Online Appendix for: "The Impact of Advisor Gender on Female Students' STEM Enrollment and Persistence"

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1 Appendix Tables

Table A1: Requirements for enrolling in history and mathematics

Number of credits required in each discipline by major

Major	English Level 200	Arabic	Humanities	Math[1]	Natural Sciences	Social Sciences	Electives
History	3	3	6	3	6	3	6
Mathematics	3	3	3	6	9	3	3

Notes: The above table shows the number of credits that a student must pass during the freshman year within each discipline in order to be eligible to enroll in history (first row) or mathematics (second row). Each course is typically equivalent to 3 credits.

Additional course and grade requirements by major

History	a minimum cumulative average of 70 in English courses taken in the freshman year
Mathematics	a minimum cumulative average of 70 in MATH 101 and 102, and a minimum grade of 70 in MATH 102

Notes: The above table shows specific courses and grades that students must obtain during the freshman year to be eligible to enroll in history or mathematics. For example, the mathematics department requires that students take Math 101 and Math 102. By passing these two courses, students receive 6 credits, thus obtaining the number of math credits required to enroll in the major (the first table shows that students need 6 credits in math).

Table A2: The effect of having a female science advisor on student outcomes—with additional controls

	Enroll in STEM	Graduate with STEM degree	Freshman GPA
	(1)	(2)	(3)
Effect on male students (β_1)	-0.040	-0.036	-0.060
	(0.032)	(0.030)	(0.069)
	[0.067]	[0.062]	[0.085]
Effect on female students ($\beta_1 + \beta_3$)	0.053*	0.040*	0.100
	(0.028)	(0.021)	(0.070)
	[0.018]	[0.047]	[0.109]
Effect on gender gap (β_3)	0.094**	0.076**	0.159**
	(0.040)	(0.034)	(0.065)
	[0.000]	[0.001]	[0.001]
Year Fixed Effect	Yes	Yes	Yes
Student Controls	Yes	Yes	Yes
Advisor Controls	Yes	Yes	Yes
Advisor Rank X Advisor Gender	Yes	Yes	Yes
Advisor Rank X Student Gender	Yes	Yes	Yes
All Observations	1,804	1,804	1,804

Note: Each column represents estimates from separate regressions. Student controls include verbal and math SAT scores, high school GPA, legacy status and birth year fixed effects. Advisor controls include academic rank and department. Additionally, we control for the interaction of student gender and all controls. Standard errors clustered at the advisor-year level and reported in parentheses. Randomization inference based p-values reported in brackets. *** p <0.01 ** p <0.05 * p <0.1

Table A3: The effect of having a female science advisor on the likelihood of dropping out or not declaring a major

	Dropout or Undeclared Major	Dropout or Undeclared Major	Dropout or Undeclared Major
	(1)	(2)	(3)
Effect on male			
students (β_1)	0.025	0.004	
	(0.041)	(0.037)	
	[0.402]	[0.887]	
Effect on female			
students ($\beta_1 + \beta_3$)	-0.019	-0.025	
	(0.034)	(0.040)	
	[0.661]	[0.567]	
Effect on the			
gender gap (β_3)	-0.044	-0.029	-0.032
	(0.041)	(0.042)	(0.044)
	[0.210]	[0.427]	[0.445]
Year Fixed Effect		Yes	Yes
Student Controls		Yes	Yes
Advisor Controls		Yes	No
Advisor Fixed Effects			Yes
Observations	1,804	1,804	1,804

Note: Dependent variable in columns 1 through 3 is the likelihood that freshman students drop out or do not declare a major after their first year. Student controls include verbal and math SAT scores, high school GPA, legacy status and birth year fixed effects. Advisor controls include faculty rank and department. We interact all controls and fixed effects with student gender. Standard errors clustered at the advisor level and reported in parentheses. Randomization inference based p-values reported in brackets. *** p <0.01 ** p <0.05 * p <0.1

Table A4: The effect of having a female versus male science advisor on STEM outcomes and Freshman GPA (Clustering at advisor level)

	Enroll in STEM			Graduate with STEM degree (within 6 years)			Freshman GPA		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Effect on male students (β_1)	-0.037	-0.032		-0.036	-0.029		-0.106*	-0.063	
	(0.038)	(0.022)		(0.041)	(0.024)		(0.053)	(0.060)	
Effect on female students ($\beta_1 + \beta_3$)	0.048*	0.054**		0.042*	0.043**		0.082*	0.113**	
	(0.028)	(0.018)		(0.022)	(0.015)		(0.043)	(0.044)	
Effect on the gender gap (β_3)	0.084**	0.086**	0.084**	0.078*	0.072**	0.070**	0.188***	0.177***	0.168***
	(0.042)	(0.038)	(0.038)	(0.038)	(0.030)	(0.030)	(0.040)	(0.052)	(0.050)
Year Fixed Effect		Yes	Yes		Yes	Yes		Yes	Yes
Student Controls		Yes	Yes		Yes	Yes		Yes	Yes
Advisor Controls		Yes	No		Yes	No		Yes	No
Advisor Fixed Effects			Yes			Yes			Yes
Observations	1,804	1,804	1,804	1,804	1,804	1,804	1,804	1,804	1,804
R^2	0.022	0.108	0.116	0.018	0.093	0.110	0.034	0.138	0.153

Note: Dependent variable in columns 1 through 3 is the likelihood of students enrolling in a STEM major after freshman year. Dependent variable in columns 4 through 6 is the likelihood of graduating with a STEM degree within 6 years of enrollment. Dependent variable in columns 7 through 9 is freshman GPA. Each column represents estimates from separate regressions. Student controls include verbal and math SAT scores, high school GPA, legacy status and birth year fixed effects. Advisor controls include faculty rank and department. We interact all controls and fixed effects with student gender. Standard errors clustered at the advisor level and reported in parentheses. *** p <0.01 ** p <0.05 * p <0.1

Table A5: Heterogeneous freshman course level effects of science advisor gender match based on student ability

	Take Sci. Course	Fail Sci. Course	Withdraw Sci. Course	Grade Sci. Course	Fail Non-Sci. Course	Withdraw Non-Sci. Course	Grade Non-Sci. Course
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
High ability students (Math SAT≥ Median=575)							
Effect on male students (β_1)	-0.015	0.042	0.023*	-0.107	0.022	0.018*	-0.040
	(0.017)	(0.030)	(0.013)	(0.114)	(0.014)	(0.010)	(0.064)
	[0.112]	[0.030]	[0.010]	[0.070]	[0.110]	[0.042]	[0.063]
Effect on female students ($\beta_1 + \beta_3$)	0.042**	-0.039**	-0.016	0.032	-0.035**	-0.008	0.128***
	(0.017)	(0.017)	(0.011)	(0.087)	(0.013)	(0.006)	(0.046)
	[0.009]	[0.010]	[0.091]	[0.720]	[0.020]	[0.400]	[0.050]
Effect on gender gap (β_3)	0.057***	-0.081**	-0.039**	0.140	-0.057***	-0.027**	0.168**
	(0.021)	(0.037)	(0.017)	(0.139)	(0.021)	(0.012)	(0.083)
	[0.040]	[0.000]	[0.000]	[0.100]	[0.110]	[0.050]	[0.050]
Lower ability students (Math SAT< Median=575)							
Effect on male students (β_1)	-0.000	0.053*	0.040**	-0.055	0.018	-0.005	-0.116**
	(0.021)	(0.031)	(0.016)	(0.098)	(0.019)	(0.009)	(0.052)
	[0.970]	[0.008]	[0.010]	[0.111]	[0.074]	[0.500]	[0.000]
Effect on female students ($\beta_1 + \beta_3$)	0.004	-0.020	0.006	0.157	-0.022	-0.004	0.026
	(0.015)	(0.025)	(0.014)	(0.099)	(0.014)	(0.008)	(0.051)
	[0.720]	[0.133]	[0.530]	[0.070]	[0.120]	[0.810]	[0.650]
Effect on gender gap (β_3)	0.004	-0.073**	-0.033	0.212	-0.040	0.001	0.143**
	(0.024)	(0.036)	(0.021)	(0.131)	(0.025)	(0.012)	(0.070)
	[0.630]	[0.000]	[0.061]	[0.032]	[0.040]	[0.490]	[0.000]
Course-by-semester Fixed Effect	No	Yes	Yes	Yes	Yes	Yes	Yes
Advisor Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Student Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations (High ability)	9,569	3,497	3,497	3,292	6,070	6,070	5,719
Observations (Lower ability)	9,775	2,858	2,858	2,607	6,911	6,911	6,443

Note: Each column represents estimates from separate regressions. Student controls include verbal and math SAT scores, high school GPA, legacy status and birth year fixed effects. Advisor controls include rank and department. Additionally, we interact all controls with student gender. Regressions in columns (2) through (7) also include course-by-semester fixed effects to control for unobserved mean differences in academic achievement or grading standards across courses and time. Standard errors clustered at the advisor-year level and reported in parentheses. Randomization inference based p-values reported in brackets. *** p <0.01 ** p <0.05 * p <0.1

Table A6: Freshman course level treatment effects when matched to a female versus male non-science advisor

	Take Sci. Course	Fail Sci. Course	Withdraw Sci. Course	Grade Sci. Course	Fail Non-Sci. Course	Withdraw Non-Sci. Course	Grade Non-Sci. Course
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Effect on male students (β_1)	-0.006	-0.005	0.001	0.128	0.015	-0.006	-0.053
	(0.012)	(0.013)	(0.010)	(0.099)	(0.012)	(0.007)	(0.037)
	[0.660]	[0.381]	[0.512]	[0.080]	[0.053]	[0.072]	[0.089]
Effect on female students ($\beta_1 + \beta_3$)	-0.002	0.024	0.014	0.003	0.006	0.006	0.038
	(0.011)	(0.015)	(0.010)	(0.068)	(0.009)	(0.004)	(0.038)
	[0.830]	[0.052]	[0.510]	[0.780]	[0.750]	[0.630]	[0.065]
Effect on gender gap (β_3)	0.004	0.029	0.014	-0.125	-0.009	0.012	0.091*
	(0.015)	(0.022)	(0.014)	(0.096)	(0.016)	(0.009)	(0.052)
	[0.800]	[0.033]	[0.061]	[0.082]	[0.190]	[0.250]	[0.030]
Course-by-Semester Fixed Effect	No	Yes	Yes	Yes	Yes	Yes	Yes
Advisor Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Student Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17,576	5,505	5,505	5,062	12,062	12,062	11,288

Note: Each column represents estimates from separate regressions. Student controls include verbal and math SAT scores, high school GPA, legacy status and birth year fixed effects. Advisor controls include rank and department. Additionally, we interact all controls with student gender. Regressions in columns (2) through (7) also include course-by-semester fixed effects to control for unobserved mean differences in academic achievement or grading standards across courses and time. Standard errors clustered at the advisor-year level and reported in parentheses. Randomization inference based p-values reported in brackets. *** p <0.01 ** p <0.05 * p <0.1

Table A7: The effect of science advisor gender using alternative definitions of STEM

	Declare STEM major	Graduate with STEM degree	Freshman GPA
	(1)	(2)	(3)
Adding Biology to STEM			
Effect on male students (β_1)	-0.002	0.005	-0.046
	(0.021)	(0.020)	(0.042)
	[0.860]	[0.680]	[0.171]
Effect on female students ($\beta_1 + \beta_3$)	0.034*	0.030*	0.092*
	(0.019)	(0.017)	(0.049)
	[0.040]	[0.032]	[0.030]
Effect on gender gap (β_3)	0.037	0.024	0.138**
	(0.030)	(0.027)	(0.052)
	[0.120]	[0.112]	[0.001]
Adding Economics to STEM			
Effect on male students (β_1)	-0.041	-0.019	-0.070
	(0.025)	(0.023)	(0.058)
	[0.062]	[0.210]	[0.062]
Effect on female students ($\beta_1 + \beta_3$)	0.056**	0.047**	0.107**
	(0.027)	(0.022)	(0.047)
	[0.008]	[0.020]	[0.070]
Effect on gender gap (β_3)	0.097**	0.066**	0.177**
	(0.039)	(0.031)	(0.067)
	[0.001]	[0.001]	[0.000]
Year Fixed Effect	Yes	Yes	Yes
Student Controls	Yes	Yes	Yes
Advisor Controls	Yes	Yes	Yes
Observations (+Biology)	2,414	2,414	2,414
Observations (+Economics)	1,844	1,844	1,844

Note: Each column represents estimates from separate regressions. We add Biology (Economics) faculty advisors and students declaring majors in Biology (Economics) in new definitions of STEM respectively. Graduating with STEM degree defined within 6 years of initial enrollment. Student controls include verbal and math SAT scores, high school GPA, legacy status and birth year fixed effects. Advisor controls include faculty rank and department. We interact all controls and fixed effects with student gender. Standard errors clustered at the advisor-year level and reported in parentheses. Randomization inference based p-values reported in brackets. *** p <0.01 ** p <0.05 * p <0.1

Table A8: Results from advisor survey

	Female science advisors				Male science advisors			
	Female students (1)	Male students (2)	Similar (3)	Don't know (4)	Female students (5)	Male students (6)	Similar (7)	Don't know (8)
A. Advisor's perception of student behavior								
Who is more likely to attend or schedule meetings	1/3	0/3	1/3	1/3	1/4	0/4	3/4	0/4
Who spends more time in meetings	2/3	0/3	1/3	0/3	0/4	0/4	4/4	0/4
Who is more likely to follow your advice	1/3	0/3	2/3	0/3	1/4	0/4	2/4	1/4
Who is more comfortable talking to you	0/3	0/3	3/3	0/3	2/4	0/4	2/4	0/4
Who is more likely to follow up with you	1/3	0/3	2/3	0/3	1/4	0/4	3/4	0/4
Who is more confident about their math/science abilities	0/3	1/3	2/3	0/3	0/4	3/4	0/4	1/4
B. Advisor behavior								
Who are you more likely to schedule meetings with	0/3	0/3	3/3	0/3	0/4	0/4	4/4	0/4
Who do you give more time to during advising sessions	0/3	0/3	3/3	0/3	0/4	0/4	4/4	0/4
Who are you more likely to follow up with	0/3	1/3	2/3	0/3	0/4	0/4	4/4	0/4

	Female science advisors			Male science advisors		
	Yes (1)	No (2)	Don't know (3)	Yes (4)	No (5)	Don't know (6)
C. Advisor attitudes						
Do you use a different style of advising with female and male students	2/3	1/3	0/3	0/4	4/4	0/4
Do you feel it's harder for women to be successful in the sciences	2/3	1/3	0/3	0/4	4/4	0/4
Would you encourage women to pursue science fields	1/3	2/3	0/3	4/4	0/4	0/4

Note: This table reports answers to a survey conducted among three female and four male science advisors. Each cell shows the fraction of female and male advisors who gave a specific answer to each question. The answers of female science advisors are reported in columns (1) to (4) of panels A and B, and columns (1) to (3) of panel C. The answers of male science advisors are shown in columns (5) to (8) of panels A and B, and columns (4) to (6) of panel C.

Table A9: Summary statistics for students entering AUB as sophomores (Declared majors)

	All	STEM Majors	Non-STEM Majors
	(1)	(2)	(3)
Female Student	0.472	0.276	0.638
	(0.500)	(0.448)	(0.482)
Female Advisor	0.334	0.110	0.525
	(0.473)	(0.309)	(0.500)
Math SAT Score	637.1	670.7	609.4
	(73.18)	(64.15)	(67.73)
Verbal SAT Score	497.7	508.4	489
	(93.19)	(99.77)	(86.48)
Standardized High School GPA	-0.0763	0.170	-0.281
	(1.004)	(0.930)	(1.014)
Legacy Status	0.209	0.180	0.232
	(0.407)	(0.384)	(0.422)
Likelihood of Graduating (Within 6 years)	0.831	0.855	0.814
	(0.375)	(0.353)	(0.389)
Standardized Graduating GPA	-0.0109	-0.0211	0.00207
	(0.701)	(0.692)	(0.698)
Observations	11,856	5,391	6,426

Note: Means and standard deviations (in parentheses) reported. Sample includes all first time entering sophomore students matched to an academic advisor (with at least 5 students) at AUB for the academic years 2003-2004 to 2013-2014.