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# DECLINING PHD ATTAINMENT OF GRADUATES OF SELECTIVE PRIVATE ACADEMIC INSTITUTIONS

**by**

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## I. Introduction

On average, the typical American citizen who received a PhD during the last 40 years did so approximately 9 years after she received her bachelor's degree.[1] Thus, if we divide the number of American citizens receiving PhDs in a year by the number of American citizens receiving bachelor's degrees 9 years earlier, we obtain an estimate of the fraction of American citizen college graduates in the earlier year who ultimately receive PhDs. This fraction rose from .042 for 1954 bachelor's recipients (1963 PhDs) to about .07 for 1962 bachelor's recipients (1971 PhDs). The fraction then plummeted over the next decade falling to .026 for 1973 bachelor's recipients (1982 PhDs) and has been relatively stable, fluctuating between .025 and .028, since then.[2]

Of course changes in the probability that bachelor's recipients go on to receive PhDs nationwide are influenced by many changing demographic trends including changes in high school graduation rates, changes in college enrollment rates of high school graduates, changes in college graduation rates for college enrollees, changes in the distribution of undergraduate majors, and changes in the academic backgrounds of college students. In this paper we focus on a more homogenous set of 31 highly selective private colleges and universities. The academic aptitudes and preparations of students attending these institutions are among the highest in the nation and make this group's students' behavior of special interest.

Table 1 presents information on the ratio of PhDs granted to graduates of these institutions to the number of graduating seniors 9 years earlier. The undergraduate degree

[1] Data from the *Survey of Earned Doctorates* indicate that the median total time to doctoral degree from receipt of bachelor's degree actually rose from 8.0 years for doctoral recipients in 1966 to 10.3 years for doctoral recipients in 2000, so our use of a 9-year lag is a simplification.
[2] Groen and Rizzo (2004), figure 4.

years in the table range from 1966-67 to 1992-93, so these correspond to PhD degree granting years 1975-76 to 2001-2002.[3] Across institutions, the weighted (by enrollment) mean of the ratio was .141 for graduates in 1966-67, fell to about .10 in 1975-76, fluctuated around that level for the next 12 years, and then fell to .073 for the class graduating in 1992-93. This represents almost a 50 percent drop in the share of graduates at these institutions going on for PhD study during the period. Moreover, similar declines are observed at the 25$^{th}$ percentile and 75$^{th}$ percentile institutions in the distribution.[4]

Figure 1 presents the information graphically, with the ratios averaged across three-year intervals to smooth out year-to-year fluctuations at each institution. The figure shows the patterns for the 31 institutions as a whole and for different subgroups of institutions (Ivy League universities, other universities, liberal arts colleges and traditionally single-sex female colleges). While the share of graduating seniors at these institutions going on for PhDs varied across the different subgroups of the institutions in our sample, the same time pattern is observed in figure 1 for each subgroup.

This suggests that there are some common forces that are influencing changes in the ratio at all the institutions. However, institution-specific forces may also matter. When one ranks the 31 institutions by the share of students at each institution receiving PhDs in each year and then looks at the correlation between any two years during the period in the institutional rankings, one finds that the correlation is high but not equal to

[3] The number of undergraduate degrees granted by each institution and the number of PhDs received by graduates of the institution both are available from WebCaspar (http://caspar.nsf.gov). The PhD degree data come from the NSF *Survey of Earned Doctorates* and the enrollment data from the U.S. Department of Education.

[4] The PhD-going rates for these institutions consistently exceed the national average, but the time pattern is roughly similar. For comparisons of PhD-going rates for graduates of different types of undergraduate institutions, see Groen and Rizzo (2004).

one. Indeed the correlation between the ratio for the graduating class of 1966-67 and the class of 1992-93 is .737.[5]

## II. Analytical Approach

Our methodological approach is to estimate linear probability equation models in which the dependent variable in each equation is the ratio of PhDs granted to graduates of an undergraduate institution in a year divided by the number of graduating seniors at the institution 9 years earlier. This ratio is specified to depend upon the distribution of fields in which the graduating seniors majored, the racial/gender/ethnic (henceforth RGE) distribution of the graduating seniors at the institution, the average SAT scores of the graduating seniors and two different sets of financial variables, which we discuss below. The data span PhD granting years 1975-76 to 2001-2002 so we have 837 (27 x 31) institution-year observations.[6] Descriptive statistics for the explanatory variables used in our analyses appear in table 2.

Information on the field distribution of graduates by major is available for all years and on the distribution of graduates by RGE is available starting in 1977-78 from WebCaspar.[7] Information on the average SAT scores of entering students comes from the institutions. Recalling that our observations correspond to undergraduate degree years 1966-67 to 1992-93, students who graduated in the former year first enrolled at their institution in the fall of 1963. Similarly students who graduated in the latter year, first enrolled in their institution in the fall of 1989. We were provided with verbal SAT data

[5] An analysis-of-variance confirms the importance of institutional and time effects. Overall, institution accounts for 64 percent of the variance in the ratio and time accounts for 21 percent.
[6] While we report the linear probability function model estimates in the text because they are easy to interpret, coefficients from a more theoretically appropriate log odds ratio model are reported in the appendix. In the main, the results we obtain from the two models are very similar.
[7] The gender distribution of graduates is available for all years.

starting with the class that entered in the fall of 1977 and mathematics SAT data starting with the class that entered in the fall of 1984. Hence, we do not have SAT data during the period when most of the decline in PhD-going rates in the sample occurred.

Decisions to enroll in PhD programs may well be influenced by the financial background of graduating students and the magnitudes of their loan burdens. Prior research indicates that there has been a growing dispersion of endowment wealth among private colleges and universities.[8] One manifestation of this growing dispersion in endowment wealth has been a growing dispersion in the typical self-help packages (loans and academic-year work expectations) across the institutions in our sample. This change, coupled with changes over time in the share of students receiving grant aid and the median income levels of the families from which these students come at each institution, may thus influence the fraction of each institution's graduates going on to PhD study. We were provided with information on typical self-help packages, share of entering students receiving grant aid and median family income of grant recipients, by institution, for entering first-year classes starting in 85-86 (86-87 for median family income of grant recipients) so we have this information for the classes that graduated in 1988-89 and thereafter.

An alternative measure of the financial situations of graduates of an institution comes from data on the number of Pell grant recipients at each institution and the total dollars of Pell grants that students at the institution received in a year.[9] Dividing the number of Pell grant recipients in a year by the undergraduate enrollment of an institution in a year, gives us the fraction of undergraduates at the institution that received Pell

[8] Ehrenberg (2003).
[9] These data were provided to us by the federal Pell grant program office.

grants. Dividing the total volume of Pell grants at an institution by the number of recipients, and this in turn by the price level, gives us the average real Pell grant that students at the recipients at the institution received in a year.

Most Pell grant recipients come from the bottom two-fifths of the family income distribution and higher levels of real Pell grants indicate greater student need. Hence, other factors held constant, we expect that an increase in the share of an institution's students receiving Pell grants or an increase in the average real Pell grant received by students at the institution will both be associated with a decrease in the proportion of the graduates of the institution going on for PhDs. Pell grant data are available to us starting with academic year 1985-86 and for each graduating class we use the value of the Pell grant variables at the institution during the classes' freshman year.

For each set of financial variables (institutional grant aid or Pell grant), we estimate three different specifications. The first includes year fixed effects to capture all omitted variables that vary over time and that influence PhD-going behavior of graduating seniors at all of these selective institutions similarly. In this model, estimated coefficients of the explanatory variables are estimates of how differences in the variables across institutions influence differences in PhD-going behavior across institutions. The second includes institutional fixed effects to capture the effects of omitted variables that do not vary over time that influence PhD-going behavior across institutions. In this model, estimated coefficients of the included variables are estimates of how changes in the variables over time influence PhD-going behavior of graduates.

Estimates of the first model may be subject to omitted variable bias if we have left out of the model any variables that differ across institutions but do not vary over time.

Estimates of the second model may be similarly subject to omitted variable bias if we have left out of the model any variables that do not vary across institutions but that do vary over time (such as the economic returns to PhD study). Hence in our third model, we include both year and institution fixed effects. The estimated coefficients from this model tell us, after controlling for all omitted year and institutional effects, how changes in the included explanatory variables influence PhD-going behavior of graduates from these selective institutions.

## III. Empirical Findings

Table 3 presents estimates of our linear probability function models of the share of an institution's graduates who go on for PhDs for each set of the financial variables and for each of the three model specifications. While we report results for all three model specifications so that the reader can view them, for the most part we confine our discussion to the models that include both institutional and year fixed effects. Turning first to the field distribution of graduating seniors, an increase in the share of graduating seniors majoring in any field other than the physical sciences (the omitted category) is associated with a decrease in the share of an institution's graduates going on to receive PhDs.

RGE stereotypes do not appear to hold at these institutions. In particular, holding other variables constant, an increase in either the share of female graduates or the share of Black graduates in the class is each associated with higher, not lower, PhD receiving behavior.[10] Similarly, an increase in the share of Asian American graduates in the class is associated with lower PhD receiving behavior. While temporary resident graduates are

[10] Cole and Barber (2003) similarly find that Black undergraduates at selective private academic institutions are not less likely than white undergraduates of similar academic backgrounds to express interest in going on for PhDs and careers as professors.

more likely to go on for PhDs, this effect is statistically insignificant in our preferred models.

When only time fixed effects are included, across institutions higher mathematics and verbal SAT scores are both associated with higher proportions of graduates going on for PhDs, other factors held constant. However, once both time and institutional fixed effects are included, an increase in an the average mathematics SAT score at an institution is associated with a greater share of the institution's graduates going on to receive PhDs, but an increase in the average verbal SAT score at an institution is associated with a smaller share of the institution's graduates going on to receive PhDs.

Turning to the financial variables, an increase in the share of students at an institution receiving institutional grant aid is associated with a decreasing PhD propensity of graduates of the institution. Similarly, an increase in the share of students at the institution receiving Pell grants is associated with a decline in the share of the graduates at the institution going on to receive PhDs. By contrast, changes in the median family income levels of grant recipients, changes in typical self-help packages, and changes in the average Pell grant level are not associated with changes in PhD-going behavior. The latter finding is not surprising because changes in the average Pell grant level among students at an institution reflect both changes in the average family income of students at the institution and changes in the generosity of the Pell grant program.

Finally, we conducted simulations to determine what fraction of the change in PhD-going behavior of graduates of these institutions could be "explained" by particular variables in our models. Changes in the RGE variables explain about 25 percent of the change during the period, while changes in the distribution of majors over time explain

about 5 percent. Changes in the share of students receiving grant aid (for which we had data for only the last five years) explain about 20 percent of the change during that period.

## IV. Conclusion

Currently, about 3 percent of U.S. college graduates go on to earn a PhD. We have examined the factors behind PhD-going rates using data on graduates of 31 highly selective private colleges and universities. Our analysis reveals several factors that influence the propensity of college graduates to receive PhDs.

First, the distribution of majors at an institution is related to the fraction of its graduates who receive PhDs, with majors in the physical sciences being most likely and majors in the humanities being least likely to go on to receive PhDs. Second, the fractions of students receiving institutional grant aid or Pell grants are associated with a greater share of an institution's graduates going on to receive PhDs. This finding points to role of the financial situations of bachelor's recipients in decisions to purue PhD study.

We also found that the average SAT scores of an institution's graduates mattered: higher mathematics SAT scores increase the share going on to received PhDs while higher verbal SAT scores decrease it. Finally, the demographic distribution of graduates from these selective institutions influenced PhD-going behavior in ways that were somewhat surprising. In particular, an increase in either the share of female graduates or the share of Black graduates is associated with an increase in the fraction of graduates going on to receive PhDs.

## References

Stephen J. Cole and Elinor Barber, *Increasing Faculty Diversity: The Occupational Choices of High-Achieving Minority Students* (Cambridge, MA: Harvard University Press, 2003).

Ronald G. Ehrenberg, "Studying Ourselves: The Academic Labor Market," *Journal of Labor Economics* 21 (April 2003): 267-288.

Jeffrey A. Groen and Michael J. Rizzo, "The Changing Composition of American-Citizen PhDs," Working Paper 48 (March 2004), Cornell Higher Education Research Institute. Forthcoming in Ronald G. Ehrenberg and Paula Stephan, eds., *Science and the University* (Madison, WI: University of Wisconsin Press).

**Figure 1: Weighted Proportion of BA Graduates Receiving a PhD 9 Years Later (3-Year Averages)**

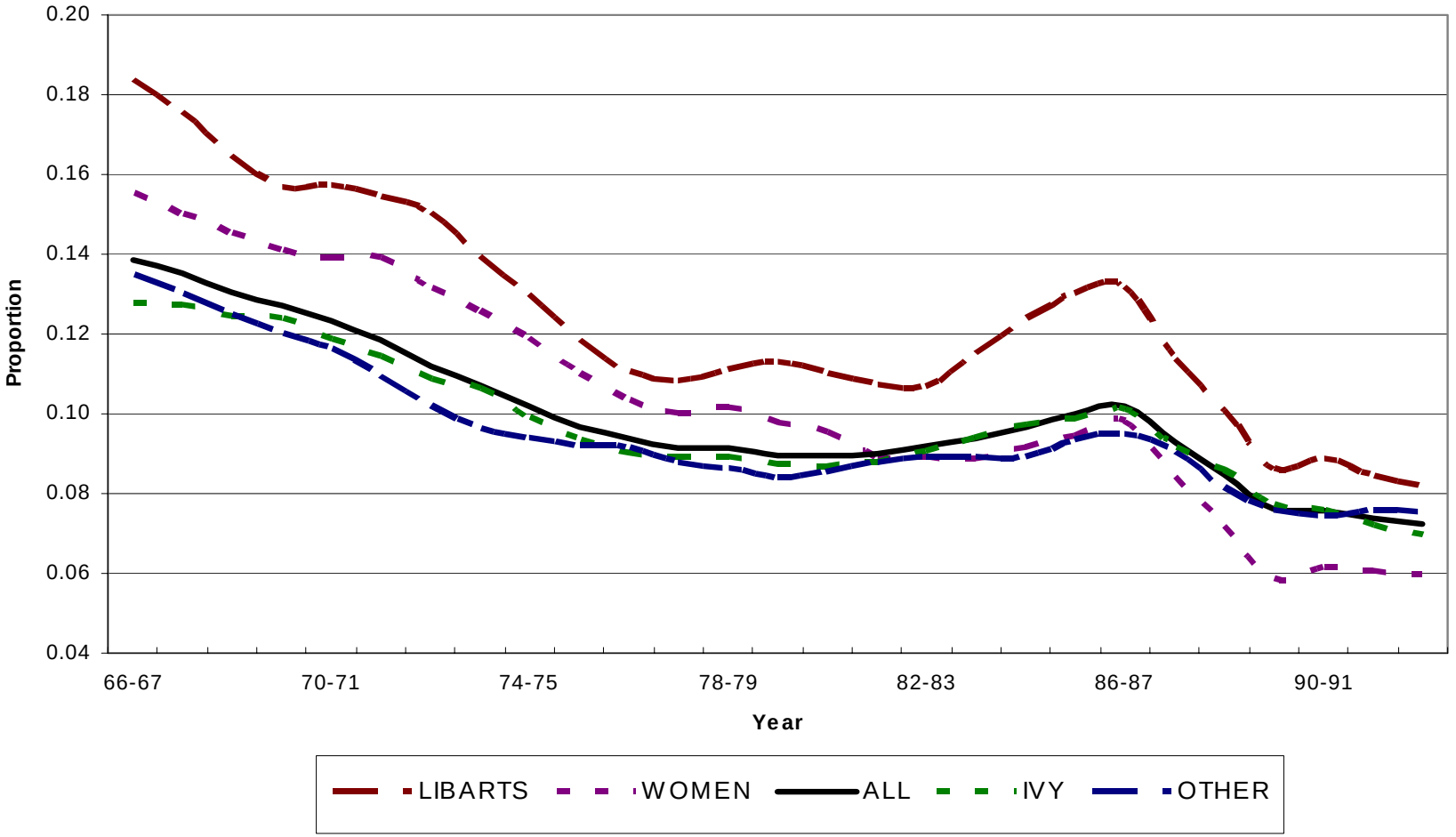

**Table 1: Ratio of PhDs Granted to Graduates of Selective Private Institutions in Our Sample to the Number of Bachelor's Degrees Granted by the Institutions**

| Year of Bachelor's Degree | Mean | Standard Deviation | 25th Percentile | 75th Percentile |
|---|---|---|---|---|
| **1966-67** | 0.141 | 0.054 | 0.101 | 0.155 |
| **1967-68** | 0.136 | 0.051 | 0.095 | 0.165 |
| **1968-69** | 0.128 | 0.050 | 0.098 | 0.140 |
| **1969-70** | 0.127 | 0.052 | 0.091 | 0.149 |
| **1970-71** | 0.126 | 0.052 | 0.091 | 0.157 |
| **1971-72** | 0.117 | 0.047 | 0.080 | 0.131 |
| **1972-73** | 0.113 | 0.035 | 0.086 | 0.139 |
| **1973-74** | 0.107 | 0.043 | 0.071 | 0.123 |
| **1974-75** | 0.103 | 0.041 | 0.082 | 0.116 |
| **1975-76** | 0.096 | 0.035 | 0.073 | 0.119 |
| **1976-77** | 0.091 | 0.030 | 0.073 | 0.103 |
| **1977-78** | 0.094 | 0.036 | 0.073 | 0.119 |
| **1978-79** | 0.090 | 0.034 | 0.065 | 0.102 |
| **1979-80** | 0.091 | 0.034 | 0.065 | 0.115 |
| **1980-81** | 0.088 | 0.031 | 0.067 | 0.103 |
| **1981-82** | 0.089 | 0.032 | 0.068 | 0.101 |
| **1982-83** | 0.093 | 0.036 | 0.069 | 0.111 |
| **1983-84** | 0.094 | 0.038 | 0.068 | 0.108 |
| **1984-85** | 0.095 | 0.038 | 0.067 | 0.123 |
| **1985-86** | 0.101 | 0.044 | 0.072 | 0.114 |
| **1986-87** | 0.103 | 0.042 | 0.070 | 0.129 |
| **1987-88** | 0.102 | 0.039 | 0.076 | 0.135 |
| **1988-89** | 0.074 | 0.034 | 0.046 | 0.083 |
| **1989-90** | 0.078 | 0.031 | 0.053 | 0.096 |
| **1990-91** | 0.077 | 0.029 | 0.059 | 0.090 |
| **1991-92** | 0.072 | 0.034 | 0.043 | 0.094 |
| **1992-93** | 0.073 | 0.030 | 0.050 | 0.087 |
| **All Years** | 0.098 | 0.042 | 0.069 | 0.118 |

Notes: PhD numbers assume a 9-year total time to PhD. The mean across the 31 institutions is weighted by enrollment size.

## Table 2: Descriptive Statistics for the Explanatory Variables

| **Major (1966-67 to 1992-93)** | **Mean** | **SD** |
|---|---|---|
| Percent Engineering and Computer Science | 10.98 | 11.49 |
| Percent Humanities | 26.50 | 12.40 |
| Percent Life Sciences | 12.14 | 4.81 |
| Percent Other Majors | 13.63 | 11.44 |
| Percent Physical Sciences and Math | 7.41 | 4.49 |
| Percent Psychology | 5.98 | 3.23 |
| Percent Social Sciences | 23.35 | 8.68 |
| **Race/Ethnicity (1977-78 to 1992-93)** | | |
| Percent Asian | 5.72 | 3.63 |
| Percent Black | 4.84 | 1.50 |
| Percent Hispanic | 2.72 | 1.68 |
| Percent Other | 0.47 | 1.27 |
| Percent White | 82.97 | 6.49 |
| Percent Temporary Resident | 3.34 | 2.29 |
| **Gender (1966-67 to 1992-93)** | | |
| Percent Female | 42.50 | 20.68 |
| **Test Scores** | | |
| Math SAT Score / 10 (1984-85 to 1992-93) | 65.48 | 3.14 |
| Verbal SAT Score / 10 (1977-78 to 1992-93) | 60.62 | 2.80 |
| **Financial Aid** | | |
| Percent Receiving Grant Aid (1988-89 to 1992-93) | 40.91 | 7.89 |
| Median Family Income of Grant Recipients ($1988) (1989-90 to 1992-93) | $64,576 | $5,974 |
| Typical Self-Help Package ($1988) (1988-89 to 1992-93) | $5,527 | $1,038 |
| Average Pell Grant Size ($2002) (1985-86 to 1992-93) | $2,131 | $132 |
| Percent Receiving Pell Grants (1985-86 to 1992-93) | 11.18 | 3.99 |

Notes: The means are the averages of the institution/year observations, weighted by enrollment size. The standard deviations are similarly the standard deviations of the institution/year observations.

## Table 3: Weighted Fixed Effects Regression Models – Linear Probability Model

| | With Grant Aid | | | | | | With Pell Grants | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Time FE | | Inst. FE | | Time & Inst. FE | | Time FE | | Inst. FE | | Time & Inst. FE | |
| Percent Humanities | **-0.0049** | **-16.9** | **-0.0015** | **-3.7** | **-0.0019** | **-5.1** | **-0.0049** | **-17.1** | **-0.0026** | **-6.4** | **-0.0020** | **-5.3** |
| Percent Life Sciences | **-0.0047** | **-14.3** | **-0.0028** | **-7.1** | **-0.0014** | **-3.8** | **-0.0047** | **-14.5** | **-0.0036** | **-8.8** | **-0.0017** | **-4.4** |
| Percent Other Majors | **-0.0056** | **-22.5** | **-0.0024** | **-6.2** | **-0.0015** | **-4.4** | **-0.0056** | **-22.8** | **-0.0032** | **-8.1** | **-0.0017** | **-4.9** |
| Percent Eng and Com Sci | **-0.0054** | **-16.3** | **-0.0018** | **-5.1** | **-0.0011** | **-3.5** | **-0.0054** | **-16.5** | **-0.0024** | **-6.4** | **-0.0014** | **-4.2** |
| Percent Psychology | **-0.0067** | **-15.2** | **-0.0032** | **-6.9** | **-0.0011** | **-2.4** | **-0.0067** | **-15.4** | **-0.0042** | **-8.8** | **-0.0013** | **-2.8** |
| Percent Social Sciences | **-0.0058** | **-19.2** | **-0.0021** | **-5.4** | **-0.0016** | **-4.3** | **-0.0058** | **-19.6** | **-0.0032** | **-8.0** | **-0.0016** | **-4.4** |
| Percent Female | **0.0002** | **3.2** | -0.0001 | -0.9 | **0.0004** | **3.8** | **0.0002** | **3.2** | 0.0000 | -0.3 | **0.0004** | **3.2** |
| Percent Asian | **0.0013** | **2.3** | **-0.0011** | **-2.6** | **-0.0008** | **-2.1** | **0.0014** | **2.6** | **-0.0023** | **-5.8** | **-0.0011** | **-2.9** |
| Percent Black | -0.0015 | -1.7 | **0.0021** | **3.3** | **0.0019** | **3.3** | -0.0015 | -1.7 | 0.0015 | 2.2 | **0.0017** | **2.8** |
| Percent Hispanic | 0.0003 | 0.3 | -0.0001 | -0.1 | 0.0000 | 0.0 | 0.0006 | 0.6 | 0.0008 | 1.0 | 0.0004 | 0.6 |
| Percent Other | -0.0009 | -1.0 | -0.0003 | -0.5 | -0.0007 | -1.2 | -0.0010 | -1.1 | -0.0011 | -1.6 | -0.0008 | -1.4 |
| Percent Temporary Resident | **0.0018** | **3.1** | **0.0009** | **2.0** | 0.0006 | 1.4 | **0.0017** | **3.0** | **0.0007** | **1.5** | 0.0006 | 1.5 |
| Math SAT Score / 10 | **0.0026** | **3.4** | **0.0032** | **6.1** | **0.0028** | **5.8** | **0.0026** | **3.3** | **0.0025** | **4.5** | **0.0027** | **5.6** |
| Verbal SAT Score / 10 | **0.0019** | **2.6** | **-0.0028** | **-5.2** | **-0.0030** | **-6.2** | **0.0019** | **2.7** | **-0.0021** | **-3.8** | **-0.0028** | **-5.7** |
| Percent on Grant Aid | 0.0003 | 1.0 | **-0.0008** | **-3.9** | **-0.0009** | **-5.0** | | | | | | |
| Median Family Income | 0.0000 | 1.2 | 0.0000 | 0.8 | 0.0000 | 1.6 | | | | | | |
| Self-Help Package | 0.0000 | -0.6 | 0.0000 | 0.9 | 0.0000 | 0.1 | | | | | | |
| Percent on Pell Grants | | | | | | | 0.0001 | 0.2 | 0.0001 | 0.3 | **-0.0010** | **-2.5** |
| Pell Grant Size | | | | | | | 0.0000 | -1.4 | **-0.0001** | **-5.1** | 0.0000 | 0.2 |
| Constant | **0.2380** | **4.0** | **0.2288** | **4.6** | **0.2260** | **4.9** | **0.3414** | **5.3** | **0.4449** | **8.6** | **0.2241** | **4.3** |
| Adjusted $R^2$ | 0.6177 | | 0.8376 | | 0.8705 | | 0.6192 | | 0.8195 | | 0.8656 | |
| N | 837 | | 837 | | 837 | | 837 | | 837 | | 837 | |

Notes: Numbers in parentheses are t-statistics. Bolded numbers represent a confidence level of 95% or higher.

## Appendix Table 1: Weighted Fixed Effects Regression Models – Log Odds Model

| | With Grant Aid | | | | | | With Pell Grants | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Time FE | | Inst. FE | | Time & Inst. FE | | Time FE | | Inst. FE | | Time & Inst. FE | |
| Percent Humanities | **-0.0453** | **-14.6** | **-0.0077** | **-1.9** | **-0.0117** | **-3.1** | **-0.0453** | **-14.8** | **-0.0218** | **-5.1** | **-0.0123** | **-3.2** |
| Percent Life Sciences | **-0.0395** | **-11.3** | **-0.0176** | **-4.4** | -0.0042 | -1.1 | **-0.0396** | **-11.4** | **-0.0272** | **-6.3** | -0.0060 | -1.6 |
| Percent Other Majors | **-0.0558** | **-21.0** | **-0.0165** | **-4.3** | **-0.0092** | **-2.6** | **-0.0562** | **-21.3** | **-0.0267** | **-6.5** | **-0.0106** | **-3.0** |
| Percent Eng and Com Sci | **-0.0520** | **-14.8** | **-0.0123** | **-3.4** | **-0.0066** | **-2.0** | **-0.0521** | **-15.0** | **-0.0188** | **-4.8** | **-0.0086** | **-2.5** |
| Percent Psychology | **-0.0612** | **-13.0** | **-0.0258** | **-5.4** | -0.0063 | -1.3 | **-0.0612** | **-13.1** | **-0.0384** | **-7.6** | -0.0084 | -1.8 |
| Percent Social Sciences | **-0.0616** | **-19.0** | **-0.0158** | **-4.0** | **-0.0113** | **-3.0** | **-0.0621** | **-19.4** | **-0.0296** | **-7.1** | -0.0120 | -3.2 |
| Percent Female | **0.0016** | **2.7** | **-0.0033** | **-3.0** | 0.0013 | 1.2 | **0.0015** | **2.6** | **-0.0024** | **-2.0** | 0.0008 | 0.7 |
| Percent Asian | **0.0179** | **3.0** | **-0.0094** | **-2.3** | -0.0070 | -1.8 | **0.0201** | **3.5** | **-0.0238** | **-5.8** | **-0.0083** | **-2.9** |
| Percent Black | **-0.0301** | **-3.2** | 0.0120 | 1.8 | 0.0108 | 1.8 | **-0.0288** | **-3.1** | 0.0047 | 0.7 | 0.0083 | 1.4 |
| Percent Hispanic | 0.0107 | 1.1 | 0.0011 | 0.2 | 0.0019 | 0.3 | 0.0137 | 1.4 | 0.0105 | 1.3 | 0.0049 | 0.7 |
| Percent Other | -0.0035 | -0.4 | -0.0019 | -0.3 | -0.0060 | -1.0 | -0.0048 | -0.5 | -0.0121 | -1.7 | -0.0070 | -1.2 |
| Percent Temporary Resident | 0.0082 | 1.3 | 0.0086 | 1.8 | 0.0051 | 1.8 | 0.0067 | 1.1 | 0.0052 | 1.0 | 0.0054 | 1.2 |
| Math SAT Score / 10 | **0.0370** | **4.5** | **0.0415** | **7.7** | **0.0379** | **7.6** | **0.0346** | **4.2** | **0.0326** | **5.7** | **0.0377** | **7.6** |
| Verbal SAT Score / 10 | **0.0359** | **4.7** | **-0.0144** | **-2.6** | **-0.0168** | **-3.3** | **0.0355** | **4.7** | -0.0064 | -1.1 | **-0.0151** | **-3.0** |
| Percent on Grant Aid | 0.0048 | 1.5 | **-0.0052** | **-2.5** | **-0.0063** | **-3.3** | | | | | | |
| Median Family Income | 0.0000 | 1.1 | 0.0000 | 1.0 | 0.0000 | 1.7 | | | | | | |
| Self-Help Package | 0.0000 | -1.0 | 0.0000 | 1.4 | 0.0000 | 0.5 | | | | | | |
| Percent on Pell Grants | | | | | | | -0.0011 | -0.2 | 0.0054 | 1.4 | **-0.0084** | **-2.1** |
| Pell Grant Size | | | | | | | -0.0002 | -1.0 | **-0.0007** | **-6.7** | 0.0000 | -0.2 |
| Constant | **-2.9124** | **-4.5** | **-3.1827** | **-6.2** | **-3.2131** | **-6.8** | **-1.7388** | -2.5 | -0.0774 | -0.1 | **-2.9016** | **-5.5** |
| Adjusted $R^2$ | 0.6359 | | 0.8583 | | 0.8849 | | 0.6358 | | 0.8424 | | 0.8830 | |
| N | 837 | | 837 | | 837 | | 837 | | 837 | | 837 | |

Notes: Numbers in parentheses are t-statistics. Bolded numbers represent a confidence level of 95% or higher.