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THE GRADUATION PART II: GRADUATE SCHOOL GRADUATION RATES

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ABSTRACT

This paper documents several facts about graduate program graduation rates using administrative data covering public and nonprofit graduate students in Texas. Despite conventional wisdom that most graduate students complete their programs, only 58 percent of who started their program in 2004 graduated within 6 years. Between the 2004 and 2013 entering cohorts, graduate student completion rates grew by 10 percentage points. Graduation rates vary widely by field of study--ranging from an average of 81 percent for law programs to 53 percent for education programs. We also find large differences in graduation rates across institutions. On average, 72 percent of students who entered programs in flagship public universities graduated in 6 years compared to only 57 percent of those who entered programs in non-research intensive (non-R1) institutions. Graduate students who do not complete may face negative consequences due to lower average earnings and substantial levels of student debt.

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1 Introduction

The number of adults in the United States with a graduate degree doubled over the past two decades. Today, over 14 percent of people 25 and older hold a graduate degree, representing a population larger than high school drop-outs.[1] Graduate students hold almost half of outstanding student debt (Looney et al., 2020) and have received a growing share of annual federal loan disbursements over the past decade (Monarrez and Matsudaira, 2023). Despite the growing prevalence of post-baccalaureate education, we know comparatively little about variation in outcomes for graduate education and, in particular, the extent to which graduate students successfully complete their degrees.

In this paper, we document several important facts about graduate program completion rates using individual-level administrative data on graduate students who entered programs in Texas public and nonprofit higher education institutions in the 2003-04 through 2012-13 academic years. First, on average, 6-year graduation rates are not substantively different than 6-year graduation rates for undergraduate bachelor's degree-seeking students. Similar to trends in undergraduate degree completion, graduate program graduation rates have grown substantially over time, increasing from 58 percent for the 2003-04 (hereafter 2004) entry cohort to 68 percent for the 2013 entry cohort.[2]

We find evidence of substantial heterogeneity in completion across fields of study. In some fields, average program graduation rates are quite high (e.g., 81 percent for students entering law programs between 2004 and 2013) while in other fields, close to half of all entrants do not complete a credential (e.g., 53 percent of 2004 through 2013 education program entrants). Public flagship universities have the highest graduation rates (72 percent), followed by other research intensive (i.e., those with an R1 Carnegie classification) universities (64 percent), and non-R1 university entrants complete at the lowest rate (57 percent). Even within the same institution, however, there are notable differences in completion rates by field of study.

Graduate programs vary in program length, costs, and expected returns, but most graduate students enroll in professional degree programs that are highly specialized and provide training for a specific career path, with the majority of financial aid coming from student loans. Across settings, estimated earnings gains are largest for students completing health-related graduate degrees and smallest for arts and humanities advanced degree

[1] See U.S. Census Bureau (2019, 2022). Most graduate degree recipients complete master's or professional degree programs; in 2021, only 15 percent had earned a doctoral degree.

[2] Among first-time, full-time bachelor's degree seeking students, 6-year graduation rates increased from 58 percent for 2004 entrants to 63 for for 2013 entrants (National Center for Education Statistics, 2021).

completers.[3]

To our knowledge, our paper is the first to provide systematic evidence on how graduation rates vary across graduate programs, by field of study, and across institutions.[4] In contrast to undergraduate graduation rates, completion rates for graduate programs are not widely published nor legally required to be disclosed.[5] In addition to being the focus of academic research (e.g., Bound et al. 2010; Denning et al. 2022), many performance-based funding schemes use undergraduate completion rates as a key metric of college success (Rosinger et al. 2020). There are two reasons why policymakers and researchers have spent much less time on measuring and understanding graduation rates for graduate school. First, data on graduate students and their programs of study is not widely available. Our detailed, student-level administrative data allow us to overcome this barrier. Second, because all graduate students have demonstrated their capacity to finish a bachelor's degree, researchers and policymakers may have assumed that most successfully complete their programs. We show that for many graduate programs, this assumption is incorrect.

In recent years, the Department of Education has published program-level information on graduate program completers' debt and earnings. In theory, prospective graduate students' decisions around whether and which programs to attend also should incorporate their expectations about the likelihood of completion. A higher likelihood of noncompletion increases a prospective student's risk associated with their investment of time and money in graduate school (e.g., that they will drop out after accruing student debt but without corresponding earnings returns). We show that in some broad fields of study, completers' average earnings exceeds those of noncompleters by over $25,000. If the risk of noncompletion is not well understood, students may not make optimal human capital

[3]Using data from the National Survey of College Graduates, Altonji et al. (2016)and Altonji and Zhong (2021) describe substantial heterogeneity in earnings gains for graduates of different graduate degree program fields and within-field heterogeneity in returns by undergraduate major. Altonji and Zhu (2021) also use Texas higher education data to estimate earnings gains for graduates of different programs, focusing primarily on the largest graduate degree programs (e.g., MBA, JD, education) and Minaya et al. (2022) examines earnings gains by graduate program for completers in Ohio. Altonji et al. (2023) find suggestive evidence that graduates of programs with lower financial returns may have higher levels of job satisfaction. Additionally, several papers analyze the returns to specific degree programs, including MBA degrees (Arcidiacono et al., 2008; Grove and Hussey, 2014), MD degrees (Gottlieb et al., 2023), and JD degrees (Simkovic and McIntyre, 2014).

[4]Baum and Steele (2017) calculate the average graduation rate for 1992 bachelor's degree recipients who subsequently enrolled in graduate school to be 65 percent (an additional 13 percent were still enrolled at the end of the follow-up period). Nevill et al. (2007) describes student characteristics associated with graduate degree completion for this same population.

[5]The Student Right to Know Act of 1990 required higher education institutions that participate in federal student aid programs to report graduation rates for first-time, full-time degree-seeking undergraduate students and the College Scorecard publishes undergraduate completion rates in an easily accessible format.

investments.

These facts have important implications for prospective graduate students' human capital investment decisions and for policymakers looking to identify successful programs. Practically, data collection efforts that focus on *graduates* of graduate school will miss a large share of students who pursue, but do not complete, a post-baccalaureate degree but, in many cases, accumulated substantial student debt. Further, the risk of noncompletion is a potentially important component of how the returns to graduate education are conceptualized and modeled. Finally, our findings help contextualize results of papers that consider graduate degree completion as an outcome (e.g., Black & al., 2023).

The rest of the paper proceeds as follows. Section 2 describes our data and analysis sample. Section 3 describes graduation rates for programs. Section 4 concludes.

2 Texas Higher Education Data and Analysis Sample

We use de-identified administrative data from the Texas Higher Education Coordinating Board (THECB) provided through the Texas Education Research Center. These data contain information on enrollment and graduation for all students who attended public and private nonprofit higher education institutions in Texas. We observe program of study for the vast majority of graduate students attending public institutions and a subset of students attending private nonprofit schools.[6] We aggregate the student-level data into a panel of program-by-entry cohort observations and calculate the probability of receiving an advanced degree within the same institution and field of study within 6 years of program entry.[7] For our primary analyses, we do not distinguish between master's, professional, and doctoral degrees, although similar to national patterns, most graduate degrees earned by students in the entry cohorts we study are master's and professional degrees (Appendix Table A.3).[8]

[6]Conceptually, a program of study is a common set of courses and requirements that leads to a specific degree and for which students face a similar set of admissions criteria and pricing. In practice, we define programs at the institution by Classification of Instructional Program (CIP) code level. We primarily use 4-digit CIP codes but aggregate to the 2-digit CIP-level for education and engineering programs. See Black & al. (2023) for additional details on data construction and availability.

[7]Our results are similar if we look at completion within any institution or program of study over this same time period or use longer time horizons (e.g., within 8 or 10 years of entry). As shown in Appendix Table A.1, around 5 percent of graduate program entrants earn a graduate degree outside of their original institution and broad field of study within 6 years, representing 7 percent of completers. Expanding the time horizon over which completion is measured to 10 years does not noticeably increase the average completion rate (Appendix Table A.2).

[8]A key limitation of our data is that, at entry, we observe the 6-digit CIP code of the program in which a graduate student enrolls, but do not consistently observe the student's intended final degree (e.g. master's

Our analysis sample includes students who entered a graduate program between 2004 (the first entry cohort for which there is information on students entering nonprofit institutions) and 2013 (the last cohort for which we can observe 6-year completion outcomes that occured prior to the COVID-19 pandemic). We limit the analysis sample to programs with at least 10 students entering in a given year and at least 10 across all entry cohorts, on average.

The first column of Table 1 shows characteristics of the 543,611 graduate program entrants in our analysis sample. Similar to graduate students nationwide, the majority of students in our analysis sample are women (58 percent). White, non-Hispanic students were overrepresented relative to Texas residents (61 percent of graduate entrants versus 49 percent of Texas residents in 2010).[9] Around 19 percent of graduate program entrants were Hispanic (compared to 40 percent of Texas residents in 2010), 12 percent were Black (versus 13 percent of Texas residents), 8 percent were Asian or Pacific Islander (API) (versus 6 percent of Texas residents), and less than 1 percent were American Indian or Alaskan Native (AIAN) (versus 1 percent of Texas residents).

Just under half of Texas graduate program entrants enrolled in a Texas public flagship institution (University of Texas at Austin or Texas A&M) or R1 institution (13 and 30 percent, respectively). Another 10 percent enrolled in a specialized health-related institution and the remaining 47 percent enrolled in a non-R1 four-year institution. On average, students who completed a federal student aid application had an expected family contribution (EFC) equal to $7,502 and faced a cost of attendance of $30,063.[10] In their first six years of enrollment, Texas graduate entrants borrowed $25,353 and received $4,677 in grants, on average.

The remaining rows of Table 1 show the distribution of graduate program entrants by broad field of study (measured by the program's 2-digit Classification of Instructional Programs or CIP code). Almost a quarter of Texas graduate students enrolled in an education program and another 16 percent enrolled in a business program. Other popular fields of study include allied health (15 percent of Texas graduate program entrants), academic

vs. doctorate). This is because some doctoral students are classified as master's degree-seeking if they do not have a master's degree at entry, even if they are entering a doctoral degree program. As a result, we cannot distinguish between doctoral degree-seeking students from those who enter a terminal master's degree program if their program also offers a PhD, and thus do not distinguish between degree types when constructing measures of program completion.

[9] See https://www.census.gov/quickfacts/fact/table/TX/POP010210 for Texas resident demographics in the 2010 Census. Because race/ethnicity for the 12 percent of graduate entrants who were international students is not available, we report the share of non-international students in each race/ethnicity category.

[10] All dollar amounts are adjusted for inflation using the CPI-U and reported in constant 2021$.

doctoral (15 percent), engineering (6 percent), and law (5 percent).

Texas graduate program entrants have largely similar demographic characteristics compared to graduate students nationwide. Appendix Table A.4 displays the characteristics of the national population of graduate program entrants in 2004, 2008, and 2012 using data from the National Postsecondary Student Aid Study (NPSAS). A slightly higher share of graduate entrants nationwide in these years were White, non-Hispanic (64 percent) and API (11 percent). Similar to Texas graduate program entrants, 12 percent of the national population of graduate entrants were Black and a smaller share were Hispanic (9 percent) or AIAN (0.4 percent). A smaller share of graduate entrants nationwide were international students (7 percent versus 12 percent of Texas graduate entrants). Likewise, enrollment in an R1 institution was less common within the national population of graduate students (22 percent) although these students faced a similar cost of attendance ($27,632). Finally, the distribution of broad fields of study within the national population of graduate entrants was relatively similar to that of Texas graduate entrants,

The second and third columns of Table 1 show that graduate completers and noncompleters had relatively similar baseline characteristics, on average. A slightly larger share of completers were international students (13 versus 12 percent), White, non-Hispanic (63 versus 57 percent), and API (9 versus 6 percent), and a slightly smaller share were Hispanic (17 versus 22 percent) or Black (11 versus 15 percent). Students who attended programs in flagship public, health-related, and R1 programs were more likely to complete within 6 years and completers had similar EFCs but faced higher initial costs of attendance, on average ($32,416 versus $24,907). Likely reflecting both differences in costs and years of enrollment, completers accumulated almost twice as much student loan debt than noncompleters ($32,498 versus $13,480) and received slightly more grant aid ($6,046 versus $2,402). Finally, students who initially enrolled in business, allied health, engineering, law, public administration, library sciences, and architecture programs were more likely to complete whereas those who entered education, academic doctoral, interdisciplinary, and parks, recreation, and leisure studies programs were less likely to graduate within 6 years.

3 Results

On average, graduate program graduation rates (weighted by entry cohort size) increased from 58 percent for 2004 entering students to 68 percent for the 2013 entry cohort (Figure 1). This approximately 1 percentage point per year increase is larger than the 0.4 per-

centage point annual increase in bachelor's degree graduation rates over this same period (Denning et al., 2022).

Figure 1 also shows average graduation rates for several categories of graduate programs that enroll a large share of students, including education, registered nursing (RN), clinical psychology, business administration (MBA), engineering, accounting, law (JD), and social work (MSW).[11] Across all of these programs except law, graduation rates increased between 2004 and 2013. In general, growth was highest for the programs that had the lowest initial graduation rates. RN programs saw the largest increases, on average, growing from a 55 percent 6-year completion rate in 2004 to a 74 percent completion rate in 2013, followed by education programs (from 48 to 60 percent) and clinical psychology programs (from 58 to 70 percent). JD programs had the highest initial graduation rates at 81 percent, peaking at 85 percent in 2011 and falling to 73 percent in 2013.

3.1 Variation in graduation rates by broad field of study

The relative stability of the ordering of average graduation rates by field of study shown in Figure 1 motivates our analysis of the distribution of program-by-entry cohort level graduation rates within the largest broad fields of study.[12] The box and whiskers plots shown in Figure 2 illustrate key points in the distribution of graduation rates for the largest programs, ordered by median graduation rate. Whiskers represent the 5th and 95th percentiles and the boundaries each box represent the 25th and 75th percentiles.

Several patterns emerge. First, there are large differences in the median graduation rates across programs within broad fields of study. For example, the median law and health programs have graduation rates exceeding 80 percent whereas the median education and family/consumer sciences programs have median graduations rates around 55 percent.

Second, Figure 2 shows the substantial variation in program graduation rates *within* broad field of study. In many cases, the interquartile range of program-by-cohort graduation rates exceeds 20 percentage points. Finally, there is substantial overlap in the distributions of graduation rates across broad fields of study. For example, within health programs, which have the second highest median graduation rate, there are programs with lower graduation rates than at least one liberal arts and general studies program, the category

[11] Nationally, 40 percent of graduate entrants in 2004, 2008, and 2012 enrolled an MBA, education, or law program (authors' calculations using NPSAS data, accessed via Powerstats; retrieval code = bxsrsc).

[12] For the purpose of these analyses, we measure broad field of study by 2-digit CIP code, except in the case of academic doctoral programs. We classify programs 4-digit CIP codes to be academic if more than 85 percent of degrees are terminal master's degrees. We define a terminal masters degree as a student who received a masters degree and subsequently did not earn a PhD in the same CIP at the same institution.

with the lowest median completion rate. This within-field-of-study variation in part reflects differences across institutions, we turn to next.

3.2 Variation in graduation rates by institutional sector

Unlike institutional categorizations for undergraduate education, there is not a well accepted notion of university-wide selectivity for graduate school (e.g., using admissions rates or test scores). Further, in our setting, some schools are highly specialized, focusing only on health programs. Thus, we split institutions in our sample into four mutually exclusive groups of: flagship public institutions, health-focused institutions, R1 institutions, and all others. The University of Texas at Austin and Texas A&M University are the only two institutions classified as flagships in the state of Texas. R1 institutions are based on the Carnegie Classification, specifically, those considered to be "Doctoral Universities [with] Very high research activity".[13] For the classification of schools as health-related, we follow the Texas Higher Education Coordinating Board.[14] The final group of "other" institutions covers all schools not included in the previous three groups. Appendix Table A.5 provides the full list of institutions in each category.

Similar to patterns for undergraduate completion rates, graduate program graduation rates increase with universities' research productivity and undergraduate selectivity (Denning et al. 2022). Graduate programs in health-related and flagship institutions have the highest (student-weighted) graduation rates. On average, 72 percent of students who enter a graduate program in a Texas flagship institution complete within 6 years, and within health-related schools, the average completion rate is 73 percent. Programs at (non-flagship) R1 schools have an average graduation rate of 64 percent and only 57 percent of graduate students entering programs within the remaining institutions complete.

At the same time, there is substantial overlap across institutional sectors, with some programs in health and flagship schools having lower graduation rates than programs in R1 and other institutions (Figure 3). For example, about a quarter of graduate students in health and flagship institutions enter programs with graduation rates below 60 percent and a quarter of students in other institutions attend a program with a graduation rate at or exceeding 70 percent.

[13] Although the two flagship institutions also belong to the R1 category, for the purpose of our analyses, they are excluded to ensure a mutually exclusive grouping. R1 institutions include Baylor University, Rice University, Texas Tech University, the University of Texas at Arlington, the University of Texas at Dallas, the University of Texas at El Paso, the University of Texas at San Antonio, the University of Houston, and the University of North Texas.

[14] These can be seen at http://www.txhighereddata.org/Interactive/Institutionsshow.cfm?Type=1&Level=3

3.3 Debt and earnings for graduates and noncompleters

Low graduation rates may signal that students are learning about their individual costs and/or returns to graduate school and optimally deciding to leave school before completion because their expected earnings gains do not justify the expected costs of completion (e.g., Arcidiacono et al., 2016). In this case, noncompleters would likely make this decision early in their enrollment. One indication of this would be lower debt burdens for noncompleters relative to graduates. Panel A of Figure 4 shows average cumulative student loan debt measured 6 years after entry, for all students and by completion status, for each broad field of study. In most fields of study, completers and noncompleters have relatively similar cumulative debt levels. For example, students who enter and complete education programs had $19,544 in student loan debt, on average, whereas noncompleters borrowed $12,030, on average. Engineering program completers had $4230 in cumulative debt compared to $3452 for dropouts. Exceptions to this pattern are programs with high debt and high completion rates, such as health professions ($65,582 for completers vs. $30,924 for noncompleters) and law ($86,194 for completers vs. $27,683 for noncompleters). Appendix Table A.6 shows average debt for completers, noncompleters, and all students for all broad fields of study.

Similar to undergraduates, the amount of student loan debt graduate students accumulate is correlated with program completion rates, overall and by completion status. Panel A of Appendix Figure A.1 shows a binned scatter plot of average cumulative debt for program completers and noncompleters by program completion rate. For programs with completion rates below 70 percent, there is very little relationship between debt accumulation and the probability of completion or the gap in student loan debt held by completers and noncompleters. For programs with completion rates above 70 percent, debt and the gap in debt for completers and noncompleters is increasing in graduation rates. However, much of this relationship can be explained by differences in the characteristics of students who enter these programs and once these characteristics are controlled for, debt accumulation by completion rate varies much less (Panel B).[15]

The fact that debt burdens are similar for completers and noncompleters in many programs suggests that some students may face a high cost of noncompletion. These students have to pay back debt associated with graduate education but may not see an earnings return to their investment to help them service this debt. We explore the extent to which debt burdens for noncompleters may be unaffordable by looking at earnings by field of study

[15]Controls include Expected Family Contribution (EFC), race and ethnicity indicators, student age, and gender as well as indicators for missingness for age and EFC.

and completion. We consider two measures: average earnings measured 7 to 12 years after entry (a point at which almost all graduate program entrants are no longer enrolled) and the difference between this quantity and average pre-period earnings (measured over the 5 years before entry for individuals with nonzero earnings). These two measures are highly correlated and result in a similar ordering of broad fields of study (see Appendix Table A.7).[16]

For a subset of programs, earnings and earnings gains are similar or even higher for noncompleters (Figure 4, Panels B and C). These include academic doctoral programs, and programs in theology, liberal arts/general studies, visual and performing arts, agriculture, biological and biomedical sciences, and communications technologies.[17] Further, Appendix Figure A.2 shows that earnings gains and differences in gains between completers and noncompleters are increasing in program completion rates, even after differences in the observable characteristics of entering students across programs are taken into account.

The results on debt and earnings for completers versus non completers present somewhat of a puzzle. The high amount of debt accrued by noncompleters in many fields seems at odds with models of learning about ability (e.g. Arcidiacono et al., 2016) where students would drop out quickly to avoid paying costs associated with college. Additionally, students who are in these programs have already successfully completed undergraduate degrees which likely revealed something about their ability to complete graduate-level work. One way to test this channel would be to compare the graduation rates of students who are studying a subject similar to their undergraduate major versus those who are studying a dissimilar subject. Other possible explanations for high debt for graduate students is that they are using debt to smooth consumption and that liquidity is valuable, regardless of completion status. Yet, another potential explanation is that students may drop out after experiencing unexpected shocks to the cost of completion. These possibilities suggest that future research into graduate school dropout are likely to yield important insights into this large human capital investment.

4 Conclusion

We document several new facts about graduate program completion in this paper. First, graduation rates for graduate programs are similar in magnitude to undergraduate com-

[16] Our main measure of average earnings gains does not limit pre- and post-earnings to come from the same students, but we obtain similar results when we restrict our sample to this group.

[17] Additionally, noncompleters from public administration and area studies graduate programs had higher post-program earnings but lower earnings gains than completers, on average.

pletion rates. Graduate graduation rates are trending up recently. Graduation rates also vary substantially across programs of study and institutional sectors. Noncompletion appears to be costly with noncompleters accruing substantial debt in many cases.

We see several avenues for future research. First, understanding the causes of dropout would be informative and mirror similar research at the undergraduate level. For example, what institution, state, and federal policies affect the graduation rates? Do grants and loans affect the probability of graduation? Does instructional spending? Finally, how do graduation rates respond to competitive pressures?

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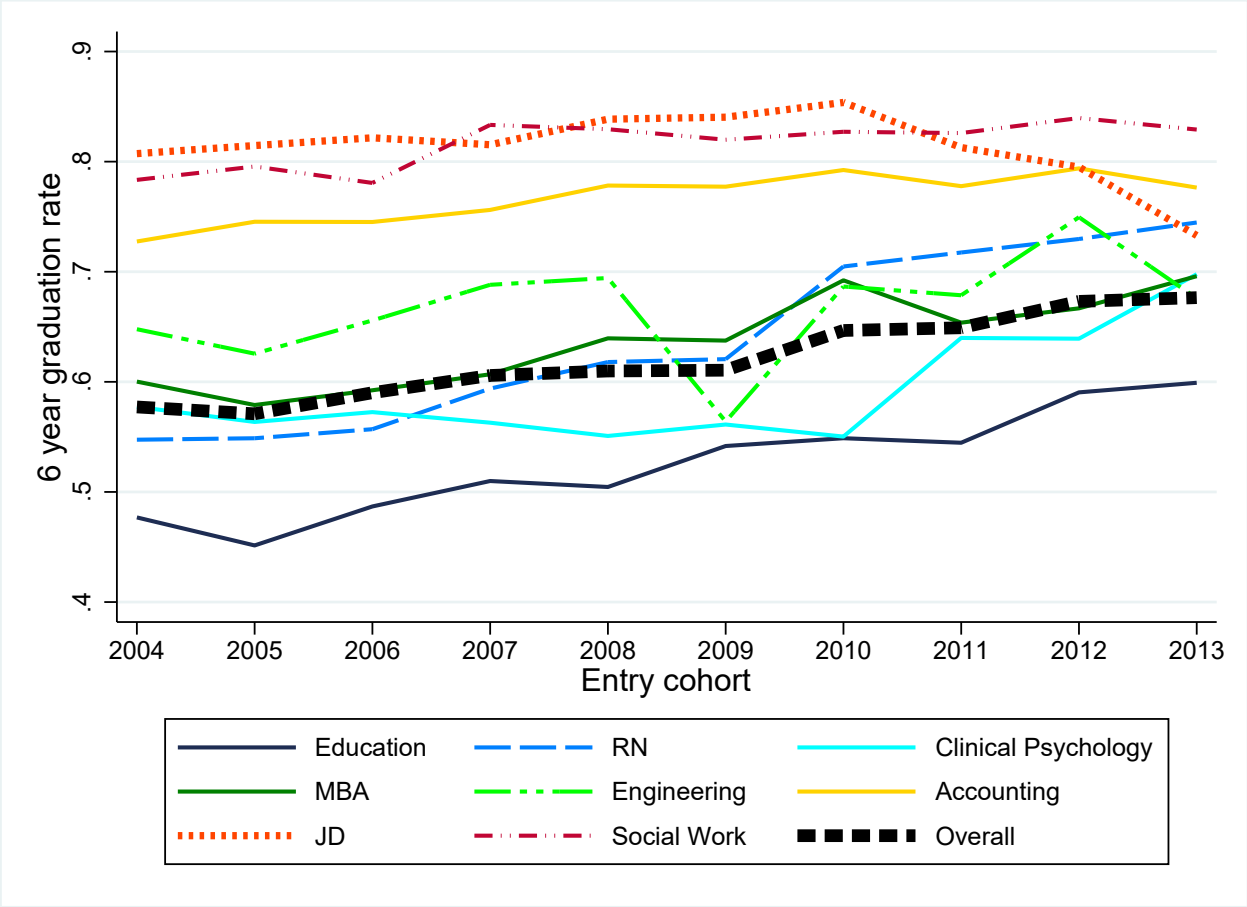
Tables and Figures

Table 1: Characteristics of Graduate Student Completers and Noncompleters

	Graduated in 6 years		
	All	No	Yes
Gender = male	0.416	0.415	0.417
International student	0.124	0.118	0.127
Race/ethnicity[1]			
White	0.607	0.571	0.628
Hispanic	0.190	0.224	0.168
Black	0.124	0.147	0.109
Asian or Pacific Islander	0.079	0.061	0.090
American Indian or Alaskan Native	0.009	0.010	0.009
Type of institution			
Flagship	0.134	0.100	0.154
Health	0.095	0.068	0.112
R1	0.297	0.283	0.306
Other	0.474	0.548	0.429
EFC (entry year)[2]	$7,502	$7,185	$7,648
Received Pell Grant as undergraduate in Texas	0.215	0.239	0.201
Cost of attendance (entry year)[3]	$30,063	$24,907	$32,416
Cumulative loans (6 years)	$25,353	$13,480	$32,498
Cumulative grants (6 years)	$4,677	$2,402	$6,046
Broad field of study (2-digit CIP code)[4]			
Education (13)	0.224	0.282	0.189
Business (52)	0.161	0.144	0.172
Allied health (51)	0.153	0.094	0.188
Academic doctoral	0.153	0.201	0.124
Engineering (14)	0.063	0.055	0.068
Law (22)	0.052	0.026	0.067
Public administration (44)	0.035	0.026	0.040
Psychology (42)	0.031	0.032	0.029
CIS (11)	0.027	0.028	0.026
Library science (25)	0.016	0.013	0.017
Multi/interdisciplinary studies (30)	0.015	0.020	0.012
Parks, recreation, fitness studies (31)	0.011	0.014	0.009
Architecture (4)	0.010	0.007	0.011
Number of students	543,611	204,227	339,384

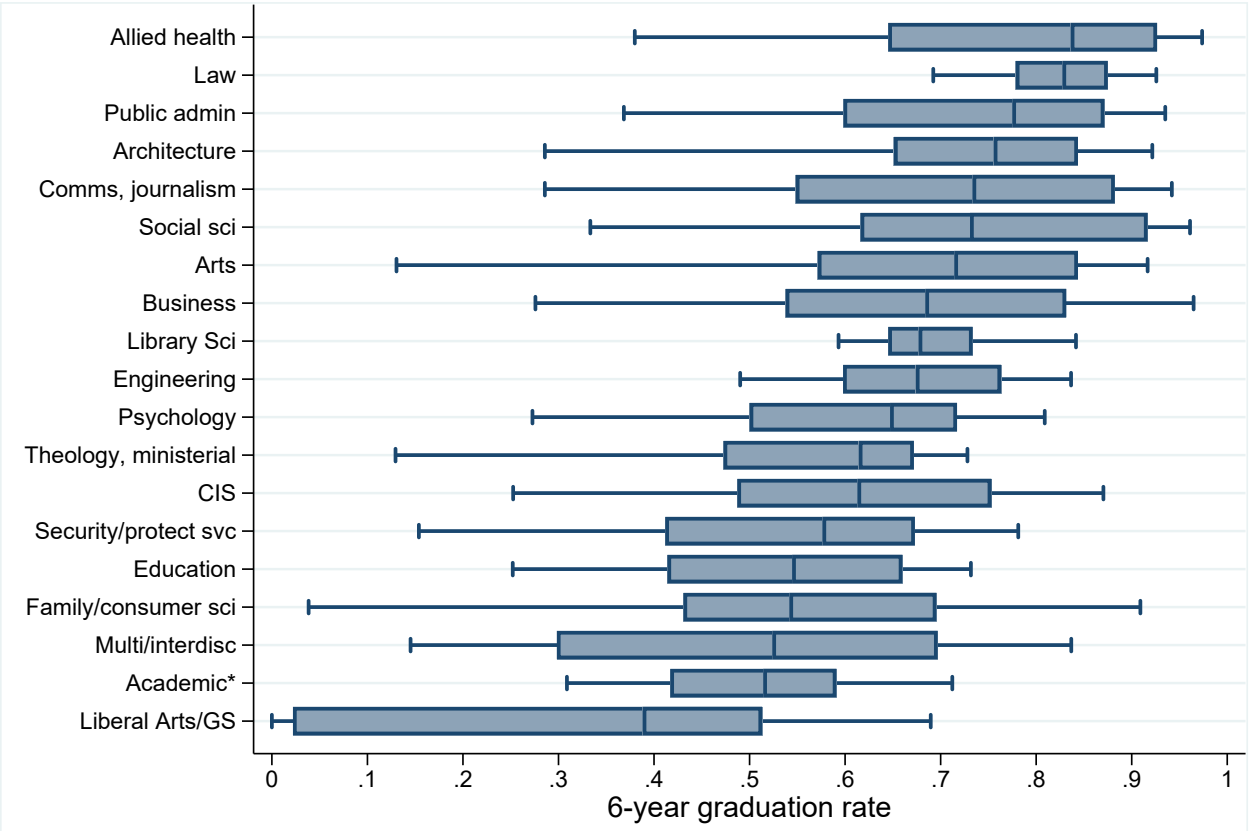
Notes: 1. Among non-international students (N = 476,334). 2. Among those with nonmissing EFC (N = 254,104). 3. Among those with nonmissing COA (N = 266,154). 4. Fields of study with <1% of overall enrollment not shown: Security/protective services (43), Communications, journalism (9), Theology, ministerial studies (39), Liberal arts/GS (24), Visual/performing arts (50), Family/consumer sciences (19), Social sciences (45), Engineering technology (15), Agriculture (1), Biological/biomedical sciences (26), Area studies (5), Communication technology (10), Natural resources, conservation (3).

Figure 1: Graduation Rates by Entry Cohort



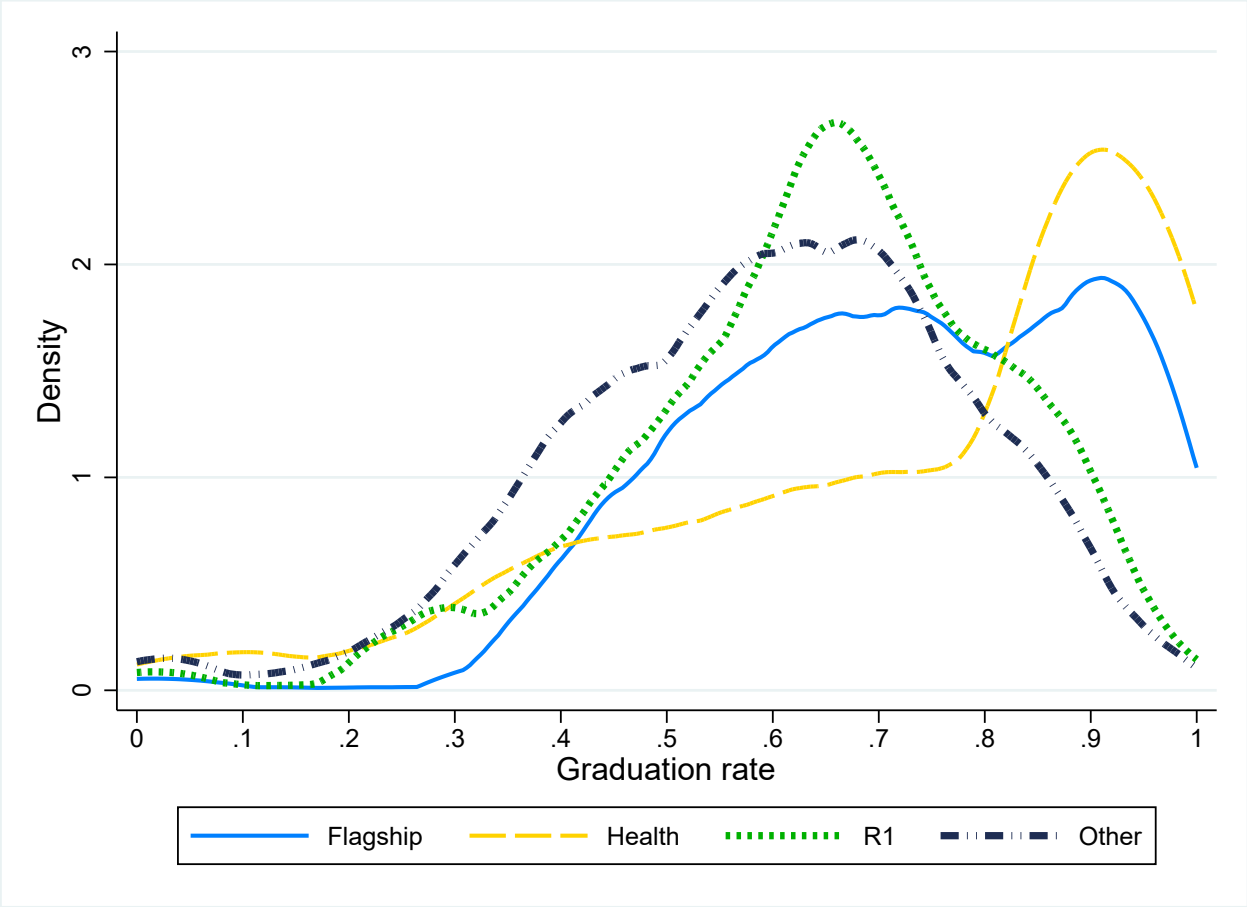
Notes: This figure plots graduation rates by entry cohort for sample overall and for the largest programs. Program-years must average over 10 students per cohort and have 10 students in a cohort to be included. See text for details.

Figure 2: Distribution of Program Graduation Rates by Field of Study



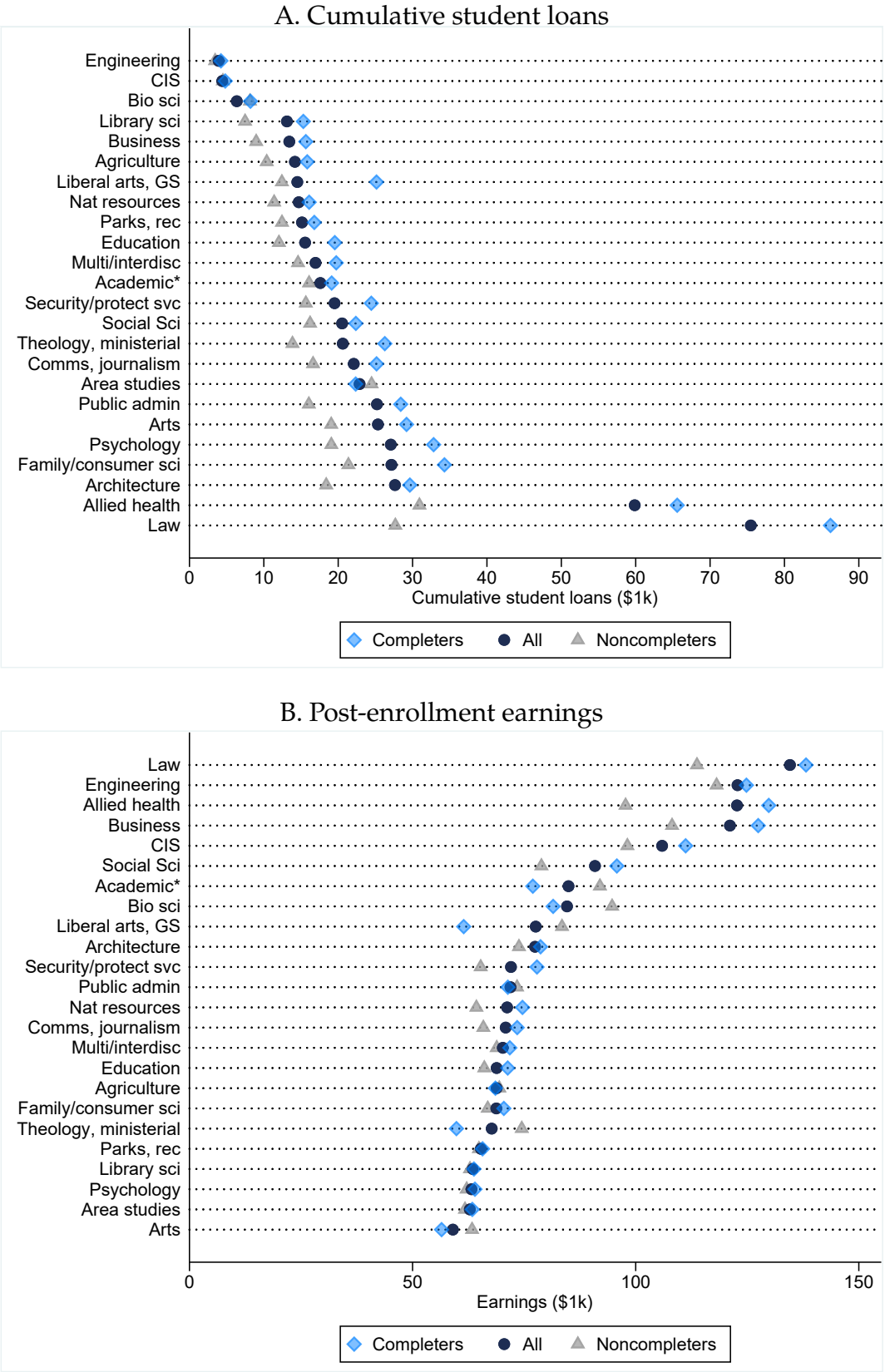
Notes: This figure plots distribution of 6-year graduation rates across programs within broad fields of study defined by 2-digit CIP codes for the 2004 through 2013 entry cohorts. Program-years must average over 10 students per cohort and have 10 students in a cohort to be included. The whiskers indicate 5th and 95th percentiles, the box indicates 25th and 75th percentiles, and the line within the box indicates the median graduation rate.

Figure 3: Distribution of Program Graduation Rates by Institutional Sector

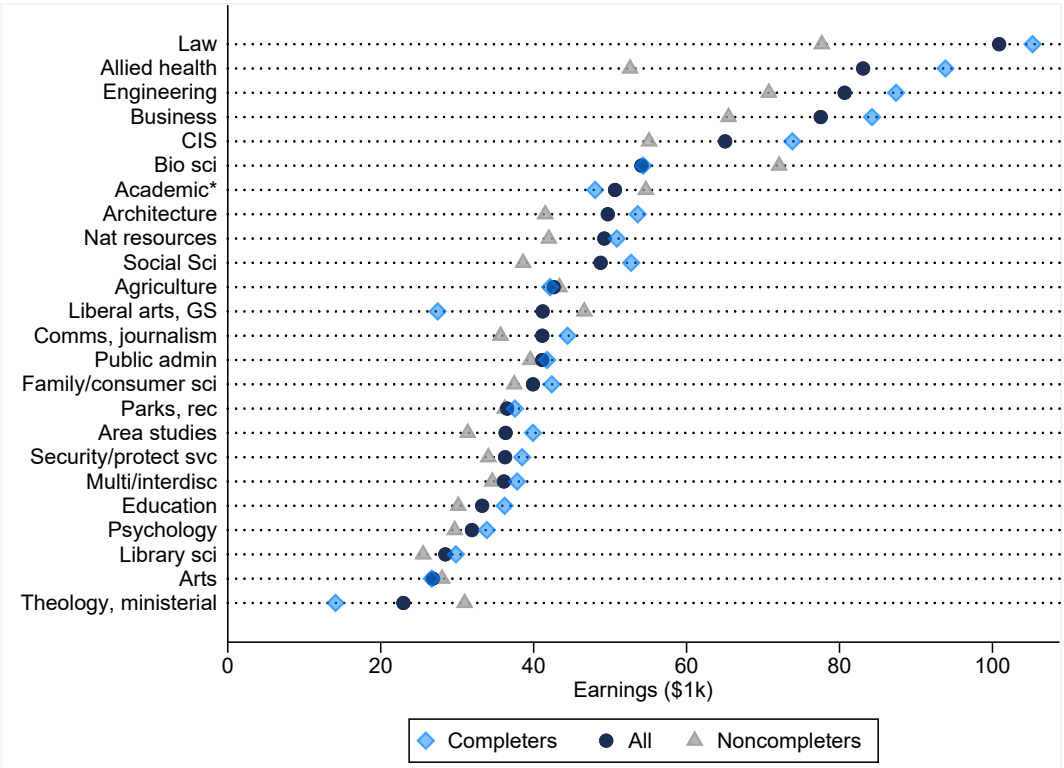


Notes: This figure plots distribution of graduation rates for programs by institutional sector for the 2004 through 2013 entry cohorts: flagships (UT Austin and Texas A&M), R1 schools (excluding UT Austin and Texas A&M), specialized health schools, and all other schools. A list of schools in each grouping can be found in Appendix Figure A.5. Program-years must average over 10 students per cohort and have 10 students in a cohort to be included. An observation is a program (School X year).

Figure 4: Student Loan Debt and Earnings by Completion and Broad Field of Study



C. Earnings Gains



Notes: This figure plots average cumulative student loans (measured over the first 6 years of enrollment) in Panel A, earnings (measured 7 to 12 years after entry for those with nonzero earnings) in Panel B, and earnings gains (the difference between average earnings 7 to 12 years after entry and average earnings in the 5 years prior to entry, for those with nonzero earnings) in Panel C, by completion status and broad field of study. Program-entry cohorts must average over 10 students per cohort for all cohorts and have 10 students in a cohort to be included. Panel

Appendix A Additional Figures and Tables

Table A.1: Completion Rates by Institution and Field of Study

	Entry institution and field of study	Other institution and/or field	Any institution or field of study	Observations
Any degree received within:				
1 year	0.040	0.004	0.043	543,611
2 years	0.241	0.017	0.257	543,611
3 years	0.445	0.030	0.472	543,611
4 years	0.566	0.037	0.599	543,611
5 years	0.604	0.043	0.641	543,611
6 years	**0.624**	**0.047**	**0.663**	543,611
7 years	0.635	0.050	0.676	543,611
8 years	0.634	0.054	0.678	483,588
9 years	0.629	0.058	0.676	422,072
10 years	0.625	0.060	0.674	362,463

Notes: This panel reports the graduation rate by institution for different time horizons. Each column represents an alternative type of degree that varies whether it was in the field or institution that a student initial enrolled in.

Table A.2: Timing of Completion

		Graduated in 6 years	
	All	No	Yes
% students receiving degree received within:			
1 year	0.040	0	0.064
2 years	0.241	0	0.385
3 years	0.445	0	0.713
4 years	0.566	0	0.907
5 years	0.604	0	0.968
6 years	0.624	0	1
7 years	0.635	0.029	1
8 years	0.634	0.042	1
9 years	0.629	0.050	1
10 years	0.625	0.056	1

Notes: This table reports the fraction of students receiving a degree within various time frames overall, for students who did not complete within 6 years and students who did.

Table A.3: Completion by Graduate Degree Type

	Master's	Professional	Doctoral
Any degree received within:			
1 year	0.038	0.001	0.001
2 years	0.233	0.003	0.003
3 years	0.396	0.039	0.009
4 years	0.455	0.093	0.018
5 years	0.476	0.098	0.033
6 years	**0.485**	**0.100**	**0.048**
7 years	0.489	0.100	0.058
8 years	0.485	0.102	0.062
9 years	0.481	0.103	0.062
10 years	0.475	0.104	0.064

Notes: This table reports the fraction of students receiving a degree within various time frames separately for Master's degrees, professional degrees, and doctorla degrees.

Table A.4: Characteristics of Graduate Program Entrants Nationwide

	2004	2008	2012	All
Gender = male	0.421	0.394	0.384	0.397
International student	0.074	0.084	0.089	0.083
Race/ethnicity (incl. international students)				
White	0.665	0.642	0.617	0.638
Hispanic	0.097	0.073	0.097	0.088
Black	0.105	0.162	0.097	0.122
Asian or Pacific Islander	0.105	0.096	0.135	0.113
Asian	0.100	0.094	0.128	0.109
AIAN	0.004	0.002	0.006	0.004
Pacific Islander	0.004	0.002	0.007	0.004
Type of institution = R1	0.225	0.200	0.237	0.221
Cost of attendance (2021$)	$26,018	$27,754	$28,556	$27,632
Broad field of study				
Education	0.287	0.279	0.227	0.261
Business	0.202	0.223	0.198	0.208
Allied Health	0.100	0.113	0.174	0.133
Engineering	0.043	0.051	0.049	0.048
Law	0.054	0.042	0.030	0.040
Psychology	0.020	0.045	0.039	0.036
Biological/biomedical sciences	0.018	0.022	0.023	0.021
Public administration	0.041	0.032	0.039	0.037
CIS	0.024	0.026	0.033	0.028
Social sciences	0.028	0.025	0.019	0.023
Library science	0.010	0.009	0.004	0.007
Muti/interdisciplinary studies	0.003	0.006	0.011	0.007
Physical sciences	0.011	0.010	0.013	0.011
English	0.013	0.010	0.016	0.013
Visual/performing arts	0.021	0.020	0.019	0.020
Math, statistics	0.009	0.004	0.007	0.006
Architecture	0.007	0.004	0.009	0.007
Parks, recreation, fitness studies	0.002	0.005	0.007	0.005
Weighted number of students	934,923	1,335,352	1,462,823	6,531,273

Notes: Notes.

Table A.5: Higher Education Institutions by Categorization

Flagship	Health-related	R1	Other
The University of Texas at Austin	The University of Texas Southwestern Medical Center	The University of Texas Medical Branch at Galveston	Sul Ross State University Rio Grande College
Texas A&M University	The University of Texas Health Science Center at San Antonio	University of North Texas	Abilene Christian University
	Baylor College of Medicine	Texas Tech University	Angelo State University
	The Texas A&M University System Health Science Center	University of Houston	Austin College
	University of North Texas Health Science Center at Fort Worth	The University of Texas at Arlington	Concordia University Texas
	Texas Tech University Health Sciences Center	The University of Texas at El Paso	East Texas Baptist University
	The University of Texas Health Science Center at Houston	The University of Texas at Dallas	Texas A&M University-Commerce
	The University of Texas Medical Branch at Galveston	The University of Texas at San Antonio	Hardin-Simmons University
			Howard Payne University
			Houston Christian University
			University of the Incarnate Word
			Lamar University
			Lubbock Christian University
			University of Mary Hardin-Baylor
			Midwestern State University
			The University of Texas-Rio Grande Valley
			Sam Houston State University
			Schreiner University
			Southern Methodist University
			Texas State University
			Southwestern Adventist University
			St. Edward's University
			St. Mary's University
			Stephen F. Austin State University
			Sul Ross State University
			Prairie View A&M University
			Tarleton State University
			Texas Chiropractic College
			Texas Christian University
			Texas A&M University-Kingsville
			Texas Southern University
			Texas Wesleyan University
			Texas Women's University
			University of St. Thomas
			Wayland Baptist University
			West Texas A&M University
			South Texas College of Law
			Texas A&M International University
			The University of Texas of the Permian Basin
			Texas A&M University at Galveston
			Texas A&M University-Corpus Christi
			The University of Texas at Tyler
			University of Houston-Clear Lake
			University of Houston-Downtown
			University of Houston-Victoria
			Parker University
			Texas A&M University-Texarkana
			The University of Texas at Brownsville
			Texas A&M University-Central Texas
			University of North Texas at Dallas
			Texas A&M University-San Antonio

Table A.6: Average Program-Level Debt by Broad Field of Study

	Cumulative student loans (6 years after entry):				Number:	
Broad field of study	(1) All students	(2) Completers	(3) Non-completers	Difference: (2) - (3)	Students	Program x year obs
Education	$15,551	$19,544	$12,030	$7,514	127,376	403
Business	$13,425	$15,648	$8,970	$6,678	87,637	928
Academic	$17,603	$19,118	$16,086	$3,032	83,210	420
Health Professions	$59,867	$65,582	$30,924	$34,658	83,087	1,019
Engineering	$3,923	$4,230	$3,452	$778	35,782	177
Legal Professions	$75,479	$86,194	$27,683	$58,511	28,217	110
Public Administration	$25,210	$28,406	$16,052	$12,354	19,074	304
Psychology	$27,076	$32,830	$19,076	$13,754	16,601	239
Computers and Information Sciences	$4,408	$4,815	$4,498	$317	14,559	278
Library Science	$13,107	$15,312	$7,481	$7,831	8,557	59
Muli/Interdisciplinary Studies	$16,948	$19,734	$14,597	$5,137	8,234	237
Architecture	$27,635	$29,636	$18,388	$11,248	5,243	145
Security and Protective Services	$19,510	$24,449	$15,648	$8,801	4,773	135
Communication, Journalism	$22,092	$25,159	$16,621	$8,539	4,545	174
Theology/Ministerial	$20,615	$26,267	$13,853	$12,414	3,899	73
Liberal Arts and Sciences, General Studies	$14,500	$25,152	$12,429	$12,723	3,297	60
Visual and Performing Arts	$25,341	$29,189	$19,059	$10,130	2,813	116
Family and Consumer Sciences	$27,158	$34,281	$21,375	$12,907	1,929	86
Social Sciences	$20,521	$22,374	$16,224	$6,150	1,741	43
Agriculture	$14,180	$15,835	$10,387	$5,448	868	50
Biological and Biomedical Sciences	$6,363	$8,200	$8,129	$71	788	37
Area, Ethnic, Cultural, and Gender Studies	$22,878	$22,352	$24,486	-$2,134	623	10
Parks, Recreation, Leisure, and Fitness Studi	$15,128	$16,787	$12,438	$4,349	424	25
Communcations Technologies	$18,781	$20,275	$16,833	$3,442	207	6
Natural Resources and Conservation	$14,695	$16,091	$11,387	$4,704	127	7

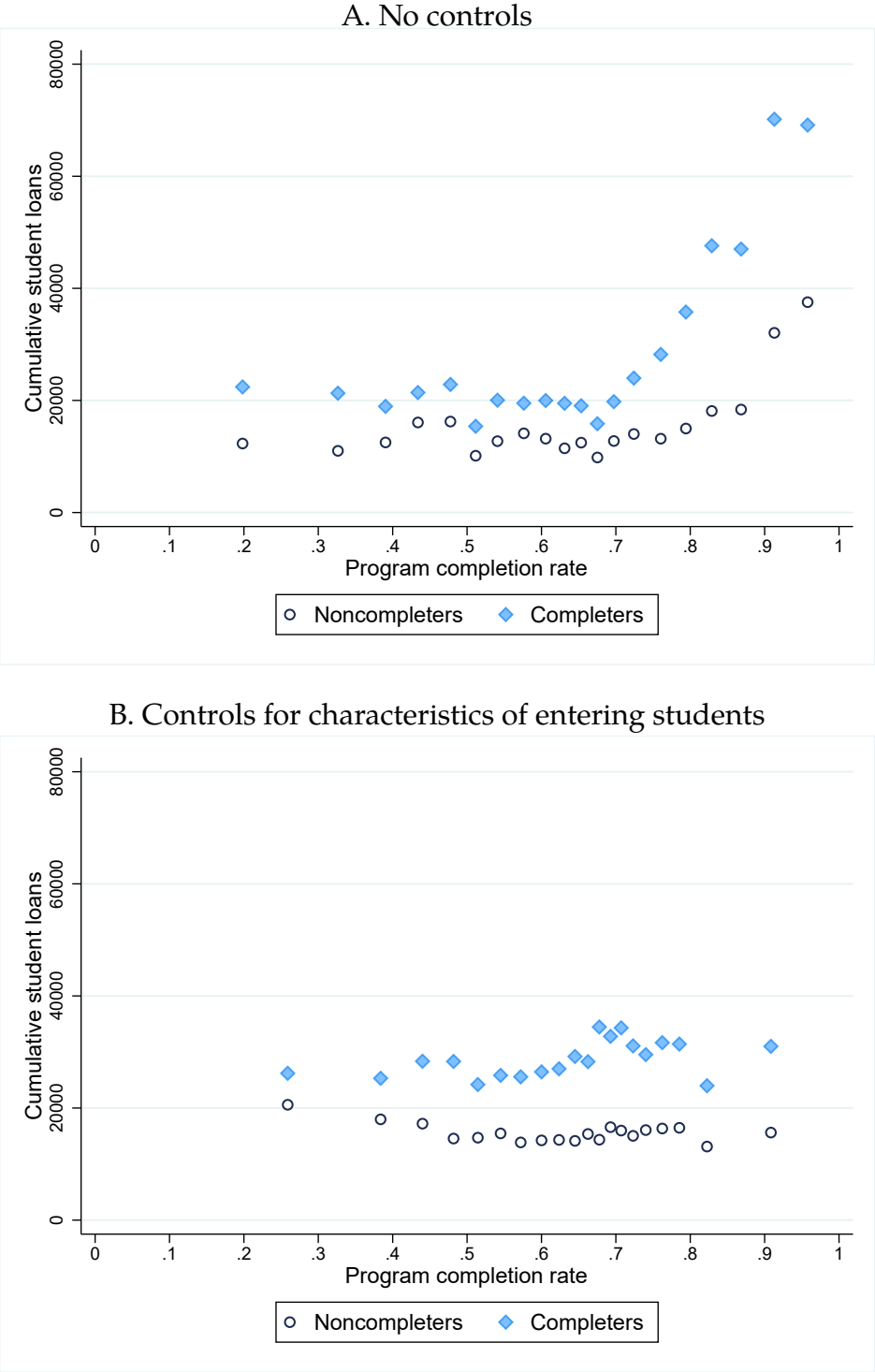
Notes: This table reports mean student debt for different 2 digit CIPs. See the notes for Figure 4 for more details.

Table A.7: Average Program-Level Earnings by Broad Field of Study

Broad field of study	Average post earnings (7-12 years after entry): (1) All students	(2) Completers	(3) Non-completers	Difference: (2) - (3)	Earnings gain (av. post earnings - av. average pre-earnings*) (4) All students	(5) Completers	(6) Non-completers	Difference: (5) - (6)	Number: Students	Program x year obs
Education	$68,842	$71,318	$66,075	$5,242	$33,266	$36,199	$30,138	$6,061	79,772	306
Business	$121,117	$127,457	$108,149	$19,309	$77,546	$84,248	$65,485	$18,763	45,135	706
Academic	$84,944	$76,952	$91,985	-$15,033	$50,640	$48,040	$54,674	-$6,634	34,061	324
Health Professions	$122,703	$129,815	$97,733	$32,083	$83,086	$93,857	$52,611	$41,246	43,118	777
Engineering	$122,822	$124,813	$118,131	$6,682	$80,669	$87,399	$70,762	$16,638	11,056	139
Legal Professions	$134,571	$138,169	$113,734	$24,435	$100,873	$105,240	$77,693	$27,547	15,520	88
Public Administration	$71,939	$71,352	$73,413	-$2,060	$41,127	$41,750	$39,561	$2,189	9,372	234
Psychology	$63,201	$63,973	$62,127	$1,846	$31,931	$33,874	$29,679	$4,195	8,464	182
Computers and Information Sciences	$105,921	$111,190	$98,138	$13,052	$65,045	$73,832	$55,090	$18,742	4,685	215
Library Science	$63,488	$63,751	$62,865	$885	$28,450	$29,832	$25,547	$4,285	5,287	48
Muli/Interdisciplinary Studies	$70,220	$71,786	$68,859	$2,927	$36,108	$37,835	$34,589	$3,246	3,735	182
Architecture	$77,444	$78,678	$73,844	$4,834	$49,694	$53,611	$41,519	$12,091	2,493	115
Security and Protective Services	$72,049	$77,880	$65,265	$12,615	$36,262	$38,493	$34,073	$4,421	2,252	98
Communication, Journalism	$70,870	$73,444	$65,859	$7,585	$41,134	$44,428	$35,676	$8,752	1,954	134
Theology/Ministerial	$67,735	$59,826	$74,475	-$14,648	$22,962	$14,095	$30,976	-$16,880	1,052	57
Liberal Arts and Sciences, General Studies	$77,599	$61,457	$83,486	-$22,029	$41,182	$27,449	$46,622	-$19,173	1,826	47
Visual and Performing Arts	$59,031	$56,503	$63,330	-$6,826	$26,801	$26,680	$28,020	-$1,339	1,099	88
Family and Consumer Sciences	$68,772	$70,455	$66,844	$3,611	$39,909	$42,367	$37,463	$4,905	1,015	69
Social Sciences	$90,876	$95,779	$78,871	$16,908	$48,760	$52,747	$38,623	$14,124	631	29
Agriculture	$68,822	$68,559	$69,437	-$879	$42,622	$42,143	$43,379	-$1,236	490	37
Biological and Biomedical Sciences	$84,608	$81,497	$94,719	-$13,221	$54,099	$54,322	$72,105	-$17,783	187	27
Area, Ethnic, Cultural, and Gender Studies	$62,826	$63,386	$61,751	$1,635	$36,338	$39,914	$31,377	$8,538	178	8
Parks, Recreation, Leisure, and Fitness Stud	$65,312	$65,680	$64,868	$812	$36,530	$37,547	$36,209	$1,338	214	21
Communcations Technologies	$66,728	$62,912	$72,070	-$9,158	$35,221	$33,741	$38,965	-$5,224	96	4
Natural Resources and Conservation	$71,185	$74,625	$64,304	$10,321	$49,239	$50,880	$41,989	$8,890	45	5

Notes: This table reports mean student debt for different 2 digit CIPs. See notes for Figure 4 for more details.

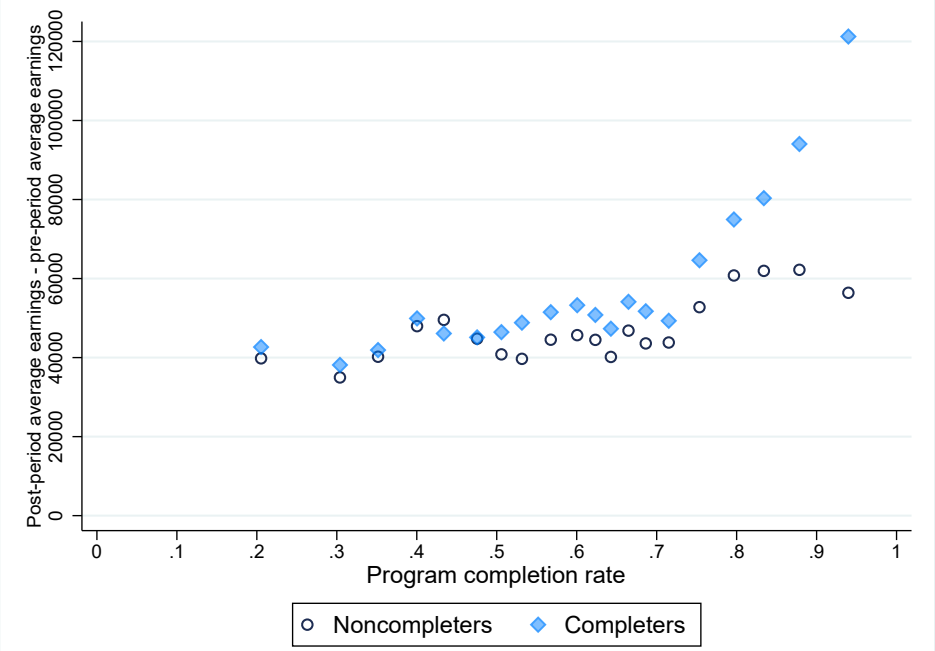
Figure A.1: Cumulative Student Loan Debt by Program Completion Rate



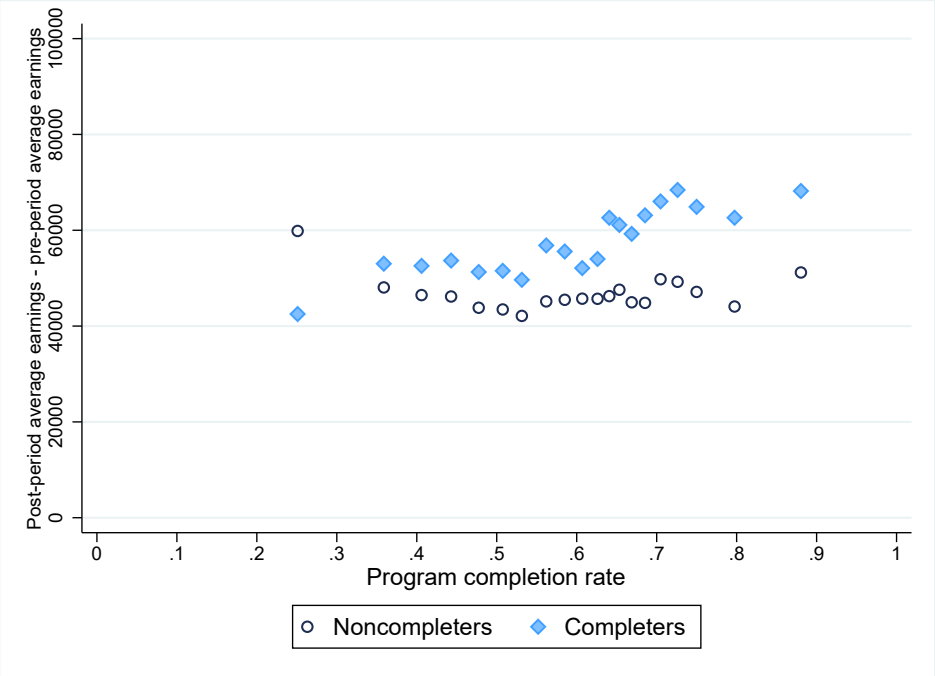
Notes: Panel A plots mean levels of student loans six years after entry for completers and non completers grouped into twenty, equal-sized bins of program completion rate. Program-years must average over 10 students per cohort and have 10 students in a cohort to be included. Panel B controls for Expected Family Contribution, race indicators, student age, and indicator for student gender, and indicators for missingness of Expected Family Contribution and age.

Figure A.2: Earnings Gains by Program Completion Rate

A. No controls



B. Controls for characteristics of entering students



Notes: Panel A plots mean levels of earnings gains for completers and non completers grouped into twenty, equal-sized bins of program completion rate. Earnings gains are the difference in earnings for years 7 to 12 after entry relative to the 5 years prior to entry (for individuals with non-zero earnings). Program-years must average over 10 students per cohort and have 10 students in a cohort to be included. Panel B controls for Expected Family Contribution, race indicators, student age, and indicator for student gender, and indicators for missingness of Expected Family Contribution and age.