

Financial Aid and College Graduation*

Anubhav Thakur

Department of Economics and International Business
Sam Houston State University
Huntsville, TX 77340
Email: axt076@shsu.edu

(This version: March 11, 2020)

Abstract: Using data for about 3,800 colleges and universities in the US, this paper examines the effects of financial aid on graduation rates. It estimates a linear regression model with graduation rates as the dependent variable and financial aid share (in educational cost) and percentage of students receiving Pell grant as the independent variables of interest along with control variables that reflect demographic and institutional characteristics. The results from the analysis indicate that financial aid in general and Pell grant in particular have significant negative impacts on on-time graduation (those who graduate within the expected time) rate. For extended-time graduation (those who take more than the expected time to graduate) rate, they have either no effect or marginally significant negative impact.

Keywords: Financial aid, Pell grant, graduation rate, extended-time graduation rate

JEL Classifications: I23, I28

* Prepared for the 2020 Undergraduate Research Symposium (URS) to be held at the Sam Houston State University on April 18th, 2020.

Financial Aid and College Graduation

1. Introduction

This paper examines the effects of financial aid on college graduation rates. In particular, using college level data for 3,798 colleges and universities across the United States, it investigates how financial aid affects graduation rates. According to estimates by the Congressional Budget Office (CBO) and the staff of the Joint Committee on Taxation (JCT), the federal government financed roughly \$100 billion in student loans and provided \$30 billion in need-based grants and \$30 billion in income tax preferences directly to students and their families in fiscal year 2017 (CBO, 2018). To see whether these funds are being used effectively and have the desired outcome is of interest to the policymakers as well as the taxpayers.

Although, the share of 25-34 year old with a post-secondary degree has grown from 39 percent in 2009 to 49 percent in 2018 in the United States (OECD, 2019), it is still short of the 60 percent goal set by the Obama administration. Currently, there are federally funded higher education institutions that do not graduate 90% of students (Martin, 2019). Martin shows that, despite public perception, the burden of failure to graduate does not fall on individual students. According to him, institutional choices drive graduation rate. One of the problems, as noted by researchers, is that federal policy has focused entirely on providing schools with access to these funds with no accountability metric. As such, experts in the field of higher education funding have suggested introducing an accountability metric that ties federal funding to graduation rate. After all, the effectiveness of these programs matter to the students as well as taxpayers. However, attention should be paid so that low resourced schools that serve the various

disadvantaged demographics are not punished for low performance (due to factors that need long-term fundamental interventions) by cutting their funding.

It is in this context that I would like to study the effectiveness of financial aid on college graduation rate. My maintained hypothesis for this study is that higher share of financial aid in total cost of education leads to a higher graduation rate. I further hypothesize that colleges and universities with a large share of students receiving Pell grant will have high graduation rate.

The rest of the paper is organized as follows. Section 2 presents a brief literature review. I discuss the methodology and data in Section 3. Section 4 presents the empirical results and their discussion. A summary and a few concluding remarks are included in Section 5.

2. Literature Review

There is a number of studies that examine the relationship between different forms of financial aid and academic performance and other educational outcomes (Dinarski 2000; Doyle et al.2009; Faulk et al 2012; Long 2004; Sjoquist and Winters 2015; van der Kauuw 2002). For example, the study by Henry and Rubenstein (2002) - based on the HOPE program in Georgia and a comparison with other southern states - shows that the students and families react positively when eligibility for aid is based on grades. It presents evidence to show that the HOPE program increases the incentive for lower income students to earn higher grades by increasing the marginal benefit for achieving a 3.0 or better GPA. Although the HOPE program is not specified just for lower income students, it did help the students from such background to further reduce the academic performance gap. Using self-reported institutional data, Cornwell et al. (2003) confirms that Georgia HOPE scholarship increased overall enrollment by about the same margin

(of 7.0 percentage points) as estimated by Dynarski (2000). Binder and Ganderton (2002) reports similar results from the New Mexico's lottery scholarship program. This study finds that enrollment in 4-year institutions increased as a result of implementing merit-based financial aid program. This increase was due to the fact that the program helped students move from 2-year institutions to 4-year institutions. These studies present evidence of the positive impact of merit-based financial aid on academic performance of students. It also shows how changing the eligibility of receiving financial aid can have a ripple effect on the students and their families. The evidence of positive impacts does suggest that merit-based financial aid can improve the quality of education. In contrast, there are studies (e.g. Henry et al. 2004) that show how merit scholarships made students less likely to graduate with their peers, who did not receive aid. Other studies further document the unintended consequences of merit-based aid program. Bradbury and Campbell (2003) find evidence of grade inflation by local school districts to increase students' eligibility for Georgia HOPE Scholarship. Long (2003) present's evidence of a hike in tuition costs by institutions in Georgia to capture more state dollars through these aids and scholarships.

There have been studies on the effect of reducing the financial support on scholastic performance. One such study by Belot (2007) on the Dutch reform to reduce the financial support to college education by the government. It was found that students below the age of 20 years (when they started their studies) improved on all performance indicators: switching, passing the first-year exam, percentage of completed courses, and grade point average. It suggests that the students are more sincere and well performing in school when they do not receive financial support from the government.

These studies based on specific financial aid programs and/or specific socioeconomic groups do not give a comprehensive picture how financial aid in general may affect the educational outcome in a society where government need prudent policies to build society's human capital for long-run growth. This is important because there are factors that may be at work in influencing student achievements. For example, those receiving merit-based financial aid (scholarships) would be incentivized to do well in their academic pursuits. In contrast, the students receiving loans or work-study grant may end up allocating their time in such a way that their academic performance suffers: they may allocate more time to their work rather than to studies. Furthermore, grants may create a moral hazard of students taking the government sponsored financial support for granted and not paying attention to their academics. Thus, the overall impact of financial aid is not clear a priori.

3. Data and Methodology

In this section, I discuss the data and methodology used for this study. I use an empirical approach to test the hypotheses that I stated in the introduction of the paper.

3.1 Data

The annual data on graduation rates are collected from *the Chronicles of Higher Education*. The dataset includes 3,798 degree-granting universities in the United States (excluding territories) that reported a first-time, full-time degree-seeking undergraduate cohort, had a total of at least 100 students at the undergraduate level in 2013, and awarded undergraduate degrees between 2011 and 2013. The graduation rates data is limited to tracking completions for groups of first-time, full-time degree-seeking students at the undergraduate level. The groups examined typically first entered college six years earlier at four-year institutions and three years earlier at

two-year institutions. Colleges report how many students completed their programs within 100 percent of normal time (we would call on-time graduation) and within 150 percent of normal time (we would call extended-time graduation). For students seeking a bachelor’s degree or equivalent, this corresponds with graduation within four years and six years, respectively. Average student aid is equal to the total amount of grants, loans, and scholarships awarded by the institution, divided by the number of recipients in 2013. Pell grant percentage corresponds to the total share of undergraduates receiving a Pell grant. Average completion cost corresponds to estimated educational spending (expenses related to instruction, research, public service, student services, academic support, institutional support, operations and maintenance) per academic award (both degrees and certificates) in 2013. This data source also provides information on race and gender. I calculate the percentage shares of white and female students for the purpose of my study.

Table 1 Summary Statistics

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
	(1)	(2)	(3)	(4)	(5)	(6)
On-time graduation rate	29.0	23.4	100	0	22.5	3506
Extended graduation rate	42.4	40.8	100	0	22.8	3506
Financial aid share)	15.1	12.5	364	0.1	13.0	3677
Pell Grant recipient share	47.6	44.7	100	0	20.1	3797
White students share for on-time graduation	36.1	33.3	100	0	22.5	1848
White students share for extended-time graduation	45.3	44.7	100	0	22.5	3269
Female students share for on-time graduation rate	36.1	33.3	100	0	23.6	1995
Female students share for extended graduation rate	44.0	43.6	100	0	23.4	3452

Note: All figures (except no. of observations in col. 6) are in percentages.

Source: Author’s calculations.

Table 1 presents the summary statistics of the variables we use for our empirical analysis. As the table indicates, on an average, only 29 percent of the students enrolled graduated on time (i.e. in four years). The ratio for the students who took 50 percent more time, i.e. six years, averages at 42.4 percent. Financial aid accounted for about 15 percent of total expenses for an average student. About 48 percent of the undergraduate students received Pell Grant. The on-time graduation rate was higher for white students than for the overall student population. Similarly, female students graduated on-time at a higher rate than did the overall student population.

3.2 Methodology

Financial aid (in the form of grants, loans, and scholarships) alleviates financial constraints students face while attending higher education institutions and help the recipients build their human capital that contributes to their lifetime productivity and earnings. Therefore, at the individual level, a student receiving financial aid is likely to be motivated and to have the incentive to succeed in his/her pursuit of collegiate education. Thus, I would expect that those who receive financial aid would do well in their studies and graduate on time.

In order to examine the effect of financial aid on the college graduation rate in the US, I estimate the following linear regression model:

$$GRATE_i = \beta_0 + \beta_1 AIDS SHARE_i + \beta_2 PELL_i + \beta_3 WHITE_i + \beta_4 FEM_i + \beta_5 PUB_i + \varepsilon_{i,t} \quad (1)$$

where $GRATE_i$ is the graduation rate as measured by the percentage of first-time, full-time, degree-seeking undergraduates who complete a degree or certificate program; β_0 is the constant term; $AIDS SHARE$ is the average financial aid as a percentage of average completion cost; $PELL$ is the percentage of undergraduates receiving a Pell Grant; $WHITE$ is the percentage of white students; FEM is the percentage of female students; PUB is a dummy variable that take a value of 1 if the

institution is public and 0 otherwise. and ε_{it} is the error term. $i = 1, 2, \dots, N$ indexes college/university. In this empirical model, *AIDSHARE* and *PELL* are the variables of interest and the rest on the right hand side are control variables. Under the hypothesis that I intend to test, I expect β_1 and β_2 to be positive and statistically significant. The country fixed effects control for the time-invariant country-specific factors that may be important for services trade. Per capita GDP captures the standard of living and population captures the size of the country.

4. Results

In this section, I will present and discuss the results from my regression analysis. I have generated two sets of results. The first set of results provides evidence on the effects of financial aid on on-time graduation. In contrast, the second set of results sheds lights on the impacts of financial aid on extended-time graduation.

Table 2 presents the regression results for those students who completed college within the expected time of 4 years. I estimate and report results for three specifications of the empirical model. Column (1) includes the estimated coefficients for the baseline specification in Equation (1). Since financial aid shares and Pell grant recipient shares may potentially be correlated, Column (2) & (3) include financial aid share and Pell grant share separately. As the results indicate, financial aid has a significant negative impact on the graduation rate. A one-percentage point increase in financial aid as a share of average expenses at completion leads to a 0.04 percentage point decrease in graduation rate. The percentage share of students receiving Pell grant also has a significant negative impact on the on-time graduation rate. A one-percentage point increase in the share of Pell grant recipient leads to a 0.03 percentage point decrease in on-

time graduation rate. In the alternative specifications reported in Column (2) & (3), the estimated coefficients for these two variables of interest are similar.

Table 2 Regression Results

Dependent variable: On-time graduation rate (percentage of first-time, full-time, degree-seeking undergraduates who complete a degree or certificate program within 100 percent of expected time)

Independent Variable	Baseline Model	Alternative Specification 1	Alternative Specification 2
	(1)	(2)	(3)
Constant	1.05 (0.65)	-0.83*** (0.22)	0.66 (0.63)
Financial aid share (<i>AIDSHARE</i>)	-0.04*** (0.01)	-0.04*** (0.01)	
Pell grant recipient share (<i>PELL</i>)	-0.03 *** (0.01)		-0.03*** (0.01)
White students share (<i>WHITE</i>)	0.51*** (0.04)	0.52*** (0.04)	0.52*** (0.04)
Female students share (<i>FEM</i>)	0.44*** (0.04)	0.46*** (0.04)	0.43*** (0.04)
Public Institution (<i>PUB</i>)	-1.15*** (0.18)	-0.86*** (0.17)	0.94*** (0.16)
Adjusted R^2	0.98	0.98	0.98
No. of observations	1768	1768	1810

Note: *** significant at the 1% level ** significant at the 5% level and * significant at the 10 % level. Heteroscedasticity robust standard errors are in parentheses.

Among the control variables, the share of students being white and the share of female students have significant positive impacts on the graduation rate. That is, institutions with higher percentages of white students as well as higher percentages of female students also have higher graduation rates. These results are consistent with existing literature. For example, a report on college graduation rates in 2009 shows that there are at least 80 colleges and universities in the U.S. where the black graduation rates is more than 25 percentage points lower than the rate for

white students. My results also indicate that the on-time graduation rate is 1.15 percentage point lower in public institutions than in private institutions. Furthermore, we estimate two different specifications of the model with one financial aid variable at a time (*AIDSHARE* or *PELL*) to see if a potential correlation between these two has driven my results. However, the results are remarkably robust. Finally, a value of 0.98 for the adjusted R-squared indicates that about 98 percent variations in on-time graduation rate are explained by the variables considered in our regression model.

Table 3 Regression Results

Dependent variable: Extended-time graduation rate (percentage of first-time, full-time, degree-seeking undergraduates who complete a degree or certificate program within 150 percent of expected time)

Independent Variable	Baseline Model	Alternative Specification 1	Alternative Specification 2
	(1)	(2)	(3)
Constant	-0.37 (0.37)	-1.07*** (0.24)	-0.37 (0.37)
Financial aid share (<i>AIDSHARE</i>)	0.01 (0.01)	0.005 (0.006)	
Pell grant recipient share (<i>PELL</i>)	-0.01** (0.00)		-0.01* (0.004)
White students share (<i>WHITE</i>)	0.42*** (0.03)	0.42*** (0.03)	0.43*** (0.03)
Female students share (<i>FEM</i>)	0.55*** (0.03)	0.55*** (0.03)	0.55*** (0.04)
Public Institution (<i>PUB</i>)	-0.01 (0.17)	-0.15 (0.16)	-0.02 (0.17)
Adjusted R ²	0.98	0.98	0.98
No. of observations	3148	3148	3248

Note: *** significant at the 1% level ** significant at the 5% level and * significant at the 10 % level. Heteroscedasticity robust standard errors are in parentheses.

I now estimate the model for extended-time graduation rate as the dependent variables. That is, we now examine the effects of financial aid on the graduation rates among students who take up to six years to complete the academic program. The most striking result is that the estimated coefficients for *AIDSHARE* are no longer significant while those for *PELL* are still negative but marginally significant. The effects of the demographic variables (race and gender) are still positive and statistically significant. There is no evidence of a significant difference in graduation rate between public and private institutions.

Overall, the results indicate that financial aid in general and Pell grant in particular have statistically significant negative effects on on-time graduation rate. However, there is little evidence of any significant effect of financial aid on extended-time graduation rate. Furthermore, the negative impact of Pell grant is only marginally significant. Thus, I do not find evidence in support of my maintained hypothesis. These results seem to indicate that the intuitively plausible negative impacts, as explained above, outweigh the positive impacts of financial aid.

5. Conclusions

Using data for 3,798 colleges and universities in the US, I examine the effects of financial aid on graduation rate. The results from the regression analysis indicate that financial aid in general and Pell grant in particular have significant negative impacts on on-time graduation rate. For extended-time graduation, they have either no effect or marginal negative impact. These results are important for policy-makers as they seem to indicate that we need to look at more specific aid programs and re-design the aid portfolio in such a way that different aid programs have the

desired results. Targeting specific demographic groups such as the female students may be more rewarding from the society's perspective.

I am proposing to extend my future research in three ways. First, instead of looking at total financial aid, I would like to examine the effects of merit-based financial aid, loans, grants, and work-study aid separately. Second, I would like to use more detailed student level data to investigate the effects of financial aid on student performance. Third, I would like to use more recent data to capture the effects of policy changes in recent years, particularly during the Obama administration.

References

- Belot, M. I., Canton, E. Webbink, D. "Does Reducing Student Support Affect Scholastic Performance? Evidence from a Dutch Reform." *Empirical Economics*, Volume 32, [Issue 2–3](#), 2007, pp 261–275
- Binder, M. & Ganderton, P. T. (2002). Musical chairs in higher education: Incentive effects of a merit-based state scholarship program. *Department of Economics, Working Papers Series*, University of New Mexico.
- Bradbury, J. C. & Campbell, N. D. (2003). Local lobbying for state grants: Evidence from Georgia's hope scholarship. *Public Finance Review*, 31(4), 367–391.
- Congressional Budget Office (CBO) (2018). Federal Aid for Postsecondary Students. Congress of the United States. Retrieved from <https://www.cbo.gov/system/files/2018-06/53736-postsecondarystudentaid.pdf> on March 10, 2020.
- Cornwell, C., Mustard, D. B., & Sridhar, D. J. (2003). The enrollment effects of merit-based financial aid: Evidence from Georgia's hope scholarship. *Working Paper*, University of Georgia.

- Dynarski, Susan. "Hope for Whom? Financial Aid for the Middle Class and Its Impact on College Attendance." *National Tax Journal*, vol. 53, no. 3, Sept. 2000, pp. 629–661.
- Doyle WR, Delaney JA, Naughton BA "Does Institutional Aid Compensate for or Comply with State Policy?" *Research in Higher Education*, vol. 50, no. 5, Aug. 2009, pp. 502–523.
- Faulk, Dagney, ArunK. Srinivasan, and Jon Bingham. "Sources of Funding and Academic Performance in Economics Principles Courses." *Journal of Economic Education*, vol. 43, no. 2, Mar. 2012, pp. 165–181.
- Henry, Gary T., and Ross Rubenstein. "Paying for Grades: Impact of Merit-Based Financial Aid on Educational Quality." *Journal of Policy Analysis & Management*, vol. 21, no. 1, Winter 2002, pp. 93–109.
- Henry, G. T., Rubenstein, R., & Bugler, D. T. (2004). Is HOPE enough? Impacts of receiving and losing merit-based financial aid. *Educational Policy*, 18(5), 686–709.
- Long, B. T. (2003). The impact of federal tax credits for higher education expenses. Technical Report 9553, *NBER Working Paper*, Cambridge, MA: National Bureau for Economic Research.
- Long, B.T. (2004) "How Do Financial Aid Policies Affect Colleges? The Institutional Impact of the Georgia HOPE Scholarship." *Journal of Human Resources*, vol. 39, no. 4., pp. 1045–1066.
- Martin, H. B. (2019). Higher Education Experts Debate Pros and Cons of Linking Federal Funding to Graduation Rates. *National Association of Student Financial Aid Administration (NASFAA) Brief*. Retrieved from https://www.nasfaa.org/news-item/20048/Higher_Education_Experts_Debate_Pro Pros_and_Cons_of_Linking_Federal_Funding_to_Graduation_Rates.
- OECD (2019). *Education at a Glance 2019: OECD Indicators*, OECD Publishing, Paris, <https://doi.org/10.1787/f8d7880d-en>

Sjoquist, David L., and John V. Winters. "State Merit-Based Financial Aid Programs and College Attainment." *Journal of Regional Science*, vol. 55, no. 3, June 2015, pp. 364–390.

U.S. Department of Education (2018) President's FY 2019 Budget Request for the U.S. Retrieved from <https://www2.ed.gov/about/overview/budget/budget19> on February 4, 2020.

Wilbert van der Klaauw. "Estimating the Effect of Financial Aid Offers on College Enrollment: A Regression-Discontinuity Approach." *International Economic Review*, vol. 43, no. 4, 2002, p. 1249.