The Effect of Honors College Participation on Student Outcomes[1]

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Abstract

Honors education refers to programs for high achieving students at U.S. post-secondary institutions. These programs provide high achieving students benefits such as the ability to enroll in exclusive courses with small class sizes, to live in special dorms, and to enroll in classes earlier then non-honors students. These changes to a student's college experience may change their academic outcomes in ways that concern students and policymakers. Results in most prior research on the effect of honors program participation on academic outcomes may be biased by unobserved differences between students in and not in an honors program. This paper addresses these unobserved differences by studying an honors college that uses GPA admissions cutoffs. The Michigan State University Honors College considers for admission all students in the top 10% of the freshmen fall semester GPA distribution of each non-honors college. I use a regression discontinuity research design to compare outcomes of students above and below the cutoffs, and attribute differences in outcomes to differences in honors college participation. I find that participation in the honors college may reduce the time for students to get their first degree and increases the probability that first-generation college students will graduate from MSU.

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I. Introduction and Motivation

Honors education refers to special programs that colleges and universities in the United States (U.S.) provide to high-achieving students. Colleges have these programs to improve the educational experience of high-achieving students and to incentivize high-achieving students to attend their college[2]. In 2016 there were at least 1,035 honors colleges and honors programs in the U.S.[3] (Scott, Smith, and Congnard-Black 2017). While the specifics of the programs vary widely, common program elements include having honors courses[4], having honors housing, and requiring students to complete a thesis (Scott, Smith, and Congnard-Black 2017). These patterns are like patterns I found when looking at honors programs in national universities with a similar ranking to the University whose program I study[5]. In this paper I study how a student's participation in an honors program changes their academic outcomes.

While honors programs have aspects which have been shown to improve student outcomes, research on K-12 programs for high achieving students have shown mixed results. One reason an honors student might do better academically than a non-honors student is that they are in classes with fewer students. A key feature of honors programs is to allow students access to exclusive classes with small class sizes. Quasi-experimental research in higher education settings has found smaller class sizes to improve students rating of courses (Monks and Schmidt 2011; Sapelli and Illanes 2016). Another reason honors students might do better academically than non-honors students is that they have higher ability peers. Prior research has found that in some cases being in post-secondary settings with higher ability peers improves a student's GPA

[2] Large universities often advertise their honors programs as making a student's experience more like that of a small liberal arts college. This seems to be done to incentivize academically gifted students who want to attend a small liberal arts college to attend a large university instead. To the extent that students going to a small liberal arts college causes students to have different academic outcomes, replicating those features in an honors program may cause the program to impact academic outcomes in a similar way. For an example of an honors college that advertises itself as having a "small-college atmosphere" see https://honorscollege.msu.edu/about/index.html.

[3] In 2016 honors education was offered at an estimated 59% of U.S. public and non-profit undergraduate post-secondary institutions, 42% of two-year public and non-profit U.S. post-secondary institutions, and 68% of 4-year post-secondary institutions. 59% of both public and private non-profit post-secondary institutions offered honors education in 2016 (Scott and Smith 2016).

[4] At MSU, compared to non-honors courses, honors courses are limited to honors students, have smaller class sizes, cover more material, cover material at a faster pace, and have more classroom interaction. See https://honorscollege.msu.edu/admissions/honors-experiences.html. Honors courses at other universities likely have similar features such as having small class sizes.

[5] See Appendix A for a summary of these findings. In this paper I study the Michigan State University (MSU) Honors College. One of the findings is that, similar to the MSU Honors College, 20 of 50 honors programs that I looked at offered priority registration for honors students. This means that honors students can register for classes earlier then non-honors students.

(Carrrell, Fullerton, and West 2009; Brady, Isnler, and Rahman 2017)[6]. Peers also impact a variety of other outcomes for college students such as if they smoke, how much they binge drink, and if they support affirmative action (Sacerdote 2011). Like post-secondary honors education, gifted and talented programs in primary and secondary schools allow high-achieving students to take classes that go through advanced material with other high-achieving students. Studies have found positive effects on grades (Booij, Haan, and Plug 2017), reading and math achievement (Card and Giuliano 2014), high school graduation and college enrollment (Cohodes 2020) for students in gifted and talented education at the K - 12 level. However, other research finds no effect (Bui, Craig, and Imberman 2014; Abadulkadiroğlu, Angrist, and Pathak 2014) or a mix of positive, negative, and insignificant effects (Barrow, Sartain, and De La Torre 2020)[7]. This discrepancy between positive outcomes for smaller classes and better peers and the mixed outcomes of K-12 programs makes it unclear what the effect of honors programs will be. This motivates me to study the effect of honors programs on student outcomes.

Another motivation for this study is most other research on this topic is not able to credibly control for unobservable differences between honors and non-honors students. Most other studies compare honors and non-honors students based on the assumption that students select into honors programs based on observable characteristics like grades[8]. This assumption is likely wrong and leads to biased results because students who select into joining honors programs are probably different on unobservable characteristics such as organizational skills and motivation. These differences would lead honors students to have better outcomes even if honors programs did not change their college experience.

In this paper I study the effect of honors college participation on academic outcomes while controlling for selection on unobservable factors. I do this by studying the effect of participating in the MSU Honors College. The MSU Honors College considers for admission freshmen whose GPA is high relative to other freshmen students with similar majors. They do this by admitting

[6] Other studies have peer effect findings consistent with little or no effect of peer ability on high ability students (Carrell, Sacerdote, and West 2013; Booij, Leuven, and Oosterbeek 2017).

[7] Barrow, Sartain, and De La Torre (2020) study the effect of being above cutoffs to get into selective high schools in Chicago. Their findings include no effect on ACT scores, negative effect on GPA especially for students from low-SES neighborhoods, and positive effects on student perceptions of personal safety and peer relationships.

[8] Cosgrove (2004), Hartleroad (2005), Rinn (2007), Slavin, Coladarci, and Pratt (2008), Patton, Coleman, and Kay (2019), and Smeaton and Walsh (2019) estimate the effect of honors college participation on student outcomes by comparing honors students to non-honors students with high GPAs. This assumes that, for students with similar GPAs, aside from differences in a student's college experience caused by the honors program, there are no other differences between honors and non-honors students that cause their outcomes to be different.

first-year students whose cumulative GPA at the end of their first fall semester is above the cumulative GPAs of at least 90% of other freshmen in their non-honors college. This policy allows me to use a fuzzy regression discontinuity research design to compare individuals above and below the GPA cutoffs and to attribute discontinuities in outcomes at the cutoffs to a discontinuous increase in the proportion of honors students at the cutoffs. Because students can not precisely control their GPA, being just above or just below a cutoff is as good as random. This allows me to address omitted variable bias by comparing honors students to non-honors students who are similar on unobservable characteristics like organization skills and motivation. Looking at all students in my sample who are close to the cutoffs, I do not find evidence of large effects on student outcomes from honors college participation. In some specifications I find that honors college participation reduces time to degree. While the effect is especially large for male students, I am likely to find a significant effect because I check 9 outcomes and that finding for all students near the cutoff is not statistically significant without covariates in the regression or using a doughnut sample. In heterogeneity analysis I find that honors college participation increases the probability that first-generation college students graduate from MSU. This finding is consistent with marginally significant effects on total number of credits completed for first-generation college students. However, the coefficients have large standard errors because of the low number of high GPA first generation students in my sample and the results are not statistically significant when I use a bandwidth of 0.10 grade points.

To better understand the MSU honors college I interviewed 10 honors students and 3 honors college advisors. These interviews help me better understand what it is like to be an honors student at MSU and how being an honors student might change student outcomes. Some things I learned from the interviews are: that rather than take honors classes honors students mostly take regular classes and do additional projects, that the honors general education requirements are fulfilled by completing courses in specific disciplines, that honors students value being able to register for classes first and that, unlike some of their non-honors peers, honors students did not have problems enrolling in the classes they wanted.

II. Literature Review

Many studies attempt to measure the causal effect of honors college participation on a student's academic outcomes by comparing honors students to observably similar non-honors

students[9]. Most papers study programs at large 4-year public colleges (Cosgrove 2004; Hartleroad 2005, Rinn 2007; Slavin, Coladarci and Pratt 2008; Keller and Lacy 2013; Furtwengler 2015; Brown, Winburn, and Sullivan-Gonzalez 2019; Diaz, Farruggia, Wellman, and Bottoms 2019; Lishinski and Micomonaco 2020). Other papers study smaller 4-year public colleges (Patton, Coleman, and Kay 2019; Smeaton and Walsh 2019) and community colleges (Honeycutt 2019). These studies look at differences in average outcomes between honors students and high ability non-honors students (Cosgrove 2004; Hartleroad 2005; Rinn 2007; Slavin, Coladarci and Pratt 2008; Patton, Coleman, and Kay 2019; Smeaton and Walsh 2019), use matching methods (Shushok 2006; Keller and Lacy 2013; Futwengler 2015; Brown, Winburn, and Sullivan-Gonzalez 2019; Honeycutt 2019; Lishinski and Micomonaco 2020), and use hierarchical models (Diaz, Farruggia, Wellman, and Bottoms 2019). They find that honors college participation is associated a student having: a higher GPA (Cosgrove 2004; Hartleroad 2004; Shushok 2006[10]; Rinn 2007; Furtwengler 2015; Brown, Winburn, and Sullivan-Gonzalez 2019; Diaz, Farruggia, Wellman, and Bottoms 2019; Honeycutt 2019; Lishinski and Micomonaco 2020), a higher retention rate (Shushok 2006[11]; Slavin, Coladarci, and Pratt 2008; Keller and Lacy 2013; Brown, Winburn, and Sullivan-Gonzalez 2019; Diaz, Farruggia, Wellman, and Bottoms 2019; Patton, Coleman, and Kay 2019; Smeaton and Walsh 2019) a higher graduation rate (Cosgrove 2004; Slavin, Coladarci, and Pratt 2008; Keller and Lacy 2013; Diaz, Farruggia, Wellman, and Bottoms 2019; Honeycutt 2019; Patton, Coleman, and Kay 2019; Lishinski and Micomonaco 2020), longer time to graduate (Cosgrove 2004), more credits earned (Diaz, Farruggia,, Wellman, and Bottoms 2019), and more credits for upper level courses (Lishinski and Micomonaco 2020)[12].

There is one recent study on the effect of honors college participation on academic outcomes

[9] See Rinn and Plucker (2017) for a literature review of papers published from 2002 to 2017 on the effects of honors programs on student outcomes. Some papers in the review are referenced later in the paragraph.

[10] Shushok (2006) found that honors students GPAs are statistically significantly higher than the GPAs of matched non-honors students at the end of freshmen year. The difference in GPAs was not statistically significant for the GPAs Shushok collected 3 years later.

[11] Shushok (2006) finds that first year retention rates for honors students are statistically significantly higher than 1st year retention rates for matched non-honors students at the end of freshmen year. The difference in retention rates is not statistically significant for students 3 years later. This may simply be due to the study's small sample size as only 9 honors students and 15 non-honors students left the college during the period being analyzed.

[12] There are also papers which associate honors college participation with variables I do not study such as higher academic self-concept (Rinn 2007), increased interaction with faculty members (Shushok 2006), students taking classes with better teaching practices (Seifert, Pascarella, Colangelo, and Assouline 2007; Miller and Dumford 2018) and getting a higher standardized exam score (Seifert, Pascarella, Colangelo, and Assouline 2007).

that uses a methodology that can credibly control for selection on both observable and unobservable characteristics. Pugatch and Thompson (2022) study the Oregon State University honors college. They use a regression kink research design based on the change in slope of the probability of honors college admission as a function of a student's honors college application score. Using student-course level data they find that looking at all students near the kink scores honors college participation increases course GPA. However, they also find that honors college participation decreases course GPA for first generation college students.

Like this study, the researchers also use student level data to look at other academic outcomes. They look at the effect of honors college participation on overall grades, non-honors grades, overall number of credit hours, non-honors credit hours, ever graduating, graduating in less than 4, 5, and 6 years, and graduating in science or engineering. They do not find a significant impact on student's overall GPA. However, their point estimate is positive and of a similar magnitude to their course level data estimate. They find significant negative effects on the number of non-honors credits and graduating in less than 6 years. The authors dismiss the later finding partially because 99% of students in their data graduate within 6 years. Their point estimate on the probability of ever graduating is large and negative at 7.7 percentage points but is not statistically significant.

This study compliments Pugatch's and Thompson's study in several ways. One is by producing a credible causal estimate of honors college participation at a different university. Another is that Pugatch and Thompson study students who were admitted to an honors program while they were in high school while I study students who were admitted when they were already in college. Further, I study a variety of outcomes that Pugatch and Thompson do not. These outcomes include number of minors, time to degree, and credits in upper-level courses. Finally, due to a larger sample size, I can provide more precise estimates for the student level outcomes both studies look at.

The admissions policy of the MSU Honors College allows me to study the effect of an honors program on academic outcomes with a fuzzy regression discontinuity research design (RDD). This research design is considered to have high internal validity because, absent manipulation of the running variable, being on either side of the cutoff is as good as random (Lee and Lemieux 2011). In other words, the RDD is less subject to potential omitted variable bias then other studies that rely on a selection on observables assumption. Studies which compare

differences in outcomes between honors students and high ability non-honors students may not be able to control for differences in other observable factors between these students. Studies that use matching techniques can account for observable factors that affect student outcomes but may not completely control for unmeasured factors such as a student's level of ambition or how much a student cares about their college education. One downside of an RDD is that estimates only apply to units near the cutoff who are treated because they are above the cutoff. In this study I estimate the effect of participating in the MSU Honors College for students: who do not join the honors college when they are in high school, whose freshmen GPA is near a GPA cutoff, and who would join the honors college if their GPA was above a GPA cutoff. The effect of honors college participation for students admitted into the Honors College when they are in high school or for students with average GPAs may be significantly different from my estimates. This methodology allows me to provide information about what might happen to student outcomes if the GPA cutoffs were lowered, and more students were invited to join the MSU Honors College.

III. Institutional Background: MSU and The MSU Honors College

MSU is a large 4-year public university located in East Lansing, Michigan. 83% of students who applied to the university in Fall 2021 were admitted. In Fall 2020 38,491 undergraduate students were enrolled in the university. These students were 90% full time, 68% white, and 80% of them were from the state of Michigan[13].

The MSU Honors College invites first-year students with high GPAs[14] to join the college. MSU is organized into 17 different non-honors colleges. These colleges represent specific categories of study such as business, communication arts and sciences, and education. Freshmen students are assigned to colleges based on their expected majors. The MSU Honors College invites to join the college all freshmen who are in the top 10% of each non-honors college's

[13] https://nces.ed.gov/collegenavigator/?q=Michigan+State+University&s=all&id=171100 The years were chosen based on the data available on the above website.

[14] GPA stands for grade point average. Each course grade at MSU is assigned one of the following scores: 0, 1, 1.5, 2, 2.5, 3, 3.5, or 4. The better a student does in a class, the higher their course grade. Each class is a certain number of credits depending on how many hours the class meets each week. To calculate GPA, you first multiply a student's course grades by the number of credits in their classes to get the number of grade points they earned in each class. You then sum the grade points the student earned and divide by the number of credits the student took at MSU. While GPAs are generally determined using grades on assignments and exams, some students may be able to change their GPA by requesting a professor raise their grade. See https://natsci.msu.edu/students/current-students/student-success-resources/academic-success/habits-to-develop-outside-of-class/calculating-your-gpa/.

freshmen GPA distribution at the end of their first fall semester[15]. Transfer students can also be invited into the honors college this way if they transfer to MSU as first year students[16]. There are no additional fees for being in the college and there are no punishments if a student starts out in the college and leaves it later. A large minority of students invited into the college this way do not accept their invitation[17].

The benefits of being in the MSU Honors College include more flexible general education requirements, the ability to enroll in classes on the first day of each enrollment period, the ability to enroll in graduate courses, honors courses, and honors sections of regular courses, the ability to live on honors-only floors of residence halls, the ability to meet with honors college advisors and the ability to apply for special scholarships. See Appendix A.2 for more details about the benefits of being enrolled in the MSU Honors College.

Students must fulfill certain requirements to stay in the college. These requirements include completing at least 3 honors experiences (explained below) by the end of their second spring semester, maintaining a GPA of at least 3.2, and completing an Honors College Academic Progress Plan once a year. The Honors College Academic Progress Plan is used to approve courses for the college's general education requirements and to have students reflect on their accomplishments and professional goals.

Students in the college who engage in enough honors activities are recognized as having graduated from the college. To graduate a student must complete at least 8 honors experiences[18]. Honors experiences include participation in honors courses, participating in honors sections, taking the honors option in a non-honors course, and taking a graduate course. During an honors option students do a project related to course material not required by other students such as writing a business plan in an accounting course or writing a report on an additional experiment in a chemistry course[19]. If a student graduates from the MSU Honors College, that fact is recorded on the student's diploma and on their official MSU transcript. They are also recognized during

[15] Students who participate in specific enrichment programs and are in the top 15% of their college's GPA distribution are also invited to join the MSU Honors College. Only a small percent of students who are invited into the MSU Honors College are between the 85th and 90th percentile of their GPA distribution.
[16] Students who transfer as something other than first year students can also petition to join the honors college.
[17] From academic years 2017 – 2018 to 2021 – 2022 54% of freshmen admitted into the college accepted their offer.
[18] Students must complete 10 honors experiences if they have 2 degrees and want both degrees to be labeled as honors degrees.
[19] See https://honorscollege.msu.edu/academics/honors-option-examples.html for other examples of honors option projects.

graduation ceremonies with an Honors College stole and their affiliation with the MSU Honors College being noted in the graduation program.

IV. Data and Sample

This chapter uses student level administrative data from MSU's Office of the Registrar. I restrict the sample to students who were freshmen and whose first semester at MSU as an undergraduate was fall semester 2009, 2010, 2011, 2012, or 2013. Students who were in a college whose 90th percentile GPA I was unable to identify[20] are removed because I do not know how close those students' GPAs are to a cutoff to be considered for admission to the MSU Honors College. Students in colleges and cohorts where the GPA cutoff is 4.0 are removed. Because 4.0 is the maximum GPA a student can receive, when the cutoff is 4.0, I am unable to model the relationship between outcome variables and a student's GPA above the cutoff. Students whose GPA at the end of their first semester is 4.0 are removed because 4.0 students may be systematically different from students with a lower GPA[21]. After removing those students, the analysis sample, I also refer to this sample as the All GPAs Sample, has 35,800 observations[22].

[20] These include students whose first college was recorded as being in: the Honors College, the College of Human Medicine, the Associate Provost for Undergraduate Education or the Associate Provost for Undergraduate Services. Students do not have to declare a major until they have 56 credits. If students do not declare a major, their major is recorded as exploratory preference. Over 99% of Associate Provost for Undergraduate Education students have exploratory preference as their freshmen major. The most common majors for Associate Provost for Undergraduate Services are Study Abroad Course Access Track (33%) and Class Connection Tracking (24%). All College of Human Medicine students have a major of Bioethics, Humanities and Society.

[21] Because 4.0 is the maximum GPA a student can have, students who have a 4.0 GPA may have a wide range of underlying abilities. This may make the average outcome of 4.0 students different from students with a GPA just below a 4.0. If there was no upper limit to a student's GPA this would not be an issue.

[22] I start with a sample of 43,267 students whose first undergraduate term is Fall 2009, Fall 2010, Fall 2011, Fall 2012, or Fall 2013. 3,594 of those students are in a first college whose 90th percentile GPA I am unable to identify, 1,968 are in a starting year and first college whose 90th percentile GPA was 4.0, and 2,334 have a first semester GPA of 4.0.

Table 1 - Summary Statistics Honors and Non-Honors Students

Variable	Honors Students	Non-Honors Students
Female Indicator	0.59	0.50
	(0.49)	(0.50)
White Indicator	0.78	0.61
	(0.42)	(0.49)
Black Indicator	0.05	0.09
	(0.21)	(0.29)
First Gen Indicator	0.20	0.28
	(0.40)	(0.45)
Age First Term	17.9	18.1
	(0.52)	(0.75)
ACT Score	28.6	24.4
	(3.6)	(3.4)
First Semester GPA	3.6	2.6
	(0.47)	(1.1)
N	2,320	33,480

Notes: Honors students are students who are in the MSU Honors College for at least 1 semester. All other students are non-honors students. The table shows the mean value for each variable for honors and non-honors students. The standard deviation is below each mean in parentheses. 8.3% of honors students and 22% of non-honors students have missing ACT scores. N = 2,128 for ACT statistics for honors students. N = 26,186 for ACT statistics for non-honors students.

Table 1 shows summary statistics for honors and non-honors students. 6% of students in the sample are honors students. Compared to non-honors students, honors students are more likely to be female, more likely to be white, less likely to be black, less likely to be a first-generation college student, and have higher ACT scores and first semester GPAs. Honors and non-honors students on average start college when they are the same age, but the variability of ages is greater for non-honors students[23].

To the extent honors college participation causes students to substitute non-honors peers for honors peers, participation will likely increase the ACT scores and grades of the students' peers. This is because honors students have higher ACT scores and first semester GPAs then non-honors students. Honors students are encouraged to have other honors students as peers through access to things like honors classes, honors-only floors of resident's halls, and by the existence of honor student organizations. Prior research has found that peers significantly impact a variety of outcomes in higher education settings such as GPA and level of binge drinking (Carrrell, Fullerton, and West 2009; Sacerdote 2011). Therefore, I expect honors students to have

[23] In results available upon request, I get summary statistics for students admitted into the MSU Honors College when they are in high school and for students admitted into the MSU Honors College when they are already at MSU. Compared to students admitted when they were in high school, students admitted when they were in college are more likely to be female, less likely to be white, have lower ACT scores, and have higher first semester GPAs. The All GPAs Sample contains 1,124 high school admits and 1,196 college admits.

improved academic outcomes because they have higher ability peers.

Table 2 - Summary Statistics Close to Cutoffs Sample and All GPAs Sample

Variable	Close to Cutoffs	All GPAs
Female Indicator	0.57	0.51
	(0.49)	(0.50)
White Indicator	0.76	0.62
	(0.42)	(0.49)
Black Indicator	0.03	0.09
	(0.18)	(0.29)
First Gen Indicator	0.20	0.28
	(0.40)	(0.45)
Age First Term	18.0	18.1
	(0.69)	(0.74)
ACT Score	26.4	24.7
	(3.2)	(3.6)
First Semester GPA	3.8	2.8
	(0.09)	(1.1)
N	4,829	35,800

Notes: The table shows the mean value for each variable either for all students in the analysis sample (All GPAs) or for students in my sample whose 1st semester GPA is close to one of the GPA cutoffs to be admitted into the honors college (Close to Cutoffs). The standard deviation is below each mean in parentheses. Students in the Close to Cutoffs Sample have a first semester GPA minus the 90th percentile GPA for their year and college (running variable) of between -0.15 and 0.15. 13% of students in the Close to Cutoffs Sample and 21% of students in the All GPAs Sample have missing ACT scores. N = 4,223 for ACT statistics for the Close to Cutoffs Sample. N = 28,314 for ACT statistics for the All GPAs Sample.

Table 2 shows summary statistics for all students in the analysis sample (All GPAs Sample) and for a sample of students who are close to the cutoffs. Compared to the students in the All GPAs Sample, the students close to the cutoffs are more likely to be female, and white, less likely to be black or first gen students and have higher ACT scores and first semester GPAs. The two groups are similar in age during their first term.

V. Empirical Methodology

My equation of interest is:

(1) $$Outcome_{ict} = \beta_0 + \beta_1 HonorsCollege_{ict} + \boldsymbol{\beta X}_i + \theta_{ct} + \epsilon_{ict}$$

$Outcome_{ict}$ represents an outcome for student i who started in non-honors college c and in year t. The main outcomes I study include: the student's cumulative GPA at the end of their 4th and 8th semesters at MSU[24], if the student graduated from MSU, the number of semesters it took

[24] When counting semesters for cumulative GPA as an outcome, I do not count summers. For example, if a student started in Fall 2009 then their 3rd semester cumulative GPA would be their cumulative GPA at the end of Fall 2010 even if they took classes at MSU during Summer 2010. I also do not account for students who leave MSU for a

the student to get their first BA or BS degree, the number of majors the student completed, the number of minors the student completed, the total number of credits the student earned at MSU, the number of credits the student earned for classes at the 300 level, and the number of credits the student earned for classes at the 400 level.

$\mathbf{X_i}$ is a vector of covariates for student i. This vector contains indicator variables for the student's race[25], gender and if the student is a first-generation college student[26]. It also contains the student's age when they entered MSU as a continuous variable.

θ_{ct} is a fixed effect for the combination of the first non-honors college a student enrolled in at MSU and what year, 2009 – 2013, the student was a freshman. Cutoffs depend on a student's first college-year combination. This fixed effect allows me to compare students who face the same GPA cutoff.

$HonorsCollege_{ict}$ is an indicator variable for the student being in the MSU Honors College for at least 1 semester.

Because students are chosen to be in the honors college based on their academic achievement, an OLS regression would be inconsistent with $\hat{\beta}_1$ likely being too large. $\hat{\beta}_1$ would include not only the causal effect of being in the Honors College, but also the difference in unobserved factors that affect academic outcomes between honors and non-honors students. These factors might include how much a student studies and how much a student enjoys attending lectures[27]. To address this issue, I use a fuzzy[28] regression discontinuity research design where having a high enough 1st semester GPA to be considered for admission to the Honors College is an instrument for being in the college for at least 1 semester.

The empirical methodology for this project relies on the fact that the MSU Honors College uses GPA cutoffs when determining which freshmen get invited to join the college. The MSU

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semester and return later. For example, if a student started in Fall 2009, took no class in Spring 2010 or Fall 2010 and returned in Spring 2011, then their 3rd semester cumulative GPA (Fall 2010) would be missing.

[25] Some students in my data have a race that is either not reported or not requested. I leave these students in the sample and consider not reported as a race and not requested as a race.

[26] Being a first-generation college student means that none of the student's ancestors such as parents, grandparents, or great grandparents attended college or university.

[27] Other examples of possible unobserved differences that OLS regressions might not account for include differences in innate intelligence or differences in the quality of schools students attend before they start attending MSU.

[28] This is a fuzzy regression discontinuity research design because the probability of being in the MSU Honors College does not go from 0 to 1 at the GPA cutoffs. The main reason some students below the cutoff are in the MSU Honors College is because they were invited into the college when they were in high school. While all students above the cutoffs are invited to join the MSU Honors College, many above cutoff students decline their invitation to join the college.

Honors College invites all freshmen into the college whose GPA at the end of their first fall semester is in the top 10% of GPAs of freshmen in each non-honors college. For example, assume that there were 100 freshmen in the College of Music in Fall of 2009, that each student had a different GPA, and that the 10th highest GPA among those students was a 3.75. In that case, the MSU Honors College would invite the 10 freshmen in The College of Music who had a GPA of greater than or equal to 3.75 to join the college[29].

Because students do not know what the cutoffs will be, and because students cannot precisely control their GPA, those just above and just below the cutoffs should be similar in both observable and unobservable characteristics unrelated to honors college participation. This allows me to attribute differences in academic outcomes between students with similar GPAs on different sides of the GPA cutoffs to the difference in participation in the honors college at the cutoffs.

The first stage estimating equation is

$$(2)\ HonorsCollege_{ict} = \beta_0 + \beta_1 AboveCutoff_{ict} + \beta_2(FreshmenGPA_{ict} - GPACutoff_{ct}) + \beta_3 AboveCutoff_{ict}(FreshmenGPA_{ict} - GPACutoff_{ct}) + \boldsymbol{\beta X}_i + \theta_{ct} + \epsilon_{ict}$$

The second stage estimating equation is

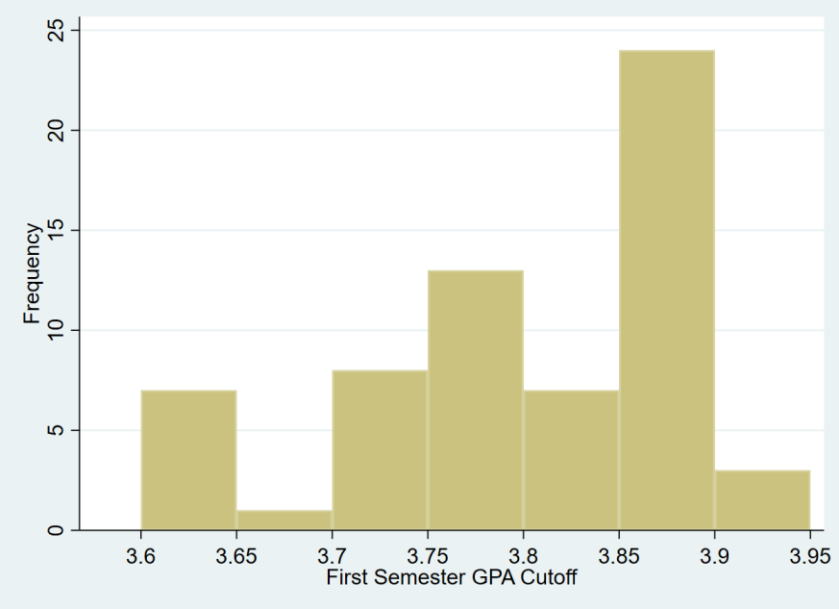
$$(3)\ Outcome_{ict} = \beta_0 + \beta_1 HonorsCollege_{ict} + \beta_2(FreshmenGPA_{ict} - GPACutoff_{ct}) + \beta_3 AboveCutoff_{ict}(FreshmenGPA_{ict} - GPACutoff_{ct}) + \boldsymbol{\beta X}_i + \theta_{ct} + \epsilon_{ict}$$

$AboveCutoff_{ict}$ is an indicator variable for if the student is above a GPA cutoff. $GPACutoff_{ct}$ is the minimum GPA the student needs to earn for them to be considered for admission into the MSU Honors College. It is specific both to the non-honors college the student was in when they were freshmen and the year the student was a freshman. The distribution of GPA cutoffs used in my analysis is shown below in Figure 1.1. In both equations the coefficient

[29] The cutoffs are calculated rounding to 2 decimal places. It might be the case that more than 10% of freshmen in a college are at or above a cutoff because many students have the same 1st semester GPA. In that case all students at or above the cutoff are invited to join the college.

of interest is β_1. In Equation 3 β_1 is the causal effect of ever being a part of the MSU Honors College on an outcome for students whose GPA is both close to one of the cutoffs and who would join the MSU Honors College if their GPA were above a cutoff.

Figure 1 – Distribution of GPA Cutoffs



Notes: N = 63. Cutoffs range from 3.6 to 3.93. For the years of my sample some colleges had cutoffs of 4.0. The 4.0 cutoffs are not included in the graph because students whose cutoff was 4.0 were not included in the analysis sample.

I also use equations 2 and 3 to measure how much students close to the cutoff participate in the MSU Honors College. I do this by looking at the following outcomes: the number of semesters a student is in the college, if the student graduated from the college, and the number of honors experiences the student completed. The more students do things that they can only do as honors students, the more intense the treatment of being admitted to the honors program is, and the more likely the program will change academic outcomes. The longer a student is in the MSU Honors College the more time they can engage in honor student only activities. Most of the things that count as honors experiences including enrolling in honors courses, honors sections, and graduate courses, are things only honors students can do[30]. The more honors experiences students have, the more being admitted into the MSU Honors College changes their college experience. Graduating from the MSU Honors College means a student has completed at least 8 honors experiences and completed yearly academic progress plans. Those students have engaged

[30] Honors options also count as honors experiences but both non-honors and honors students can do honors options. Honors students have a much stronger incentive to do them because only for honors students do they count towards getting a degree from the MSU Honors College.

a lot with honors activities, much more so than students who were admitted into the college but who did not have any honors experiences.

If there are discontinuities in observable characteristics at the GPA cutoffs, this may be evidence that students on either side of the cutoffs are different in ways other than their participation in the MSU Honors College. I test for this using the following equation

$$(4)\ Covariate_{ict} = \beta_0 + \beta_1 AboveCutoff_{ict} + \beta_2(FreshmenGPA_{ict} - GPACutoff_{ct}) + \beta_3 AboveCutoff_{ict}(FreshmenGPA_{ict} - GPACutoff_{ct}) + \theta_{ct} + \epsilon_{ict}$$

The models as specified above assume a linear relationship between a student's freshmen fall semester GPA and the outcome variables, allowing for different slopes on each side of the GPA cutoffs. I use a bandwidth of 0.15 for all regressions in the main body of the paper. I include alternative specifications in Appendix A. These other specifications include using a bandwidth of 0.10, using a bandwidth of 0.20, removing students with GPAs within 0.01 grade points of the cutoffs (doughnut sample), and choosing a bandwidth using an algorithm and calculating confidence intervals using the method described in Calonico, Cattaneo, and Titiunik (2014).

To test for differences in the effect of Honors College participation for different subgroups, I use the following equation

$$(5) Outcome_{icts} = \beta_0 + \beta_1 HonorsCollege_{icts} + \beta_2(FreshmenGPA_{icts} - GPACutoff_{ct}) + \beta_3 AboveCutoff_{icts}(FreshmenGPA_{icts} - GPACutoff_{ct}) + \beta_4 Subgroup_s + \beta_5 Subgroup_s HonorsCollege_{icts} + \beta_6 Subgroup_s(FreshmenGPA_{icts} - GPACutoff_{ct}) + \beta_7 Subgroup_s AboveCutoff_{ict}(FreshmenGPA_{icts} - GPACutoff_{ct}) + \theta_{ct} + \epsilon_{icts}$$

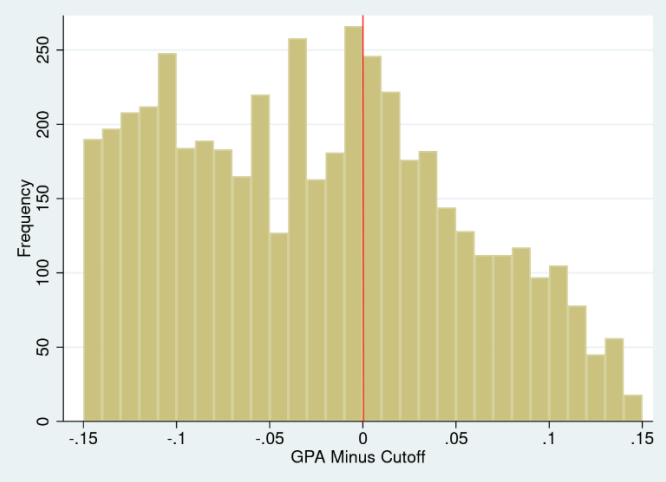
Subscript s denotes if individual i is a member of subgroup s. $Subgroup_s$ is a subgroup indicator variable. This equation models the relationship between the running variable and the dependent variable differently for students who are and are not subgroup members. I estimate Equation 5 by instrumenting $HonorsCollege_{icts}$ and $Subgroup_s HonorsCollege_{icts}$ with

$AboveCutoff_{icts}$ and $Subgroup_s AboveCutoff_{icts}$. The coefficients of interest are β_1 and β_5. β_1 is the treatment effect of honors college participation for students who are not members of the subgroup. $\beta_1 + \beta_5$ is the treatment effect for students who are members of the subgroup. The statistical test on β_5 tests whether the treatment is different for subgroup members and non-subgroup members.

VI. Results

A. Identification Test: Discontinuity in Density

Figure 2 – Histogram Students Close to Cutoffs



Notes: N = 4,829. Each bar in this histogram has a width of 0.01. The histogram starts at GPA Minus Cutoff = -0.15.

A sudden change in the density of observations at the cutoffs may be evidence that individuals on different sides of the cutoffs are different in ways that are not related to participation in the MSU Honors College. Figure 2 shows the density of observations for students in my sample who have a GPA within 0.15 grade points of the cutoffs. For this study the running variable (GPA Minus Cutoff) is a student's GPA at the end of their freshmen fall semester minus the 90th percentile of GPA for the student's cohort and first college[31]. The graph shows a small decrease in the number of observations where the running variable equals 0. I test for the significance of the change in the density of observations at the cutoffs using the test described in Cattaneo, Jansson and Ma (2018) which builds on foundational work for this type of test in McCrary (2008). I find that this decrease is statistically significant with a test statistic of

[31] 90th percentile GPAs by year and college were obtained from the MSU Enrollment and Term End Reports Ranking of Cumulative GPAs by Class and Level of Primary Major. See https://reg.msu.edu/roinfo/ReportView.aspx?Report=CTE-RankCumGPAs

2.2409 and a p-value of 0.03[32].

I do not think the significant test result means that students are precisely manipulating their GPA to be above the cutoffs. If they were, the density of observations would be much higher just above the cutoffs than just below the cutoffs. However, based on Figure 2, the density of observations declines slightly at the cutoffs. No student has an incentive to have a GPA just below a GPA cutoff. It is also the case that students can not precisely control their GPA. GPA is generally determined by grades on tests, homework assignments, and projects. Students generally do not know precisely what grade they will earn on a project for different levels of work. Students do not know what questions will be on a test and therefore cannot study specific topics to get the exact score they want. Finally, the cutoffs change from year to year. Cutoffs are calculated after the fall semester based on the distribution of grades of freshmen in each college. Even if a student knew what the previous year's cutoff was and could precisely target their GPA to last year's cutoff, the cutoff may be higher when it is applied to the student. In that case the student's GPA would be below the cutoff and they would not be invited to join the MSU Honors College.

[32] This is for an algorithmically chosen bandwidth of 0.137. Specifying a bandwidth of 0.15 the test statistic is 1.9961 and the p-value is 0.0459.

B. Identification Test: Discontinuities in Covariates

Table 3 – Discontinuity in Covariates

	Female	First Gen	Age First Semester	ACT Score[33]	White	Black
Above Cutoff	-0.0090	0.0059	-0.0120	-0.1358	-0.0148	0.0235**
	(0.0277)	(0.0178)	(0.0371)	(0.1959)	(0.0229)	(0.0108)
College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Mean Outcome	0.51	0.28	18	25	0.62	0.09
	American Native	Asian	Pacific Islander	Hawaiian	Hispanic	Two or More Races
Above Cutoff	0.0069**	-0.0086	0.0003	-0.0003	-0.0052	0.0000
	(0.0029)	(0.0155)	(0.0003)	(0.0003)	(0.0077)	(0.0068)
College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Mean Outcomes	0.00	0.05	0.00	0.00	0.04	0.02
	Race Not Reported	Race Not Requested				
Above Cutoff	0.0018	-0.0037				
	(0.0048)	(0.0151)				
College-Cohort Fixed Effects	Y	Y				
Mean Outcome	0.01	0.16				

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Bandwidth = 0.15. Standard errors are clustered at the first college – cohort level. The regressions above use estimating Equation 4 from Section 1.5 of this chapter and include first college – cohort fixed effects. N = 4,829 except for ACT Score where N = 4,223. The outcomes are indicator variables for being female, being a specific race, being a first-generation college student, the student's age during their first semester at MSU and the student's ACT score. Mean outcomes for the All GPAs Sample are shown.

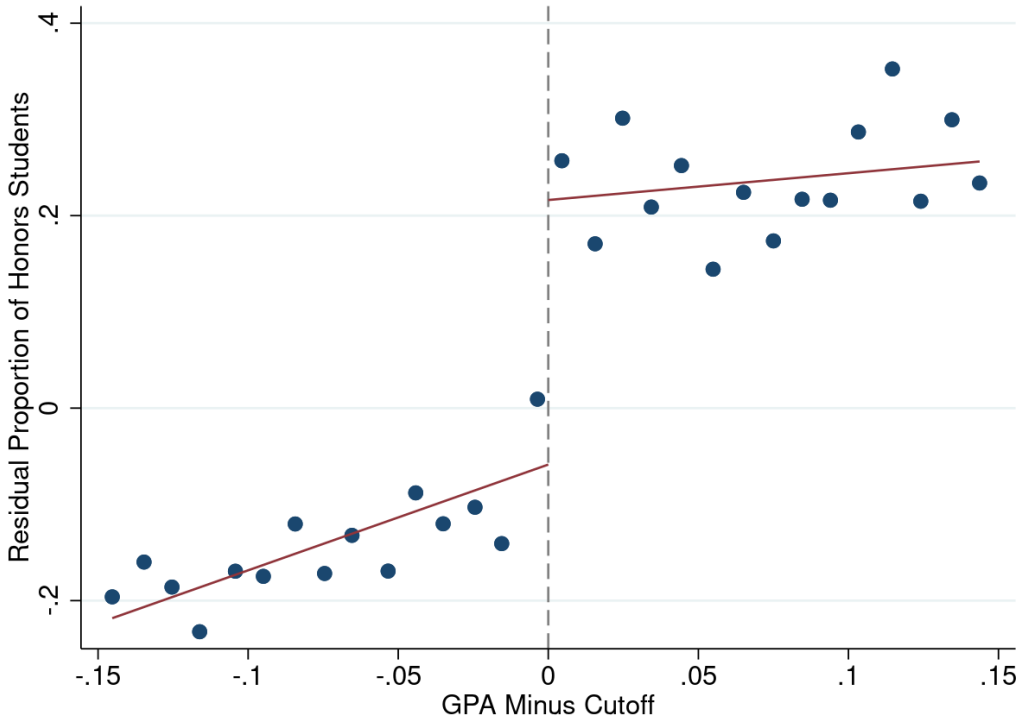
In Table 3 I test if there is a statistically significant discontinuity at the cutoffs for variables that should not be affected by a student enrolling in the MSU Honors College. Most of the coefficients are small and statistically insignificant. There is a statistically significant discontinuity in the proportion of black students and American Native students at the cutoff. I do not think this is much of an issue given the small number of black and American Native students near the cutoff. To the extent it is an issue, I address this by doing a robustness check using a doughnut sample. In that sample observations within 0.01 grade points of the cutoffs are removed. In Appendix A.4 I show that for the doughnut sample, no covariate that I check has a

[33] In results not shown, I test for a discontinuity at the cutoffs in the proportion of students whose ACT score is missing in my data. The discontinuity, at a decline of 0.0%, is small and insignificant.

statistically significant change at the cutoff at the 5% level.

C. Discontinuities in Honors College Participation at the Cutoffs

Figure 3 – Discontinuity in Proportion of Honors Students



Notes: N = 4,829. To create the graph, I regressed being an honors student on indicator variables for a student being in a particular first college and cohort. The graph above plots the residuals from that regression. This was done because all my regressions include first college-cohort fixed effects. Only students in the analysis sample who have a running variable between -0.15 and 0.15 are included in the graph. I define an honors student as a student who was in the MSU Honors College for at least 1 semester. Each dot is the residual proportion of honors students whose running variable is an element of [x, x + 0.01). For the left most dot x = -0.15.

Figure 3 shows a binned scatter plot of the residual proportion of honors students for different values of the running variable around the cutoffs. Residuals are from a regression of an indicator for a student being an honors student on indicator variables for students being in a particular first college and cohort. This was done because all my regressions include first college-cohort fixed effects. I did this so I am only comparing students who faced the same GPA cutoff. All binned scatter plots in this chapter will plot residuals of the variable of interest on first-college cohort indicator variables for the same reason. Binned scatter plots using the raw data are available upon request. In the figure the proportion of students who are honors students discontinuously increases from -0.05 to 0.2 at the cutoffs.

Table 4 – Discontinuity in Ever Being in the Honors College

	Ever in Honors College	Ever in Honors College
Above Cutoff	0.2871***	0.2859***
	(0.0269)	(0.0259)
First College-Cohort Fixed Effects	Y	Y
Covariates	N	Y
Mean Outcome	0.06	0.06

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. N = 4,829. Bandwidth = 0.15. Standard errors are clustered at the first college – cohort level. All regressions include first college-cohort fixed effects. Covariates include the student's age when the entered MSU and indicators for being female, being a specific race, and being a first-generation college student. Mean outcomes for the All GPAs sample are shown.

Table 4 shows that the increase in the proportion of honors students at the GPA cutoffs is statistically significant at the 1% level for a bandwidth of 0.15. This means that there are many students below the cutoffs who would have joined the MSU Honors College if their GPA was a bit higher, and they were invited to join the college.

Many students who are invited to join the MSU Honors College because they are at or above a GPA cutoff do not join the college. Of 1,759 students in my sample at or above the cutoffs who are not in the MSU Honors College during their first semester, only 828 of them (47%) ever become honors students. To learn about what kinds of invited students are more likely to accept their invitation, using the sample of 1,759 students, I regress an indicator for being in the honors college on indicators for being female, being a first-generation student, being a specific race, starting in a specific year, and having a specific first college. Clustering standard errors at the first-college cohort level, several of the coefficients are statistically significant. Women are 7 percentage points more likely to accept their invitation then men. Students who are a year older when they start attending MSU are 4 percentage points less likely to accept their invitation. Students who start in 2013 are 10 percentage points more likely to accept their invitation than students who started in 2009. Students whose first college is James Madison[34], Music, Natural Science, or Veterinary Medicine are more likely to accept their invitation then students whose first college is Agriculture and Natural Resources. The coefficients for black (8

[34] Students in James Madison College have at least one of the following majors: International Relations, Comparative Cultures and Politics, Social Relations and Policy, or Political Theory and Constitutional Democracy. James Madison is a living-learning community where students in the college can live in a special dorm (Case Hall) connected to classrooms, a dining hall, and faculty advising offices. See https://jmc.msu.edu/ for more information.

percentage points) and being a first-generation student (-5 percentage points) are both statistically insignificant.

Table 5 – Intensity of Honors College Participation for Marginal Students

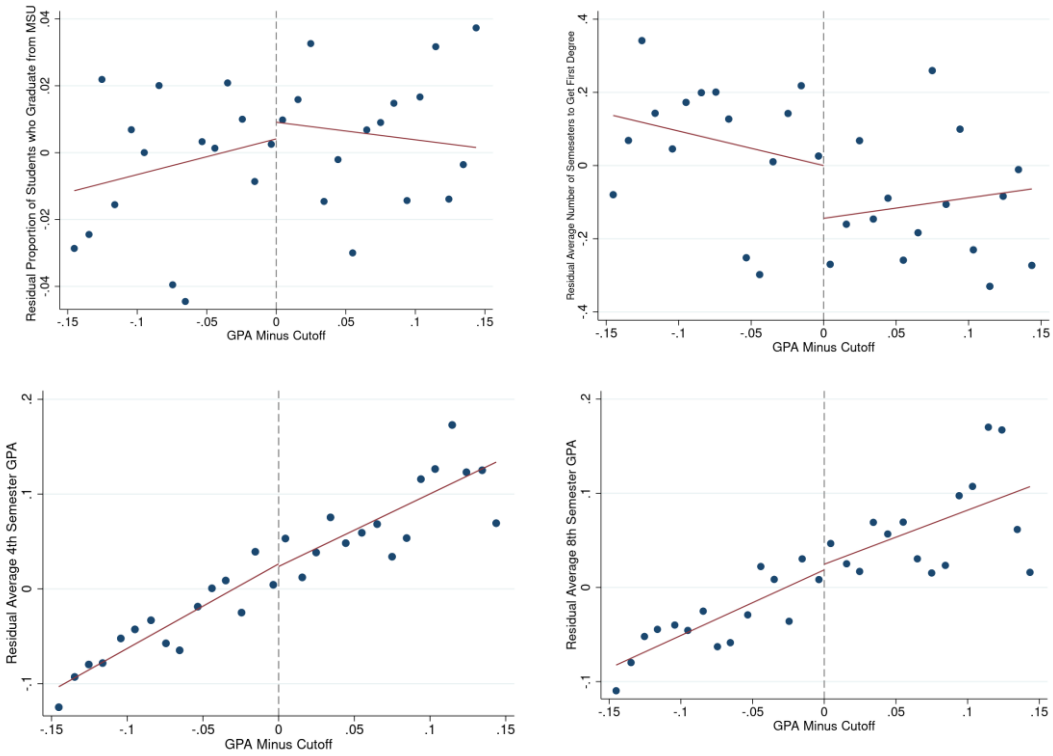
	Number of Semesters in the Honors College	Number of Semesters in the Honors College	Number of Honors Experiences	Number of Honors Experiences	Graduating from Honors College	Graduating from Honors College
Treatment Effect	7.8047***	7.8054***	5.2522***	5.2714***	0.5165***	0.5182***
	(0.4398)	(0.4422)	(0.3779)	(0.3789)	(0.0576)	(0.0578)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Mean Outcome College Admits	7.8	7.8	5.3	5.3	0.52	0.52

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. N = 4,829. Bandwidth = 0.15. Standard errors are clustered at the first college – cohort level. All regressions include first college-cohort fixed effects. The coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. Covariates include the student's age when the entered MSU and indicator variables for being female, being a specific race, and being a first-generation college student. Number of Semesters in Honors College is calculated using the first and last semester the student is in the honors college and counts summers as 1 semester. Mean outcomes for honors students in the All GPAs Sample whose first semester in the honors college is not their first semester at MSU are shown.

Table 5 shows treatment effects for how accepting an invitation to join the honors college changes honors college related outcomes. The table shows that, at least based on the outcomes in the table, honors students just above the cutoffs participate in the honors college as much as other students invited into the college as a freshman. Marginal honors students stayed in the honors college for an average of 7.8 semesters and completed an average of 5.3 honors experiences. About 52% of them ended up graduating from the honors college meaning they completed at least 8 honors experiences. These results show that honors college participation significantly changed the college experience of students near the cutoffs.

D. Results: Discontinuities in Academic Outcomes

Figure 4 – Discontinuities in Selected Outcomes



Notes: N = 4,829 for the top left graph. N = 4,403 for the top right graph. N = 4,561 for bottom left graph. N = 4,006 for bottom right graph. The top left graph has the most observations because some students left MSU before they earned a degree or before their 4th or 8th semesters. To create each graph, I regressed the outcome variable on indicator variables for a student being in a particular first college and cohort. In the graphs above I plot the residuals from those regressions. Graphs created using the raw data are available upon request. For the top right graph time to degree counts summers as 1 semester even if the student did not take any summer classes. For the bottom two graphs the variable is cumulative GPA at the end of the term. Each dot is the average residual for students whose running variable is an element of [x, x + 0.01). For the left most dot x = -0.15.

Figure 4 contains binned scatter plots showing the discontinuity in: the proportion of students who graduated from MSU (top left), the number of semesters to get first degree (top right), 4th semester GPA (bottom left), and 8th semester GPA (bottom right). The only outcome that has a visually large discontinuity at the cutoffs is time to degree. Time to degree decreases by about 0.15 semesters at the cutoffs.

Table 6 – Effect of Honors College Participation on Student Outcomes

	Graduate MSU	Graduate MSU	Time to Degree	Time to Degree	4th Semester GPA	4th Semester GPA
Treatment Effect	0.0133	0.0178	-0.5883*	-0.7789**	-0.0173	0.0068
	(0.0537)	(0.0536)	(0.3556)	(0.3269)	(0.0676)	(0.0652)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Number of Observations	4,829	4,829	4,403	4,403	4,561	4,561
Mean Outcome	0.79 8th Semester GPA	0.79 8th Semester GPA	13 Total Credit Hours	13 Total Credit Hours	3.0 Credit Hours 300 Level	3.0 Credit Hours 300 Level
Treatment Effect	0.0138	0.0503	-3.0377	-3.3693	-1.9085	-1.9186
	(0.0685)	(0.0633)	(4.7788)	(4.8348)	(2.0016)	(2.0133)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Number of Observations	4,006	4,006	4,829	4,829	4,829	4,829
Mean Outcome	3.1 Credit Hours 400 Level	3.1 Credit Hours 400 Level	106 More than One Degree	106 More than One Degree	25 Number Minors	25 Number Minors
Treatment Effect	0.6898	0.8118	-0.0478	-0.0494	-0.0970	-0.0987
	(2.1644)	(2.1546)	(0.0412)	(0.0414)	(0.0754)	(0.0766)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Number of Observations	4,829	4,829	4,403	4,403	4,829	4,829
Mean Outcome	17	17	0.03	0.03	0.15	0.15

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. Covariates include the student's age when they enter MSU and indicators for being female, being a specific race, and being a first-generation college student. For all regressions the bandwidth is 0.15. Mean outcomes for students in the All GPAs Sample are shown. Time to degree counts summers as 1 semester. For the GPA regressions, 4th semester and 8th semester are calculated ignoring summers. GPA is cumulative GPA at the end of the semester. For more than one degree only students who have at least 1 degree are included in the regression.

Table 6 shows treatment effect estimates for ever being in the MSU Honors College on academic outcomes. Almost all outcomes have insignificant coefficients with or without covariates. The only exception to this is the negative coefficient on time to degree with

covariates. According to that estimate, being in the MSU Honors College causes students near the cutoff to graduate 0.78 semester sooner. This is a reduction in the number of semesters to graduate of about 6%[35]. The magnitude for time to degree is 24% smaller without covariates and is only statistically significant at the 10% level. The statistically significant coefficient might be a spurious result given that the 8 other outcomes I check are statistically insignificant and the more outcomes I check the more likely 1 is significant even if all true effects are 0. Based on these results, it seems like honors college participation does not affect student outcomes with the possible exception of reducing the time it takes students to get their first degree.

In Appendix A.7 I estimate the effect of being in the MSU Honors College on outcomes not in Table 5. Outcomes in Tables A.22 and A.23 include cumulative GPA 2nd to 8th semesters, retention for 2nd to 8th semester, and time to first degree ignoring summers. In Table A.24 I look at the effect of honors college participation on the major of a student bachelor's degree[36]. No coefficient in Tables A.22, A.23, or A.24 is statistically significant at the 5% level. This includes the coefficients on time to degree when calculated ignoring summer semesters. I conclude that I do not have evidence that honors college participation changes any of the outcomes in Appendix A.7.

E. Alternative Specifications: Full Sample

In Appendix A.3.1 I re-create Tables 3 to 6 using algorithmically chosen bandwidths and bias corrected confidence intervals from Calonico, Catteno, and Titiunik (2014). The results are presented in Tables A.1 to A.4 and are qualitatively similar to those above.

In Appendix A.3.2 I re-do the analysis from Tables 3 to 6 for a bandwidth of 0.10 and a bandwidth of 0.20. The results are presented in Tables A.5 to A.10. In most cases changing the bandwidth does not change the significance of the results. The coefficient on the proportion of black students is significant at a 10% level for a bandwidth of 0.20 but not significant for a bandwidth of 0.10. With a bandwidth of 0.15 the coefficient is significant at the 5% level. The negative treatment effect of honors college participation on time to degree is only significant at the 10% level for a bandwidth of 0.20. The treatment effect is significant at the 5% level for

[35] The denominator for this calculation is the average of 13 semesters it took students in the All GPAs Sample to get their first degree.

[36] My data contains the name of each degree or certificate a student earned at MSU. I take the name of the first bachelor's degree in each student's list of awards and classify the degree into 1 of 11 groups of degrees based on the degree groups in Andrews, Imberman, Lovenheim, and Strange (2022). If a student did not earn a bachelor's degree at MSU they are classified as being in a No Degree group of degrees. A list of which majors are classified as being part of each major group is available upon request.

bandwidths of 0.10 and 0.15.

Finally, I re-create Tables 3 to 6 using a doughnut sample. This sample removes students in the analysis sample whose GPA at the end of their first fall semester is within 0.01 grade points of their cutoff. One reason for creating this sample was to address the significant discontinuity in the proportion of black students at the cutoffs in the analysis sample. Another is to address identification issues arising from the jump in the proportion of honors students of about 10 percentage points from between 0.02 and 0.01 grade points below the cutoffs to between 0.01 grade points below the cutoffs and the cutoffs. The results are presented in Tables A.11 to A.14. With the doughnut sample no covariates have a statistically significant discontinuity at the cutoff at the 5% level. The proportion of honors students still increases significantly at the cutoff and the treatment effect on honors college related outcomes is about the same as it is in Table 1.5. However, unlike in Table 1.6, no outcome has a significant coefficient at the 5% level when covariates are included. In particular, the estimated treatment effect for time to degree is about 35% of the magnitude it is in Table 1.6 and is not significant even at the 10% level. This result is consistent with the significant time to degree in Table 1.6 being due to random variation rather than due to a real causal effect.

Another possible concern with my main specification is that I may not have a large enough range of observations above the cutoff to properly estimate the regression. To address this, in results available upon request, I get the results in Tables 3 to 6 dropping all students whose cutoff is 3.9 or greater. Results are similar to the main specification with a first stage of 27 percentage points and a significant effect on time to degree with covariates of -0.84 semesters.

To see if my results are robust to including students whose GPA at the end of their first term is 4.0, in results available upon request I get the information in Tables 3 to 6 including those 4.0 students. In all regressions I include an indicator variable for a student having a 4.0 GPA at the end of their first term in case those students are different from other students. Results are similar to the main specification with a first stage of 30 percentage points and a significant effect on time to degree with covariates of -0.77 semesters. The only major difference is that I estimate compliers stayed in the honors college on average 4.5 semesters. This is much less than the estimate of 7.8 semesters in Table 5.

F. Discontinuity in High School Admits

In Appendix A.5 I look for a discontinuity in the proportion of students who were

admitted into the MSU Honors College when they were in high school. I identify a student as a high school admit based on the student being in the MSU Honors College during their first term at MSU. Because those students being in the MSU Honors College is unrelated to the cutoffs, there should be no discontinuity in high school admits at the cutoffs. This is what I find in Figure A.1 and Table A.15. The discontinuity for high school admits is close to 0 and statistically insignificant.

G. Heterogeneity: Female vs Male

Table 7 – Male and Female Treatment Effect of Honors College Participation

	Graduate MSU	Time to Degree	4th Semester GPA	8th Semester GPA	Total Credit Hours	Credit Hours 300
In Honors College	0.0351	-1.5449**	0.0586	0.0855	-4.6264	-1.8286
	(0.1040)	(0.6713)	(0.0954)	(0.1097)	(8.1971)	(3.8378)
In Honors College * Female	-0.0356	1.6551**	-0.1323	-0.1202	3.0443	-0.0316
	(0.1320)	(0.7845)	(0.1159)	(0.1095)	(9.8622)	(6.1465)
P(In Honors College + Interaction)	0.99	0.80	0.38	0.61	0.78	0.59
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Number of Observations	4,829	4,403	4,561	4,006	4,829	4,829
Mean Outcome Males	0.77	13	3.0	3.1	104	25
Mean Outcome Females	0.81	12	3.1	3.2	107	25

	Credit Hours 400	More Than One Degree	Number Minors
In Honors College	1.2094	0.0125	0.0301
	(3.6923)	(0.0519)	(0.1315)
In Honors College * Female	-0.9019	-0.1062	-0.2248
	(4.1635)	(0.0806)	(0.2011)
P(In Honors College + Interaction)	0.90	0.14	0.10
First College-Cohort Fixed Effects	Y	Y	Y
Number of Observations	4,829	4,403	4,829
Mean Outcome Males	16	0.02	0.12
Mean Outcome Females	18	0.03	0.17

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Regressions are 2SLS regressions where Above Cutoff and Above Cutoff * Female are instruments for In Honors College and In Honors College * Female. All regressions have a bandwidth of 0.15. Time to degree results only use students who graduated and counts summers as 1 semester. For the GPA regressions, 4th semester and 8th semester are calculated ignoring summers. GPA is cumulative GPA at the end of the semester. Mean outcomes are for all male or all female students in the All GPAs Sample. For more than one degree only students who have at least 1 degree are included in the regression.

Table 7 shows results of regressions that explore differences in the effect of honors college participation for female and male students. For most outcomes, neither the treatment effect for female students, the treatment effect for male students, nor the difference between the two treatment effects is statistically significant. The one exception to this is for time to degree. I estimate that male students graduate a statistically significant 1.5 semesters faster because they

join the MSU Honors College. This is statistically significantly different than my estimated treatment effect for female students of an insignificant increase in time to degree of 0.1 semesters. As robustness checks, I re-run the regressions used to create Table 7 with a doughnut sample and with bandwidths of 0.10 and 0.20. The results are presented in Appendix Table A.16, A.17, and A.18. Results are similar to those in Table 7. In all alternative specifications I find that being in the MSU Honors College reduces time to degree for male students and has a near 0 effect for female students. The coefficient on male time to degree is significant for bandwidths of 0.1 and 0.2 but not when using the doughnut sample. I conclude that my time to degree results looking at all students near the cutoff are entirely driven by the effect of honors college participation on male students.

H. Heterogeneity: First Generation College Students vs Second and Above Generation Students

Table 8 –First Gen and Second and Above Gen Treatment Effect of Honors College Participation

	Graduate MSU	Time to Degree	4th Semester GPA	8th Semester GPA	Total Credit Hours
In Honors College	-0.0536	-0.6459	-0.0384	-0.0237	-9.2399*
	(0.0548)	(0.4130)	(0.0715)	(0.0647)	(5.2039)
In Honors College * First Gen	0.3257**	0.2345	0.1031	0.1739	30.3831**
	(0.1367)	(1.1164)	(0.1379)	(0.1746)	(13.0604)
P(In Honors College + Interaction)	0.04	0.67	0.62	0.40	0.09
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y
Number of Observations	4,829	4,403	4,561	4,006	4,829
Mean Outcome 2nd and Above Gen	0.82	12	3.1	3.2	107
Mean Outcome First Gen	0.73	13	2.9	3.0	101

	Credit Hours 300 Level	Credit Hours 400 Level	More Than One Degree	Number Minors
In Honors College	-3.7226	0.4058	-0.0522	-0.1444
	(2.2992)	(2.4136)	(0.0436)	(0.1003)
In Honors College * First Gen	8.8233*	1.5211	0.0240	0.2255
	(4.9352)	(5.2188)	(0.0769)	(0.2483)
P(In Honors College + Interaction)	0.25	0.68	0.71	0.69
First College-Cohort Fixed Effects	Y	Y	Y	Y
Number of Observations	4,829	4,829	4,403	4,829
Mean Outcome 2nd and Above Gen	25	17	0.03	0.15
Mean Outcome First Gen	22	16	0.03	0.14

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Regressions are 2SLS regressions where Above Cutoff and Above Cutoff * First Gen are instruments for In Honors College and In Honors College * First Gen. All regressions have a bandwidth of 0.15. The regression for time to degree only includes students who graduated and counts summers as 1 semester. For the GPA regressions, 4th semester and 8th semester are calculated ignoring summers. GPA is cumulative GPA at the end of the semester. Mean outcomes are for 2nd and above generation or first-generation students in the All GPAs Sample.

Table 8 shows differences in the effect of honors college participation for students who are and are not first-generation college students. The only treatment effect significant at the 5% level is for graduation. I estimate that joining the MSU Honors College causes first generation

college students to be 27 percentage points more likely to graduate from MSU. The other significant result in the table is the difference in the treatment effect on total number of credits completed at MSU. I estimate that being in the MSU Honors College causes first generation college students to complete 21 more credits at MSU and second and above generation college students to complete 9 credits less at MSU. Both treatment effects have p-values between 0.1 and 0.05. As robustness checks, I re-run the regressions used to create Table 1.8 with a doughnut sample and with bandwidths of 0.10 and 0.20. The results are presented in Appendix Tables A.19, A.20, and A.21. Results are qualitatively similar to those in Table 1.8, but p-values are larger for a bandwidth of 0.1 and the doughnut sample because of the smaller number of observations. The treatment effects for first generation college students for graduation and number of credits earned are significant at the 5% level for a bandwidth of 0.20 but not for a bandwidth of 0.10 or when using the doughnut sample. I conclude that participating in the MSU Honors College likely causes first generation college students to be more likely to graduate and to earn more credits at MSU. Because the effects are so large and because first generation college students are a population of interest for higher education policymakers, it is possible that this is the most important finding in this paper.

VII. Discussion and Conclusion

In this paper I study how a student's participation in the MSU Honors College changes a variety of academic outcomes. The MSU Honors College invites all students whose GPA is in the top 10% of the GPA distribution in their non-honors college during their freshmen fall semester to join the MSU Honors College. This creates a large discontinuity in the probability of ever being in the college at these 90th percentile GPA cutoffs. This discontinuity allows me to use a fuzzy regression discontinuity research design to study the effect of participation in the MSU Honors College on student outcomes by looking for discontinuities in student outcomes at those GPA cutoffs.

Looking at all students in my analysis sample near the cutoffs, I do not find that honors college participation has a large effect on student outcomes. For 21 of 22 outcomes I look at, my estimated effects are statistically insignificant. I do find a significant effect for time to degree, but this effect is not significant when I exclude covariates or when I use a doughnut sample. Because I am checking 22 outcomes there is a good chance that I randomly find a significant effect even if all true treatment effects are 0. The time to degree effect I find in some

specifications may just be a result of random variation.

In heterogeneity analysis, I show that honors college participation may cause large changes in a small number of academic outcomes for particular groups of students. I find that honors college participation causes male students to get their first degree significantly faster and that this effect is robust to all bandwidths I check. I also find for at least one bandwidth I check that honors college participation makes first generation college students significantly more likely to graduate and to earn significantly more credits at MSU. Because the effect is large, for an important outcome, and for a population of interest to higher education policymakers, it is possible that the effect on graduation for first generation students to be the main finding of the paper.

To understand how being in the honors college changes the college experience of honors students, in 2022 I conducted interviews with 10 current honors students and 3 honors college advisors. One thing I learned from this is that most honors experiences are honors options. When I asked the students what honors experiences they had or planned to have, they generally listed at most one honors course or section with the rest of their honors experiences being honors options. An honors advisor estimated that 80-90% of honors experiences are honors options and that one reason for this was the lack of honors courses and sections that were available for students to take. Another thing I learned is how significant the change in the general education requirements for honors students is. Non-honors students must take courses that fulfill general education requirements but do not fulfill any requirements to complete particular majors[37]. Honors students fulfill their requirements by taking courses in specific majors such as Philosophy 101. Courses taken to fulfill requirements for a minor or second major can also count to fulfilling general education requirements for honors students. A third thing I learned is that being an honors student may have little impact on who a student's peers are. Honors students do not take many classes with only honors students. Many of the students I talked to never lived in the honors only floors of residence halls. There are a variety of student organizations that are affiliated with the honors college but the students I talked to were not very involved with them. The impression I got is that the main ways being an honors student changed a student's college experience was by letting them enroll in classes early, by having alternative general education requirements, and by

[37] Non-Honors students must complete ISS and IAH courses. See https://reg.msu.edu/academicprograms/Print.aspx?Section=215

doing honors options.

Honors students may get their degree faster because honors students can enroll in classes before non-honors students and because their general education requirements are easier to fulfill with coursework they would do even if they were not an honors student. Being able to enroll in classes earlier than most other students may prevent honors students from having to stick around for an additional semester because there was no more room to enroll in a class they needed to get their degree. In my interviews with them, honors students were always able to enroll in the classes they wanted at the times that they wanted. They discussed that some classes were small and filled up fast. They never had a problem getting into those classes, but some of their non-honors friends had trouble enrolling in those classes. General education requirements for honors students could be fulfilled with courses students were already taking to complete a second major or a minor[38]. This allows some honors students to finish their degree(s) taking fewer courses. If a student needs to take fewer courses, then they can graduate in less time[39].

The main economic effect of a student finishing their degree sooner is that they can enter the workforce sooner. Each semester in college is about 4 months long. Assume joining the Honors College causes a student to graduate a semester earlier. Also assume the student earns the median earnings for MSU graduates of $61,101. In that case, joining the Honors College would increase the student's earnings by $61,101 * 4/12 = $20,367[40]. The additional time in the labor force might also increase future earnings if earnings increase with years in the labor force.

Joining the MSU Honors College may increase the graduation rate of first-generation students by giving them access to honors advisors and by getting them involved in the First-Generation Honors Association[41]. Being in the honors college allows students to meet with special advisors. According to my interviews, these advisors are easier to meet with than other advisors students have access to. While most students meet with honors advisors to discuss

[38] To see if students who had more than one major or who had at least one minor were driving the time to degree results, I estimated the treatment effect of being in the honors college using only students who graduated with a single major an no minor (single major students). Including all covariates in the regression, I estimate that singe major students who join the honors college get their first degree 0.43 semesters sooner p-value 0.261. Because this is much smaller than my main estimate of getting the first degree 0.78 sooner, it provides some evidence that non-single major students are driving the time to degree effect.

[39] If this was the main reason honors students got their first degree sooner, then I would expect to see large negative treatment effects on total number of credits earned at MSU. However, the estimated effects are credit hours for all students in the sample near the cutoff and for males, while negative, are statistically insignificant.

[40] Earnings of MSU graduates are from U.S. Department of Education's College Scorecard at the following URL. https://collegescorecard.ed.gov/school/?171100-. The statistics was taken from the website on 7/26/2022.

[41] https://honorscollege.msu.edu/admissions/first-generation-honors-association.html

issues related to being an honors student, the advisors can discuss a variety of topics related to college such as how many credits a student should take each semester. Being able to easily meet with advisors might be especially important for first generation students because their parents cannot advise them about college based on their experience of being a college student. The First-Generation Honors Association is a student organization affiliated with the MSU Honors College. The organization's goal is to benefit first generation students by creating a community of high achieving first generation students and providing first generation students with advice and information to help them while in college. I attended one of the organization's events where they invited 4 college graduates who themselves were first generation students to discuss their experience in college and answer questions from event attendees. It is possible that joining the honors college may make first generation students aware of this organization and that participating in its activities may make students more likely to graduate. If other researchers could figure out what about the honors college is so beneficial for these students, then MSU or other universities might be able to improve the outcomes of first gen students by providing those benefits to first-generations students even if they are not in an honors program.

If joining the MSU Honors College increases the graduation rates of first-generation students, then it likely increases the future incomes of those students. College graduates make significantly higher incomes than those without a college degree (Abel and Deitz 2014). Graduating from college also opens the opportunity to get advanced degrees such as master's degrees and medical degrees which also are associated with higher incomes (Altonji and Zhong 2021).

One of my most surprising findings compared to prior literature is the lack of a significant effect of honors college participation on a student's GPA. Several previous studies have found honors college participation to be associated with earning a higher GPA (Cosgrove 2004; Hartleroad 2004; Shushok 2006; Rinn 2007; Furtwengler 2015; Brown, Winburn, and Sullivan-Gonzalez 2019; Diaz, Farruggia, Wellman and Bottoms 2019; Honeycutt 2019; Lishinski and Micomonaco 2020; Pugatch and Thompson 2022). One possibility is that the GPA effect is small and positive but that I do not have enough observations to detect the effect. This would be consistent with my positive estimate of the effect of honors college participation on 8^{th} semester GPAs for all students in my sample near the cutoffs. Another possibility is that the effect of honors college participation on GPA is positive for honors students on average, but that the

effect is 0 for students who are on the margin of being admitted into the MSU Honors College. A third possibility is that the real effect of honors college participation is 0 and other studies are unable to control for unobserved variables that explain the GPA difference between honors and non-honors students. This would not explain the results from Pugatch and Thompson (2022) who find that on average honors college participation increases course GPA but that it decreases course GPA for first-generation students.

There are many additional questions related to this research that future projects could explore. One set of questions relates to which aspects of the MSU Honors College cause the effects found in this paper assuming the significant results are causal rather than due to random variation in the data. Is the faster time to degree due to being able to enroll in classes first or due to something else? What is the effect of being able to take graduate classes, being in a dorm with other honors students, or having access to an honors advisor separate from all the other benefits of being in the college? Another set of questions relates to what the causal effect of honors college participation is on student outcomes for types of students not studied in this paper. How would participation in an honors college affect students in other parts of the GPA distribution? Do higher GPA students or lower GPA students benefit more from honors college participation? If the structure of the MSU Honors College was recreated at another university, would students at that college experience the same effects as students at MSU? Are the effects limited to large 4-year public universities or would students at other types of institutions, like community colleges, benefit from participating in an honors program?

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APPENDIX

A.1 Common Features of Similarly Ranked Honors Programs

To learn about honors programs outside of Michigan State University (MSU), I looked online for information about honors programs at similarly ranked U.S. universities. I limited my search to national universities whose U.S. News and World Report 2022 ranking was within 20 spots of MSU's ranking. In the process I checked the websites of 53 universities for information about the university's honors program. 50 of those universities had honors programs. 48 of the programs had courses for honors students as a key feature of the program. 35 programs had honors housing, 29 programs had honors advising, 20 programs had priority registration allowing honors students to register for classes before non-honors students, and 20 programs required honors students to complete a thesis or capstone project to finish the program.

A.2 Benefits of Being Enrolled in the MSU Honors College

Students get a variety of benefits when they join the MSU Honors College. They get a different, more flexible set of general education requirements[42]. They can enroll in classes on the first day of each enrollment period. This is before most other students at MSU can enroll in courses. They can enroll in courses without being in the course's required major or having completed the required prerequisites. This may require approval from the department that teaches the course. They can enroll in graduate-level courses as an undergraduate student[43]. They can enroll in honors courses. These courses are only available to honors students. On its website the MSU Honors College describes the benefits of honors courses over regular courses as[44]: having smaller class sizes, covering the material in greater depth, covering the material at a faster pace, and having more classroom interaction. They can enroll in honors sections of courses. Courses with large numbers of students are often divided into multiple sections. Generally, all sections of a course are taught by the same professor, take the same exams, and have the same homework assignments. The main difference is that each section is assigned to attend in-person meetings, such as lectures, at different times. Honors sections cover the same material and fulfill the same major and prerequisite requirements as non-honors sections. However, honors sections compared to non-honors sections have many of the benefits of honors courses such as smaller section sizes and covering the material in greater depth. They can meet with honors college advisors. Honors college advisors can help students with a variety of topics including making plans to fulfill requirements to graduate from the MSU Honors College, enroll in courses outside their major and make course plans consistent with their post-college graduation goals. They can apply to have an honors college peer mentor. Mentors are expected to share their experiences of being in the MSU Honors College and respond to communications from their mentee. Mentors

[42] The general education requirements for students enrolled in the MSU Honors College are: one course in introductory writing, two courses in arts and humanities, two lecture classes in natural sciences and two social science courses. Each course must be 3 or 4 credits. By contrast the university wide requirements are: 8 credits in Arts and Humanities, 8 credits in Social, Behavioral, and Economic Sciences, 3 credits in Biological Sciences, 3 credits in Physical Sciences and 2 credits of lab in either biological or physical sciences. Both the honors and non-honors general education requirements can be at least partially completed using AP, IB, or Dual Enrollment credits. See https://honorscollege.msu.edu/admissions/general-education-requirements.html for honors college general education requirements and https://reg.msu.edu/Forms/ESAF/IS_DN_FAQ.aspx#IS1 for non-honors general education requirements.

[43] Students pay the same tuition for graduate classes as they do for undergraduate classes. I learned this in an email from an associate dean of the MSU Honors College.

[44] https://honorscollege.msu.edu/academics/honors-experiences.html

are available to first- and second-year students. They can live on honors-only floors of residence halls. Students on honors only floors sometimes organize floor-specific events[45]. Finally, there are some merit scholarships available only to students enrolled in the MSU Honors College. Some of these scholarships are only available to students accepted into the college from high school[46]. Other scholarships are available to all students who are currently members of the college[47]. Because only a minority of students in the MSU Honors College receive these scholarships, and because these scholarships are merit based, I do not think they would have much effect on the students near the GPA cutoffs. Therefore, I do not expect them to influence my results.

[45] This may not have much effect on students who were admitted to the MSU Honors College when they are freshmen. While students at MSU are required to live on campus their first year, many students move off campus after their first year.
[46] https://honorscollege.msu.edu/admissions/freshman-scholarships.html
[47] https://honorscollege.msu.edu/programs/scholarships-for-current-students.html

A.3 Alternative Specifications All Students Near Cutoffs

A.3.1 Bias-Corrected Results

Table A.1 – Discontinuity in Covariates

	Female	First Gen	Age First Semester	ACT Score[48]	White	Black
Above Cutoff	-0.0061	0.0185	-0.0032	-0.0416	-0.0154	0.0248**
	[-0.07,0.05]	[-0.02,0.09]	[-0.07,0.10]	[-0.44,0.42]	[-0.06,0.05]	[0.01,0.05]
Bandwidth	0.186	0.157	0.180	0.144	0.188	0.166
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Number of Observations	5,613	4,990	5,479	4,113	5,639	5,178
Mean Outcome	0.51	0.28	18	25	0.62	0.09
	American Native	Asian	Pacific Islander	Hawaiian	Hispanic	Two or More Races
Above Cutoff	0.0067*	-0.0131	-0.0002	-0.0002	-0.0104	-0.0005
	[-0.00,0.01]	[-0.05,0.01]	[-0.00,0.00]	[-0.00,0.00]	[-0.03,0.01]	[-0.02,0.02]
Bandwidth	0.212	0.146	0.515	0.169	0.179	0.191
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Number of Observations	6,124	4,768	12,439	5,238	5,455	5,667
Mean Outcome	0.00	0.05	0.00	0.00	0.04	0.02
	Race Not Reported	Race Not Requested				
Above Cutoff	0.0011	0.0059				
	[-0.01,0.01]	[-0.03,0.03]				
Bandwidth	0.199	0.206				
First College-Cohort Fixed Effects	Y	Y				
Number of Observations	5,857	6,012				
Mean Outcome	0.01	0.16				

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. All regressions include first college-cohort fixed effects. The method for selecting bandwidths and calculating confidence intervals is from Calonico, Cattaneo, and Titiunik (2014). Robust 95% confidence intervals are below the coefficients in brackets. Coefficients are calculated using a triangular kernel. The outcomes are indicator variables for being female, being white, being black, and being a first-generation college student, the student's age during their first semester at MSU and the student's ACT score. Mean outcomes for the All GPAs Sample are shown.

[48] In results not shown, I test for a discontinuity in the probability a student's ACT score is missing at the cutoffs. The discontinuity, at a decline of 0.1%, is small and statistically insignificant.

Table A.2 – Discontinuity in Ever Being in the Honors College

	Ever in Honors College	Ever in Honors College
Above Cutoff	0.2880***	0.2902***
	[0.22,0.34]	[0.23,0.34]
First College-Cohort Fixed Effects	Y	Y
Covariates	N	Y
Bandwidth	0.148	0.150
Number of Observations	4,798	4,810
Mean Outcome	0.06	0.06

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. All regressions include first college-cohort fixed effects. The method for selecting bandwidths and calculating confidence intervals is from Calonico, Cattaneo, and Titiunik (2014). Robust 95% confidence intervals are below the coefficients in brackets. Coefficients are calculated using a triangular kernel. Covariates include the student's age when the entered MSU and indicators for being female, being a specific race, and being a first-generation college student. Robust 95% confidence intervals are below the coefficients in brackets. Mean outcomes for the All GPAs sample are shown.

Table A.3 – Intensity of Honors College Participation for Marginal Students

	Number of Semesters in the Honors College	Number of Semesters in the Honors College	Number of Honors Experiences	Number of Honors Experiences	Graduating from Honors College	Graduating from Honors College
Treatment Effect	7.6377***	7.5778***	5.2753***	5.3360***	0.5073***	0.5055***
	[6.5,8.4]	[6.5,8.4]	[4.4,6.2]	[4.5,6.2]	[0.34,0.63]	[0.34,0.63]
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Bandwidth	0.151	0.136	0.142	0.117	0.157	0.144
Number of Observations	4,870	4,534	4,662	4,004	4,972	4,691
Mean Outcome Honors Students	7.8	7.8	5.3	5.3	0.52	0.52

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. All regressions include first college-cohort fixed effects. The method for selecting bandwidths and calculating confidence intervals is from Calonico, Cattaneo, and Titiunik (2014). Robust 95% confidence intervals are below the coefficients in brackets. Coefficients are calculated using a triangular kernel. The coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. Covariates include the student's age when the entered MSU and indicators for being female, being a specific race, and being a first-generation college student. Robust 95% confidence intervals are below the coefficients in brackets. Mean outcomes for honors students in the All GPAs Sample who were not in the honors college during their first semester are shown.

Table A.4 – Effect of Honors College Participation on Student Outcomes

	Graduate MSU	Graduate MSU	Time to Degree	Time to Degree	4th Semester GPA	4th Semester GPA
Treatment Effect	0.0431	0.0484	-1.0562***	-1.3930***	0.0323	0.0697
	[-0.08,0.18]	[-0.7,0.19]	[-2.0, -0.4]	[-2.3, -0.7]	[-0.07, 0.17]	[-0.03, 0.20]
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Bandwidth	0.108	0.103	0.099	0.090	0.109	0.108
Number of Observations	3,760	3,674	3,126	2,906	3,550	3,545
Mean Outcome	0.79	0.79	13	13	3.0	3.0
	8th Semester GPA	8th Semester GPA	Total Credit Hours	Total Credit Hours	Credit Hours 300 Level	Credit Hours 300 Level
Treatment Effect	0.0612	0.1182*	-0.6987	-0.3924	-2.0418	-1.8525
	[-0.07, 0.21]	[-0.02, 0.28]	[-12, 11]	[-12, 12]	[-7.9, 2.7]	[-7.6, 2.9]
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Bandwidth	0.097	0.087	0.102	0.095	0.110	0.104
Number of Observations	2,827	2,592	3,606	3,367	3,767	3,674
Mean Outcome	3.1	3.1	106	106	25	25
	Credit Hours 400 Level	Credit Hours 400 Level	More than One Degree	More than One Degree	Number Minors	Number Minors
Treatment Effect	0.9603	1.5477	-0.0443	-0.0463	-0.1302	-0.1348
	[-4.0, 6.0]	[-3.4, 6.7]	[-0.15, 0.02]	[-0.15, 0.02]	[-0.39, 0.07]	[-0.39, 0.08]
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Bandwidth	0.099	0.092	0.170	0.150	0.158	0.146
Number of Observations	3,435	3,251	4,769	4,439	5,038	4,768
Mean Outcome	17	17	0.03	0.03	0.15	0.15

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include first college-cohort fixed effects. The method for selecting bandwidths and calculating confidence intervals is from Calonico, Cattaneo, and Titiunik (2014). Robust 95% confidence intervals are below the coefficients in brackets. Coefficients are calculated using a triangular kernel. Coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. Covariates include the student's age when they enter MSU and indicators for being female, being a specific race, and being a first-generation college student. Mean outcomes for students in the All GPAs Sample are shown. Time to degree counts summers as 1 semester. For the GPA regressions, 4th semester and 8th semester are calculated ignoring summers. GPA is cumulative GPA at the end of the semester. For more than one degree only students who have at least 1 degree are included in the regression.

A.3.2 Additional Bandwidths All Students Near the Cutoffs

Table A.5 – Discontinuity in Covariates 1

	Female	Female	First Gen	First Gen	Age First Semester	Age First Semester
Above Cutoff	-0.0100	0.0004	0.0221	0.0040	-0.0010	-0.0102
	(0.0301)	(0.0257)	(0.0204)	(0.0177)	(0.0364)	(0.0379)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.20	0.10	0.20	0.10	0.20
Number of Observations	3,472	5,866	3,472	5,866	3,472	5,866
Mean Outcome	0.51	0.51	0.28	0.28	18	18
	ACT Score	ACT Score	White	White	Black	Black
Above Cutoff	-0.0244	-0.0518	-0.0181	-0.0275	0.0259*	0.0210**
	(0.2280)	(0.1873)	(0.0266)	(0.0203)	(0.0143)	(0.0096)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.20	0.10	0.20	0.10	0.20
Number of Observations	3,028	5,113	3,472	5,866	3,472	5,866
Mean Outcome	25	25	0.62	0.62	0.09	0.09

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. The regressions above are estimated using Equation 4 from Section 1.5 of this dissertation. The outcomes are indicator variables for being female, being a first-generation college student, the student's age during their first semester at MSU, the student's ACT score and indicator for being white and an indicator for being black. Mean outcomes for the All GPAs Sample are shown.

Table A.6 – Discontinuity in Covariates 2

	American Native	American Native	Asian	Asian	Pacific Islander	Pacific Islander
Above Cutoff	0.0069**	0.0070**	-0.0154	-0.0018	N/A	-0.0001
	(0.0031)	(0.0027)	(0.0188)	(0.0135)		(0.0001)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.20	0.10	0.20	0.10	0.20
Number of Observations	3,472	5,866	3,472	5,866	3,472	5,866
Mean Outcome	0.00	0.00	0.05	0.05	0.00	0.00
	Hawaiian	Hawaiian	Hispanic	Hispanic	Two or More Races	Two or More Races
Above Cutoff	-0.0004	-0.0003	-0.0183*	-0.0135*	0.0006	-0.0008
	(0.0005)	(0.0005)	(0.0106)	(0.0074)	(0.0102)	(0.0055)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.20	0.10	0.20	0.10	0.20
Number of Observations	3,472	5,866	3,472	5,866	3,472	5,866
Mean Outcome	0.00	0.00	0.04	0.04	0.02	0.02
	Race Not Reported	Race Not Reported	Race Not Requested	Race Not Requested		
Above Cutoff	0.0001	0.0015	0.0187	0.0145		
	(0.0062)	(0.0046)	(0.0171)	(0.0162)		
First College-Cohort Fixed Effects	Y	Y	Y	Y		
Bandwidth	0.10	0.20	0.10	0.20		
Number of Observations	3,472	5,866	3,472	5,866		
Mean Outcome	0.01	0.01	0.16	0.16		

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. The regressions above are estimated using Equation 4 from Section 1.5 of this dissertation. The outcomes are indicator variables for being the race described. Mean outcomes for the All GPAs Sample are shown.

Table A.7 – Discontinuity in Ever Being in the Honors College

	Ever in Honors College	Ever in Honors College	Ever in Honors College
Above Cutoff	0.3068***	0.2859***	0.3155***
	(0.0311)	(0.0259)	(0.0241)
First College-Cohort Fixed Effects	Y	Y	Y
Covariates	Y	Y	Y
Bandwidth	0.10	0.15	0.20
Number of Observations	3,472	4,829	5,866
Mean Outcome	0.06	0.06	0.06

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. All regressions include the following covariates: the student's age when the entered MSU and indicators for being female, being a specific race, and being a first-generation college student. Mean outcomes for the All GPAs sample are shown.

Table A.8 – Intensity of Honors College Participation for Marginal Students

	Number of Semesters in the Honors College	Number of Semesters in the Honors College	Number of Semesters in the Honors College	Number of Honors Experiences	Number of Honors Experiences	Number of Honors Experiences
Above Cutoff	7.6817***	7.8054***	7.8924***	5.3137***	5.2714***	5.3531***
	(0.4869)	(0.4422)	(0.3833)	(0.3878)	(0.3789)	(0.3243)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.15	0.20	0.10	0.15	0.20
Number of Observations	3,472	4,829	5,866	3,472	4,829	5,866
Mean Outcome College Admits	7.8	7.8	7.8	5.3	5.3	5.3
	Graduating from Honors College	Graduating from Honors College	Graduating from Honors College			
Above Cutoff	0.5126***	0.5182***	0.5531***			
	(0.0599)	(0.0578)	(0.0489)			
First College-Cohort Fixed Effects	Y	Y	Y			
Covariates	Y	Y	Y			
Bandwidth	0.10	0.15	0.20			
Number of Observations	3,472	4,829	5,866			
Mean Outcome College Admits	0.52	0.52	0.52			

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. The coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. All regressions include the following covariates: the student's age when the entered MSU and indicators for being female, being a specific race, and being a first-generation college student. Mean outcomes for honors students in the All GPAs Sample whose first semester in the honors college is not their first semester at MSU are shown.

Table A.9 – Effect of Honors College Participation on Student Outcomes 1

	Graduate MSU	Graduate MSU	Graduate MSU	Time to Degree	Time to Degree	Time to Degree
Above Cutoff	0.0311	0.0178	0.0328	-0.8544**	-0.7789**	-0.5831**
	(0.0689)	(0.0536)	(0.0375)	(0.3867)	(0.3269)	(0.2930)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.15	0.20	0.10	0.15	0.20
Number of Observations	3,472	4,829	5,866	3,168	4,403	5,338
Mean Outcome	0.79	0.79	0.79	13	13	13
	4th Semester GPA	4th Semester GPA	4th Semester GPA	8th Semester GPA	8th Semester GPA	8th Semester GPA
Above Cutoff	0.0518	0.0068	0.0108	0.0851	0.0503	0.0564
	(0.0762)	(0.0652)	(0.0505)	(0.0714)	(0.0633)	(0.0547)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.15	0.20	0.10	0.15	0.20
Number of Observations	3,272	4,561	5,542	2,880	4,006	4,854
Mean Outcome	3.0	3.0	3.0	3.1	3.1	3.1

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. All regressions include the following covariates: the student's age when they enter MSU and indicators for being female, being a specific race, and being a first-generation college student. Mean outcomes for students in the All GPAs Sample are shown. Time to degree counts summers as 1 semester. For the GPA regressions, 4th semester and 8th semester are calculated ignoring summers. GPA is cumulative GPA at the end of the semester. For more than one degree only students who have at least 1 degree are included in the regression.

Table A.10 – Effect of Honors College Participation on Student Outcomes 2

	Total Credit Hours	Total Credit Hours	Total Credit Hours	Credit Hours 300 Level	Credit Hours 300 Level	Credit Hours 300 Level
Above Cutoff	-2.4737	-3.3693	-1.5321	-2.0451	-1.9186	-0.2072
	(5.4790)	(4.8348)	(3.6429)	(2.1083)	(2.0133)	(1.5904)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.15	0.20	0.10	0.15	0.20
Number of Observations	3,472	4,829	5,866	3,472	4,829	5,866
Mean Outcome	106	106	106	25	25	25
	Credit Hours 400 Level	Credit Hours 400 Level	Credit Hours 400 Level	More than One Degree	More than One Degree	More than One Degree
Above Cutoff	0.5808	0.8118	1.4166	-0.0218	-0.0494	-0.0229
	(2.4737)	(2.1546)	(1.7758)	(0.0463)	(0.0414)	(0.0331)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.15	0.20	0.10	0.15	0.20
Number of Observations	3,472	4,829	5,866	3,168	4,403	5,338
Mean Outcome	17	17	17	0.03	0.03	0.03
	Number Minors	Number Minors	Number Minors			
Above Cutoff	-0.1538*	-0.0987	-0.0229			
	(0.0841)	(0.0766)	(0.0331)			
First College-Cohort Fixed Effects	Y	Y	Y			
Covariates	Y	Y	Y			
Bandwidth	0.10	0.15	0.20			
Number of Observations	3,472	4,829	5,338			
Mean Outcome	0.15	0.15	0.15			

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. All regressions include the following covariates: the student's age when they enter MSU and indicators for being female, being a specific race, and being a first-generation college student. Mean outcomes for students in the All GPAs Sample are shown. Time to degree counts summers as 1 semester. For the GPA regressions, 4th semester and 8th semester are calculated ignoring summers. GPA is cumulative GPA at the end of the semester. For more than one degree only students who have at least 1 degree are included in the regression.

A.4 Results Using Doughnut Sample

The doughnut sample is the All GPAs Sample without students whose GPA minus the GPA cutoff they face to be invited into the MSU Honors College is between -0.01 and 0.01.

Table A.11 – Discontinuity in Covariates

	Female	First Gen	Age First Semester	ACT Score	White	Black
Above Cutoff	-0.0024	-0.0309	-0.0121	-0.1005	0.0165	0.0051
	(0.0343)	(0.0256)	(0.0535)	(0.2425)	(0.0288)	(0.0114)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Mean Outcome	0.51	0.28	18	25	0.62	0.09
	American Native	Asian	Pacific Islander	Hawaiian	Hispanic	Two or More Races
Above Cutoff	0.0058*	-0.0074	0.0004	-0.0003	-0.0070	-0.0006
	(0.0033)	(0.0146)	(0.0004)	(0.0003)	(0.0098)	(0.0096)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Mean Outcome	0.00	0.05	0.00	0.00	0.04	0.02
	Race Not Reported	Race Not Requested				
Above Cutoff	0.0021	-0.0146				
	(0.0064)	(0.0226)				
First College-Cohort Fixed Effects	Y	Y				
Mean Outcome	0.01	0.16				

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Bandwidth = 0.15. The regressions above are estimated using Equation 4 from Section 1.5 of this dissertation. N = 4,317 except for ACT Score where N = 3,763. The outcomes are indicator variables for being female, being a specific race, being a first-generation college student, the student's age during their first semester at MSU and the student's ACT score. Mean outcomes for the All GPAs Sample are shown.

Table A.12 – Discontinuity in Ever Being in the Honors College

	Ever in Honors College	Ever in Honors College
Above Cutoff	0.3020***	0.3001***
	(0.0345)	(0.0342)
First College-Cohort Fixed Effects	Y	Y
Covariates	N	Y
Mean Outcome	0.06	0.06

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. All regressions include first college-cohort fixed effects. N = 4,317. Bandwidth = 0.15. Standard errors are clustered at the first college – cohort level. Covariates include the student's age when they entered MSU and indicators for being female, being a specific race, and being a first-generation college student. Mean outcomes for the All GPAs sample are shown.

Table A.13 – Intensity of Honors College Participation for Marginal Students

	Number of Semesters in the Honors College	Number of Semesters in the Honors College	Number of Honors Experiences	Number of Honors Experiences	Graduating from Honors College	Graduating from Honors College
Treatment Effect	7.6684***	7.6440***	4.9822***	4.9769***	0.4849***	0.4831***
	(0.5172)	(0.5213)	(0.4540)	(0.4546)	(0.0745)	(0.0749)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Mean Outcome College Admits	7.8	7.8	5.3	5.3	0.52	0.52

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. All regressions include first college-cohort fixed effects. N = 4,317. Bandwidth = 0.15. Standard errors are clustered at the first college – cohort level. The coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. Covariates include the student's age when they entered MSU and indicators for being female, being a specific race, and being a first-generation college student. Mean outcomes for honors students in the All GPAs Sample whose first semester in the honors college is not their first semester at MSU are shown (College Admits).

Table A.14 – Effect of Honors College Participation on Student Outcomes

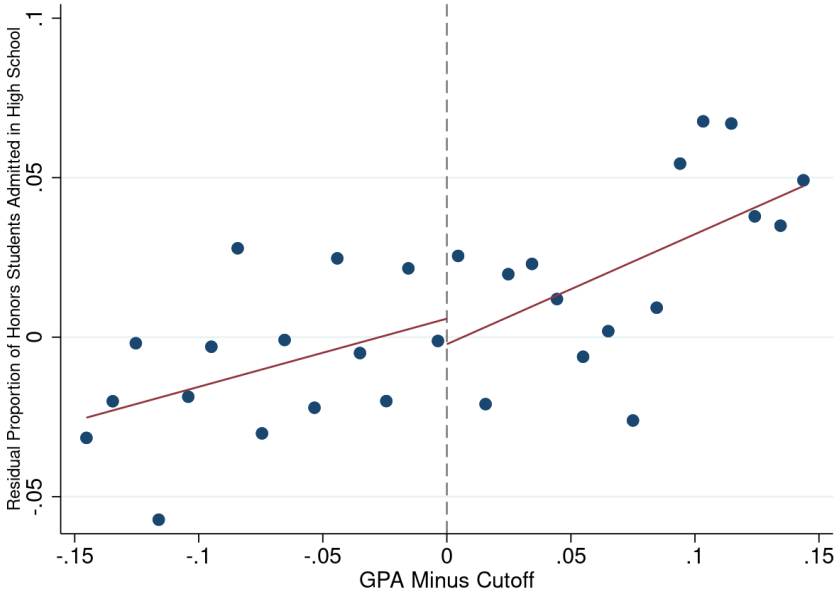
	Graduate MSU	Graduate MSU	Time to Degree	Time to Degree	4th Semester GPA	4th Semester GPA
Treatment Effect	0.0117	0.0104	-0.2730	-0.2717	-0.0892	-0.0962
	(0.0552)	(0.0545)	(0.4686)	(0.4482)	(0.0737)	(0.0726)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Number of Observations	4,317	4,317	3,934	3,934	4,079	4,079
Mean Outcome	0.79 8th Semester GPA	0.79 8th Semester GPA	13 Total Credit Hours	13 Total Credit Hours	3.0 Credit Hours 300 Level	3.0 Credit Hours 300 Level
Treatment Effect	-0.0387	-0.0412	-2.5772	-2.8455	-2.6998	-2.9276
	(0.0744)	(0.0695)	(5.3452)	(5.4208)	(2.2418)	(2.2677)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Number of Observations	3,575	3,575	4,317	4,317	4,317	4,317
Mean Outcome	3.1 Credit Hours 400 Level	3.1 Credit Hours 400 Level	106 More than One Degree	106 More than One Degree	25 Number Minors	25 Number Minors
Treatment Effect	1.9152	1.7142	-0.0387	-0.0413	-0.1356	-0.1437
	(2.3074)	(2.3072)	(0.0441)	(0.0440)	(0.0998)	(0.1031)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Number of Observations	4,317	4,317	3,934	3,934	4,317	4,317
Mean Outcome	17	17	0.03	0.03	0.15	0.15

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. Covariates include the student's age when they enter MSU and indicators for being female, being a specific race, and being a first-generation college student. For all regressions the bandwidth is 0.15. Mean outcomes for students in the All GPAs Sample are shown. Time to degree counts summers as 1 semester. For the GPA regressions, 4th semester and 8th semester are calculated ignoring summers. GPA is cumulative GPA at the end of the semester. For more than one degree only students who have at least 1 degree are included in the regression.

A.5 Discontinuity in Honors Students Admitted in High School

A student is identified as being admitted into the MSU Honors College when they are in high school if the student is enrolled in the MSU Honors College during their first term at MSU.

Figure A.1 – Discontinuity in the Proportion of Honors Students Admitted in High School



Notes: N = 4,829. Only students who have a running variable between -0.15 and 0.15 are included in the graph. I define an honors student admitted in high school as a student who was in the MSU Honors College during their first semester at MSU. Each dot is the proportion of honors students admitted in high school whose running variable is an element of [x, x + 0.01). For the left most dot x = -0.15.

Table A.15 – Discontinuity in Honors Students Admitted in High School

	High School Honors College Admit	High School Honors College Admit
Above Cutoff	-0.0082	-0.0066
	(0.0160)	(0.0160)
First College-Cohort Fixed Effects	Y	Y
Covariates	N	Y
Mean Outcome	0.03	0.03

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. All regressions include first college-cohort fixed effects. N = 4,829. Bandwidth = 0.15. Standard errors are clustered at the first college – cohort level. Covariates include the student's age when the entered MSU and indicators for being female, being a specific race, and being a first-generation college student. Mean outcomes for the All GPAs sample are shown.

A.6 Alternative Specifications Heterogeneity Analysis

Table A.16 – Male and Female Treatment Effect of Honors College Participation Additional Bandwidths 1

	Graduate MSU	Graduate MSU	Time to Degree	Time to Degree	4th Semester GPA	4th Semester GPA
In Honors College	0.1354	0.0291	-1.7950**	-1.2989**	0.1188	0.0390
	(0.1269)	(0.0767)	(0.7479)	(0.5248)	(0.1106)	(0.0890)
In Honors College * Female	-0.1822	-0.0129	1.8640**	1.4339**	-0.1649	-0.0772
	(0.1550)	(0.1020)	(0.9112)	(0.6578)	(0.1279)	(0.1100)
P(In Honors College + Interaction)	0.57	0.75	0.89	0.73	0.64	0.55
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.20	0.10	0.20	0.10	0.20
Number of Observations	3,472	5,866	3,168	5,338	3,272	5,542
	8th Semester GPA	8th Semester GPA	Total Credit Hours	Total Credit Hours	Credit Hours 300 Level	Credit Hours 300 Level
In Honors College	0.1443	0.0955	0.6590	-3.9978	-1.2186	-1.4840
	(0.1383)	(0.0937)	(9.9098)	(6.3313)	(3.9977)	(2.7672)
In Honors College * Female	-0.1686	-0.1129	-4.3632	4.0566	-1.3919	2.0709
	(0.1313)	(0.1042)	(12.6867)	(7.7112)	(7.0457)	(4.5856)
P(In Honors College + Interaction)	0.71	0.78	0.60	0.99	0.53	0.83
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.20	0.10	0.20	0.10	0.20
Number of Observations	2,880	4,854	3,472	5,866	3,472	5,866

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Regressions are 2SLS regressions where Above Cutoff and Above Cutoff * Female are instruments for In Honors College and In Honors College * Female. Time to degree only uses students who graduated and counts summers as 1 semester. For the GPA regressions, 4th semester and 8th semester are calculated ignoring summers. GPA is cumulative GPA at the end of the semester.

Table A.17 – Male and Female Treatment Effect of Honors College Participation Additional Bandwidths 2

	Credit Hours 400 Level	Credit Hours 400 Level	More than One Degree	More than One Degree	Number Minors	Number Minors
In Honors College	1.8041	1.8209	0.0770	0.0336	-0.0801	0.0814
	(4.8643)	(3.0617)	(0.0636)	(0.0405)	(0.1373)	(0.1096)
In Honors College * Female	-2.4450	-1.3925	-0.1725*	-0.0946	-0.1296	-0.2337
	(5.6407)	(3.5017)	(0.0923)	(0.0699)	(0.2147)	(0.1634)
P(In Honors College + Interaction)	0.81	0.83	0.15	0.25	0.12	0.12
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.20	0.10	0.20	0.10	0.20
Number of Observations	3,472	5,866	3,168	5,338	3,472	5,866

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Regressions are 2SLS regressions where Above Cutoff and Above Cutoff * Female are instruments for In Honors College and In Honors College * Female. For more than one degree only students who have at least 1 degree are included in the regression.

Table A.18 – Male and Female Treatment Effect of Honors College Participation Doughnut Sample

	Graduate MSU	Time to Degree	4th Semester GPA	8th Semester GPA	Total Credit Hours	Credit Hours 300
In Honors College	-0.0413	-0.9605	-0.0416	0.0002	-9.1723	-0.8313
	(0.1085)	(0.8465)	(0.1108)	(0.1032)	(9.6000)	(4.1556)
In Honors College * Female	0.0916	1.1793	-0.0824	-0.0630	11.3384	-3.0823
	(0.1346)	(0.9157)	(0.1347)	(0.1060)	(11.6801)	(5.7875)
P(In Honors College + Interaction)	0.45	0.65	0.17	0.45	0.74	0.23
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Number of Observations	4,317	3,934	4,079	3,575	4,317	4,317
Mean Outcome Males	0.77	13	3.0	3.1	104	25
Mean Outcome Females	0.81	12	3.1	3.2	107	25

	Credit Hours 400	More Than One Degree	Number Minors
In Honors College	-2.7446	-0.0033	-0.0955
	(3.9353)	(0.0610)	(0.1828)
In Honors College * Female	7.8089*	-0.0633	-0.0736
	(4.5810)	(0.0929)	(0.2479)
P(In Honors College + Interaction)	0.07	0.32	0.22
First College-Cohort Fixed Effects	Y	Y	Y
Number of Observations	4,317	3,934	4,317
Mean Outcome Males	16	0.02	0.12
Mean Outcome Females	18	0.03	0.17

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Students with a GPA within 0.01 grade points of the cutoff have been removed from the sample. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Regressions are 2SLS regressions where Above Cutoff and Above Cutoff * Female are instruments for In Honors College and In Honors College * Female. All regressions have a bandwidth of 0.15. Time to degree only uses students who graduated and counts summers as 1 semester. For the GPA regressions, 4th semester and 8th semester were calculated ignoring summers. GPA is cumulative GPA at the end of the semester. Mean outcomes are for all male or all female students in the All GPAs Sample. For more than one degree only students who have at least 1 degree are included in the regression.

Table A.19 – First Gen and Second and Above Gen Treatment Effect of Honors College Participation Additional Bandwidths 1

	Graduate MSU	Graduate MSU	Time to Degree	Time to Degree	4th Semester GPA	4th Semester GPA
In Honors College	-0.0254	-0.0339	-0.6884	-0.4959	0.0258	-0.0241
	(0.0656)	(0.0411)	(0.4616)	(0.3430)	(0.0863)	(0.0563)
In Honors College * First Gen	0.2797*	0.2810**	-0.3037	-0.0162	0.0176	0.1078
	(0.1555)	(0.1291)	(1.4093)	(0.8408)	(0.1843)	(0.1291)
P(In Honors College + Interaction)	0.12	0.04	0.42	0.50	0.80	0.48
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.20	0.10	0.20	0.10	0.20
Number of Observations	3,472	5,866	3,168	5,338	3,272	5,542
	8th Semester GPA	8th Semester GPA	Total Credit Hours	Total Credit Hours	Credit Hours 300 Level	Credit Hours 300 Level
In Honors College	0.0187	0.0075	-7.7021	-7.1938*	-3.1778	-1.8035
	(0.0772)	(0.0530)	(5.2575)	(4.2709)	(2.2914)	(1.8219)
In Honors College * First Gen	0.1397	0.1239	29.1312*	27.7376**	5.7985	7.4295
	(0.2217)	(0.1700)	(15.0205)	(11.4473)	(6.2156)	(4.6394)
P(In Honors College + Interaction)	0.47	0.44	0.17	0.05	0.65	0.18
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.20	0.10	0.20	0.10	0.20
Number of Observations	2,880	4,854	3,472	5,866	3,472	5,866

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Regressions are 2SLS regressions where Above Cutoff and Above Cutoff * First Gen are instruments for In Honors College and In Honors College * First Gen. Time to degree only uses students who graduated and counts summers as 1 semester. For the GPA regressions, 4th semester and 8th semester are calculated ignoring summers. GPA is cumulative GPA at the end of the semester.

Table A.20 – First Gen and Second and Above Gen Treatment Effect of Honors College Participation Additional Bandwidths 2

	Credit Hours 400 Level	Credit Hours 400 Level	More than One Degree	More than One Degree	Number Minors	Number Minors
In Honors College	-0.1565	0.8016	-0.0255	-0.0069	-0.2177*	-0.0523
	(2.5708)	(2.0809)	(0.0489)	(0.0318)	(0.1203)	(0.0775)
In Honors College * First Gen	2.7874	1.3236	0.0230	-0.0673	0.3569	0.0059
	(6.6946)	(4.8042)	(0.0956)	(0.0669)	(0.2534)	(0.2303)
P(In Honors College + Interaction)	0.68	0.61	0.98	0.29	0.45	0.81
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Bandwidth	0.10	0.20	0.10	0.20	0.10	0.20
Number of Observations	3,472	5,866	3,168	5,338	3,472	5,866

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Regressions are 2SLS regressions where Above Cutoff and Above Cutoff * First Gen are instruments for In Honors College and In Honors College * First Gen. Time to degree only uses students who graduated and counts summers as 1 semester. For more than one degree only students who have at least 1 degree are included in the regression.

Table A.21 –First Gen and Second and Above Gen Treatment Effect of Honors College Participation Doughnut Sample

	Graduate MSU	Time to Degree	4th Semester GPA	8th Semester GPA	Total Credit Hours	Credit Hours 300 Level
In Honors College	-0.0544	-0.3213	-0.1408*	-0.0939	-7.7197	-4.0809*
	(0.0558)	(0.4796)	(0.0730)	(0.0627)	(5.5735)	(2.3869)
In Honors College * First Gen	0.2992**	0.2762	0.1962	0.2078	23.7289*	6.0180
	(0.1442)	(1.2199)	(0.1454)	(0.1799)	(13.7509)	(5.5272)
P(In Honors College + Interaction)	0.08	0.97	0.72	0.57	0.22	0.71
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Number of Observations	4,317	3,934	4,079	3,575	4,317	4,317
Mean Outcome 2nd and Above Gen	0.82	12	3.1	3.2	107	25
Mean Outcome First Gen	0.73	13	2.9	3.0	101	22

	Credit Hours 400 Level	More Than One Degree	Number Minors
In Honors College	0.6059	-0.0522	-0.1550
	(2.6169)	(0.0499)	(0.1152)
In Honors College * First Gen	5.8473	0.0595	0.0824
	(6.2468)	(0.0759)	(0.2929)
P(In Honors College + Interaction)	0.25	0.91	0.78
First College-Cohort Fixed Effects	Y	Y	Y
Number of Observations	4,317	3,934	4,317
Mean Outcome 2nd and Above Gen	17	0.03	0.15
Mean Outcome First Gen	16	0.03	0.14

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Students with a GPA within 0.01 grade points of the cutoff have been removed from the sample. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Regressions are 2SLS regressions where Above Cutoff and Above Cutoff * First Gen are instruments for In Honors College and In Honors College * First Gen. All have a bandwidth of 0.15. The regression for time to degree only includes students who graduated and counts summers as 1 semester. For the GPA regressions, 4th semester and 8th semester are calculated ignoring summers. GPA is cumulative GPA at the end of the semester. Mean outcomes are for 2nd and above generation or first-generation students in the All GPAs Sample.

A.7 Additional Outcomes Analysis Sample

Table A.22 – Effect of Honors College Participation on Student Outcomes

	Time to Degree Ignoring Summers	Time to Degree Ignoring Summers	Retention to 4th Semester	Retention to 4th Semester	Retention to 8th Semester	Retention to 8th Semester
Treatment Effect	-0.2400	-0.3294	0.0442	0.0441	0.0230	0.0189
	(0.2440)	(0.2395)	(0.0404)	(0.0409)	(0.0670)	(0.0682)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Number of Observations	3,812	3,812	4,829	4,829	4,829	4,829
	2nd Semester GPA	2nd Semester GPA	3rd Semester GPA	3rd Semester GPA	5th Semester GPA	5th Semester GPA
Treatment Effect	-0.0279	-0.0158	-0.0229	-0.0018	-0.0001	0.0316
	(0.0357)	(0.0358)	(0.0541)	(0.0539)	(0.0693)	(0.0668)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Number of Observations	4,750	4,750	4,608	4,608	4,457	4,457

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the first college – cohort level. All regressions include first college-cohort fixed effects. Coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. Covariates include the student's age when the entered MSU and indicators for being female, being a specific race, and being a first-generation college student. For all regressions the bandwidth is 0.15. For time to degree ignoring summers all students who got their first degree during a summer semester are dropped and summer semesters count as 0 semesters. For the GPA regressions, the semester numbers are calculated ignoring summers. GPA is cumulative GPA at the end of the semester. Retention to semester X is measured as having a cumulative GPA at the end of semester X with semester number calculated ignoring summers.

Table A.23 – Effect of Honors College Participation on Student Outcomes

	6th Semester GPA	6th Semester GPA	7th Semester GPA	7th Semester GPA	Retention to 2nd Semester	Retention to 2nd Semester
Treatment Effect	0.0204	0.0517	0.0317	0.0660	0.0217	0.0216
	(0.0717)	(0.0677)	(0.0722)	(0.0679)	(0.0245)	(0.0250)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Number of Observations	4,387	4,387	4,264	4,264	4,829	4,829

	Retention to 3rd Semester	Retention to 3rd Semester	Retention to 5th Semester	Retention to 5th Semester	Retention to 6th Semester	Retention to 6th Semester
Treatment Effect	0.0370	0.0380	-0.0275	-0.0258	-0.0319	-0.0299
	(0.0377)	(0.0379)	(0.0500)	(0.0485)	(0.0510)	(0.0502)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Number of Observations	4,829	4,829	4,829	4,829	4,829	4,829

	Retention to 7th Semester	Retention to 7th Semester
Treatment Effect	-0.0578	-0.0589
	(0.0508)	(0.0505)
First College-Cohort Fixed Effects	Y	Y
Covariates	N	Y
Number of Observations	4,829	4,829

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the first college – cohort level. All regressions include first college-cohort fixed effects. Coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. Covariates include the student's age when the entered MSU and indicators for being female, being a specific race, and being a first-generation college student. For all regressions the bandwidth is 0.15. For the GPA regressions, the semester numbers are calculated ignoring summers. GPA is cumulative GPA at the end of the semester. Retention to semester X is measured as having a cumulative GPA at the end of semester X with semester number calculated ignoring summers.

Table A.24 – Effect of Honors College Participation on Major of Bachelor's Degree

	Agriculture and Natural Resources Degree	Agriculture and Natural Resources Degree	Biology and Health Degree	Biology and Health Degree	Business and Economics Degree	Business and Economics Degree
Treatment Effect	0.0236	0.0246	-0.0365	-0.0279	0.0571	0.0573
	(0.0249)	(0.0249)	(0.0601)	(0.0597)	(0.0526)	(0.0536)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Mean Outcome	0.03	0.03	0.13	0.13	0.24	0.24
	Communications Degree	Communications Degree	Education Degree	Education Degree	Engineering and Architecture Degree	Engineering and Architecture Degree
Treatment Effect	-0.0123	-0.0125	-0.0113	-0.0076	-0.0374	-0.0365
	(0.0247)	(0.0253)	(0.0331)	(0.0323)	(0.0580)	(0.0572)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Mean Outcome	0.04	0.04	0.03	0.03	0.07	0.07
	Information Technology Degree	Information Technology Degree	Liberal Arts Degree	Liberal Arts Degree	Physical Sciences and Math Degree	Physical Sciences and Math Degree
Treatment Effect	0.0021	0.0012	0.0153	0.0117	-0.0344	-0.0340
	(0.0535)	(0.0546)	(0.0384)	(0.0388)	(0.0348)	(0.0352)
First College-Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Covariates	N	Y	N	Y	N	Y
Mean Outcome	0.04	0.04	0.04	0.04	0.02	0.02
	Social Sciences Degree	Social Sciences Degree	Vocational Degree	Vocational Degree		
Treatment Effect	0.0571	0.0551	-0.0060	-0.0089		
	(0.0470)	(0.0467)	(0.0175)	(0.0177)		
First College-Cohort Fixed Effects	Y	Y	Y	Y		
Covariates	N	Y	N	Y		
Mean Outcome	0.14	0.14	0.02	0.02		

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. N = 4,829. All regressions include first college-cohort fixed effects. Standard errors are clustered at the first college – cohort level. Coefficients are 2SLS estimates for the treatment effect of ever participating in the MSU Honors College. Covariates include the student's age when they enter MSU and indicators for being female, and being a specific race, and being a first-generation college student. For all regressions the bandwidth is 0.15. Mean outcomes for students in the All GPAs Sample are shown. Only students who earn a bachelor's degree at MSU are included in the regressions.