Closing the Gap: The Effect of Reducing Complexity and Uncertainty in College Pricing on the Choices of Low-Income Students Online Appendix

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A HAIL Materials

A.1 Student Packet

Exhibit 1 Front view of packet

Exhibit 2 Back view of packet

Exhibit 3 Inside flap of packet

Exhibit 4 Open view of packet; insert materials

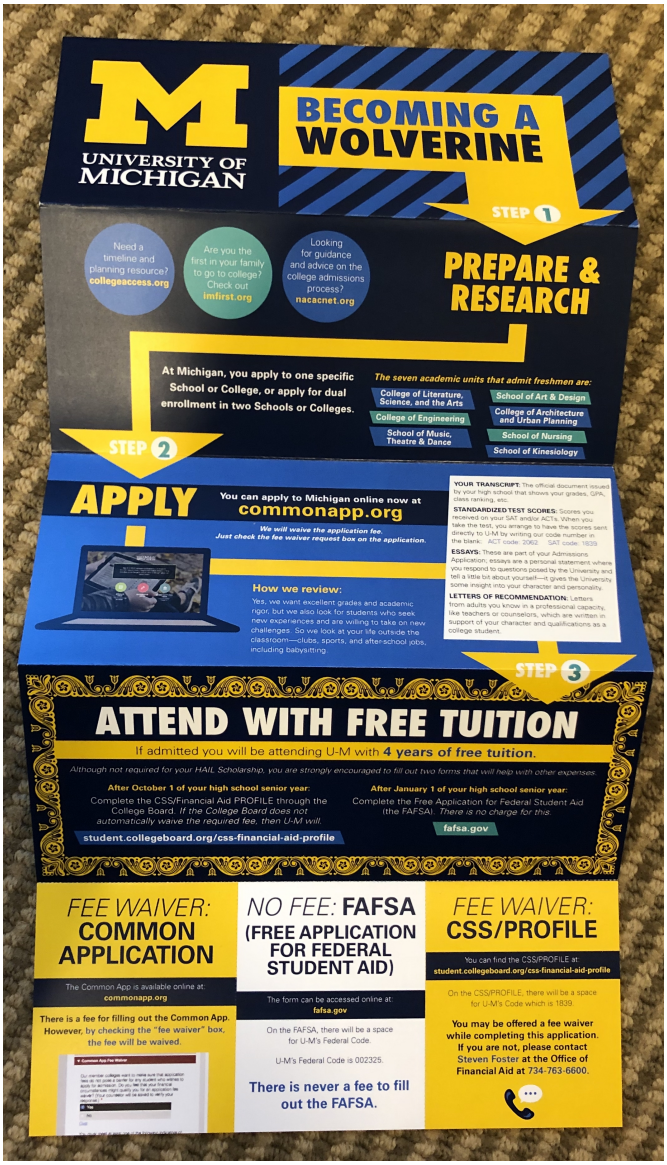

Exhibit 5 Packet insert: Becoming a Wolverine Guide

A.2 Parent Letter

Dear Parent or Guardian of <<first name>> <<last name>>:

Success in life is due, in part, to seizing opportunities as they are presented. Since your child is an excellent student, we want to offer a potentially transformative college opportunity: If <<first name>> applies and is admitted to the University of Michigan - Ann Arbor, your child will be awarded the HAIL Scholarship covering the entire cost of U-M tuition and fees for four years. This is an offer we are delighted to make, worth approximately $60,000. Furthermore, after a review of their financial aid applications, your student will likely be eligible for additional aid to cover other costs such as housing and textbooks.

The ability to pay for college shouldn't determine whether or not a child attends. All academically high-achieving seniors, like <<first name>>, have worked hard and challenged themselves throughout high school, and deserve access to an outstanding college experience. A world of opportunity is within reach in Ann Arbor–relatively close to home–where one of the top 25 universities in the world offers the resources and support that enables our students to stay in school, graduate, and achieve great things.

<<first name>> should have recently received a separate packet in the mail with more information on applying to Michigan. We know the process can be challenging, and we want to assure you that we're here to support <<first name>> and make it as easy as possible.

We encourage your student to apply for admission by our November 1 Early Action deadline, or no later than our February 1 Regular Decision deadline. Our brochure shows the steps to applying through the Common Application, with the $75 fee waived. We will also waive the $25 application fee for the CSS/Profile, which is available October 1 and will enable your student to be considered for additional aid from U-M. The Free Application for Federal Student Aid (FAFSA) will be open January 1, 2016, and will likely provide your student additional federal aid to cover other costs.

You and <<first name>> can also visit a special website together to find out more information about how your student was selected for this scholarship, as well as contact information for personal U-M admissions and financial aid counselors, and a place to sign up for a free U-M t-shirt. Your student's packet contains their personalized website address.

At Michigan, we're deeply committed to college access and equity for Michigan high school students. I'm excited to offer this unique opportunity to attend one of the world's premier universities with tuition and fees completely covered, should your student apply and be admitted.

If you have any questions, do not hesitate to contact Jody Gore in our Office of Undergraduate Admissions at 734-764-7433, or Steven Foster in our Office of Financial Aid at 734-763-2941.

Sincerely,
Kedra Ishop, PhD
Associate Vice President
Office of Enrollment Management

A.3 Principal Letter

Dear {PRINCIPAL FIRST} {PRINCIPAL LAST},

I'm delighted to inform you that several seniors in your school are eligible for our pilot HAIL Scholarship, an outstanding offer of four years of free in-state tuition and fees at the University of Michigan - Ann Arbor, a value of about $60,000 per student. Furthermore, they will likely qualify for more aid to cover additional expenses such as housing and textbooks if they apply for aid.

As a public institution committed to the well-being of the residents of the state of Michigan, we want to increase academic opportunities among Michigan's high-achieving, low-income teens. The HAIL Scholarship is a unique effort to show talented seniors who qualify for free or reduced lunch that a world of opportunity is accessible relatively close to home.

The list of your students who qualify for the scholarship is attached. We hope you might meet with them and tell them a little about the University of Michigan, our stellar academic ranking, renowned professors, and near-limitless list of majors. You can see more at admissions.umich.edu.

The students will receive an information packet from us, which outlines how they apply to Michigan through the Common Application - with their $75 admissions fee waived - and instructions on how to file the correct forms and documentation for additional financial aid. Students will need to file the Free Application for Federal Student Aid (FAFSA) when it opens Jan. 1, and the CSS/Profile, which opens Oct. 1, to receive likely additional aid to cover other expenses. We will waive the $25 CSS/Profile processing fee.

Students will also be given a link to a personalized scholarship website, which provides even more clarification about the scholarship, and a connection to personal U-M admissions and financial aid counselors.

We are excited to offer this special scholarship opportunity, and we hope your eligible students take advantage of it by applying before our Early Action deadline of November 1, or no later than our Regular Decision deadline of February 1.

If you have any questions, please feel free to contact Jody Gore in the Office of Undergraduate Admissions at 734-764-7433, Steven Foster in the Office of Financial Aid at 734-763-2941, or your school's U-M admissions counselor, who can be found here: http://admissions.umich.edu/contact-us Go Blue!

Sincerely,
Kedra Ishop, PhD
Associate Vice President
Office of Enrollment Management

University of Michigan - Ann Arbor HAIL Scholarship-eligible students.
Please inform your University of Michigan - Ann Arbor admissions counselor if a student no longer attends your school.

{STUDENT FIRST} {STUDENT LAST}, {BIRTHDATE}

B Randomization-Based Inference

The effects presented here are extremely large and are unlikely to have occurred by chance. We demonstrate this with a simulation exercise following Athey and Imbens (2017), who recommend randomization-based statistical inference for significance tests. This approach calculates the likelihood of obtaining the observed treatment effects by random chance, where the randomness comes from assignment of a fixed number of units (in our case, high schools) to treatment, rather than from random sampling from a population.

Using the first and second cohorts of 1,026 schools, we re-assign treatment status using the same procedure used in the original randomization. We then estimate "treatment effects" based on this reassignment. We repeat this procedure 10,000 times to generate a distribution of potential treatment effects that could be due to baseline differences between schools assigned to treatment and control. For each outcome, we calculate the share of the 10,000 simulated treatment-control differences that is larger in absolute value than the difference observed in the actual random assignment discussed throughout the paper. This proportion represents the randomization-based p-value.

The results are summarized in Appendix Figure 3, where we plot the distribution of treatment effects from the 10,000 iterations for a selection of outcomes. The dashed vertical line in each graph plots the actual treatment effect. Results are also presented in Appendix Table 7.

Our findings cannot be explained by random differences between the treatment and control schools. As we would expect under successful randomization, for each outcome the average simulated treatment effect is zero, indicating no difference between the randomly-assigned treated and control schools in average outcomes over 10,000 iterations.

For our key outcome, enrollment at University of Michigan, we never observe a simulated treatment effect as large as the actual treatment effect in any of the 10,000 iterations. In other words, the randomization-based p-value is precisely zero. For the other outcomes, the randomization-based p-values are comparable to the sampling-based p-values shown earlier in the paper. For example, we showed earlier that the offer of HAIL increased college enrollment by 3.8 percentage points, with a sampling-based p-value of 0.042. In the simulations, we observe a treatment effect this large 432 times out of 10,000, or 4.3 percent of the time (a randomization-based p-value of 0.043).

For enrollment at any highly selective institution and enrollment at a four-year institution, there is less than a four percent chance of observing an effect at least as large as the actual treatment effect in the 10,000 simulations. Although they represent different conceptual approaches, the sampling-based and randomization-based analyses produce virtually identical conclusions about the effects of the HAIL intervention.

C Compliers Analysis

One way to look at our intervention is as an attempt to randomly assign low-income, high-achieving students to apply to the University of Michigan, but with imperfect compliance. Thinking about it this way allows us to use our treatment as an instrumental variable (IV) to recover the causal effect of applying to the University of Michigan on any number of outcomes.

This framework unlocks a number of other useful estimates for understanding whose behavior was changed by the intervention. In particular, with some standard assumptions we can compare the characteristics of students who "comply" with the treatment to those who do not. That is, some of the students in our sample would have applied to Michigan whether or not they were sent the packet (commonly called always-takers). Another group would not have applied no matter what (never-takers). But for the remainder of students, being sent the packet is what determined whether they would apply (compliers).

The assumptions that make it possible to compare compliers to always-takers and never-takers are those of the local average treatment effect (Imbens and Angrist, 1994). The LATE theorem requires the same assumptions as any IV (independence, exclusion, first stage), but adds an additional assumption: that there are no students for whom being assigned to treatment made them less likely to apply or being assigned to the control made them more likely to apply. As Imbens and Rubin (1997) point out, this monotonicity assumption means there are no "defiers" and allows us to directly measure the characteristics of some always-takers and never-takers in our sample (see Appendix Table 20 for a schematic).

A student who applies to Michigan no matter what could have been assigned to either the treatment or control group (the always-takers). If assigned to treatment, she is sent a packet, but would have applied anyway. To us, these students are observably indistinguishable from compliers who were assigned to treatment because both groups were sent a packet and applied. One portion of the group did so because they were sent the packet, the other would have applied anyway.

This is not true for always-takers who were assigned to the control group. These students are not sent a packet but apply anyway. By definition, there are no compliers in this group. So if our assumption of no defiers holds, then any student who was assigned to the control group but applied anyway is an always-taker. Because they are the only student type in this group, we can observe them directly and measure their characteristics.

Because our instrument (being sent a packet) is randomly assigned, the characteristics of always-takers is the same, in expectation, between the treatment and control groups. Observing the characteristics of the always-takers in the control group thus provides information on the always-takers from the full sample, regardless of treatment assignment.

The same is true, only in reverse, for never-takers. While the set of students from the control group who do not apply consists of both never-takers and compliers, the group of students assigned to treatment but do not apply is only never-takers. Independence again allows us to infer the characteristics of the full group of never-takers in our sample. Since there are only three student types, knowing the characteristics of the always-takers and never-takers allows us to back out the characteristics of the compliers from the means for our full sample.

The simplest example of this logic comes from determining the share of our sample that belongs to each of the three compliance groups. In the notation of Imbens and Rubin (1997), consider the three proportions we would like to calculate:

$$\phi_n = Pr(D_{obs,i} = 0 | Z_{obs,i} = 1) \tag{1}$$

$$\phi_a = Pr(D_{obs,i} = 1 | Z_{obs,i} = 0) \tag{2}$$

$$\phi_c = 1 - \phi_n - \phi_a \tag{3}$$

where ϕ_n is the proportion of students who are never takers, ϕ_a the share of always-takers, and ϕ_c the fraction compliers. It is easy to extend this logic to any number of student characteristics, as shown in Table 3, which presents our estimates of the proportion of each compliance sub-population, as well as their average characteristics.

D Surrogate Index

To predict the effect of HAIL on college completion, we employ the surrogate index technique as described by Athey et al. (2019). Using a previous cohort of low-income, high-achieving students in Michigan, we first predict the likelihood of completing college based on a vector of intermediate outcomes, such as enrolling in a highly competitive institution, and a vector of student characteristics.

$$Y_i = \beta_0 + \beta_1 Z_i + \beta_2 X_i + u_i \tag{4}$$

Where Y_i represents whether individual i completed college within 4 or 5 years, Z_i is a vector of intermediate outcomes: whether the student enrolled at a four-year institution, a highly-competitive institution, or any institution, with separate indicators for one-year enrollment and two-year enrollment. X_i is a vector of student and school characteristics: GPA, ACT score, race, gender, an indicator for whether the student was always FRPL between 9th and 11th grade, indicators for whether the student resided in an urban or rural area, the geographic region of their high school (West Central, Upper Peninsula, Southeast (reference)) and the number of HAIL students in their high school. We conducted separate analyses for 4- and 5-year college completion rates. The results of these models are presented in Appendix Table 19.

We then use the coefficients from this regression to predict college completion rates for the HAIL sample, collapse the data to the school-year level, and regress the predicted completion rate on an indicator for whether the school was in the treatment group:

$$\hat{Y}_{jt} = \beta_0 + \beta_1 D_{jt} + u_{jt} \tag{5}$$

Where $\hat{Y}_{jt}$ is the school-level predicted share of students completing a college degree within four or five years, based on applying the coefficients from (4) to the first HAIL cohort, and D_{jt} is an indicator for whether the school was in the treatment or control group. β_1 is the coefficient of interest, and indicates the predicted effect of HAIL on college completion. We use the delta method to adjust the standard errors to account for using a predicted value for the outcome. This method assumes that the only pathway through which HAIL affects college completion is through these intermediate outcomes.

REFERENCES

Athey, Susan, and Guido W Imbens. 2017. "The Econometrics of Randomized Experiments." In *Handbook of Economic Field Experiments*. Vol. 1, 73–140. Elsevier.

Athey, Susan, Raj Chetty, Guido W Imbens, and Hyunseung Kang. 2019. "The surrogate index: Combining short-term proxies to estimate long-term treatment effects more rapidly and precisely." NBER Working Paper No. 26463, National Bureau of Economic Research, Cambridge, MA.

Imbens, Guido W., and Donald B. Rubin. 1997. "Estimating outcome distributions for compliers in instrumental variables models." *The Review of Economic Studies*, 64(4): 555–574.

E Appendix Tables

Appendix Table 1
Number of Students in Schools in Treatment and Control Group, by Cohort

	Number of schools	Number of students
First cohort (Y1)		
Treatment	262	1,057
Control	267	1,051
Total Y1	529	2,108
Second cohort (Y2)		
Treatment (from Y1)	211	832
Treatment (newly randomized)	27	43
Treated in Y1, no HAIL students in Y2	51	-
Total Treatment	238	875
Control (from Y1)	227	867
Control (newly randomized)	32	60
Control in Y1, no HAIL students in Y2	40	-
Total Control	259	927
Total Y2	497	1,802

Source: Michigan administrative data.

Appendix Table 2
Balance Table: School Characteristics by Subgroup
First and Second HAIL Cohorts

Characteristic	Upper Peninsula			West Central			Southeast		
	Control	Treated	P-value	Control	Treated	P-value	Control	Treated	P-value
Upper Peninsula	1.000	1.000		0.000	0.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
West Central	0.000	0.000		1.000	1.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
Southeast	0.000	0.000		0.000	0.000		1.000	1.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
Suburb	0.000	0.000		0.157	0.176	0.476	0.673	0.701	0.925
	(0.000)	(0.000)		(0.033)	(0.034)		(0.044)	(0.044)	
City	0.000	0.000		0.153	0.118	0.469	0.152	0.112	0.534
	(0.000)	(0.000)		(0.033)	(0.028)		(0.033)	(0.030)	
Town or Rural	1.000	1.000		0.691	0.706	0.982	0.175	0.188	0.505
	(0.000)	(0.000)		(0.042)	(0.040)		(0.036)	(0.038)	
Distance from UM (miles)	243.272	268.113	0.155	97.504	98.825	0.568	32.249	36.708	0.046
	(12.973)	(13.135)		(2.937)	(2.884)		(1.430)	(1.524)	
# of 11th grade students ins school	94.430	77.800	0.224	162.949	145.521	0.500	253.777	242.832	0.098
	(13.773)	(10.581)		(9.348)	(9.349)		(15.428)	(15.014)	
# of HAIL students in school	2.924	2.846	0.992	3.568	3.391	0.546	4.289	4.787	0.912
	(0.282)	(0.408)		(0.193)	(0.231)		(0.364)	(0.417)	
Share female	0.569	0.615	0.397	0.563	0.593	0.390	0.580	0.617	0.174
	(0.041)	(0.043)		(0.024)	(0.024)		(0.024)	(0.020)	
Share White (non-Hispanic)	0.872	0.893	0.655	0.816	0.805	0.636	0.686	0.729	0.398
	(0.038)	(0.029)		(0.021)	(0.024)		(0.032)	(0.027)	
Share Asian	0.022	0.010	0.405	0.052	0.056	0.639	0.086	0.074	0.403
	(0.013)	(0.008)		(0.011)	(0.014)		(0.015)	(0.015)	
Share Black (non-Hispanic)	0.034	0.019	0.585	0.052	0.055	0.800	0.165	0.148	0.854
	(0.015)	(0.016)		(0.011)	(0.012)		(0.027)	(0.022)	
Share Hispanic	0.029	0.036	0.704	0.058	0.075	0.356	0.056	0.042	0.564
	(0.014)	(0.019)		(0.011)	(0.014)		(0.015)	(0.013)	
Share Amer. Indian, AK or HI Native	0.043	0.041	0.855	0.022	0.009	0.149	0.007	0.007	0.994
	(0.026)	(0.019)		(0.008)	(0.004)		(0.003)	(0.004)	
Share free lunch eligible	0.702	0.575	0.073	0.690	0.671	0.483	0.732	0.756	0.374
	(0.041)	(0.051)		(0.022)	(0.021)		(0.022)	(0.020)	
Share reduced-price lunch eligible	0.298	0.425	0.073	0.310	0.329	0.483	0.268	0.244	0.374
	(0.041)	(0.051)		(0.022)	(0.021)		(0.022)	(0.020)	
Average SAT (or equivalent)	1253.095	1251.723	0.791	1251.940	1256.908	0.333	1256.973	1265.197	0.333
	(7.244)	(8.756)		(4.246)	(4.256)		(4.369)	(4.840)	
Average GPA	3.846	3.850	0.957	3.831	3.837	0.749	3.806	3.822	0.220
	(0.017)	(0.017)		(0.009)	(0.009)		(0.010)	(0.010)	
Share limited English proficient	0.000	0.000		0.003	0.003	0.842	0.003	0.006	0.347
	(0.000)	(0.000)		(0.002)	(0.001)		(0.002)	(0.003)	
Share receiving special ed services	0.000	0.005	0.320	0.011	0.021	0.384	0.009	0.006	0.470
	(0.000)	(0.005)		(0.005)	(0.007)		(0.004)	(0.003)	
Share sent ACT/SAT scores to UM	0.305	0.286	0.612	0.372	0.360	0.715	0.380	0.426	0.260
	(0.033)	(0.039)		(0.024)	(0.022)		(0.024)	(0.024)	
F-test p-value		0.018			0.650			0.045	
Avg. predicted prob. selective college	0.070	0.065	0.558	0.097	0.106	0.284	0.179	0.186	0.524
	(0.008)	(0.009)		(0.006)	(0.006)		(0.007)	(0.008)	
Number of school-years	79	65	144	236	238	474	211	197	408
Number of students	231	185	416	842	804	1,646	905	943	1,848

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Appendix Table 2 *(Continued)*
Balance Table: School Characteristics by Subgroup
First and Second HAIL Cohorts

Characteristic	Suburb			City			Town or Rural		
	Control	Treated	P-value	Control	Treated	P-value	Control	Treated	P-value
Upper Peninsula	0.000	0.000		0.000	0.000		0.283	0.241	0.463
	(0.000)	(0.000)		(0.000)	(0.000)		(0.036)	(0.035)	
West Central	0.207	0.233	0.667	0.529	0.560	0.835	0.584	0.622	0.458
	(0.042)	(0.044)		(0.083)	(0.094)		(0.040)	(0.040)	
Southeast	0.793	0.767	0.667	0.471	0.440	0.835	0.133	0.137	0.904
	(0.042)	(0.044)		(0.083)	(0.094)		(0.028)	(0.029)	
Suburb	1.000	1.000		0.000	0.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
City	0.000	0.000		1.000	1.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
Town or Rural	0.000	0.000		0.000	0.000		1.000	1.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
Distance from UM (miles)	46.817	52.292	0.285	65.057	64.495	0.943	129.856	131.636	0.689
	(3.410)	(3.533)		(7.268)	(6.811)		(7.216)	(7.438)	
# of 11th grade students ins school	288.017	262.294	0.051	207.118	199.420	0.755	121.233	112.389	0.553
	(16.933)	(15.425)		(18.363)	(26.980)		(6.527)	(6.569)	
# of HAIL students in school	4.760	5.178	0.919	4.368	4.660	0.833	2.971	2.852	0.723
	(0.349)	(0.381)		(0.737)	(1.199)		(0.141)	(0.148)	
Share female	0.557	0.620	0.071	0.574	0.575	0.904	0.579	0.601	0.464
	(0.028)	(0.020)		(0.046)	(0.058)		(0.021)	(0.022)	
Share White (non-Hispanic)	0.762	0.732	0.394	0.433	0.399	0.618	0.862	0.894	0.193
	(0.027)	(0.025)		(0.056)	(0.068)		(0.019)	(0.015)	
Share Asian	0.083	0.077	0.570	0.141	0.175	0.510	0.028	0.022	0.639
	(0.015)	(0.014)		(0.031)	(0.053)		(0.008)	(0.008)	
Share Black (non-Hispanic)	0.104	0.151	0.087	0.308	0.212	0.169	0.036	0.022	0.233
	(0.020)	(0.021)		(0.059)	(0.056)		(0.010)	(0.008)	
Share Hispanic	0.046	0.035	0.614	0.094	0.194	0.098	0.047	0.047	0.990
	(0.013)	(0.009)		(0.031)	(0.056)		(0.010)	(0.010)	
Share Amer. Indian, AK or HI Native	0.005	0.004	0.839	0.024	0.021	0.831	0.027	0.015	0.277
	(0.003)	(0.003)		(0.022)	(0.012)		(0.009)	(0.006)	
Share free lunch eligible	0.712	0.740	0.308	0.838	0.768	0.201	0.675	0.646	0.350
	(0.022)	(0.021)		(0.028)	(0.050)		(0.022)	(0.022)	
Share reduced-price lunch eligible	0.288	0.260	0.308	0.162	0.232	0.201	0.325	0.354	0.350
	(0.022)	(0.021)		(0.028)	(0.050)		(0.022)	(0.022)	
Average SAT (or equivalent)	1263.098	1267.559	0.789	1251.898	1249.969	0.813	1248.925	1255.891	0.177
	(4.853)	(4.747)		(8.669)	(10.781)		(3.663)	(4.110)	
Average GPA	3.788	3.820	0.031	3.828	3.841	0.606	3.845	3.839	0.552
	(0.011)	(0.010)		(0.017)	(0.027)		(0.008)	(0.008)	
Share limited English proficient	0.002	0.003	0.744	0.012	0.019	0.565	0.000	0.001	0.157
	(0.002)	(0.001)		(0.006)	(0.012)		(0.000)	(0.001)	
Share receiving special ed services	0.013	0.011	0.676	0.000	0.011	0.256	0.008	0.015	0.340
	(0.007)	(0.006)		(0.000)	(0.010)		(0.003)	(0.006)	
Share sent ACT/SAT scores to UM	0.391	0.397	0.674	0.386	0.489	0.129	0.343	0.342	0.912
	(0.025)	(0.024)		(0.043)	(0.051)		(0.022)	(0.020)	
F-test p-value		0.064			0.017			0.000	
Avg. predicted prob. selective college	0.155	0.177	0.055	0.233	0.231	0.964	0.082	0.084	0.839
	(0.007)	(0.007)		(0.013)	(0.016)		(0.005)	(0.005)	
Number of school-years	179	180	359	68	50	118	279	270	549
Number of students	852	932	1,784	297	233	530	829	767	1,596

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Appendix Table 2 *(Continued)*
Balance Table: School Characteristics by Subgroup
First and Second HAIL Cohorts

	Male			Female		
Characteristic	Control	Treated	P-value	Control	Treated	P-value
Upper Peninsula	0.150	0.121	0.409	0.144	0.118	0.401
	(0.024)	(0.022)		(0.022)	(0.020)	
West Central	0.446	0.451	0.866	0.449	0.456	0.945
	(0.033)	(0.034)		(0.032)	(0.032)	
Southeast	0.404	0.428	0.700	0.407	0.426	0.628
	(0.033)	(0.034)		(0.031)	(0.032)	
Suburb	0.360	0.405	0.360	0.343	0.400	0.161
	(0.032)	(0.034)		(0.030)	(0.032)	
City	0.129	0.098	0.267	0.134	0.095	0.164
	(0.023)	(0.021)		(0.022)	(0.018)	
Town or Rural	0.512	0.497	0.867	0.523	0.506	0.654
	(0.033)	(0.034)		(0.032)	(0.032)	
Distance from UM (miles)	93.583	91.729	0.899	91.370	92.686	0.823
	(5.409)	(5.025)		(4.713)	(4.870)	
# of 11th grade students ins school	205.010	199.503	0.477	201.690	188.913	0.259
	(9.698)	(10.234)		(9.409)	(9.023)	
# of HAIL students in school	4.465	4.718	0.581	4.201	4.288	0.711
	(0.220)	(0.273)		(0.201)	(0.235)	
Share female	0.000	0.000		1.000	1.000	
	(0.000)	(0.000)		(0.000)	(0.000)	
Share White (non-Hispanic)	0.790	0.774	0.644	0.777	0.785	0.753
	(0.020)	(0.021)		(0.020)	(0.019)	
Share Asian	0.075	0.079	0.897	0.055	0.052	0.773
	(0.012)	(0.013)		(0.009)	(0.010)	
Share Black (non-Hispanic)	0.066	0.061	0.666	0.096	0.101	0.767
	(0.012)	(0.011)		(0.014)	(0.013)	
Share Hispanic	0.051	0.077	0.092	0.053	0.049	0.749
	(0.010)	(0.014)		(0.010)	(0.009)	
Share Amer. Indian, AK or HI Native	0.018	0.009	0.208	0.019	0.012	0.455
	(0.007)	(0.004)		(0.006)	(0.005)	
Share free lunch eligible	0.710	0.681	0.307	0.693	0.698	0.722
	(0.020)	(0.021)		(0.019)	(0.017)	
Share reduced-price lunch eligible	0.290	0.319	0.307	0.307	0.302	0.722
	(0.020)	(0.021)		(0.019)	(0.017)	
Average SAT (or equivalent)	1274.962	1278.256	0.559	1245.063	1249.058	0.437
	(3.795)	(4.266)		(3.265)	(3.425)	
Average GPA	3.778	3.786	0.517	3.851	3.855	0.592
	(0.009)	(0.009)		(0.007)	(0.007)	
Share limited English proficient	0.003	0.011	0.192	0.002	0.003	0.435
	(0.002)	(0.005)		(0.001)	(0.002)	
Share receiving special ed services	0.019	0.017	0.824	0.004	0.009	0.228
	(0.006)	(0.006)		(0.002)	(0.004)	
Share sent ACT/SAT scores to UM	0.400	0.422	0.446	0.337	0.350	0.607
	(0.020)	(0.022)		(0.017)	(0.018)	
F-test p-value		0.165			0.349	
Avg. predicted prob. selective college	0.130	0.140	0.326	0.125	0.130	0.488
	(0.006)	(0.007)		(0.006)	(0.006)	
Number of school-years	381	348	729	432	423	855
Number of students	853	784	1,637	1,125	1,148	2,273

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Appendix Table 2 *(Continued)*
Balance Table: School Characteristics by Subgroup
First and Second HAIL Cohorts

	White (non-Hispanic)			Asian			Black (non-Hispanic)		
Characteristic	Control	Treated	P-value	Control	Treated	P-value	Control	Treated	P-value
Upper Peninsula	0.158	0.137	0.471	0.053	0.025	0.410	0.059	0.019	0.138
	(0.022)	(0.021)		(0.024)	(0.018)		(0.024)	(0.013)	
West Central	0.470	0.479	0.877	0.404	0.400	0.913	0.327	0.314	0.759
	(0.031)	(0.031)		(0.062)	(0.068)		(0.055)	(0.053)	
Southeast	0.372	0.384	0.723	0.543	0.575	0.723	0.614	0.667	0.400
	(0.030)	(0.031)		(0.063)	(0.069)		(0.056)	(0.054)	
Suburb	0.350	0.364	0.610	0.521	0.625	0.351	0.446	0.705	0.004
	(0.030)	(0.031)		(0.063)	(0.067)		(0.058)	(0.052)	
City	0.094	0.072	0.335	0.255	0.188	0.531	0.337	0.162	0.036
	(0.018)	(0.016)		(0.055)	(0.054)		(0.057)	(0.042)	
Town or Rural	0.556	0.564	0.967	0.223	0.188	0.616	0.218	0.133	0.202
	(0.031)	(0.031)		(0.050)	(0.052)		(0.048)	(0.036)	
Distance from UM (miles)	96.178	97.633	0.848	64.023	65.660	0.779	66.156	58.060	0.286
	(4.950)	(5.081)		(5.676)	(6.892)		(7.262)	(4.733)	
# of 11th grade students ins school	193.705	179.573	0.312	289.734	291.975	0.873	234.149	263.952	0.797
	(9.242)	(8.721)		(18.069)	(22.965)		(14.863)	(20.656)	
# of HAIL students in school	3.979	4.067	0.453	6.096	7.250	0.312	4.772	5.848	0.601
	(0.190)	(0.223)		(0.451)	(0.823)		(0.381)	(0.641)	
Share female	0.569	0.614	0.055	0.470	0.448	0.823	0.636	0.718	0.252
	(0.017)	(0.016)		(0.044)	(0.048)		(0.045)	(0.041)	
Share White (non-Hispanic)	1.000	1.000		0.000	0.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
Share Asian	0.000	0.000		1.000	1.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
Share Black (non-Hispanic)	0.000	0.000		0.000	0.000		1.000	1.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
Share Hispanic	0.000	0.000		0.000	0.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
Share Amer. Indian, AK or HI Native	0.000	0.000		0.000	0.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
Share free lunch eligible	0.690	0.668	0.391	0.695	0.682	0.748	0.812	0.812	0.709
	(0.016)	(0.017)		(0.045)	(0.052)		(0.036)	(0.032)	
Share reduced-price lunch eligible	0.310	0.332	0.391	0.305	0.318	0.748	0.188	0.188	0.709
	(0.016)	(0.017)		(0.045)	(0.052)		(0.036)	(0.032)	
Average SAT (or equivalent)	1260.173	1264.871	0.264	1272.631	1272.335	0.778	1238.603	1249.757	0.294
	(2.958)	(3.090)		(9.949)	(10.597)		(7.178)	(7.061)	
Average GPA	3.817	3.828	0.278	3.854	3.870	0.611	3.812	3.791	0.737
	(0.007)	(0.006)		(0.016)	(0.018)		(0.018)	(0.018)	
Share limited English proficient	0.001	0.001	0.642	0.031	0.053	0.498	0.010	0.005	0.618
	(0.001)	(0.001)		(0.016)	(0.023)		(0.010)	(0.005)	
Share receiving special ed services	0.008	0.014	0.336	0.003	0.000	0.323	0.005	0.014	0.474
	(0.003)	(0.005)		(0.003)	(0.000)		(0.005)	(0.011)	
Share sent ACT/SAT scores to UM	0.355	0.358	0.865	0.520	0.611	0.313	0.457	0.384	0.248
	(0.016)	(0.017)		(0.052)	(0.047)		(0.044)	(0.044)	
F-test p-value		0.152			0.000			0.049	
Avg. predicted prob. selective college	0.094	0.102	0.130	0.270	0.274	0.997	0.295	0.298	0.445
	(0.004)	(0.004)		(0.011)	(0.013)		(0.008)	(0.007)	
Number of school-years	468	461	929	94	80	174	101	105	206
Number of students	1,541	1,461	3,002	147	163	310	162	168	330

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Appendix Table 2 *(Continued)*
Balance Table: School Characteristics by Subgroup
First and Second HAIL Cohorts

	Hispanic			American Indian or Native Hawaiian		
Characteristic	Control	Treated	P-value	Control	Treated	P-value
Upper Peninsula	0.086	0.077	0.684	0.280	0.389	0.236
	(0.034)	(0.035)		(0.101)	(0.139)	
West Central	0.571	0.603	0.688	0.520	0.389	0.273
	(0.065)	(0.066)		(0.109)	(0.134)	
Southeast	0.343	0.321	0.850	0.200	0.222	0.980
	(0.063)	(0.063)		(0.083)	(0.104)	
Suburb	0.329	0.346	0.949	0.160	0.167	0.660
	(0.063)	(0.065)		(0.075)	(0.092)	
City	0.243	0.244	0.782	0.120	0.167	0.948
	(0.059)	(0.060)		(0.083)	(0.092)	
Town or Rural	0.429	0.410	0.844	0.720	0.667	0.795
	(0.064)	(0.066)		(0.101)	(0.122)	
Distance from UM (miles)	84.355	87.666	0.815	131.394	166.773	0.169
	(7.368)	(7.188)		(20.141)	(33.752)	
# of 11th grade students ins school	217.986	237.859	0.865	169.480	180.278	0.988
	(16.644)	(21.778)		(22.126)	(39.535)	
# of HAIL students in school	4.971	6.436	0.285	4.240	4.833	0.741
	(0.395)	(0.831)		(0.642)	(0.898)	
Share female	0.575	0.489	0.350	0.573	0.611	0.646
	(0.058)	(0.050)		(0.102)	(0.128)	
Share White (non-Hispanic)	0.000	0.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)	
Share Asian	0.000	0.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)	
Share Black (non-Hispanic)	0.000	0.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)	
Share Hispanic	1.000	1.000		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)	
Share Amer. Indian, AK or HI Native	0.000	0.000		1.000	1.000	
	(0.000)	(0.000)		(0.000)	(0.000)	
Share free lunch eligible	0.830	0.737	0.115	0.620	0.806	0.109
	(0.044)	(0.051)		(0.101)	(0.084)	
Share reduced-price lunch eligible	0.170	0.263	0.115	0.380	0.194	0.109
	(0.044)	(0.051)		(0.101)	(0.084)	
Average SAT (or equivalent)	1251.285	1232.108	0.088	1251.200	1257.222	0.774
	(10.219)	(9.787)		(15.339)	(20.137)	
Average GPA	3.815	3.841	0.120	3.765	3.844	0.158
	(0.022)	(0.017)		(0.045)	(0.050)	
Share limited English proficient	0.010	0.006	0.685	0.000	0.000	
	(0.009)	(0.006)		(0.000)	(0.000)	
Share receiving special ed services	0.000	0.019	0.192	0.040	0.000	0.355
	(0.000)	(0.014)		(0.040)	(0.000)	
Share sent ACT/SAT scores to UM	0.416	0.419	0.976	0.393	0.417	0.971
	(0.056)	(0.051)		(0.091)	(0.125)	
F-test p-value		0.127			0.037	
Avg. predicted prob. selective college	0.207	0.197	0.535	0.070	0.104	0.228
	(0.013)	(0.013)		(0.014)	(0.022)	
Number of school-years	70	78	148	25	18	43
Number of students	100	118	218	28	22	50

Source: Michigan administrative data.
Notes: All analyses done at the school-year level. For region and urbancity subgroups, p-values are from a t-test of the coefficient on treatment status from a regression of the characteristic on treatment and strata dummies, estimated on the subgroup. For gender and race, p-values are from separate regressions of school-subgroup-level characteristic on treatment status and strata dummies. F-test is from a joint significance test predicting treatment based on the characteristics listed here (excluding the summary index) as well as strata dummies. F-test tests all characteristics except strata jointly. Standard errors clustered at the school level in parentheses. All regressions use robust standard errors clustered at the school level.

Appendix Table 3
Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment
First and Second HAIL Cohorts

Outcome	Treatment effect		Control mean
Applied	0.422	0.417	0.259
	(0.022)	(0.019)	
Admitted	0.176	0.164	0.149
	(0.020)	(0.017)	
Enrolled	0.151	0.143	0.117
	(0.019)	(0.017)	
Strata dummies	X	X	
Covariates		X	
Number of school-years	1,026		
Number of students	3,910		

Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: All analyses done at the school-year level. Covariates include all characteristics listed in Table 2 as well as cohort indicators. Robust standard errors clustered at the school level reported in parentheses. Application, admission and enrollment measured in the summer and fall following expected high school graduation. Admission and enrollment are unconditional on application.

Appendix Table 4
Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment,
Estimated at the Student Level
First and Second HAIL Cohorts

Outcome	Treatment effect		Control mean
Applied	0.379	0.367	0.298
	(0.023)	(0.020)	
Admitted	0.153	0.140	0.156
	(0.020)	(0.013)	
Enrolled	0.129	0.119	0.120
	(0.016)	(0.013)	
Strata dummies	X	X	
Covariates		X	
Number of students	3,910		

Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: This analysis done at the student level. Covariates include all characteristics listed in Table 2 as well as cohort indicators. Robust standard errors clustered at the school level reported in parentheses. Application, admission and enrollment measured in the summer and fall following expected high school graduation. Admission and enrollment are unconditional on application.

Appendix Table 5
Estimated Effect of HAIL Scholarship on Timing of Application to the University of Michigan
First and Second HAIL Cohorts

Outcome	Treatment effect		Control mean
Applied (any)	0.422	0.417	0.259
	(0.022)	(0.019)	
Applied Early Action	0.322	0.320	0.201
	(0.022)	(0.020)	
Applied Regular Decision	0.101	0.098	0.058
	(0.014)	(0.014)	
Strata dummies	X	X	
Covariates		X	
Number of students	1,026		

Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: All analyses done at the school-year level. Covariates include all characteristics listed in Table 2 as well as cohort indicators. Robust standard errors clustered at the school level reported in parentheses. Application measured in the summer and fall following expected high school graduation.

Appendix Table 6
University of Michigan Admission Rates Conditional on Application, by Treatment Status
(Non-Experimental Results)
First and Second HAIL Cohorts

	Control Students	Treated Students	P-value
Propotion admitted	0.525	0.456	0.016
	(0.021)	(0.020)	
Number of students who applied	589	1,306	

Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: This analysis done at the student level. Robust standard errors clustered at the school level reported in parentheses. P-value is from a two-way t-test of the coefficient on treatment status from a regression of the outcome on treatment and strata dummies. For reference, the overall UM acceptance rate in 2016-17 was 28.6 percent.

Appendix Table 7
Randomization-Based Inference on College Choice Outcomes
First and Second HAIL Cohorts

Enrollment outcome	Estimated treatment effect	Simulated treatment effects (10,000 iterations)				# greater than estim. effect	Randomiz.-based p-value	Sampling-based p-value
		Mean	Std. Dev.	Min	Max			
University of Michigan (UM)	0.147	0.000	0.019	-0.066	0.085	0	0.000	0.000
Highly competitive or above other than UM	0.000	0.000	0.007	-0.023	0.024	9,851	0.985	0.985
Four-year	0.072	0.000	0.022	-0.084	0.081	11	0.001	0.001
Two-year	-0.035	0.000	0.014	-0.050	0.053	127	0.013	0.011
Any	0.038	0.000	0.019	-0.076	0.064	432	0.043	0.042

Source: Michigan administrative data and National Student Clearinghouse data.
Notes: Each simulated treatment effect comes from first randomly assigning schools to treatment using the same randomization algorithm used for true assignment, then running a regression of the outcome on "treatment" status, including controls for strata. Exact p-value is calculated as the number of simulated effects greater in absolute value than the estimated effect.

Appendix Table 8
Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment
by High School Geography, With Covariates
First and Second HAIL Cohorts

	Panel A. Region				Panel B. Urbanicity			
	Southeast	West Central	Upper Peninsula	p-value, F-test of treatment-by-region interactions	Suburb	City	Town or Rural	p-value, F-test of treatment-by-urbanicity interactions
Applied	0.371	0.462	0.417	0.079	0.378	0.277	0.483	0.001
	(0.029)	(0.028)	(0.051)		(0.028)	(0.055)	(0.027)	
	[0.364]	[0.200]	[0.156]		[0.336]	[0.464]	[0.159]	
		{0.024}	{0.425}			{0.105}	{0.007}	
Admitted	0.135	0.172	0.205	0.308	0.125	0.024	0.224	0.000
	(0.027)	(0.026)	(0.039)		(0.026)	(0.051)	(0.024)	
	[0.202]	[0.116]	[0.105]		[0.164]	[0.319]	[0.097]	
		{0.313}	{0.143}			{0.078}	{0.005}	
Enrolled	0.128	0.140	0.192	0.430	0.110	0.094	0.182	0.058
	(0.026)	(0.024)	(0.042)		(0.025)	(0.047)	(0.023)	
	[0.167]	[0.085]	[0.080]		[0.140]	[0.221]	[0.078]	
		{0.736}	{0.198}			{0.766}	{0.035}	
Number of school-years	408	474	144		359	118	549	
Number of students	1,848	1,646	416		1,784	530	1,596	

Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: All analyses done at the school-year level. For each panel, treatment effects are from a single regression of the outcome on treatment status and strata dummies, fully interacted with subgroup indicators, as well as covariates (not interacted). Covariates include all characteristics listed in Table 2 as well as cohort indicators. Robust standard errors clustered at the school level reported in parentheses. Control mean for subgroup in brackets. P-value from test of subgroup compared to reference subgroup (Southeast or suburban schools) in curly brackets. F-test jointly tests the significance of the treatment-by-subgroup interactions. Application, admission and enrollment measured in the summer and fall following expected high school graduation. Admission and enrollment are unconditional on application. Estimates without covariates reported in Table 4.

Appendix Table 9

Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment by Number of HAIL Students and Historical School Connection to UM

First and Second HAIL Cohorts

Coefficient	Applied	Admitted	Enrolled
Panel A. Number of HAIL Students in School			
Treatment	0.482	0.208	0.181
	(0.033)	(0.033)	(0.031)
Number of HAIL students	0.017	0.008	0.006
	(0.004)	(0.003)	(0.003)
Interaction	-0.016	-0.008	-0.008
	(0.005)	(0.005)	(0.004)
Panel B. Prior School-Level UM Enrollment Rate			
Treatment	0.486	0.201	0.171
	(0.025)	(0.024)	(0.023)
Prior UM Enrollment rate	2.846	1.707	1.502
	(0.296)	(0.448)	(0.452)
Interaction	-2.656	-0.841	-0.677
	(0.540)	(0.594)	(0.610)
Number of school-years		1,026	

Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.

Notes: All analyses done at the school-year level. Results are from a regression of the outcome on treatment, the named variable, the interaction of the two, and strata dummies. Robust standard errors clustered at the school level reported in parentheses. Prior UM enrollment rate is for the high school graduating class of 2015.

Appendix Table 10

Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment by Whether Student Was Known by University of Michigan Admissions Office, With and Without Covariates
First and Second HAIL Cohorts

	Without covariates			With covariates		
	Known by Univ. Mich. (UM) Admissions	Unknown by UM Admissions	p-value, difference	Known by UM Admissions	Unknown by UM Admissions	p-value, difference
Applied	0.375	0.443	0.044	0.370	0.446	0.021
	(0.027)	(0.025)		(0.025)	(0.024)	
	[0.397]	[0.096]		[0.397]	[0.096]	
Admitted	0.189	0.131	0.059	0.175	0.131	0.124
	(0.027)	(0.019)		(0.024)	(0.017)	
	[0.225]	[0.046]		[0.225]	[0.046]	
Enrolled	0.171	0.105	0.019	0.161	0.105	0.041
	(0.024)	(0.017)		(0.023)	(0.016)	
	[0.172]	[0.036]		[0.172]	[0.036]	
Number of school-years	808	785		808	785	
Number of students	2,215	1,695		2,215	1,695	

Source: Michigan administrative data and University of Michigan Office of Enrollment Management data. Notes: All analyses done at the school-year level. Treatment effects are from a single regression of school-subgroup-level outcome rate on treatment status and strata dummies, fully interacted with an indicator for whether a student was unknown to UM, as well as covariates (not interacted). Covariates include all characteristics listed in Table 2 as well as cohort indicators, and are at the school-subgroup level. Robust standard errors clustered at the school level reported in parentheses. Control mean for subgroup in brackets. UM application, admission and enrollment measured in the summer and fall following expected high school graduation. Admission and enrollment are unconditional on application.

Appendix Table 11
Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment by Economic Status, With Covariates
First and Second HAIL Cohorts

	Panel A. Free or Reduced-Price Lunch Eligibility			Panel B. Persistence of Economic Disadvantage		
	Free Lunch	Reduced-Price	p-value, difference	Always Disadvantaged	Sometimes Disadvantaged	p-value, difference
Applied	0.415	0.416	0.974	0.421	0.382	0.334
	(0.021)	(0.030)		(0.020)	(0.038)	
	[0.270]	[0.245]		[0.259]	[0.302]	
Admitted	0.157	0.135	0.468	0.167	0.121	0.204
	(0.019)	(0.026)		(0.018)	(0.032)	
	[0.151]	[0.146]		[0.149]	[0.167]	
Enrolled	0.139	0.110	0.296	0.147	0.114	0.362
	(0.018)	(0.024)		(0.018)	(0.032)	
	[0.116]	[0.118]		[0.118]	[0.130]	
Number of school-years	923	607		982	425	
Number of students	2,748	1,162		3,268	642	

Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: All analyses done at the school-year level. For each panel, treatment effects are from a single regression of school-subgroup-level outcome rate on treatment status and strata dummies, fully interacted with an indicator for subgroup, as well as covariates (not interacted). Covariates include all characteristics listed in Table 2 as well as cohort indicators, and are at the school-subgroup level. Robust standard errors clustered at the school level reported in parentheses. Control mean for subgroup in brackets. UM application, admission and enrollment measured in the summer and fall following expected high school graduation. Admission and enrollment are unconditional on application. In Panel A, eligibility is measured in 11th grade. In Panel B, "always disadvantaged" is defined as being eligible for free or reduced-price lunch every (observed) year of high school through 11th grade. Estimates without covariates reported in Table 5.

Appendix Table 12
Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment by Student Gender and Race, With Covariates
First and Second HAIL Cohorts

	Panel A. Gender		Panel B. Race/Ethnicity				
	Women	Men	White	Asian	Black	Hispanic	p value, F-test of treatment-by-race/ethnicity interactions
Applied	0.420	0.396	0.442	0.222	0.305	0.232	0.000
	(0.023)	(0.026)	(0.022)	(0.059)	(0.055)	(0.072)	
	[0.239]	[0.286]	[0.210]	[0.601]	[0.478]	[0.405]	
		{0.449}		{0.000}	{0.020}	{0.005}	
Admitted	0.184	0.133	0.173	0.179	0.114	0.053	0.210
	(0.021)	(0.022)	(0.018)	(0.056)	(0.055)	(0.061)	
	[0.143]	[0.139]	[0.116]	[0.279]	[0.283]	[0.265]	
		{0.085}		{0.922}	{0.302}	{0.060}	
Enrolled	0.162	0.113	0.147	0.142	0.069	0.102	0.438
	(0.020)	(0.021)	(0.017)	(0.050)	(0.048)	(0.060)	
	[0.115]	[0.105]	[0.091]	[0.219]	[0.234]	[0.198]	
		{0.079}		{0.926}	{0.120}	{0.467}	
Number of school-years	855	729	929	174	206	148	
Number of students	2,273	1,637	3,002	310	330	218	

Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: All analyses done at the school-year level. For each panel, treatment effects are from a single regression of school-subgroup-level outcome rate on treatment status and strata dummies, fully interacted with subgroup indicators, as well as covariates (not interacted). Covariates include all characteristics listed in Table 2 as well as cohort indicators, and are at the school-subgroup level. Robust standard errors clustered at the school level reported in parentheses. Control mean for subgroup in square brackets. P-value from test of subgroup compared to reference subgroup (women or white students) in curly brackets. F-test jointly tests the significance of the treatment-by-race/ethnicity-category interactions. UM application, admission and enrollment measured in the summer and fall following expected high school graduation. Admission and enrollment are unconditional on application. Estimates without covariates reported in Table 6.

Appendix Table 13
Coefficients from Regression Used to Predict Selective College Attendance

Outcome: Enrolled at highly competitive or above college	
ACT score	0.037
	(0.003)
GPA	0.330
	(0.025)
Asian	0.128
	(0.030)
Black (non-Hispanic)	0.195
	(0.028)
Hispanic	0.116
	(0.028)
American Indian or native Hawaiian	0.014
	(0.042)
Female	-0.003
	(0.010)
Always economically disadvantaged	0.001
	(0.012)
High school in city	0.037
	(0.022)
High school in town or rural area	-0.026
	(0.013)
High school in Upper Peninsula	-0.057
	(0.018)
High school in West Central Michigan	-0.047
	(0.013)
Number of HAIL-eligible students in school	-0.001
	(0.001)
Number of students	4,529
R-squared	0.140

Source: Michigan administrative data, University of Michigan Office of Enrollment Management data, and National Student Clearinghouse data.
Notes: Coefficients and standard errors from a regression of highly selective college attendance on all of the listed characteristics, estimated on the population of high-achieving, low-income students in Michigan who were in 11th grade during the 2012-13 and 2013-14 school years. Sample criteria are the same as for HAIL scholarship students in the subsequent year. College attendance is measured at the first college attended in the fall following expected high school graduation and is unconditional on any college enrollment. Selectivity is based on Barron's selectivity index. Prior to the 2015-16 school year, Michigan 11th graders took the ACT rather than the SAT; for prediction purposes, SAT scores are converted to ACT scores using official concordance tables. Robust standard errors clustered at the school level reported in parentheses.

Appendix Table 14
Estimated Effect of HAIL Scholarship on College Choice, With and Without Covariates
First and Second HAIL Cohorts

College attended	Treatment effect		Control mean
University of Michigan (UM)	0.147	0.140	0.107
	(0.018)	(0.016)	
Highly competitive or above other than UM	0.000	0.001	0.028
	(0.007)	(0.006)	
Four-year	0.072	0.077	0.675
	(0.022)	(0.021)	
Two-year	-0.035	-0.035	0.116
	(0.014)	(0.013)	
Any	0.038	0.042	0.791
	(0.019)	(0.019)	
Covariates	N	Y	
Number of school-years	1,026		
Number of students	3,910		

Source: Michigan administrative data and National Student Clearinghouse data.
Notes: All analyses done at the school-year level. Coefficients are from regressions of outcome on treatment status and strata dummies. Covariates include all characteristics listed in Table 2 as well as cohort indicators. Robust standard errors clustered at the school level reported in parentheses. Enrollment is measured at the first college attended in the fall following expected high school graduation and is unconditional on any college enrollment.

Appendix Table 15
Estimated Effect of HAIL Scholarship on College Choice by Selected School and Student Characteristics,
With and Without Covariates
First and Second HAIL Cohorts

College Attended	Panel A. Region (without covariates) Southeast	West Central	Upper Peninsula	p-val, F-test of treat-by-region interactions	Panel B. Urbanicity (without covariates) Suburb	City	Town or Rural	p-val, F-test of treat-by-urbanicity interactions
University of Michigan (UM)	0.134	0.154	0.164	0.823	0.126	0.063	0.185	0.091
	(0.031)	(0.024)	(0.048)		(0.029)	(0.063)	(0.024)	
	[0.162]	[0.068]	[0.078]		[0.139]	[0.203]	[0.063]	
		{0.599}	{0.600}			{0.363}	{0.110}	
Highly competitive or above other than UM	-0.002	0.008	-0.008	0.435	0.011	0.001	-0.006	0.466
	(0.012)	(0.009)	(0.008)		(0.011)	(0.030)	(0.008)	
	[0.037]	[0.024]	[0.013]		[0.024]	[0.046]	[0.025]	
		{0.523}	{0.680}			{0.756}	{0.217}	
Four-year	0.040	0.116	0.024	0.177	0.043	-0.001	0.100	0.263
	(0.031)	(0.033)	(0.060)		(0.032)	(0.066)	(0.032)	
	[0.774]	[0.579]	[0.697]		[0.746]	[0.704]	[0.622]	
		{0.093}	{0.810}			{0.544}	{0.210}	
Two-year	-0.016	-0.069	0.015	0.074	-0.021	0.013	-0.047	0.318
	(0.015)	(0.024)	(0.034)		(0.017)	(0.035)	(0.021)	
	[0.066]	[0.179]	[0.060]		[0.093]	[0.079]	[0.140]	
		{0.058}	{0.414}			{0.379}	{0.353}	
Any	0.024	0.047	0.038	0.849	0.022	0.012	0.053	0.656
	(0.027)	(0.029)	(0.051)		(0.028)	(0.057)	(0.027)	
	[0.840]	[0.758]	[0.757]		[0.838]	[0.783]	[0.762]	
		{0.570}	{0.807}			{0.877}	{0.420}	
	Panel A. Region (with covariates)				Panel B. Urbanicity (with covariates)			
College Attended	Southeast	West Central	Upper Peninsula	p-val, F-test of treat-by-region interactions	Suburb	City	Town or Rural	p-val, F-test of treat-by-urbanicity interactions
University of Michigan (UM)	0.117	0.146	0.187	0.374	0.106	0.053	0.188	0.009
	(0.026)	(0.023)	(0.043)		(0.025)	(0.050)	(0.022)	
	[0.162]	[0.068]	[0.078]		[0.139]	[0.203]	[0.063]	
		{0.415}	{0.171}			{0.338}	{0.015}	
Highly competitive or above other than UM	-0.001	0.008	-0.003	0.665	0.008	0.010	-0.005	0.558
	(0.012)	(0.009)	(0.009)		(0.011)	(0.029)	(0.008)	
	[0.037]	[0.024]	[0.013]		[0.024]	[0.046]	[0.025]	
		{0.592}	{0.853}			{0.957}	{0.311}	
Four-year	0.036	0.117	0.045	0.174	0.045	0.013	0.110	0.210
	(0.031)	(0.033)	(0.060)		(0.032)	(0.062)	(0.031)	
	[0.774]	[0.579]	[0.697]		[0.746]	[0.704]	[0.622]	
		{0.070}	{0.899}			{0.647}	{0.142}	
Two-year	-0.011	-0.067	0.008	0.082	-0.015	0.008	-0.051	0.211
	(0.015)	(0.024)	(0.032)		(0.016)	(0.031)	(0.021)	
	[0.066]	[0.179]	[0.060]		[0.093]	[0.079]	[0.140]	
		{0.046}	{0.602}			{0.504}	{0.168}	
Any	0.025	0.050	0.053	0.790	0.030	0.021	0.059	0.701
	(0.028)	(0.028)	(0.051)		(0.030)	(0.055)	(0.026)	
	[0.840]	[0.758]	[0.757]		[0.838]	[0.783]	[0.762]	
		{0.526}	{0.641}			{0.890}	{0.467}	
Number of school-years	408	474	144		359	118	549	
Number of students	1,848	1,646	416		1,784	530	1,596	

Appendix Table 15 *(Continued)*
Estimated Effect of HAIL Scholarship on College Choice by Selected School and Student Characteristics, With and Without Covariates
First and Second HAIL Cohorts

	Panel C. Gender (without covariates)		Panel D. Race/Ethnicity (without covariates)				
College Attended	Women	Men	White	Asian	Black	Hispanic	p val, F-test of treat-by-race/ethnicity interactions
University of Michigan (UM)	0.163	0.114	0.158	0.104	0.054	0.098	0.214
	(0.021)	(0.022)	(0.018)	(0.057)	(0.052)	(0.063)	
	[0.104]	[0.100]	[0.085]	[0.213]	[0.214]	[0.155]	
		{0.101}		{0.366}	{0.058}	{0.362}	
Highly competitive or above other than UM	0.005	-0.003	0.003	-0.021	0.043	-0.010	0.302
	(0.008)	(0.010)	(0.006)	(0.028)	(0.034)	(0.012)	
	[0.021]	[0.034]	[0.020]	[0.057]	[0.058]	[0.016]	
		{0.543}		{0.409}	{0.257}	{0.340}	
Four-year	0.086	0.071	0.075	0.106	-0.026	0.194	0.108
	(0.026)	(0.029)	(0.024)	(0.055)	(0.055)	(0.073)	
	[0.671]	[0.672]	[0.666]	[0.759]	[0.792]	[0.586]	
		{0.653}		{0.598}	{0.083}	{0.114}	
Two-year	-0.032	-0.043	-0.039	-0.052	-0.019	-0.073	0.789
	(0.017)	(0.019)	(0.016)	(0.024)	(0.030)	(0.052)	
	[0.122]	[0.126]	[0.132]	[0.054]	[0.056]	[0.140]	
		{0.623}		{0.670}	{0.531}	{0.533}	
Any	0.055	0.028	0.036	0.055	-0.045	0.121	0.191
	(0.022)	(0.025)	(0.020)	(0.047)	(0.050)	(0.065)	
	[0.793]	[0.798]	[0.798]	[0.813]	[0.848]	[0.726]	
		{0.394}		{0.705}	{0.125}	{0.203}	
	Panel C. Gender (with covariates)		Panel D. Race/Ethnicity (with covariates)				
College Attended	Women	Men	White	Asian	Black	Hispanic	p val, F-test of treat-by-race/ethnicity interactions
University of Michigan (UM)	0.161	0.108	0.149	0.105	0.057	0.113	0.262
	(0.020)	(0.020)	(0.017)	(0.052)	(0.047)	(0.056)	
	[0.104]	[0.100]	[0.085]	[0.213]	[0.214]	[0.155]	
		{0.055}		{0.428}	{0.062}	{0.537}	
Highly competitive or above other than UM	0.006	-0.002	0.002	-0.018	0.042	-0.007	0.388
	(0.008)	(0.010)	(0.007)	(0.027)	(0.034)	(0.012)	
	[0.021]	[0.034]	[0.020]	[0.057]	[0.058]	[0.016]	
		{0.574}		{0.473}	{0.252}	{0.489}	
Four-year	0.085	0.068	0.076	0.108	-0.027	0.206	0.064
	(0.024)	(0.028)	(0.023)	(0.055)	(0.054)	(0.069)	
	[0.671]	[0.672]	[0.666]	[0.759]	[0.792]	[0.586]	
		{0.610}		{0.588}	{0.073}	{0.069}	
Two-year	-0.029	-0.043	-0.038	-0.054	-0.016	-0.076	0.696
	(0.016)	(0.019)	(0.016)	(0.025)	(0.028)	(0.050)	
	[0.122]	[0.126]	[0.132]	[0.054]	[0.056]	[0.140]	
		{0.559}		{0.600}	{0.488}	{0.472}	
Any	0.057	0.025	0.038	0.055	-0.043	0.130	0.167
	(0.022)	(0.024)	(0.020)	(0.047)	(0.049)	(0.064)	
	[0.793]	[0.798]	[0.798]	[0.813]	[0.848]	[0.726]	
		{0.324}		{0.743}	{0.116}	{0.168}	
Number of school-years	855	729	929	174	206	148	
Number of students	2,273	1,637	3,002	310	330	218	

Appendix Table 15 *(Continued)*
Estimated Effect of HAIL Scholarship on College Choice by Selected School and Student Characteristics, With and Without Covariates
First and Second HAIL Cohorts

Source: Michigan administrative data and National Student Clearinghouse data.
Notes: All analyses done at the school-year level. For each of Panels A and B (region and urbanicity), treatment effects are from a single regression of the outcome on treatment status and strata dummies, fully interacted with subgroup indicators, as well as covariates (not interacted) in the versions with covariates. Covariates include all characteristics listed in Table 2 as well as cohort indicators. For each of Panels C and D (gender and race/ethnicity), treatment effects are from a single regression of school-subgroup-level outcome rate on treatment status and strata dummies, fully interacted with subgroup indicators, as well as covariates (not interacted) in the versions with covariates. For characteristics with more than two categories, F-test jointly tests the significance of the treatment-by-subgroup interactions. Robust standard errors clustered at the school level reported in parentheses. Control mean for subgroup in square brackets. P-value from test of subgroup compared to reference subgroup (Southeast schools, suburban schools, women or white students) in curly brackets. Enrollment is measured at the first college attended in the fall following expected high school graduation and is unconditional on any college enrollment.

Appendix Table 16
Estimated Effect of HAIL Scholarship on College Enrollment and Persistence, With Covariates
First HAIL Cohort

	Attended fall following high school graduation		Attended two consecutive falls following high school graduation	
College attended	Treatment effect	Control mean	Treatment effect	Control mean
University of Michigan (UM)	0.144	0.104	0.126	0.102
	(0.019)		(0.019)	
Highly competitive or above other than UM	0.007	0.026	0.007	0.024
	(0.010)		(0.010)	
Four-year	0.097	0.651	0.114	0.557
	(0.028)		(0.029)	
Two year	-0.034	0.127	-0.013	0.078
	(0.018)		(0.015)	
Any	0.063	0.779	0.085	0.683
	(0.025)		(0.027)	
Number of school-years	529			
Number of students	2,108			

Source: Michigan administrative data and National Student Clearinghouse data.
Notes: All analyses done at the school-year level. Coefficients are from regressions of outcome on treatment status and strata dummies. Covariates include all characteristics listed in Table 2. Robust standard errors clustered at the school level reported in parentheses. Enrollment is measured at the first college attended in the two falls following expected high school graduation and is unconditional on any college enrollment. Estimates without covariates reported in Table 7.

Appendix Table 17
Estimated Effect of HAIL Scholarship on Second Year College Persistence by Selected School and Student Characteristics, With and Without Covariates
First HAIL Cohort

	Panel A. Region (without covariates)				Panel B. Urbanicity (without covariates)			
College Attended (two falls)	Southeast	West Central	Upper Peninsula	p-val, F-test of treat-by-region interactions	Suburb	City	Town or Rural	p-val, F-test of treat-by-urbanicity interactions
University of Michigan (UM)	0.113	0.144	0.125	0.800	0.129	-0.006	0.161	0.123
	(0.037)	(0.028)	(0.065)		(0.032)	(0.076)	(0.030)	
	[0.145]	[0.070]	[0.091]		[0.096]	[0.234]	[0.076]	
		0.509	0.874			0.105	0.461	
Highly competitive or above other than UM	0.014	0.004	0.007	0.928	0.031	0.022	-0.011	0.112
	(0.021)	(0.012)	(0.007)		(0.019)	(0.046)	(0.010)	
	[0.038]	[0.020]	[0.000]		[0.019]	[0.033]	[0.025]	
		0.699	0.756			0.848	0.043	
Four-year	0.091	0.146	0.046	0.468	0.112	0.057	0.118	0.797
	(0.042)	(0.043)	(0.082)		(0.044)	(0.082)	(0.042)	
	[0.667]	[0.462]	[0.563]		[0.623]	[0.646]	[0.498]	
		0.359	0.624			0.553	0.925	
Two-year	-0.005	-0.033	0.033	0.401	0.004	0.029	-0.030	0.342
	(0.019)	(0.027)	(0.043)		(0.023)	(0.035)	(0.024)	
	[0.045]	[0.116]	[0.044]		[0.056]	[0.050]	[0.097]	
		0.384	0.418			0.543	0.319	
Any	0.084	0.085	0.053	0.931	0.109	0.050	0.067	0.666
	(0.038)	(0.042)	(0.079)		(0.041)	(0.069)	(0.040)	
	[0.746]	[0.632]	[0.676]		[0.722]	[0.739]	[0.648]	
		0.996	0.719			0.460	0.456	
	Panel A. Region (with covariates)				Panel B. Urbanicity (with covariates)			
College Attended (two falls)	Southeast	West Central	Upper Peninsula	p-val, F-test of treat-by-region interactions	Suburb	City	Town or Rural	p-val, F-test of treat-by-urbanicity interactions
University of Michigan (UM)	0.098	0.143	0.150	0.492	0.100	-0.009	0.169	0.013
	(0.031)	(0.027)	(0.052)		(0.028)	(0.058)	(0.027)	
	[0.145]	[0.070]	[0.091]		[0.096]	[0.234]	[0.076]	
		0.271	0.399			0.092	0.075	
Highly competitive or above other than UM	0.017	0.004	0.007	0.865	0.024	0.040	-0.007	0.197
	(0.021)	(0.011)	(0.010)		(0.018)	(0.047)	(0.010)	
	[0.038]	[0.020]	[0.000]		[0.019]	[0.033]	[0.025]	
		0.591	0.681			0.741	0.125	
Four-year	0.081	0.151	0.081	0.440	0.101	0.077	0.133	0.759
	(0.041)	(0.042)	(0.081)		(0.041)	(0.077)	(0.041)	
	[0.667]	[0.462]	[0.563]		[0.623]	[0.646]	[0.498]	
		0.224	0.996			0.786	0.575	
Two-year	0.000	-0.032	0.028	0.407	0.014	0.022	-0.033	0.247
	(0.020)	(0.026)	(0.040)		(0.021)	(0.033)	(0.024)	
	[0.045]	[0.116]	[0.044]		[0.056]	[0.050]	[0.097]	
		0.330	0.527			0.822	0.149	
Any	0.080	0.091	0.085	0.979	0.110	0.069	0.077	0.791
	(0.038)	(0.041)	(0.075)		(0.040)	(0.068)	(0.040)	
	[0.746]	[0.632]	[0.676]		[0.722]	[0.739]	[0.648]	
		0.837	0.945			0.597	0.553	
Number of school-years	204	247	78		179	60	290	
Number of students	951	927	230		930	284	894	

Appendix Table 17 *(Continued)*
Estimated Effect of HAIL Scholarship on Second Year College Persistence by Selected School and Student Characteristics, With and Without Covariates
First HAIL Cohort

	Panel C. Gender (without covariates)		Panel D. Race/Ethnicity (without covariates)				
College Attended (two falls)	Women	Men	White	Asian	Black	Hispanic	p val, F-test of treat-by-race/ethnicity interactions
University of Michigan (UM)	0.136	0.119	0.146	0.100	0.016	0.053	0.213
	(0.026)	(0.029)	(0.023)	(0.088)	(0.066)	(0.076)	
	[0.098]	[0.091]	[0.082]	[0.189]	[0.177]	[0.158]	
		0.655		0.617	0.068	0.239	
Highly competitive or above other than UM	0.014	0.001	0.003	0.011	0.085	-0.001	0.365
	(0.012)	(0.013)	(0.009)	(0.036)	(0.046)	(0.017)	
	[0.017]	[0.027]	[0.019]	[0.029]	[0.045]	[0.013]	
		0.462		0.817	0.081	0.861	
Four-year	0.112	0.116	0.096	0.133	-0.018	0.094	0.585
	(0.036)	(0.039)	(0.033)	(0.082)	(0.088)	(0.105)	
	[0.560]	[0.561]	[0.549]	[0.648]	[0.695]	[0.483]	
		0.931		0.682	0.212	0.982	
Two-year	-0.012	-0.048	-0.013	-0.032	0.009	-0.067	0.708
	(0.019)	(0.022)	(0.019)	(0.031)	(0.040)	(0.059)	
	[0.078]	[0.094]	[0.086]	[0.023]	[0.031]	[0.125]	
		0.191		0.603	0.615	0.378	
Any	0.105	0.030	0.062	0.095	-0.014	0.024	0.730
	(0.032)	(0.036)	(0.030)	(0.077)	(0.079)	(0.100)	
	[0.682]	[0.710]	[0.694]	[0.699]	[0.757]	[0.633]	
		0.103		0.690	0.363	0.716	
	Panel C. Gender (with covariates)		Panel D. Race/Ethnicity (with covariates)				
College Attended (two falls)	Women	Men	White	Asian	Black	Hispanic	p val, F-test of treat-by-race/ethnicity interactions
University of Michigan (UM)	0.140	0.107	0.145	0.117	0.013	0.079	0.161
	(0.024)	(0.026)	(0.021)	(0.082)	(0.059)	(0.065)	
	[0.098]	[0.091]	[0.082]	[0.189]	[0.177]	[0.158]	
		0.358		0.740	0.036	0.337	
Highly competitive or above other than UM	0.013	0.001	0.001	0.014	0.080	0.004	0.408
	(0.012)	(0.013)	(0.009)	(0.037)	(0.045)	(0.019)	
	[0.017]	[0.027]	[0.019]	[0.029]	[0.045]	[0.013]	
		0.492		0.738	0.089	0.894	
Four-year	0.111	0.113	0.105	0.113	-0.014	0.117	0.588
	(0.034)	(0.038)	(0.032)	(0.083)	(0.084)	(0.097)	
	[0.560]	[0.561]	[0.549]	[0.648]	[0.695]	[0.483]	
		0.979		0.929	0.175	0.901	
Two-year	-0.007	-0.045	-0.013	-0.024	0.006	-0.074	0.711
	(0.019)	(0.021)	(0.018)	(0.035)	(0.041)	(0.057)	
	[0.078]	[0.094]	[0.086]	[0.023]	[0.031]	[0.125]	
		0.173		0.778	0.683	0.302	
Any	0.107	0.031	0.073	0.087	-0.009	0.045	0.749
	(0.031)	(0.036)	(0.030)	(0.076)	(0.076)	(0.095)	
	[0.682]	[0.710]	[0.694]	[0.699]	[0.757]	[0.633]	
		0.098		0.860	0.306	0.779	
Number of school-years	441	384	488	88	100	83	
Number of students	1,225	883	1,635	151	165	122	

Appendix Table 17 *(Continued)*
Estimated Effect of HAIL Scholarship on Second Year College Persistence, With and Without Covariates
First HAIL Cohort

Source: Michigan administrative data and National Student Clearinghouse data.
Notes: All analyses done at the school-year level. For each of Panels A and B (region and urbanicity), treatment effects are from a single regression of the outcome on treatment status and strata dummies, fully interacted with subgroup indicators, as well as covariates (not interacted) in the versions with covariates. Covariates include all characteristics listed in Table 2. For each of Panels C and D (gender and race/ethnicity), treatment effects are from a single regression of school-subgroup-level outcome rate on treatment status and strata dummies, fully interacted with subgroup indicators, as well as covariates (not interacted) in the versions with covariates. Covariates include all characteristics listed in Table 2 and are at the school-subgroup level. For characteristics with more than two categories, F-test jointly tests the significance of the treatment-by-subgroup interactions. Robust standard errors clustered at the school level reported in parentheses. Control mean for subgroup in square brackets. P-value from test of subgroup compared to reference subgroup (Southeast schools, suburban schools, women or white students) in curly brackets. Enrollment is measured at the first college attended in the two falls following expected high school graduation and is unconditional on any college enrollment.

Appendix Table 18
Estimated Spillover Effect of HAIL Scholarship on Non-HAIL Students
First and Second HAIL cohorts

Outcome	Treatment effect		Control mean
Applied	-0.011	-0.008	0.068
	(0.007)	(0.006)	
Admitted	-0.005	-0.004	0.030
	(0.003)	(0.003)	
Enrolled	-0.004	-0.002	0.021
	(0.003)	(0.002)	
Strata dummies	X	X	
Covariates		X	
Number of school-years		1,025	

Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: All analyses done at the school-year level. Coefficients are from regression of outcome rate for non-HAIL eligible students on treatment status and strata dummies, plus controls as indicated. Covariates include all characteristics listed in Table 2 as well as cohort indicators. Robust standard errors clustered at the school level reported in parentheses.

Appendix Table 19
Coefficients from Regression Used to Predict BA completion

	Outcome: Completed a bachelor's degree	
	Within 4 years	Within 5 years
ACT score	0.005	0.010
	(0.004)	(0.004)
GPA	0.223	0.357
	(0.050)	(0.057)
Asian	0.038	0.020
	(0.042)	(0.054)
Black (non-Hispanic)	-0.050	0.035
	(0.043)	(0.047)
Hispanic	-0.039	0.011
	(0.047)	(0.053)
American Indian, Alaska Native, or Native Hawaiian	-0.043	-0.032
	(0.099)	(0.099)
Female	0.085	0.044
	(0.018)	(0.021)
Always economically disadvantaged	-0.049	0.041
	(0.021)	(0.053)
High school in city	0.003	0.003
	(0.035)	(0.033)
High school in town or rural area	-0.016	0.023
	(0.028)	(0.028)
High school in Upper Peninsula	-0.013	-0.052
	(0.041)	(0.037)
High school in West Central	-0.001	-0.040
	(0.028)	(0.025)
Number of HAIL students in school	0.001	0.001
	(0.0003)	(0.001)
Enroll in a highly-competitive institution year 1	0.111	-0.201
	(0.085)	(0.05)
Enroll in a highly-competitive institution year 2	0.098	0.276
	(0.089)	(0.053)
Enroll in a four-year institution year 1	0.051	0.027
	(0.027)	(0.039)
Enroll in a four-year institution year 2	0.341	0.428
	(0.031)	(0.039)
Enroll in any institution year 1	0.033	0.053
	(0.022)	(0.043)
Enroll in any institution year 2	0.048	0.108
	(0.021)	(0.033)
N	2,093	1,833
R-squared	0.2449	0.282

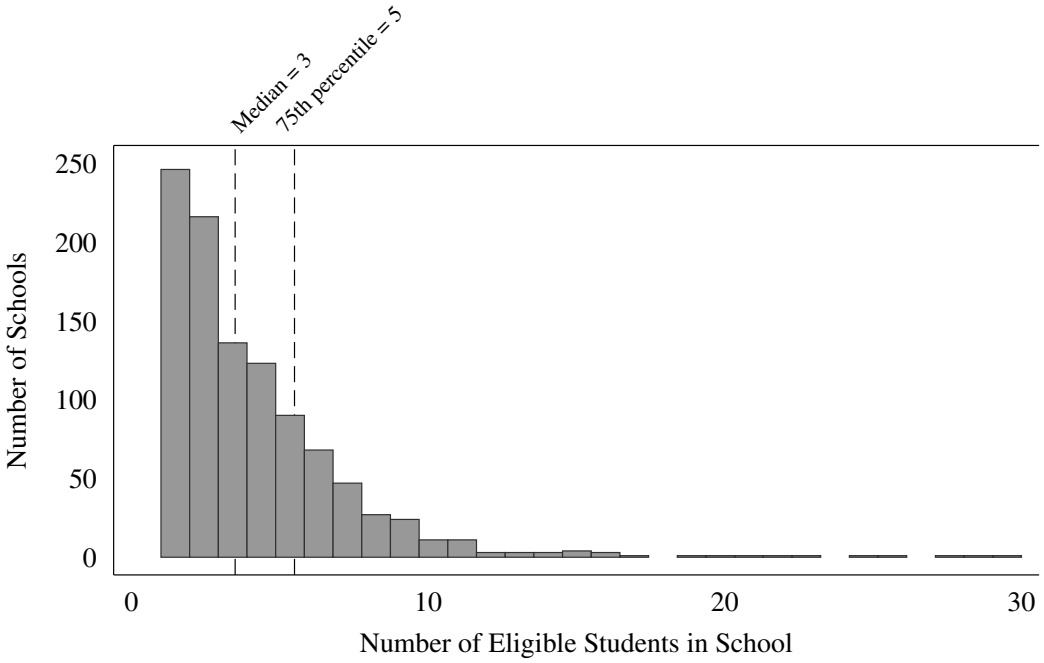
Source: Michigan administrative data, University of Michigan Office of Enrollment Management data, and National Student Clearinghouse data.
Notes: Coefficients and standard errors from regressions predicting 4- and 5-year college completion rates on all of the listed characteristics, estimated on the population of high-achieving, low-income students in Michigan prior to the HAIL scholarship intervention. Sample criteria are the same as for HAIL scholarship students in the subsequent years. College attendance is measured as the first college attended in the year after expected high school graduation and is unconditional on any college enrollment. Selectivity is based on Barron's selectivity index. Robust standard errors clustered at the school level reported in parentheses.

Appendix Table 20
Treatment Assignment and Takeup and the Compliance Subpopulations They Define

	Not Sent a Packet ($Z_i = 0$)	**Sent a Packet** ($Z_i = 1$)
Did Not Apply ($D_i = 0$)	Compliers, Never-takers ($Z_i = 0, D_i = 0$)	Never-takers only ($Z_i = 1, D_i = 0$)
Applied ($D_i = 1$)	Always-takers only ($Z_i = 0, Di = 1$)	Compliers, Always-takers ($Z_i = 1, D_i = 1$)

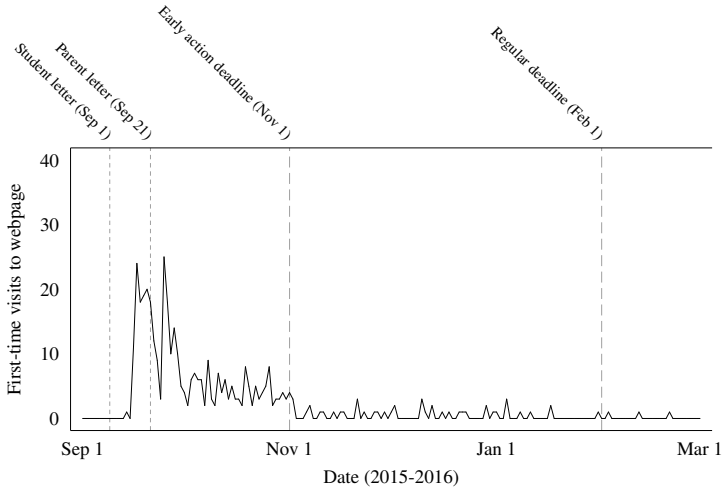
F Appendix Figures

Appendix Figure 1
Typical School Has Few Eligible Students
First and Second HAIL Cohorts

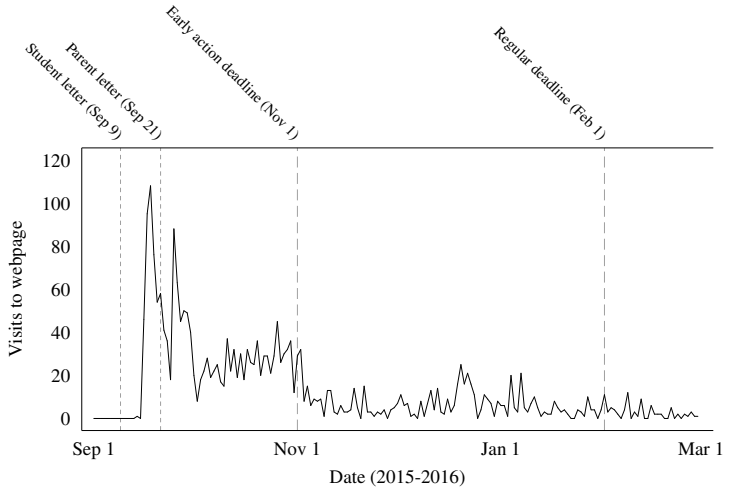


Source: Michigan administrative data.
Notes: Unit of analysis is the school-year.

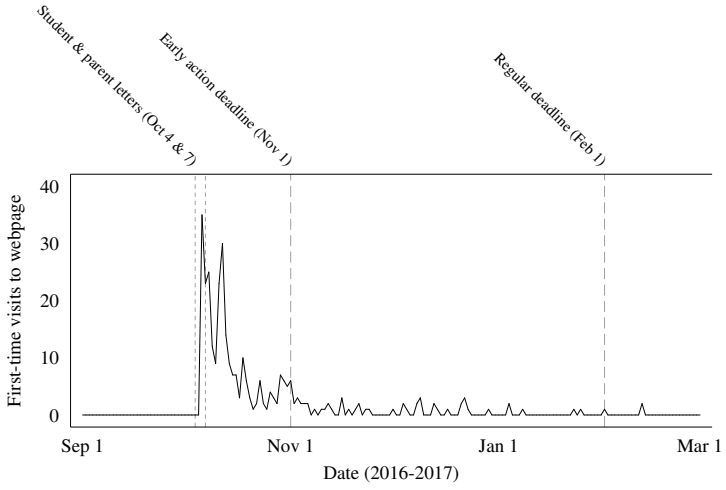
Appendix Figure 2
First-time and Total Visits to HAIL Webpages, by HAIL Cohort



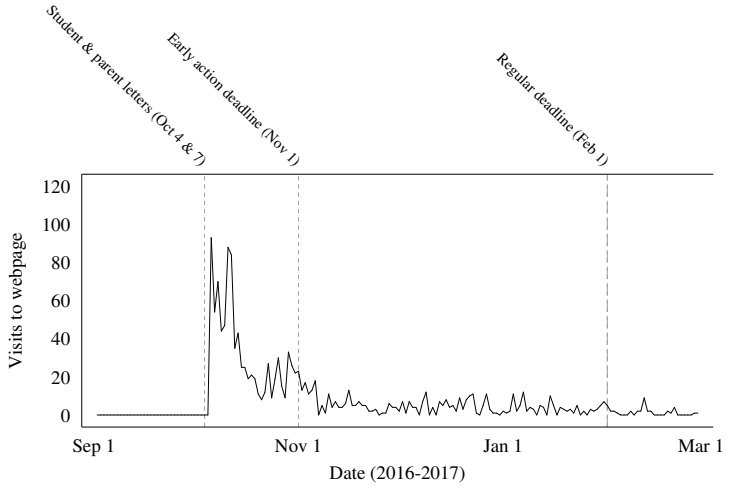
(a) First HAIL Cohort, First Time Page Views



(b) First HAIL Cohort, Total Page Views



(c) Second HAIL Cohort, First Time Page Views

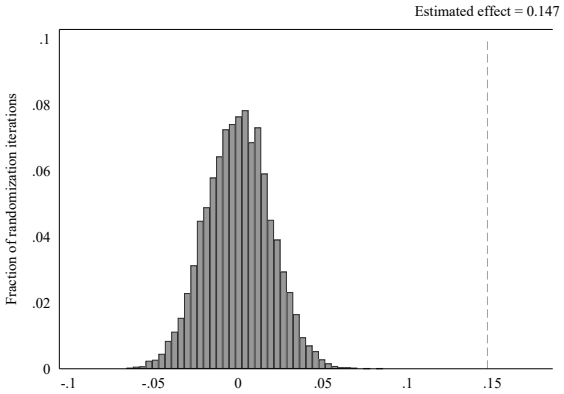


(d) Second HAIL Cohort, Total Page Views

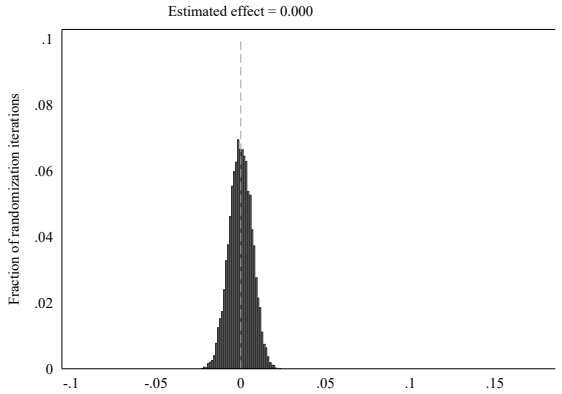
Source: University of Michigan Office of Enrollment Management data.
Notes: For first time views, unit of analysis is a first-time visit to the personalized URL associated with a treated HAIL student, aggregated by date. For total views, unit of analysis is a visit to a personalized URL associated with a treated HAIL student, aggregated by date.

Appendix Figure 3
Randomization-Based Inference

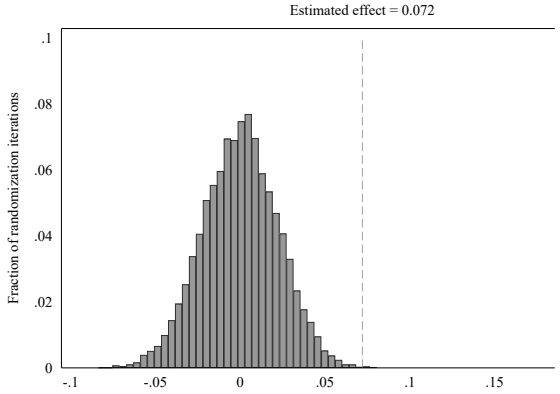
(a) University of Michigan (UM)



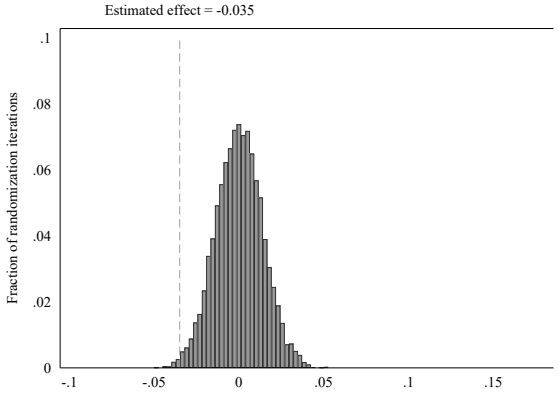
(b) Highly competitive or above other than UM



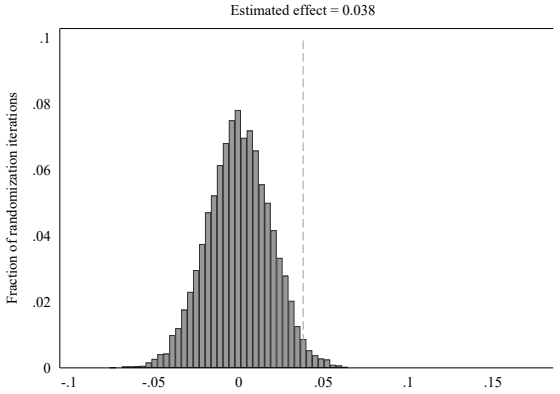
(c) Four-year



(d) Two-year



(e) Any

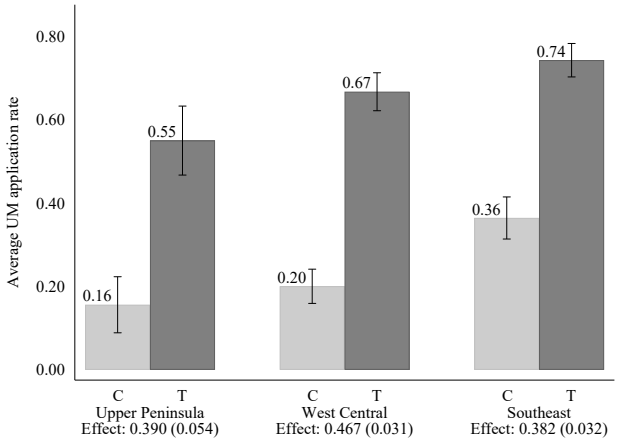


Notes: Each simulated treatment effect comes from first randomly assigning schools to treatment using the same randomization algorithm used for true assignment, then running a regression of the outcome on "treatment" status, including controls for strata. Exact p-value is calculated as the number of simulated effects greater in absolute value than the estimated effect.

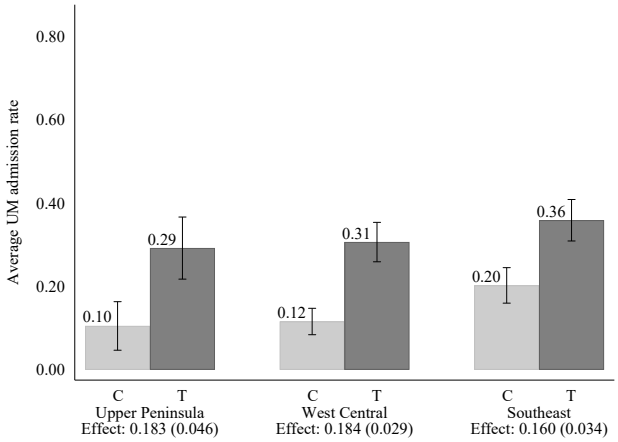
Appendix Figure 4

Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment by Region
First and Second HAIL Cohorts

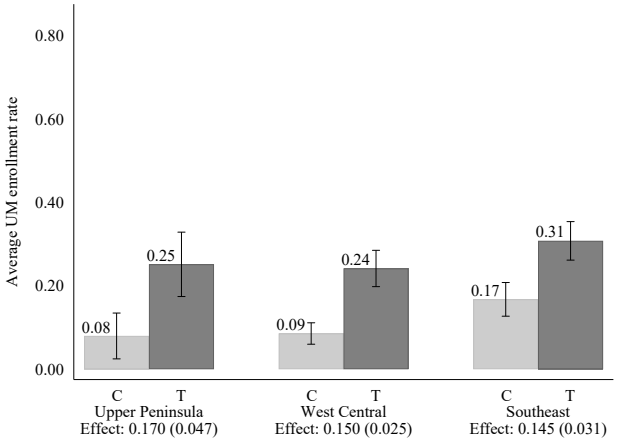
(a) Application to University of Michigan (UM)



(b) Admission to UM



(c) Enrollment at UM

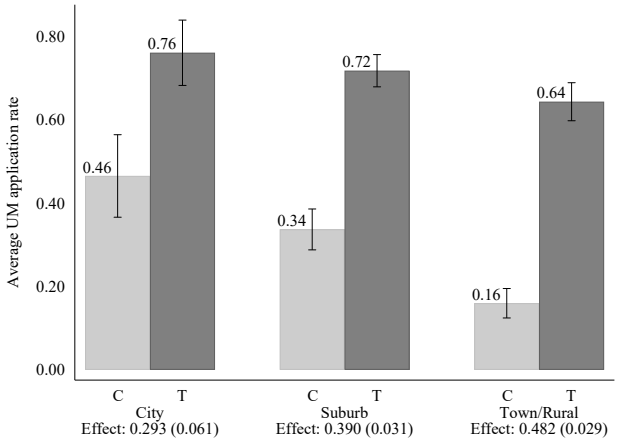


Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: All analyses done at the school-year level. 95 percent confidence intervals shown based on standard errors clustered at the school level. Application, admission and enrollment measured in the summer and fall following expected high school graduation. Admission and enrollment are unconditional on application. Treatment effects (displayed below each panel) are from a single regression of the outcome on treatment status and strata dummies, fully interacted with subgroup indicators. Robust standard errors clustered at the school level reported in parentheses. Schools in the UP make up 14 percent of sample, while schools in West Central and Southeast Michigan represent 46 percent and 40 percent of the sample, respectively.

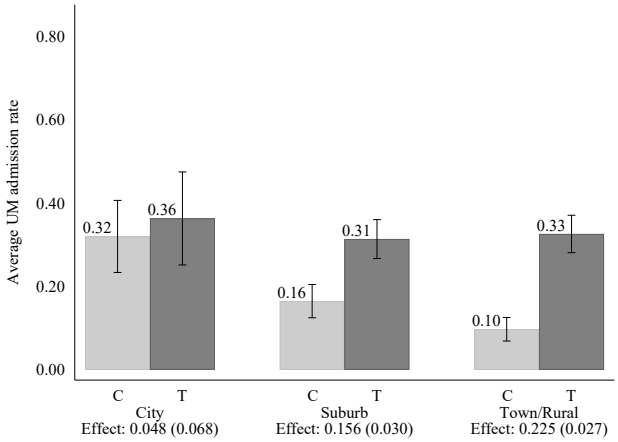
Appendix Figure 5

Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment by Urbanicity
First and Second HAIL Cohorts

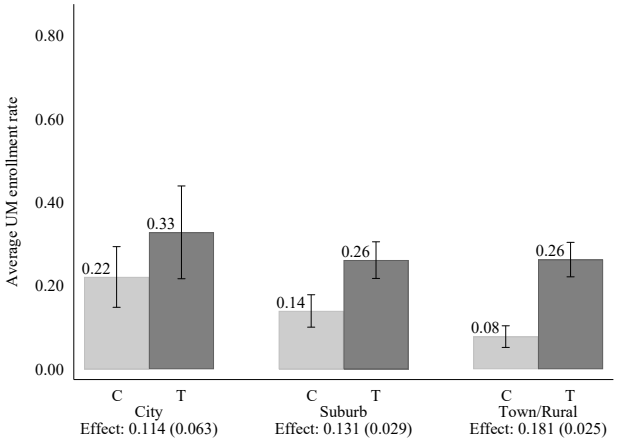
(a) Application to University of Michigan (UM)



(b) Admission to UM

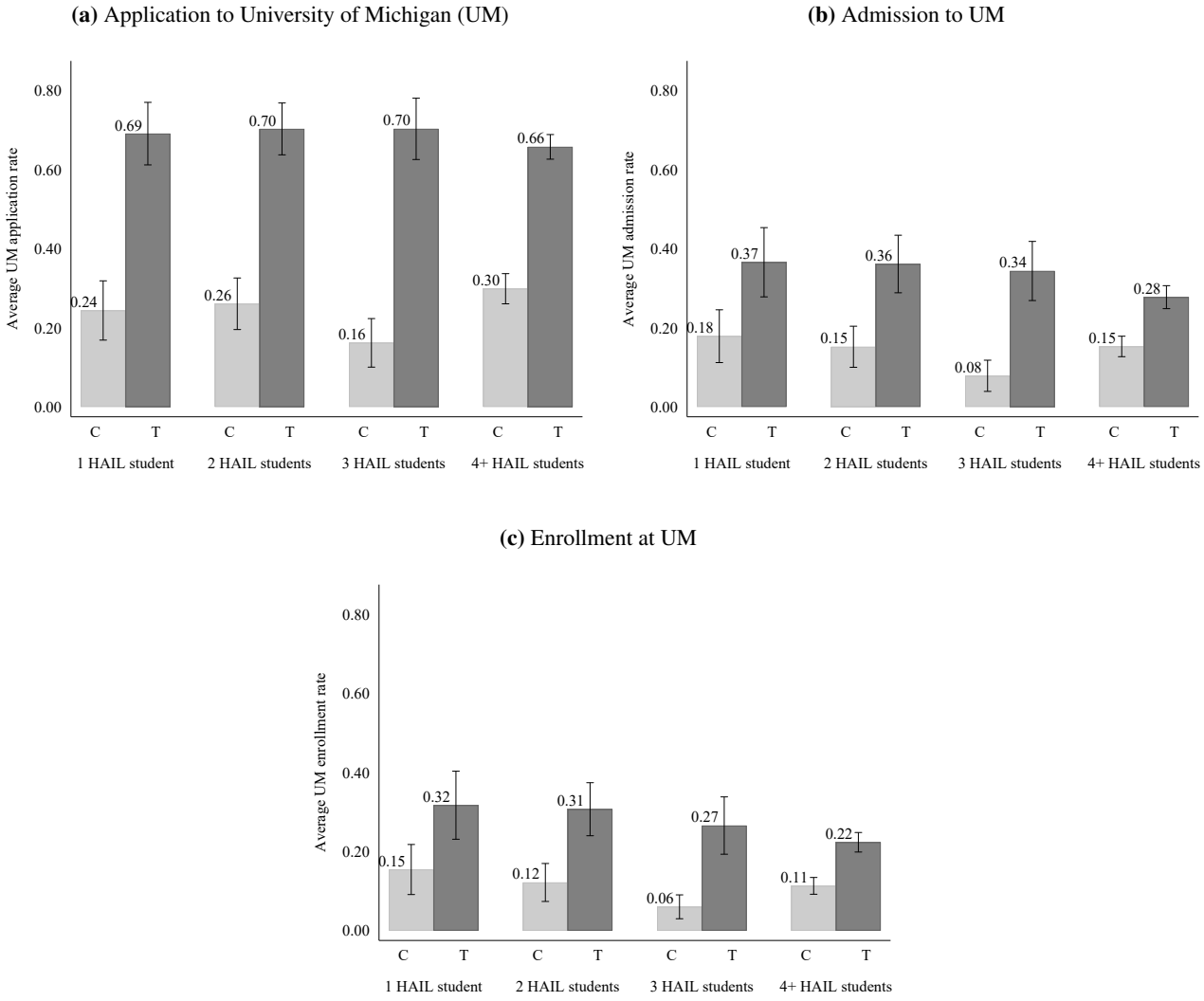


(c) Enrollment at UM



Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: All analyses done at the school-year level. 95 percent confidence intervals shown based on standard errors clustered at the school level. Application, admission and enrollment measured in the summer and fall following expected high school graduation. Admission and enrollment are unconditional on application. Treatment effects (displayed below each panel) are from a single regression of the outcome on treatment status and strata dummies, fully interacted with subgroup indicators. Robust standard errors clustered at the school level reported in parentheses. Schools in suburban areas make up 35 percent of sample, while schools in cities and town or rural areas represent 12 percent and 54 percent of the sample, respectively.

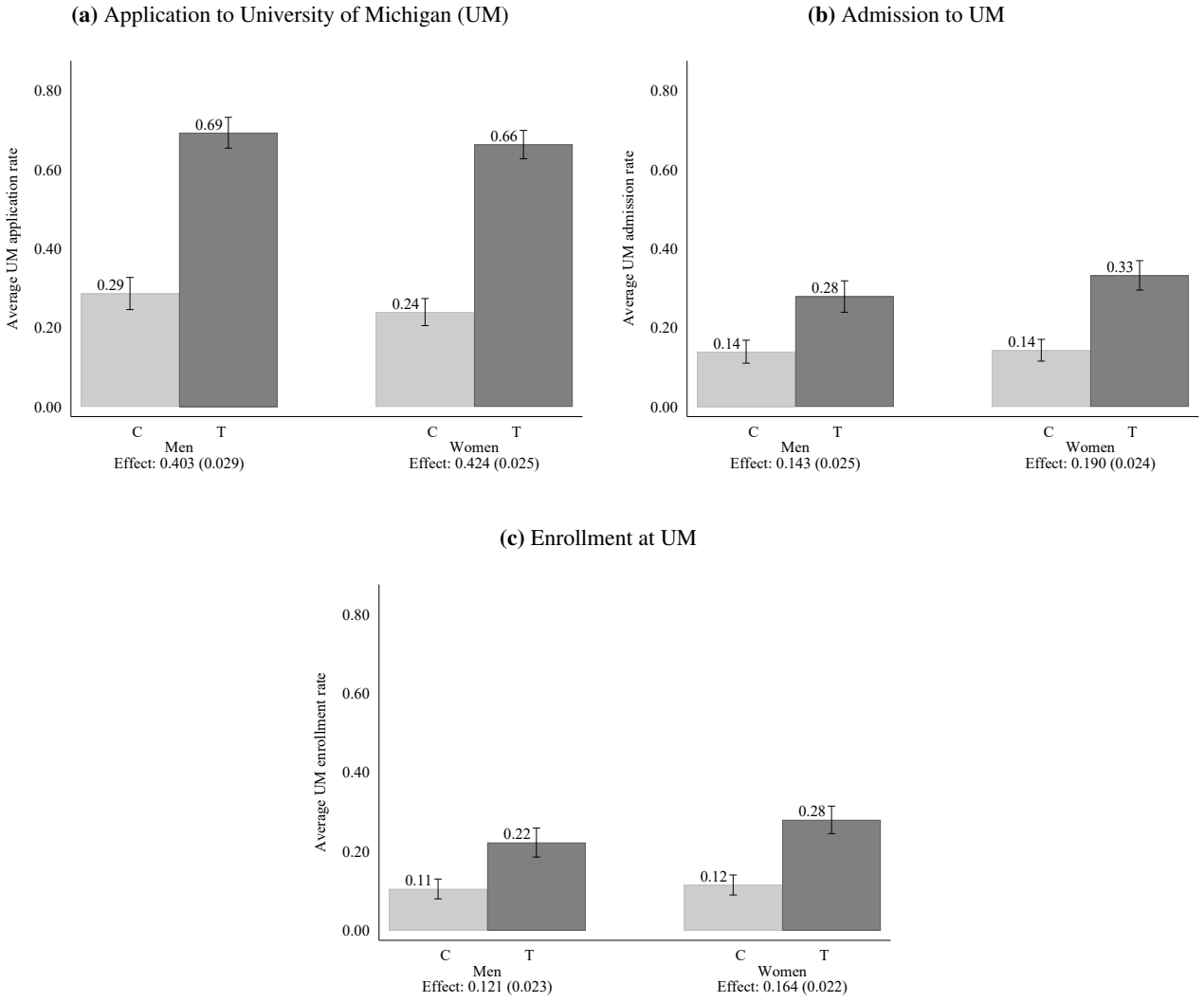
Appendix Figure 6
Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment
by Number of HAIL Students in School
First and Second HAIL Cohorts



Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: All analyses done at the school-year level. 95 percent confidence intervals shown based on standard errors clustered at the school level. Application, admission and enrollment measured in the summer and fall following expected high school graduation. Admission and enrollment are unconditional on application. Schools with 1 HAIL student make up 24 percent of sample, while schools with 2, 3, and 4 or more HAIL students represent 21 percent, 13 percent, and 42 percent of the sample, respectively.

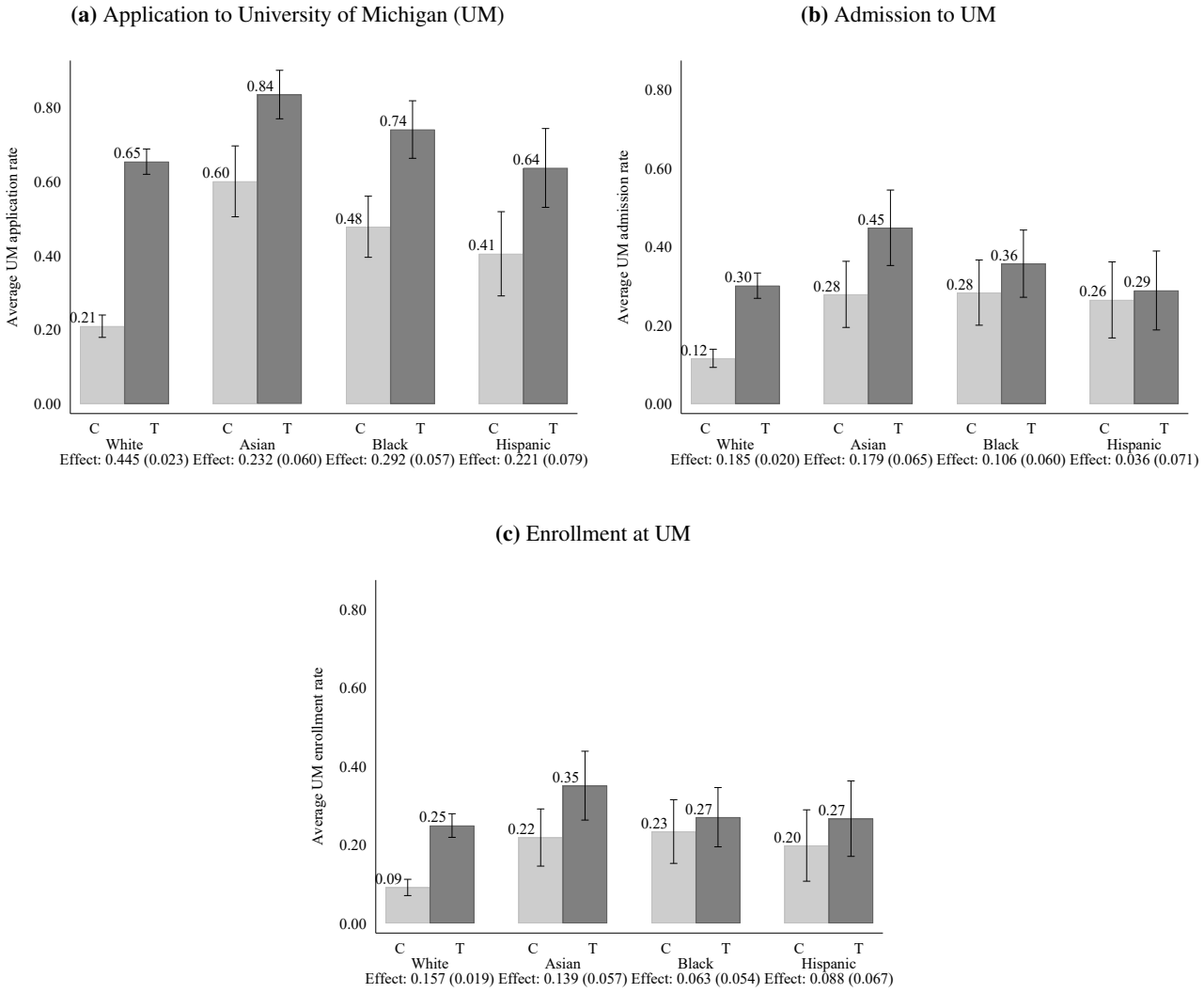
Appendix Figure 7

Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment by Gender
First and Second HAIL Cohorts



Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: Rates are gender-specific school-year averages. 95 percent confidence intervals shown based on standard errors clustered at the school level. Application, admission and enrollment measured in the summer and fall following expected high school graduation. Admission and enrollment are unconditional on application. Treatment effects (displayed below each panel) are from a single regression of school-subgroup-level outcome rate on treatment status and strata dummies, fully interacted with subgroup indicators. Robust standard errors clustered at the school level reported in parentheses. 83 percent of HAIL schools have at least one female HAIL student; 71 percent have at least one male. Female students represent 58 percent of the sample and male students represent 42 percent.

Appendix Figure 8
Estimated Effect of HAIL Scholarship on University of Michigan Application, Admission, and Enrollment by Race/Ethnicity
First and Second HAIL Cohorts



Source: Michigan administrative data and University of Michigan Office of Enrollment Management data.
Notes: Rates are race-specific school-year averages. Application, admission and enrollment measured in the summer and fall following expected high school graduation. 95 percent confidence intervals shown based on standard errors clustered at the school level. Admission and enrollment are unconditional on application. Treatment effects (displayed below each panel) are from a single regression of school-subgroup-level outcome rate on treatment status and strata dummies, fully interacted with subgroup indicators. Robust standard errors clustered at the school level reported in parentheses. 91 percent of HAIL schools have at least one White HAIL student; 17 percent have at least one Asian student; 20 percent have at least one Black student; and 14 percent have at least one Hispanic student. White students represent 77 percent of the sample; Asian, Black, and Hispanic students represent 8 percent, 8 percent, and 6 percent, respectively.