Online Appendix for "Advisor Value-Added and Student Outcomes: Evidence from Randomly Assigned College Advisors"

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1 Appendix Figures

Figure A1: Standardized distribution of advisor VA measure
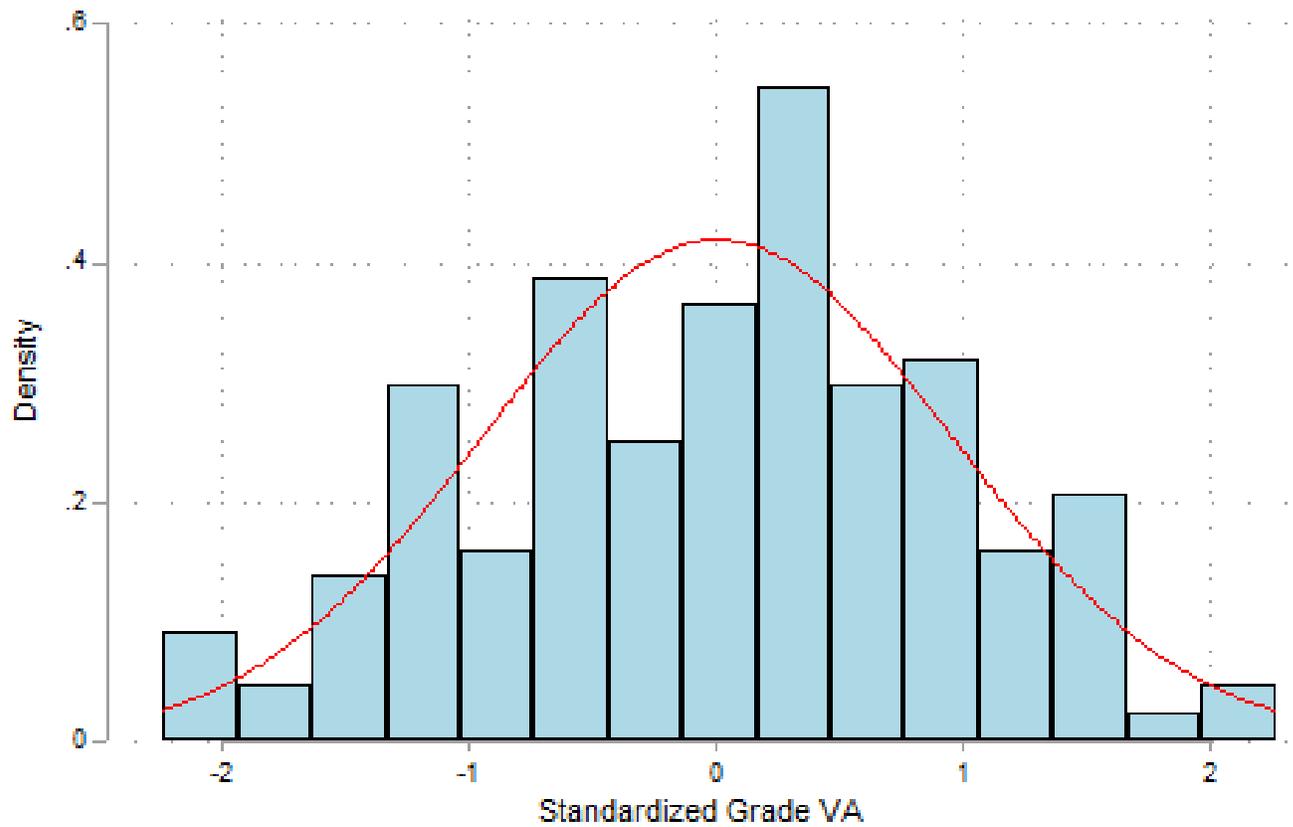
Notes: The above figure shows the standardized distribution of our constructed advisor value-added measure—based on student course grades. Freshman advisor VA is standardized by year and the sample includes students matched to a freshman advisor who initially enrolled at AUB from academic years 2003-2004 till 2015-2016.

Figure A2: Discrete Treatment on Freshman Academic Performance and College Completion
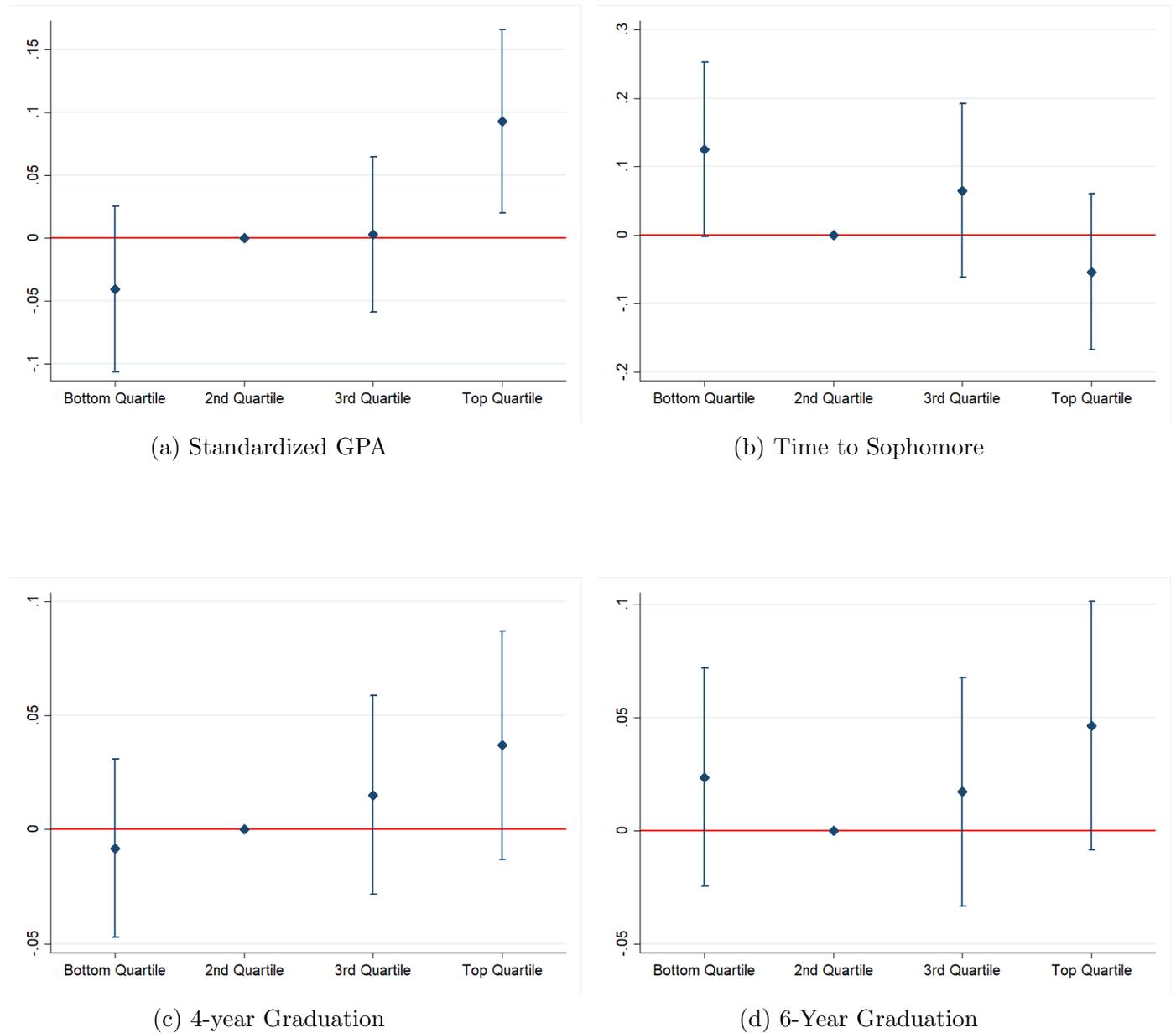
(a) Standardized GPA

(b) Time to Sophomore

(c) 4-year Graduation

(d) 6-Year Graduation

Notes: The different panels show the impacts of being matched to freshman advisors from different quartiles of the grade VA distribution. Sample includes first-time enrolling freshman students from the academic years 2003-2004 to 2015-2016. The sample is restricted to 2003-2004 to 2012-2013 for graduation outcomes. Point estimates represent coefficients from regressions of advisor VA quartile (with the second quartile as the baseline excluded category) on student outcomes. All regression include year fixed effects and students controls. All bars represent 95% confidence intervals with standard errors clustered at the advisor-year level.

Figure A3: Discrete Treatment on Freshman Selective Major Enrollment and Graduation
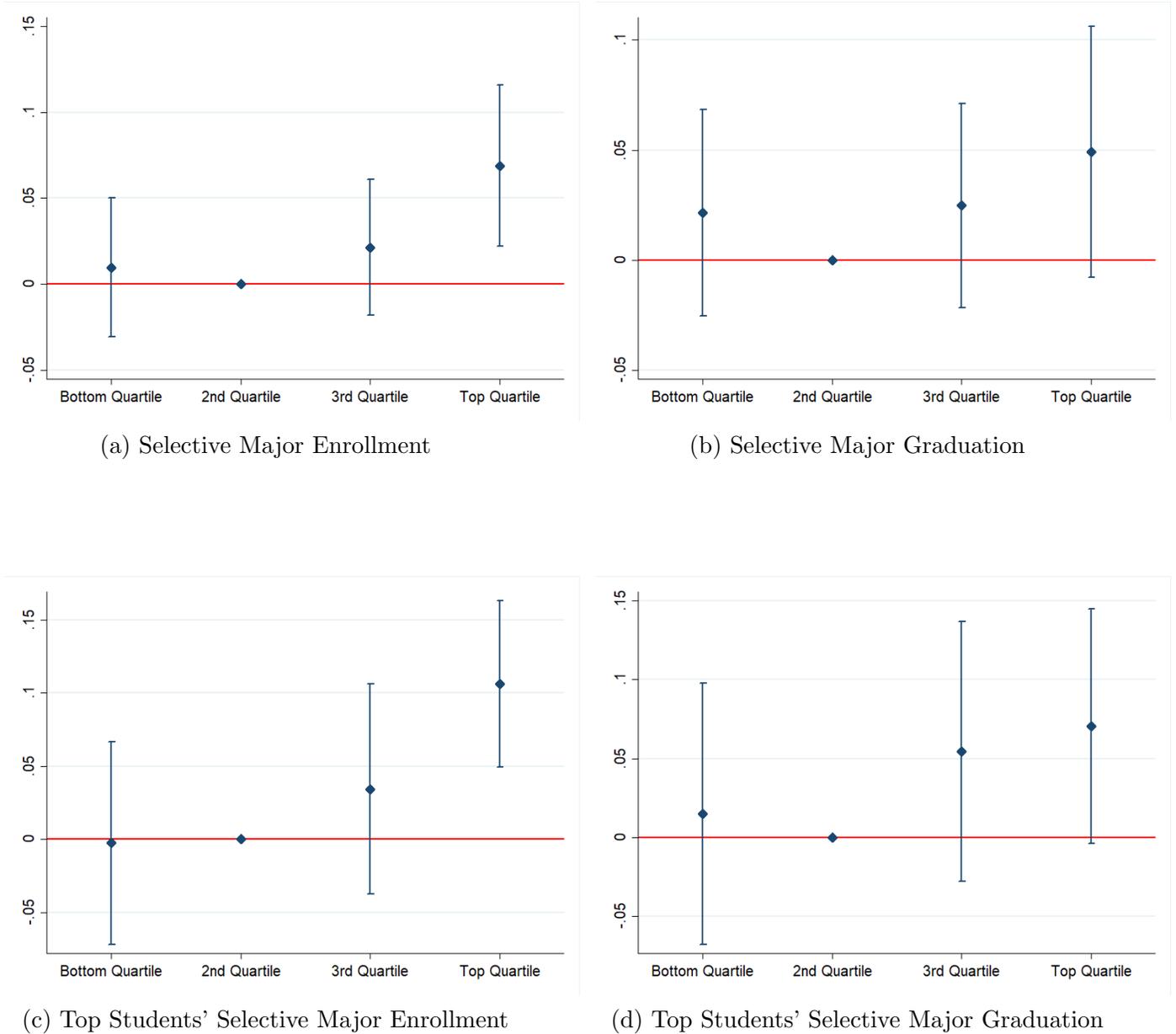
(a) Selective Major Enrollment

(b) Selective Major Graduation

(c) Top Students' Selective Major Enrollment

(d) Top Students' Selective Major Graduation

Notes: The different panels show the impacts of being matched to freshman advisors from different quartiles of the grade VA distribution. Sample includes first-time enrolling freshman students from the academic years 2003-2004 to 2015-2016. The sample is restricted to 2003-2004 to 2012-2013 for graduation outcomes. Point estimates represent coefficients from regressions of advisor VA quartile (with the second quartile as the baseline excluded category) on student outcomes. All regression include year fixed effects and students controls. All bars represent 95% confidence intervals with standard errors clustered at the advisor-year level.

Figure A4: Discrete Treatment on Sophomore Academic Performance and College Completion

(a) Standardized GPA

(b) Dropout after Sophomore

(c) 4-year Graduation

(d) 6-Year Graduation
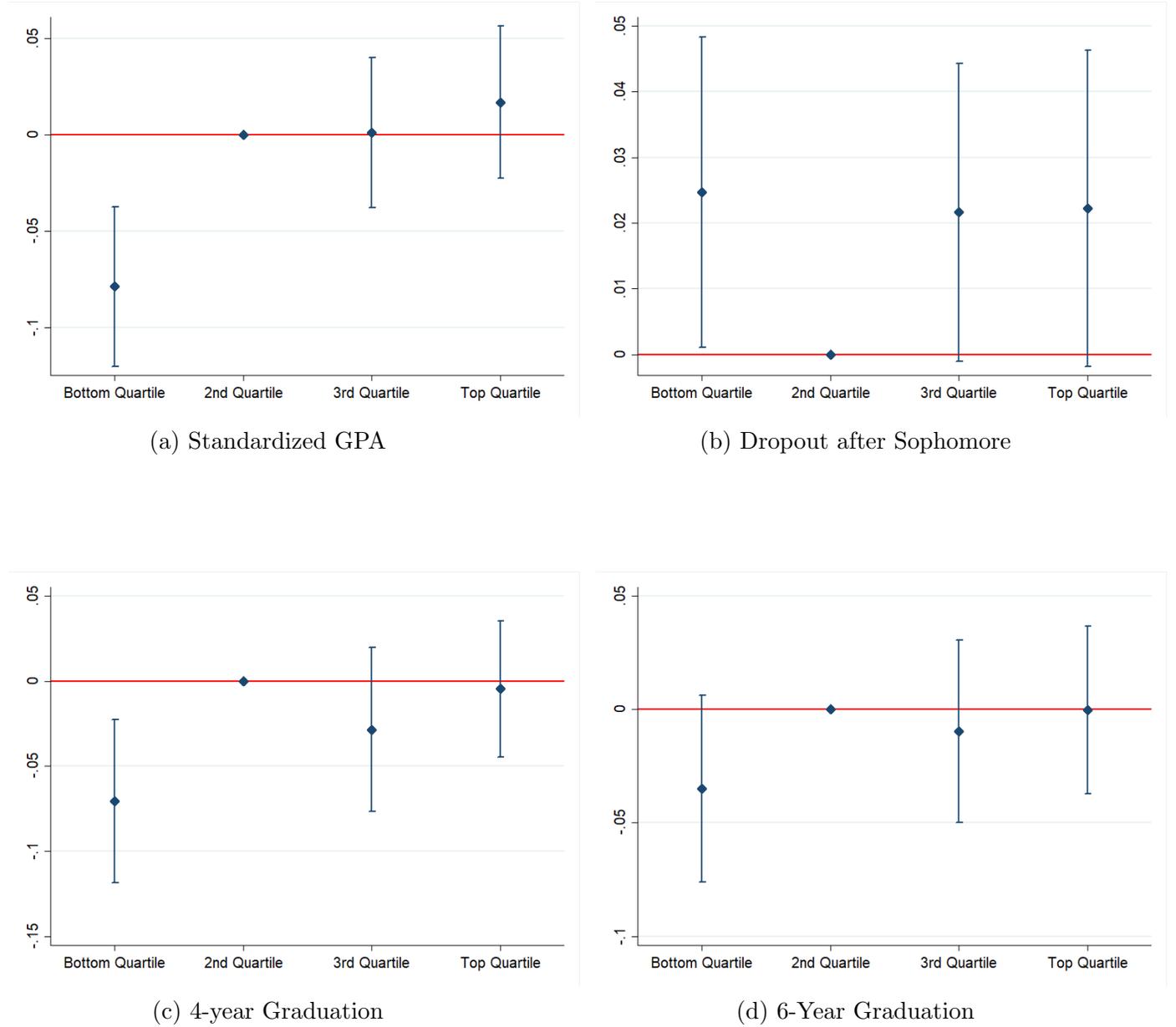
Notes: The different panels show the impacts of being matched to sophomore advisors from different quartiles of the grade VA distribution. Sample includes first-time enrolling sophomore students from the academic years 2003-2004 to 2015-2016. The sample is restricted to 2003-2004 to 2012-2013 for graduation outcomes. Point estimates represent coefficients from regressions of advisor VA quartile (with the second quartile as the baseline excluded category) on student outcomes. All regression include year and department fixed effects and students controls. All bars represent 95% confidence intervals with standard errors clustered at the advisor-year level.

2 Appendix Tables

Table A1: Requirements for admission in different majors

Number of credits required in each discipline by major

Major	English Level 200	Arabic	Humanities	Math	Natural Sciences	Social Sciences	Electives
Engineering	3	3	3	6	9	3	3
Physics	3	3	3	6	9	3	3
Business	3	3	6	3	6	3	6
History	3	3	6	3	6	3	6

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 for admission into engineering, physics, business and history. Each course is typically equivalent to 3 credits.

Additional course and grade requirements by major

Engineering	completion of MATH 101 and 102, CHEM 101, 101L, PHYS 101, and PHYS 101 L, and a cumulative average of at least 80 in the freshman year
Physics	a minimum cumulative average of 70 in PHYS 101 and 101L, and a minimum cumulative average of 70 in MATH 101 and 102
Business	a minimum cumulative average of 77 in at least 24 credits during the freshman year, and a minimum grade of 70 in any one of the following courses: MATH 101, MATH 102, MATH 203 (Refer to Mathematics Department for course requirements).
History	a minimum cumulative average of 70 in English courses taken in the freshman year

Notes: The above table shows specific courses and grades that students must obtain during the freshman year to be eligible for admission into engineering, physics, business and history. For example, the engineering department requires that students take Math 101 (Calculus I), Math 102 (Calculus II), CHEM 101 and 101L (General Chemistry) and PHYS 101 and 101L (Introductory Physics). By passing these courses, students receive enough credits to fulfill the math and science credit requirements for admission into engineering (the first table shows that students need 6 credits in math and 9 credits in sciences).

Table A2: Pre-major academic advising at other private 4-year colleges and universities

College/University	Advisors help students with	Meetings	Advisors are
Amherst College	defining academic goals, improving academic skills, selecting courses, exploring new areas of study and declaring a major	One-on-one meetings prior to course registration	Faculty
Duke University	selecting courses, setting academic goals, deciding on field of study, finding co-curricular opportunities	One-one meeting during orientation week and prior to course registration	Faculty or staff members
Harvard College	choosing courses, meeting degree requirements, considering concentration options, or planning for the summer	One-on-one meetings during course selection week and every 3 or 4 weeks during semester	Faculty, administrators or graduate students
Middlebury College	choosing courses and major keeping tabs on academic problems	One-on-one meetings prior to course registration	Faculty
Princeton University	setting long-term academic goals, selecting courses, discovering academic interests	One-on-one meetings each semester	Faculty
Swarthmore College	selecting courses and program of study; maintaining academic success; discuss setting goals, time management, balancing academics with other parts of life	One-on-one meetings during pre-registration period or when students have academic difficulties	Faculty, deans, administrators, or staff members
Vanderbilt University	creating course schedule; discuss academic goals and progress towards fulfilling curriculum requirements	Phone meeting prior to Fall semester and one-on-one meeting later on	Faculty
Wesleyan University	academic planning, setting long-term academic and career goals, selecting courses and program of study	One-on-one meetings	Faculty
Williams College	choosing a major and courses, setting long-term career goals; check in on students' well-being and academic progress	One-one meetings prior to each course registration period	Faculty
Yale University	selecting courses, setting academic goals, deciding on program of study	Advisors set up one-on-one meetings	Faculty, administrators or staff members

Notes: This table shows the organization of pre-major academic advising at various U.S. private 4-year colleges or universities. The information is taken from each college or university's website.

Table A3: Pre-major academic advising at other private 4-year colleges and universities (continued)

College/University	Advisors have access to students' academic records	Advisors notified of students' academic standing	Advisors approve course withdrawals
Amherst College	N/A	N/A	Yes
Duke University	N/A	N/A but students urged to talk to advisor in case of academic probation	No but students encouraged to discuss course withdrawal with advisors
Harvard College	N/A	N/A	N/A
Middlebury College	Yes	Advisors emailed when students receive course warning (i.e., expected to earn a final grade of "D" or "F")	No but students should discuss course withdrawal with advisors
Princeton University	N/A	N/A	Required approval of Residential dean, director of studies, or academic advisor
Swarthmore College	Yes	Advisors receive copies of all official correspondence concerning advisees' academic standing	No
Vanderbilt University	N/A	N/A	Yes
Wesleyan University	Yes	Advisors notified of students' Unsatisfactory Progress Report and required to schedule one-on-one meeting in that case	No
Williams College	N/A	Advisors notified of students' unsatisfactory grades	No
Yale University	N/A	N/A	No

Notes: This table reports whether pre-major advisors at various U.S. private 4-year colleges or universities perform certain tasks. Each task is shown in a different column. The information is taken from each college or university's website. Information is reported as unavailable (N/A) in case we could not find it on the corresponding university/college's website.

Table A4: Estimate of Forecast Bias of Freshman Advisor Grade VA Measure with Different Sample Splits

A. Leave Current Year and 2 Lags Out

	Freshman Course Grade
Advisor VA	0.950***
	(0.333)
N	33,981

B. Leave Current Year and 2 Leads Out

	Freshman Course Grade
Advisor VA	1.052***
	(0.301)
N	33,696

C. Random Sample Split

	Freshman Course Grade
Advisor VA	0.811***
	(0.343)
N	17,749

Notes: Standard errors in parentheses are clustered at the advisor-year level. All regressions include year fixed effects. Freshman advisor VA is constructed using a leave-year out estimate as described in the methodology section. In Panel C, the random sample split is done by randomly dropping half of the observations in a each year, estimating leave-year out VA, then checking for forecast unbiasedness using the dropped observations. *** p <0.01 ** p <0.05 * p <0.1.

Table A5: Heterogeneous Effects of Advisor Grade VA on Academic Performance and Retention

	Overall Sample (1)	Below Median Math SAT (2)	Above Median Math SAT (3)	Male (4)	Female (5)
A. Standardized GPA					
No Controls	0.057***	0.042**	0.072***	0.054**	0.058***
	(0.016)	(0.017)	(0.023)	(0.024)	(0.014)
Controls	0.048***	0.041**	0.054***	0.047**	0.047***
	(0.014)	(0.016)	(0.020)	(0.023)	(0.013)
Mean Dep. Var.	0.038	-0.111	0.202	-0.094	0.182
N	3,857	2,019	1,838	2,014	1,843
B. Likelihood of Becoming Sophomore					
No Controls	0.008	0.001	0.013	0.003	0.012
	(0.006)	(0.009)	(0.008)	(0.009)	(0.008)
Controls	0.007	0.001	0.012	0.003	0.011
	(0.006)	(0.009)	(0.008)	(0.009)	(0.008)
Mean Dep. Var.	0.793	0.772	0.817	0.773	0.816
N	3,857	2,019	1,838	2,014	1,843
C. Time to Sophomore					
No Controls	-0.078***	-0.107***	-0.049	-0.062*	-0.089***
	(0.026)	(0.032)	(0.032)	(0.033)	(0.030)
Controls	-0.072***	-0.103***	-0.041	-0.056*	-0.086***
	(0.025)	(0.031)	(0.031)	(0.032)	(0.029)
Mean Dep. Var.	2.480	2.587	2.373	2.527	2.433
N	3,047	1,526	1,521	1,525	1,522

Notes: Sample includes first-time enrolling freshman students from the academic years 2003-2004 to 2015-2016. Standard errors in parentheses are clustered at the advisor-year level. All regressions include year fixed effects and advisor VA is standardized by year. Controls include math and verbal SAT scores, a dummy variable for being a female, and a dummy variable for being a legacy student. *** p <0.01 ** p <0.05 * p <0.1.

Table A6: Effect of Advisor Grade VA on Student Outcomes Using Graduation Sample

	Standardized GPA (1)	Become a Sophomore (2)	Time to Sophomore (3)	Enroll in a Selective Major (4)
A. No Controls				
Advisor Grade VA	0.070***	0.007	-0.081***	0.027***
	(0.018)	(0.008)	(0.028)	(0.009)
B. With Controls				
Advisor Grade VA	0.056***	0.006	-0.075***	0.023**
	(0.016)	(0.008)	(0.026)	(0.009)
Mean Dep Var	0.035	0.776	2.575	0.434
N	2,948	2,948	2,287	2,948

Notes: Sample includes first-time enrolling freshman students from the academic years 2003-2004 to 2012-2013. Standard errors in parentheses are clustered at the advisor-year level. All regressions include year fixed effects. Advisor VA is standardized by year. Controls include math and verbal SAT scores, a dummy variable for being a female, and a dummy variable for being a legacy student. Sample includes students from academic years 2003-2004 till 2012-2013. *** p <0.01 ** p <0.05 * p <0.1.

Table A7: Heterogeneous Effects of Advisor Grade VA on College Completion

	Overall Sample (1)	Below Median Math SAT (2)	Above Median Math SAT (3)	Male (4)	Female (5)
A. 4-Year Graduation					
No Controls	0.025***	0.024**	0.023*	0.030**	0.017
	(0.008)	(0.011)	(0.013)	(0.012)	(0.012)
Controls	0.022***	0.025**	0.020	0.028**	0.014
	(0.008)	(0.010)	(0.013)	(0.012)	(0.012)
Mean Dep. Var.	0.458	0.422	0.500	0.380	0.543
B. 6-Year Graduation					
No Controls	0.015	0.008	0.020	0.019	0.010
	(0.009)	(0.011)	(0.015)	(0.014)	(0.010)
Controls	0.013	0.010	0.018	0.018	0.008
	(0.010)	(0.011)	(0.015)	(0.014)	(0.010)
Mean Dep. Var.	0.575	0.547	0.606	0.510	0.647
N	2,952	1,551	1,401	1,551	1,401

Notes: Sample includes first-time enrolling freshman students from the academic years 2003-2004 to 2012-2013. Standard errors in parentheses clustered at the advisor-year level. All regressions include year fixed effects and advisor VA is standardized by year. Controls include math and verbal SAT scores, a dummy variable for being a female, and a dummy variable for being a legacy student. *** p <0.01 ** p <0.05 * p <0.1.

Table A8: Effect of Non-Grade VA on Academic Performance, College Completion, and Major Choice

	Standardized GPA	4-Year Graduation	6-Year Graduation	Proportion of Courses Withdrawn	Proportion of Courses Failed	Enroll in Selective Major	Graduate from Selective Major	Proportion of Courses Science
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Persistence VA	0.040**	0.018**	0.014	-0.004**	-0.005	0.020**	0.024***	0.010**
	(0.019)	(0.008)	(0.009)	(0.002)	(0.004)	(0.008)	(0.008)	(0.004)
Selective VA	0.050***	0.018**	0.016*	-0.005***	-0.007*	0.024***	0.028***	0.008**
	(0.018)	(0.008)	(0.010)	(0.002)	(0.004)	(0.009)	(0.009)	(0.004)
N	2,984	2,987	2,987	2,987	2,987	2,987	2,987	2,987

Notes: Sample includes first-time enrolling freshman students from the academic years 2003-2004 to 2012-2013 to be able to create graduation outcomes. Standard errors in parentheses are clustered at the advisor-year level. All regressions include year fixed effects and VA is standardized by year. Controls included are math and verbal SAT scores, a dummy variable for being a female, and a dummy variable for being a legacy student. *** p <0.01 ** p <0.05 * p <0.1.

Table A9: Maximum Likelihood Correlations Between Different VA measures

	Grade VA	Persistence VA	Selective VA
Grade VA	1.00		
Persistence VA	0.59	1.00	
Selective VA	0.60	0.78	1.00

Notes: This table presents the two-way correlation coefficient between the estimated VA on Grades, the Persistence Index, and the Selectiveness Index. Correlations were computed using the maximum likelihood approach described in section IV-E.

Table A10: Summary Statistics for Sophomore Sample

	Mean (1)	S.D. (2)	Obs. (3)
A. Student Level Covariates			
Female	0.480	0.500	14,055
Math SAT	644	72.2	14,055
Verbal SAT	530	106.2	14,055
Legacy Status	0.249	0.432	14,055
B. Student Level Outcomes			
Sophomore GPA	77.5	7.84	14,055
Dropout after Sophomore	0.088	0.283	14,055
Graduate in 4 years	0.529	0.499	9,120
Graduate in 6 Years	0.796	0.403	9,120
Graduate in 4 years in major	0.405	0.491	9,120
Graduate in 6 Years in major	0.554	0.497	9,120
C. Advisor-Year Level Characteristics			
Female	0.310	0.463	736
Science Department	0.484	0.500	736
Lecturer and Other	0.240	0.428	736
Assistant Professor	0.352	0.478	736
Associate Professor	0.174	0.379	736
Professor	0.234	0.423	736
Number of Students	19.1	19.5	736

Notes: Our main sample includes sophomore students who first enrolled in AUB in the academic years 2003-2004 to 2015-2016. Data from these years comprise 194 unique advisors. Our graduation sample includes students who first enrolled in AUB in the academic years 2003-2004 to 2012-2013. Data from these years comprise 152 unique advisors.

Table A11: Estimate of Forecast Bias of Advisor Grade VA Measure for Sophomore Sample

	Sophomore Course Grade
Advisor Grade VA	0.991***
	(0.163)
Mean of VA	0.0009
S.D of VA	0.042
N	144,093

Notes: Standard errors in parentheses are clustered at the advisor-year level. Regressions includes department and year fixed effects. Sophomore advisor VA is constructed using a leave-year out estimate as described in the methodology section. *** p <0.01 ** p <0.05 * p <0.1.

Table A12: Estimate of Forecast Bias of Sophomore Advisor Grade VA Measure with Different Sample Splits

A. Leave Current Year and 2 Lags Out

	Sophomore Course Grade
Advisor VA	1.017***
	(0.164)
N	141,305

B. Leave Current Year and 2 Leads Out

	Sophomore Course Grade
Advisor VA	1.060***
	(0.164)
N	139,181

C. Random Sample Split

	Sophomore Course Grade
Advisor VA	0.891***
	(0.192)
N	71,939

Notes: Standard errors in parentheses are clustered at the advisor-year level. Regressions include department, and year fixed effects. Sophomore advisor VA is constructed using a leave-year out estimate as described in the methodology section. In Panel C, the random sample split is done by randomly dropping half of the observations in a each year-department, estimating leave-year out VA, then checking for forecast unbiasedness using the dropped observations. *** p <0.01 ** p <0.05 * p <0.1.

Table A13: Test of Random Assignment for Sophomore Sample

	Advisor Grade VA
Math SAT	0.010
	(0.009)
Verbal SAT	0.002
	(0.008)
Female	0.029
	(0.022)
Legacy	-0.015
	(0.020)
N	14,055
P-Value Joint Significance	0.462

Notes: Sample includes first-time enrolling sophomore students from the academic years 2003-2004 to 2015-2016. Standard errors in parentheses are clustered at the advisor-year level. Regression includes department and year fixed effects. Advisor VA is standardized by year. SAT scores are standardized within department and year. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

Table A14: Effect of Sophomore Advisor Persistence VA on Academic Performance, Retention and College Completion

	Standardized GPA (1)	Dropout after Sophomore (2)	4-Year Graduation (3)	6-Year Graduation (4)	4-Year Graduation in Major (5)	6-Year Graduation in Major (6)
A. Overall Sample						
Persistence VA	0.003	-0.022***	0.030***	0.025***	0.035***	0.036***
	(0.007)	(0.006)	(0.009)	(0.008)	(0.010)	(0.009)
Mean Dep Var	0.006	0.085	0.527	0.791	0.403	0.549
N	8,761	8,761	8,761	8,761	8,761	8,761
B. STEM Majors						
Persistence VA	0.025*	-0.016***	0.026**	0.016*	0.037**	0.036***
	(0.013)	(0.004)	(0.011)	(0.008)	(0.015)	(0.014)
Mean Dep Var	0.083	0.067	0.579	0.814	0.417	0.528
N	4,747	4,747	4,747	4,747	4,747	4,747
C. Non-STEM Majors						
Persistence VA	0.001	-0.022**	0.038***	0.027***	0.037***	0.035***
	(0.008)	(0.009)	(0.011)	(0.010)	(0.011)	(0.011)
Mean Dep Var	-0.086	0.108	0.466	0.765	0.386	0.574
N	4,014	4,014	4,014	4,014	4,014	4,014

Notes: The sample includes first-time enrolling sophomore students from the academic years 2003-2004 to 2012-2013. Standard errors in parentheses are clustered at the advisor-year level. Regressions includes department and year fixed effects. Advisor VA is standardized by year. Controls include math and verbal SAT scores, a dummy variable for being a female, and a dummy variable for being a legacy student. SAT scores are standardized within department and year.

*** p <0.01 ** p <0.05 * p <0.1.

Table A15: Effect of Various VA Skill Measures on the Corresponding Skills Sophomore Sample

	Standardized GPA			Persistence Index		
	(1)	(2)	(3)	(4)	(5)	(6)
Grade VA	0.027***		0.027***	0.038*		0.033*
	(0.009)		(0.009)	(0.021)		(0.018)
Persistence VA		0.003	0.001		0.075***	0.073***
		(0.007)	(0.008)		(0.019)	(0.018)
N	8,761	8,761	8,761	8,761	8,761	8,761

Notes: The sample includes first-time enrolling sophomore students from the academic years 2003-2004 to 2012-2013. Standard errors in parentheses are clustered at the advisor-year level. Regressions includes department and year fixed effects. Advisor VA is standardized by year. Controls include math and verbal SAT scores, a dummy variable for being a female, and a dummy variable for being a legacy student. SAT scores are standardized within department and year. Each column represents estimates from a separate regression. Controls included are math and verbal SAT scores, a dummy variable for being a female, and a dummy variable for being a legacy student. *** p <0.01 ** p <0.05 * p <0.1.

Table A16: Observable Characteristics Effect on Freshman Advisor VA Measures

	Grade VA	Persistence VA	Selective VA
Professor	0.003	0.019	0.014
	(0.019)	(0.023)	(0.020)
Associate Professor	0.016	0.023	0.013
	(0.016)	(0.024)	(0.019)
Female Advisor	0.016	0.012	0.014
	(0.012)	(0.022)	(0.017)
Science Department	-0.008	0.021	0.021
	(0.010)	(0.027)	(0.022)
N	131	115	115

Notes: Sample includes academic advisors matched to first-time enrolling freshman students for academic years 2003-2004 to 2015-2016. Standard errors in parentheses are clustered at the advisor level. All regressions include year fixed effects. The number of observations drops for Persistence and Selective VA measures because they are constructed using the sample of students we can observe graduation for (2003-2004 till 2012-2013 freshman entering cohorts). *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

Table A17: Observable Characteristics Effect on Sophomore Advisor VA Measures

	Grade VA	Persistence VA
Professor	-0.008	-0.002
	(0.006)	(0.007)
Associate Professor	-0.003	0.001
	(0.005)	(0.007)
Female Advisor	-0.004	0.008
	(0.005)	(0.007)
Science Department	0.006	0.002
	(0.004)	(0.007)
N	736	646

Notes: Sample includes academic advisors matched to first-time enrolling sophomore students for academic years 2003-2004 to 2015-2016. Standard errors in parentheses are clustered at the advisor level. All regressions include year fixed effects. The number of observations drops for Persistence VA because it is constructed using the sample of students we can observe graduation for (2003-2004 till 2012-2013). *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

Table A18: Effect of Being Matched with a Female Rather than Male Advisor on Freshman Student Outcomes

	Standardized GPA (1)	Becoming Sophomore (2)	4-Year Graduation (3)	6-Year Graduation (4)	Selective Major Enroll (5)	Selective Major Grad (6)	Selective Major Enroll Top (7)	Selective Major Grad Top (8)
Effect on Male Students (β_1)	-0.012	-0.023	-0.036	-0.020	-0.016	-0.009	-0.045	-0.007
	(0.037)	(0.018)	(0.023)	(0.025)	(0.022)	(0.025)	(0.035)	(0.040)
Effect on Female Students ($\beta_1 + \beta_3$)	0.077**	0.009	0.064***	0.024	0.017	0.032	0.006	0.025
	(0.032)	(0.017)	(0.024)	(0.023)	(0.024)	(0.024)	(0.049)	(0.055)
Mean Dep Var	0.038	0.794	0.458	0.575	0.429	0.355	0.567	0.464
N	3,857	3,857	2,952	2,952	3,857	2,952	1,317	995

Notes: Sample includes advisors matched to first-time enrolling freshman students from the academic years 2003-2004 to 2015-2016. The sample is restricted to 2003-2004 to 2012-2013 for graduation outcomes. Standard errors are clustered at the advisor-year level and reported in parentheses. All regressions include year fixed effects. Controls include math and verbal SAT scores and a dummy variable for being a legacy student. *** p <0.01 ** p <0.05 * p <0.1.

Table A19: Effect of Being Matched with a Female Rather than Male Advisor on Sophomore Student Outcomes

	Standardized GPA (1)	Dropout after Sophomore (2)	4-Year Graduation (3)	6-Year Graduation (4)	4-Year Graduation in Major (5)	6-Year Graduation in Major (6)
Effect on Male Students (β_1)	-0.049*	-0.003	-0.043	-0.041	-0.009	-0.011
	(0.030)	(0.015)	(0.026)	(0.025)	(0.025)	(0.026)
Effect on Female Students ($\beta_1 + \beta_3$)	0.054**	-0.012	0.003	0.011	0.025	0.031
	(0.021)	(0.017)	(0.028)	(0.025)	(0.028)	(0.026)
Mean Dep Var	-0.002	0.088	0.529	0.796	0.405	0.554
N	14,055	14,055	9,120	9,120	9,120	9,120

Notes: Sample includes advisors matched to first-time enrolling sophomore students from the academic years 2003-2004 to 2015-2016. The sample is restricted to 2003-2004 to 2012-2013 for graduation outcomes. Standard errors are clustered at the advisor-year level and reported in parentheses. All regressions include year and department fixed effects. Controls include math and verbal SAT scores and a dummy variable for being a legacy student. SAT scores are standardized within department and year. *** p <0.01 ** p <0.05 * p <0.1.