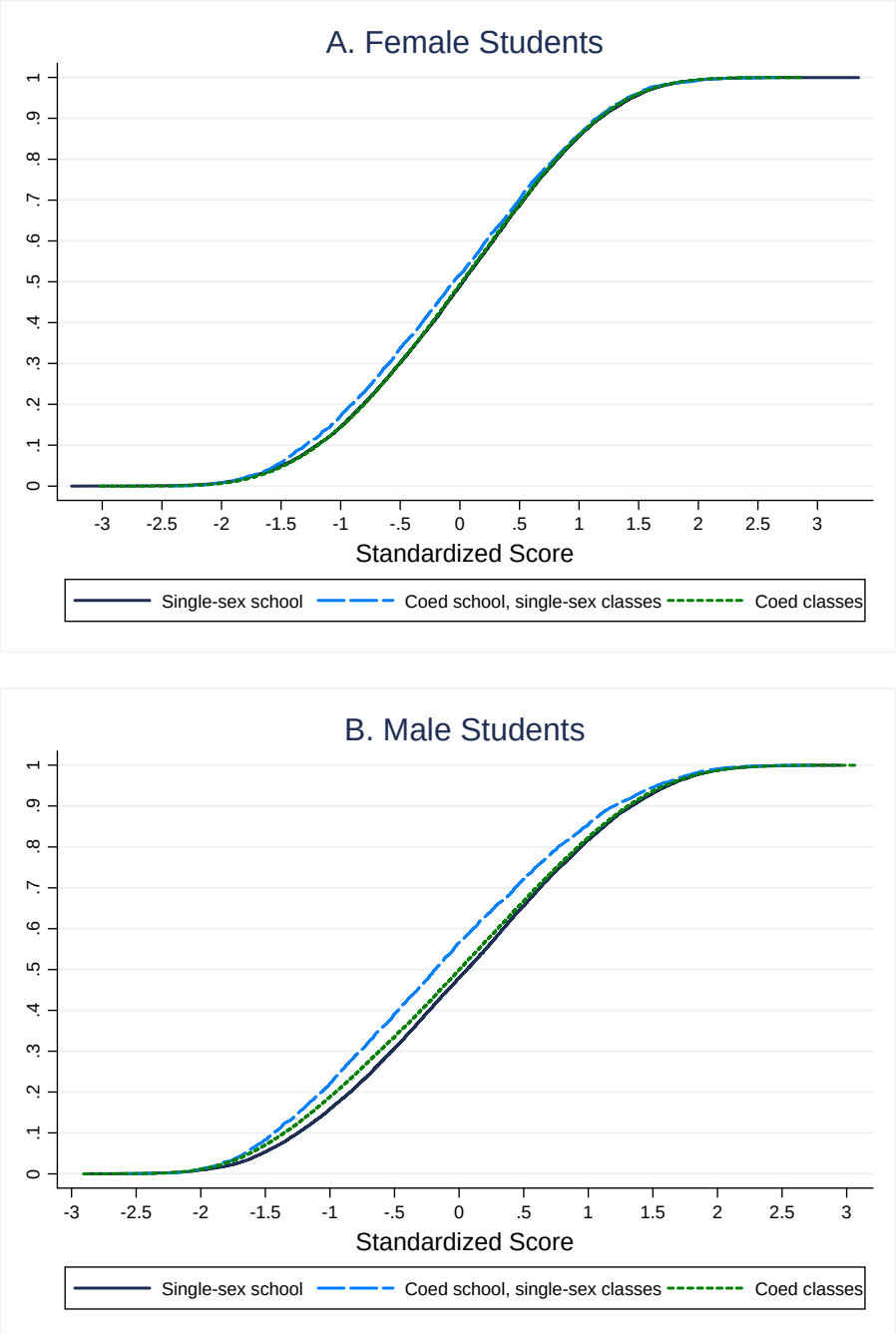
Figure B.1: The Distribution of Student Achievement by School and Classroom Gender Composition





Notes: For sample, see Table 1 notes. Achievement is standardized to have a mean of zero, standard deviation of one.

Figure B.2: The Cumulative Distribution of Achievement by Peer Gender Composition



Notes: For sample, see Table 1 notes. Cumulative distribution of residual achievement (from regressions of achievement on student controls, school controls, and year and district fixed effects, separately estimated by gender). Kolmogorov-Smirnov test of equality of distributions for female students (p-value): single-sex school = coed school with coed classes: $p = 0.891$; coed school with single-sex classes = coed school with coed classes: $p < 0.001$; single-sex school = coed school with single-sex classes: $p < 0.001$. Kolmogorov-Smirnov test of equality of distributions for male students (p-value): single-sex school = coed school with coed classes: $p < 0.001$; coed school with single-sex classes = coed school with coed classes: $p < 0.001$; single-sex school = coed school with single-sex classes: $p < 0.001$.